

Assessing the quality of the food offered in Quebec healthcare facilities: tool's content development and face validity

ABSTRACT

Purpose: This study aimed 1) to develop the content of a tool assessing the quality of the food offered to inpatients/residents in healthcare facilities (short- and long-term care) of the province of Quebec and 2) to evaluate its face validity.

Methods: The tool's initial content was developed based on available literature and consultations with foodservice managers and registered dietitians. Face validity was evaluated using a Delphi method involving potential users – including foodservice managers and government partners – and experts in the field and consisting of two rounds, mainly focusing on the clarity and the relevance of questions.

Results: This study led to the development of a 72-questions tool divided in two parts. Part 1 addresses the characteristics of the healthcare facility and the menu (37 questions) and Part 2 measures the inpatient/resident's perception of the food offered with distinctive versions for short- (21 questions) and long-term care facilities (35 questions).

Conclusions: The development of a tool adapted to the Quebec context will enable a standardized evaluation of the quality of the food offered to inpatients/residents in healthcare facilities at a provincial level. This tool fulfills a gap identified in the literature and on the field during previous phases of the project.

INTRODUCTION

Foodservices in healthcare facilities often represent the sole source of food for inpatients and residents, playing an important role in their care [1]. Inadequate nutritional intakes contribute to malnutrition, which is highly prevalent in healthcare facilities [2-4] and associated with a higher risk of in-hospital mortality, a greater use of resources and increased costs [5, 6]. Therefore, foodservices in healthcare facilities must offer foods of quality, defined as “foods that are nutritious and safe, prepared or processed

in a people- and eco- friendly way, available in a wide variety and in appropriate amounts in diverse living environments.” [7] This definition also suggests that “foods must be acceptable to consumers, and therefore respect both individual preferences (*e.g.*, appearance, taste) and needs” [7]. The government of the province of Quebec is looking for a method to assess this quality to ensure alignment with nutritional needs, inpatient/resident well-being and overall quality of nutritional care.

Thus, this study is part of an initiative supported by Québec’s Ministry of Health, aimed to set the grounds of such an evaluation strategy. A variety of tools assessing the quality of the food offered in healthcare facilities have been published recently [7], all of which (n=77) were reviewed by our research team through a systematic review to identify those relevant for usage in the province. Most relevant tools (n=6) were submitted to potential users (*i.e.*, people who will use the tool or its results), who concluded that none of the tools presented corresponded to their needs. Briefly, existing tools were considered difficult to complete due to their length and complexity, and lacking information on the actual nutritional quality of foods. Moreover, most tools were not suitable for broad use, since they had been developed or adapted to address a specific research question or objective [8]. The aims of this study were to 1) develop the content of a new tool assessing the quality of the food offered to inpatients/residents in healthcare facilities in the province of Quebec and 2) evaluate its face validity in collaboration with its potential users.

METHODS

1. Content development

To allow an assessment of the quality of the food offered to inpatients/residents that considers both the objective and subjective quality [7, 8], the content was divided into two parts. The first part addressed objective components, including the characteristics of the facility and the food offered (Part 1). The second part assessed subjective components, measuring inpatient/resident’s perception of the food (Part 2). For Part 2, two versions were developed for adaptability for both short- and long-term care facilities.

Both versions share a set of core questions, with the long-term care version including additional items. The tool (hereafter referring to both parts in conjunction) aims to evaluate the food offered to inpatients and residents in their room or in the dining room, excluding foods in vending machines or from the cafeteria. The tool was developed for use in public hospitals, nursing homes and senior and alternative housing, excluding private healthcare facilities and rehabilitation centers, among others. The scope of the tool was determined in collaboration with the Ministry of Health, under whose mandate this study was conducted.

Questions from available tools assessing the quality of the food offered were pooled [7, 9, 10]. All questions were extracted from tools used in healthcare facilities [7, 9] or in primary schools [10]. The latter were included, although school foodservices may differ from healthcare foodservices, since both environments share important similarities, including a focus on user satisfaction, adherence to clear food policies and guidelines for the food offered as well as common operational challenges [11-13].

Domains were then identified and broken down into sub domains from the questions pooled, based on available literature and the research team's judgment. For example, sustainability was a domain including sub domains such as food waste and use of plant-based proteins.

The suggested categorization was evaluated by experts through individual interviews and online surveys to identify key domains. A convenience sample was recruited through the professional networks of the research team and collaborators, aiming to represent the Quebec context as best as possible. First, foodservice managers were questioned through individual semi-structured interviews using an interview guide exploring the foodservice's capacity to measure aspects related to the suggested domains/sub domains for Part 1 (interview guide available in Supplementary file 1). Data from these interviews were analyzed quantitatively and qualitatively through content analysis – the presence and frequency of

specific concepts were identified. Second, registered dietitians working in healthcare facilities were questioned through an online survey evaluating the relevance of all suggested domains/sub domains for Part 2 (online survey available in Supplementary file 2). Data from the online survey were pooled; domains and sub domains with higher scores were identified as key.

Each sub domain identified as key in the previous step was matched with the most adequate question from the pool of existing tools, based on its simplicity. In some cases, more than one question was selected to capture a sub domain, leading to a discrepancy between the number of sub domains and questions. Although questions from existing tools could adequately capture a sub domain, most were not perfectly adapted for use in healthcare facilities of Quebec (*e.g.*, context, wording, response choices). Therefore, when needed, questions were translated from English to French – the first language in the province of Quebec – by a bilingual research coordinator and/or adapted to current applicable dietary guidelines [9, 14, 15]. If no existing question could provide an adequate measure of a key sub domain, a new question was created. Both the creation and modification of questions were carried out by the research team, with an emphasis on the simplicity and clarity of wording of all questions, as well as a consistency in style across the tool.

2. Face validity of the tool's content

Face validity was evaluated by consulting experts through online questionnaires based on the Delphi method: participants respond anonymously to a sequence of questions over various rounds until a consensus is reached [16-18]. Two rounds were conducted using an online questionnaire on Microsoft Forms (Microsoft Corporation, 2016). Consensus was established at 80% of agreement, which is commonly used in the literature [16, 19-22].

Participants were foodservice managers, government partners and researchers in the field of food quality assessment in healthcare facilities. A diversity of regions in the province and of settings (*i.e.*, type of care provided) were considered. A convenience sample was recruited through the professional networks of the research team and its collaborators, aiming to represent the Quebec context as best as possible. All recruited participants took part in the first Delphi round. Participants had to evaluate all questions from Part 1, but were assigned to evaluate either the short-term or the long-term care version for Part 2. This allocation allowed participants to focus on questions relevant to their field of work (*e.g.*, the type of facility in which they worked) while ensuring that the largest portion of the tool was assessed by the widest range of participants. Participants in the first round were invited to participate in the second round, which was not mandatory, to evaluate both Part 1 and the same version of Part 2 as in the first round.

Face validity evaluation focused on the clarity and relevance of questions. Participants were asked, for each submitted question from the tool: 1) Is the question clear ? (Yes / No), 2) Is the question: Essential / Important / Complementary (in the assessment of the quality of the food offered in healthcare facilities)?, and 3) Open comments (optional).

Quantitative (multiple-choice questions) and qualitative (comments) data were extracted from the online form. Quantitative data were aggregated ; qualitative data were analyzed by two reviewers. Questions with less than 80% of “Yes” answers for clarity were modified based on participants’ comments. However, since participants provided numerous valuable insights, all comments were reviewed for potential modifications. As a result, questions were sometimes revised even when the 80% clarity threshold had been met. These modifications were applied to both versions of Part 2 when comments were issued for a question common to both versions. Questions below 80% of combined “Essential” and “Important” for relevance were removed. The median answer (“Important”) was combined to the “Essential” answer for all analyses.

The second round was conducted to consolidate changes. Based on feedback from responses provided, participants were asked whether they agreed or disagreed with the suggested modifications, removals or additions made to the originally submitted questions. Participants could provide written comments for each suggested change. The analyses conducted for the first round were repeated with data from the second round. As such, suggested changes that reached 80% of agreement were accepted. Alternatively, suggested modifications, additions or removals that did not meet this threshold were remodified, removed or retained, respectively. A final revision of the tool was conducted based on all data collected in the two-round Delphi process.

Data analysis

All data analysis were conducted using Microsoft Excel. This software was selected given the limited sample size and nature of the analyses performed.

Ethical considerations

This project was granted an exemption (#2023-079) from *Université Laval*'s ethics committee since only data regarding participants' professional practice were collected.

RESULTS

1. Content development

Figure 1 shows a flowchart of the content development process. A total 1 149 questions (n=266 for Part 1, n=883 for Part 2) were included in the pool of questions.

Questions for Part 1 were categorized into 7 domains: nutritional quality (13 sub domains), food safety (3 sub domains), sustainability (13 sub domains), accessibility (4 sub domains), quantity (3 sub domains),

variety (3 sub domains) and general (17 sub domains) [8]. Questions for Part 2 were categorized into 6 domains: food characteristics (11 sub domains), meal service (7 sub domains), eating environment (11 sub domains), meal context within the organization (9 sub domains), individual constraints (6 sub domains) and sociocultural aspects (8 sub domains).

Individual interviews with foodservice managers (n=6) were conducted in June 2022. Content analysis identified several recurring concepts across interviews. All participants reported limited time and human resources available in healthcare facilities as a potential challenge to conducting Part 1, highlighting the concept of feasibility. Foodservice managers also emphasized that the nutritional value of menus is already carefully monitored within their facilities, supported by the use of harmonized menus and regular reassessments of their nutritional value. In contrast, certain concepts, such as “cheat meals” or monitoring of phosphate additives, were mentioned by only a minority of participants and were therefore not retained in the development of Part 1. Based on these data, the overarching conclusion was that Part 1 should be a general questionnaire completed by foodservice managers to measure adherence to food-based guidelines rather than a detailed nutritional analysis of the menu and an exhaustive audit of the foodservice’s procedures. The online survey, completed by registered dietitians (n=8), was conducted in August 2022. Based on survey data, all domains and sub domains identified as key for Part 2 were drawn from the suggested domains and sub domains in Supplementary file 3.

Since some key domains or sub domains were covered by multiple questions from the pool, questions were selected to avoid redundancy. A total of 74 questions for Part 1 and 35 questions for Part 2 were selected to measure key domains and sub domains. Modifications of selected questions included translation, combination and/or adaptation to be affirmative rather than negative, to be less specific for applicability in both healthcare settings (short- and long-term), and/or to be aligned with current dietary guidelines [9, 14, 15]. Thirteen sub domains derived from 5 domains were not covered by existing

questions. Therefore, 27 original questions (n=24 for Part 1, n=3 for Part 2) were created by the research team to measure these sub domains. As some sub domains are assessed through multiple questions, the total number of questions exceeds the number of sub domains. The final iterative revision led to the removal of 61 questions (n=57 for Part 1, n=4 for Part 2). Questions were removed to limit the number of questions on a given subject or to avoid redundancy.

The selection, removal and merging of questions led to a two-part tool comprising 66 questions. Part 1, meant to be completed by a foodservice manager, included 37 questions divided in two sections: (a) characteristics of the facility and (b) characteristics of the food offered. Part 2, meant to be completed by inpatients/residents, included 19 questions common to both versions (short- and long-term care facilities) and 10 additional questions for the long-term care version. Two versions were created to better reflect the different healthcare settings. The short-term care version focuses on core aspects relevant to temporary stays, such as appreciation of the food's taste and texture. The long-term care version includes additional questions addressing elements more relevant to extended stays, such as the eating environment, which is essential for the mealtime experience – an aspect that is particularly important in living environments such as long-term care facilities.

2. Face validity of the tool's content

The face validity evaluation was completed through a two-round Delphi process during summer 2023.

A total of 23 participants were involved in the first round. Participants included 12 foodservice managers, 9 government partners and 2 researchers representing different professional groups, regions, organizations and positions (**Table 1**). Part 1 was evaluated by all participants. For Part 2, participants were divided into two groups: short-term care version (n=4) and long-term care version (n=19).

Some questions from Part 1 (n=6) and Part 2 (n=2) were below 80% of agreement for clarity (range: 70-78%). These questions were modified. Due to the numerous comments made by participants for questions deemed clear (*i.e.*, meeting the 80% agreement threshold), additional questions were modified for further clarity. As such, a total of 29 questions for Part 1 and 16 for Part 2 were modified, textually or structurally. A total of 15 questions was below the established threshold for relevance, with a range from 40 to 78% (vs. 80%). Of these, 4 were retained because they were considered key during previous phases of the project: food waste management, favorite/least favorite meal and strengths/weaknesses of meals. The other questions (n=11) were removed from the tool. To address other suggestions made by participants, 15 questions were added to the tool (*e.g.*, challenges encountered by the foodservice). These additions did not involve the creation of new domains or sub domains.

The second round was conducted with 16 participants (70% participation rate from the first round): 9 institutional foodservice actors, 5 government partners and 2 researchers in the field of food quality assessment in healthcare facilities. Part 1 was evaluated by all participants, while they were divided in two groups for Part 2: short-term care version (n=3) and long-term care version (n=12). One participant did not complete the online questionnaire for Part 2.

All suggested modifications exceeded 80% of agreement. As for the first round, participants' written comments were considered to further clarify questions, even if the threshold of agreement was met. This resulted in the modification of 48 questions. Of the 11 suggested removals from the first round, all exceeded 80% of agreement, confirming their withdraw from the tool. Out of the 15 added questions suggested from the previous round, 12 reached consensus and were kept in the tool. Consensus was not met for the other suggested additions (n=3; range: 42-67%), leading to the withdrawal of these questions. A question regarding meal cost was added to Part 1 following participants' suggestion. This line of questioning was suggested during the first round. However, given that Quebec's ministry of Health

already monitors meal cost annually, an evaluation of the question's relevance and feasibility was conducted during the second round. Consequently, this question was only added in the final version of the tool's content. This new question was included in an existing domain and related sub domain. Detailed results for each item added and removed for both rounds of the Delphi process are presented in Supplementary file 4.

Throughout the rounds, participants were also questioned on the appropriateness of the tool for Quebec healthcare facilities and the feasibility of its implementation. Regarding its suitability, changes were made in multiple-choice answers to correspond to the reality of foodservices in healthcare facilities (*e.g.*, production methods). Regarding feasibility, questions were considered easily answerable and the number of questions was considered appropriate (*i.e.*, not too time-consuming). **Figure 2** summarizes changes made to the tool's content.

The final tool included a maximum of 72 questions in two distinct parts: 1) Characteristics of the facility and the food offered (n= 37 questions), and 2) Inpatient/resident's perception of the food offered (n= 21 questions for short-term care; n=35 questions for long-term care, which included all 21 short-term care questions). Domains and sub domains included in each part are listed in **Table 2**. The full tool is available in Supplementary files 5-6-7.

DISCUSSION

One of the most important features of the tool is its global assessment approach, which distinguishes it from previously published tools. Since our aim is unprecedented, comparison with other studies is difficult. To our knowledge, only 5 published tools combine the characteristics of the facility and the food offered and the inpatients/residents' perception of the food [3, 23-26]. However, none of these tools

[3, 23-26] provided an overall assessment (*i.e.*, with all the domains included in this study) of the food offered. Moreover, only 1 published tool [27] is applicable to both short- and long-term care settings.

Part 1 of the tool assesses components related to objective aspects of the quality of the food offered, such as nutritional quality and sustainability. Very few published tools include the evaluation of the characteristics of the facility and the food offered, most tools favoring only an evaluation of the inpatients/residents' appreciation of the food. Even fewer tools go beyond the computation of nutritional value to evaluate the objective dimension of the quality of the food offered [7]. For example, a tool developed by Carrier *et al.* assesses limited foodservice characteristics, such as menu composition and food production system [28]. Nonetheless, the importance of considering the objective dimension of the quality of the food offered is supported by studies that have shown associations between foodservice practices and meal appreciation. For example, Carrier *et al.* showed that, in cognitively intact individuals in long-term care facilities, a longer menu cycle decreased the risk of malnutrition, and that the type of dishware influenced the risk of malnutrition, food waste and the perceived taste of foods and beverages [28]. Similarly, Amminudin *et al.* showed that patient satisfaction differed according to the type of foodservice and plating system [29]. Data from these studies support the inclusion of key sub domains measured in Part 1 of the tool developed in this study, namely production/distribution methods, length of menu cycle and type of dishes/cutlery used. Of note, the questions pertaining to menu sustainability included in the tool are limited and do not allow for a thorough evaluation of sustainability. Instead, selected questions were included to capture specific elements aligned with current guidelines for healthcare facilities and the current political and institutional contexts in Quebec [11, 30].

Part 2 measures the inpatients/residents' satisfaction in relation to their meals, which has been repeatedly evaluated in existing tools. Several of these tools assess food quality as perceived by inpatients/residents (*e.g.*, taste, temperature) and/or inpatients/residents' meal experience (*e.g.*, physical environment,

exercising choice), all of which were included in Part 2 of the developed tool [7]. However, sociocultural aspects are rarely addressed in existing tools, despite being an important determinant in the acceptance of meals/foods from users [7, 31, 32]. As such and given Quebec's multicultural population, the consideration of the preferences of various cultures in the assessment of inpatients/residents' satisfaction towards their meals was included in the developed tool [11].

To ensure that the tool was suitable for the assessment of the quality of the food offered in the healthcare facilities of Quebec, an evaluation of its face validity involving actors in the field was conducted. Face validity has rarely been used in the development and validation of tools assessing food quality in healthcare settings. To our knowledge, only Trinca *et al.* included an evaluation of face validity in the development of the *Hospital Food Experience Questionnaire* (HFEQ) [33]. Comparable to the present study, the validation of the HFEQ involved advisory groups who reviewed 1) a list of potential concepts to confirm the content to be assessed, and 2) the questions/responses, through several rounds [33]. The evaluation of face validity in this study ensures that our assessment tool will be appropriate for use in the targeted facilities, since people who will use it regularly were consulted. Initial content validation will allow for further validity tests such as construct validity [34-36] in future phases of this project.

Strengths of this study should be highlighted. First, the tool development was based on the broad definition of a high-quality food offer adapted for healthcare facilities suggested by Bélanger *et al.*, allowing an overall assessment of the quality of the food offered [7]. Second, many questions from existing tools compose the developed tool, which is a first for a tool assessing the quality of the food offered in healthcare facilities. Third, a collaborative approach involving potential users was applied throughout the development and validation processes, resulting in a tool that is relevant and aligned with real-world needs. The involvement of key actors throughout the process is likely to favor the tool's acceptance and possible adoption. Some limitations also need to be pointed out. Recruited participants

may not reflect the opinions of all potential users. For example, participants in this study were mainly from urban areas of Quebec. Hence, the tool provided in the Supplementary files could have differed if other, more diverse, participants had been involved. Face validity is often considered the weakest form of validity due to biases in its evaluation. However, the use of this form of validity testing was appropriate for this study, being in the first stages of development [37].

CONCLUSION AND RELEVANCE TO PRACTICE

This study led to the development and face validation of a 72-questions two-part tool assessing the quality of the food offered to inpatients/residents in healthcare facilities of the province of Quebec. Future phases of this project include field-tests, which will allow the evaluation of the tool's reliability and feasibility of implementation. Once fully validated, the tool will provide a standardized measure of the quality of the food offered at the provincial level. Registered dietitians can use the results from Part 1 (i.e., objective assessment) to identify nutritional gaps in the food offered, improve menu planning, guide staff training, and/or advocate for policy or operational changes to improve nutritional care. In addition, incorporating the results from Part 2 (i.e., subjective assessment) into the work of registered dietitians supports a patient-centered approach, placing patients at the heart of the meal experience, improving satisfaction, and ultimately leading to more adequate intake and better nutrition and health outcomes. This tool could be adapted for use in other Canadian provinces by tailoring its questions to province-specific dietary guidelines, healthcare policies, and cultural contexts. Further studies would be warranted to ensure its validity in those different contexts.

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Tables

Table 1. Characteristics of the participants – Evaluation of face validity (n=23)

Professional groups involved	n
Foodservice managers	12
Healthcare setting	
- Long-term care	8
- Short-term care	4
Administrative region	
- Capitale-Nationale	3
- Montréal	2
- Chaudière-Appalaches	1
- Bas-St-Laurent	1
- Outaouais	1
- Saguenay Lac-St-Jean	1
- Montérégie	1
- Lanaudière	1
- Estrie	1
Government partners	9
Organization	
- <i>Ministère de la Santé et des Services sociaux</i> (Provincial public health institution)	4
- <i>Centre intégré universitaire de santé et de services sociaux</i> (Regional public health institution)	2
- <i>Health Canada</i> (National public health institution)	1
	1
	1

- *Ministère de l'Agriculture, des Pêcheries et de l'Alimentation* (Provincial agriculture, fisheries and food institution)
- *Institut national de santé publique du Québec* (Provincial public health institution)

Researchers in the field of food quality assessment in healthcare facilities

2

Table 2. Domains and sub domains covered by the tool

Part 1 - Characteristics of the facility and the food offered	
Characteristics of the facility (n=16 questions)	
- Identification (region, type, size)	- Menu display
- Food production and distribution methods	- Quantity of meal options
- Meal planning (food policy, harmonized menu, cycle, revision, and modification)	- Financial aspect of the menu
	- Foodservice's challenges
Characteristics of the food offered	
Nutritional quality (n= 12 questions)	
- Frequency of foods offered from categories based on the 2019 CFG [14] (fruits and vegetable, whole grain foods, protein foods)	- Nutritional thresholds for nutrients of interest (sodium, carbohydrates, saturated fat, calcium, vitamin D)
- Nutritional quality of snacks	- Management of therapeutic diets
Accessibility (n = 1 question)	
- Snacks	
Sustainability (n= 8 questions)	
- Cultural inclusiveness	- Use of plant-based proteins
- Food products source (regional, provincial, national, seasonality)	- Waste management (cutlery, food scraps, food waste)
Part 2 – Inpatient/ resident ¹ perception of the food offered	
Inpatient/ resident 's characteristics	
- Age	- Specificity of diet (allergy, therapeutic diet, texture, aversion)
- Admission information	

Food characteristics – lunch and dinner (n=6 questions)

- Taste
- Appearance
- Temperature
- Variety
- Texture
- Overall satisfaction

Meal service (n=2 or 4 questions)

- Helpful staff
- Overall satisfaction
- **Courteous staff**
- **Staff engagement (accessibility)**

Eating environment (n=0 or 5 questions)

- **Atmosphere**
- **Positioning**
- **Cutlery**
- **Cleanliness**
- **Overall satisfaction**

Meal context within the organization (n=6 or 10 questions)

- Received as ordered
- Sufficient meal time
- Accessibility (beverage and snacks)
- Missed meal
- Menu choice
- **Menu information**

Sociocultural aspects (n=1 or 3 questions)

- Food preferences (cultural)
- **Pleasure of eating**
- **Familiarity of food**

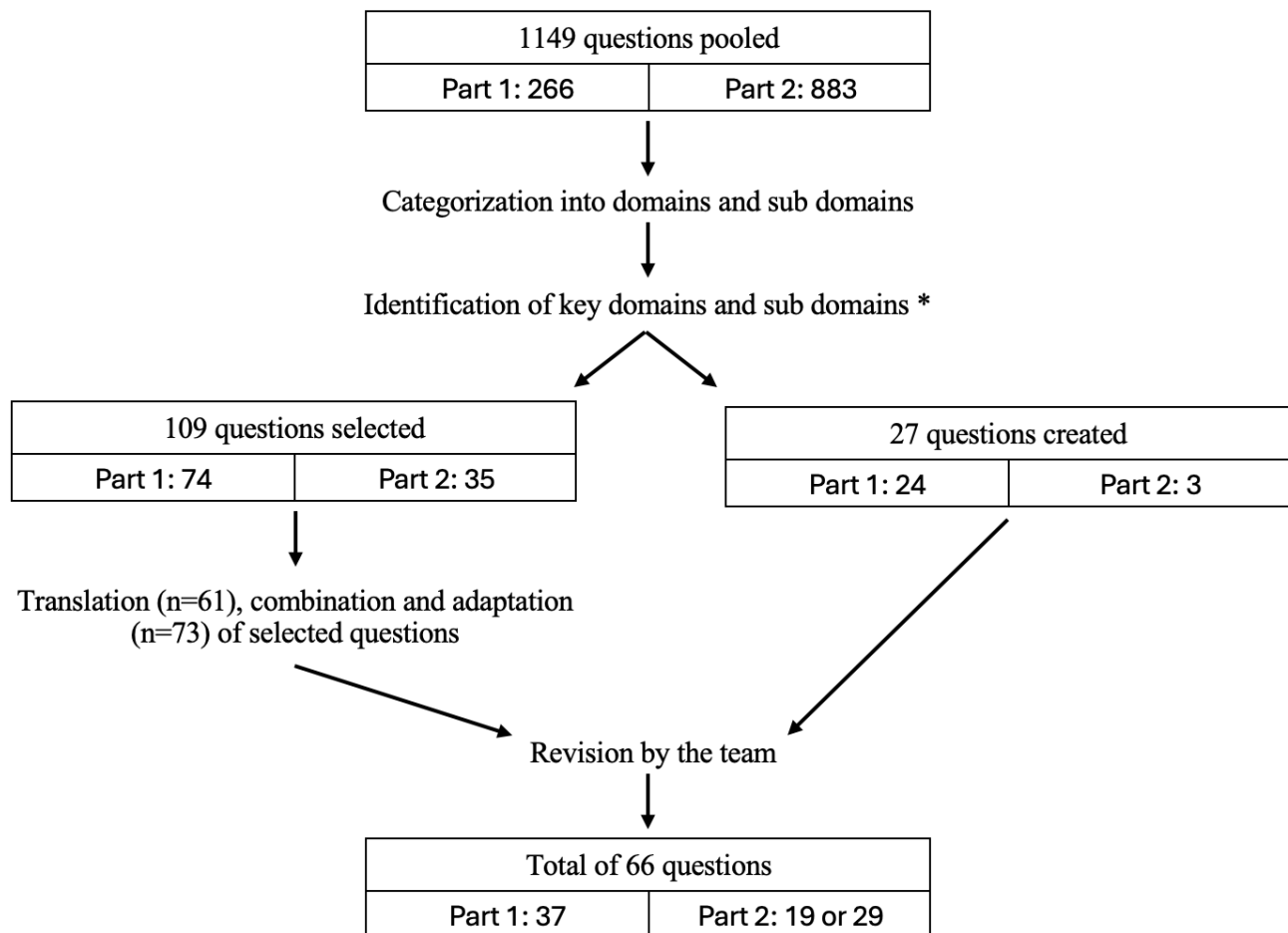
General (n=6 or 7 questions)

- Portion size
- Overall satisfaction (breakfast, snacks, meals, foodservice)

¹ Components in bold characters are exclusively in the long-term care version of Part 2

Figures

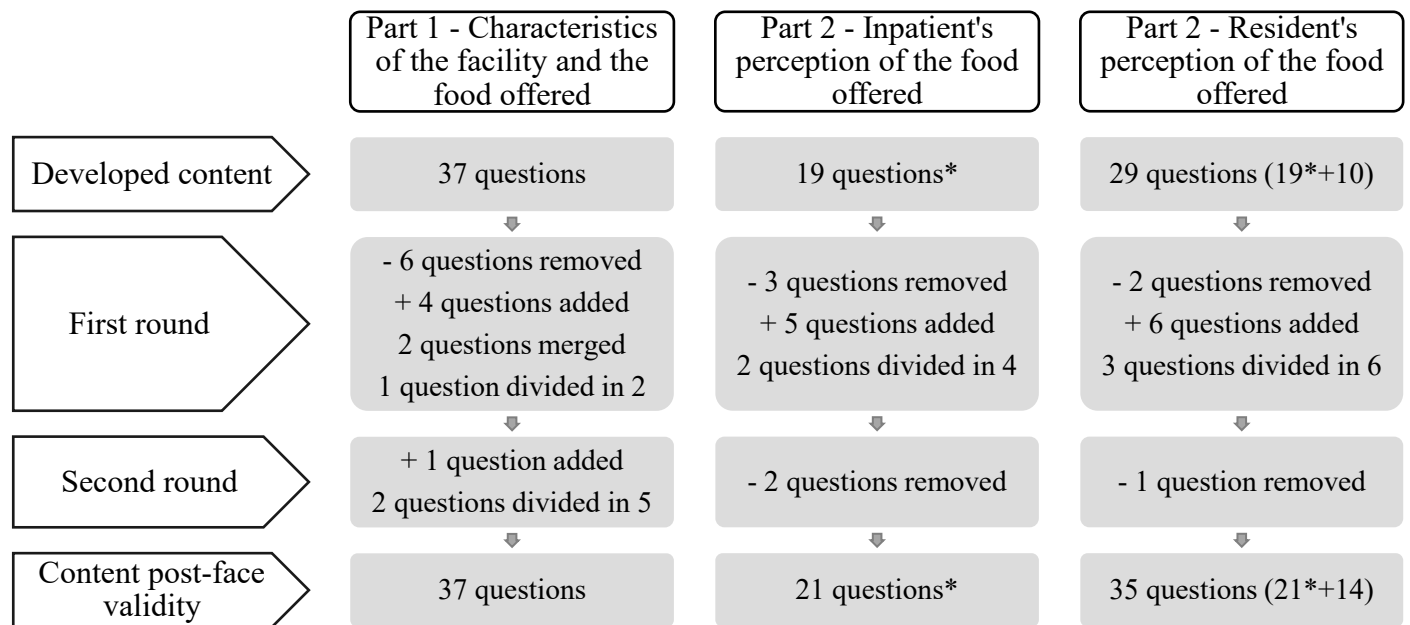
Figure 1. Stages of the content development process of a new tool assessing the quality of the food offered in healthcare facilities, illustrating changes in Part 1^a and Part 2^b of the tool and highlighting the integration of external input (*)



^a. Part 1 addressed objective components, including the characteristics of the facility and the food offered

^b. Part 2 addressed subjective components, measuring inpatient/resident's perception of the food offered

Figure 2. Changes made to the tool's content through out the Delphi process (2 rounds) with experts (n=23) to evaluate the face validity of the tool.



* Core questions common to both versions of Part 2.