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Station Ernährung
Vollwertige Verpflegung
in Krankenhäusern und Rehakliniken

DGE-Quality Standard for Meals in Clinics

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Vollwertige Verpflegung
in Krankenhäusern und Rehakliniken

DGE-Quality Standard for Meals in Clinics

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Message from the Federal Ministry of Food and Agriculture

Dear persons responsible for catering in clinics,

varied, well-balanced and delicious – this characterizes the perfect mass catering meal. This is especially true for hospitals and rehabilitation clinics. People who are ill or recovering from surgery particularly appreciate good meals. In many cases, food is also an important factor in supporting recovery. Additionally, the meals served here can serve as a positive influence, offering a model for post-hospitalization dietary habits.

Mass catering within hospitals and rehabilitation clinics presents considerable opportunities for environmental and climate protection. The production of food has effects on air, water, soil, climate, and animals. Opting for locally sourced, seasonal, and organic produce can yield a significant positive impact. The same applies to increased consumption of plant-based food. Furthermore, the implementation of efficient kitchen technology, thoughtful food preparation, and strategies to minimize food waste play crucial roles in climate and environmental conservation. Equally important is the adherence to minimum social standards in food production.

The German Federal Government's Food and Nutrition Strategy aims to achieve good nutrition for all people in Germany. We aim to improve the conditions to facilitate healthy and sustainable eating. Mass catering, and catering in clinics, is an important approach for reaching many people. Patients can learn by example how they are able to eat healthily and sustainably at home.

The Quality Standard of the German Nutrition Society (DGE) for Meals in Clinics shows what health-promoting and sustainable catering can look like. It was updated in 2023 and specified regarding sustainability to provide you with practical tips and further information.

Health-promoting and sustainable catering is an expression of appreciation towards patients and employees. But it is also a contribution to the careful use of our planet's limited resources. With your important efforts, you can ensure that the DGE-Quality Standard is applied in practice – for the benefit of people and the environment.

Kind regards

Yours

Federal Ministry of Food and Agriculture

Preface

Dear readers,

what we eat and how we eat it has an impact on our health. That is why catering plays a particularly important role in clinics. Many diseases are also caused by unhealthy diets. A good nutritional status and appropriate catering may help patients to get well faster.

Increasingly, it becomes clear that what we eat also has consequences for our environment, our climate, our society and animal welfare. Every year, over 18 million people receive meals during their stay in hospitals and rehabilitation clinics. This shows the great potential of clinic catering for sustainable action.

The “DGE-Quality Standard for Meals in Clinics” presents criteria that, structured along the catering processes in kitchens, promote both patient health and sustainability. The scientifically based recommendations of the German Nutrition Society for a wholesome diet form the basis for the criteria. Furthermore, “Beyond the plate” addresses aspects that contribute to proper catering beyond the kitchen. Supportive information on potential strategies for enhancing catering quality is offered and key aspects that can contribute to this improvement identified.

You can use the DGE-Quality Standard as a guideline to optimise your clinic’s catering offer. Serve your patients enjoyable, health-promoting and at the same time sustainable food and beverages. Show them that you care about their well-being and health. In the clinic cafeteria, your own staff will also benefit from such an offer. Satisfied patients and employees as well as your sustainable commitment to the well-being of the present and future generations are a flagship for your clinic.

The team of “Station Ernährung” provides support and information at www.station-ernaehrung.de and will gladly offer advice and assistance with any individual questions you may have.

Sincerely yours,

Dr. Kiran Virmani
Managing Director of the German Nutrition Society

1 Background, Goal and Design

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1.1 Clinic meals: An opportunity for more health and sustainability

During a clinic stay, catering serves to **provide** patients with food and beverages. What patients wish for is an enjoyable and varied offer with a choice of fresh components, as well as friendly service. Satisfaction with the meals contributes significantly to well-being and, together with the medical treatment, also influences the assessment of the clinic stay.

In clinics, the patients' health is the focus of all activities and the most important therapy goal. Nutrition and human health are directly related. Certain diets may contribute to the development of diseases. Likewise, diseases may require certain diets. In addition, a good nutritional status contributes significantly to a faster recovery from various diseases. However, when patients are admitted to a clinic, they are often malnourished or overnourished. Both *malnutrition* and *overweight*, especially *obesity*, have negative effects on the health status. The consequences of *malnutrition* range from impaired wound healing, higher complication rates, longer clinic stays to an increased risk of *morbidity* and *mortality*. *Obesity* is associated with an increased risk of developing several diet-related diseases, including type 2 diabetes, lipid metabolic disorders and cardiovascular diseases.

Promoting health is not only a medical but also a catering aspiration in clinics. In the context of **health promotion**, the entire range of clinic meals should be based on a whole foods diet (Vollkost) described in the "Manual of Nutritional Therapy in Patient Care" (LEKuP) and thus reflect a wholesome diet [1]. A health-promoting catering offer should contribute to an improved nutritional status and thus to the recovery process. Moreover, for some patients, the meals serve as specific **remedies** in the course of a nutritional therapy.

Meals in clinics are supposed to serve as **example** and guide patients in their diet after their stay. Recovery from an illness often results in a high level of motivation and willingness to reflect on and change previous dietary behaviour.

The fact that more than 18 million patients per year are treated in hospitals for an average of 1 week and in rehabilitation clinics for 3 weeks [2, 3] also shows the great potential of clinic catering to contribute to more **sustainability**. The responsible use of our planet's limited resources is related to the appreciation of food and the dishes prepared from it. Implementing the food choices recommended in this DGE-Quality Standard supports the goals of the Planetary Health Diet.

If health-promoting and sustainable catering is also offered to the clinic's employees, e.g., in a cafeteria or canteen, then catering also contributes to **workplace health promotion**.

Offering healthy and sustainable meals in clinics contribute to creating ***fair food environments***. *Food environments* are places where eating decisions are made. Every *food environment* affects nutrition behaviour: what we see (exposition), what we can access (access), what we choose (choice) and what we eat (consumption). Food environments are fair if, among other things, they enable patients to make healthy and sustainable choices, makes them easy and support them with an appropriate eating and drinking environment (see chapter 5).

1.2 Who is the DGE-Quality Standard addressed to?

The tasks of catering, such as planning, purchase and preparation, are primarily carried out by the kitchen staff. Other divisions of the clinic, like nursing, medicine, service and other therapy fields, as well as general management, also contribute to the success of good catering (see Figure 1). In addition to the provision of food and beverages by the kitchen, aspects beyond the kitchen also influence the catering quality (see chapter 5).

The DGE-Quality Standard addresses everyone who is in charge for catering in their respective divisions. In the following, these persons are referred to as **persons**

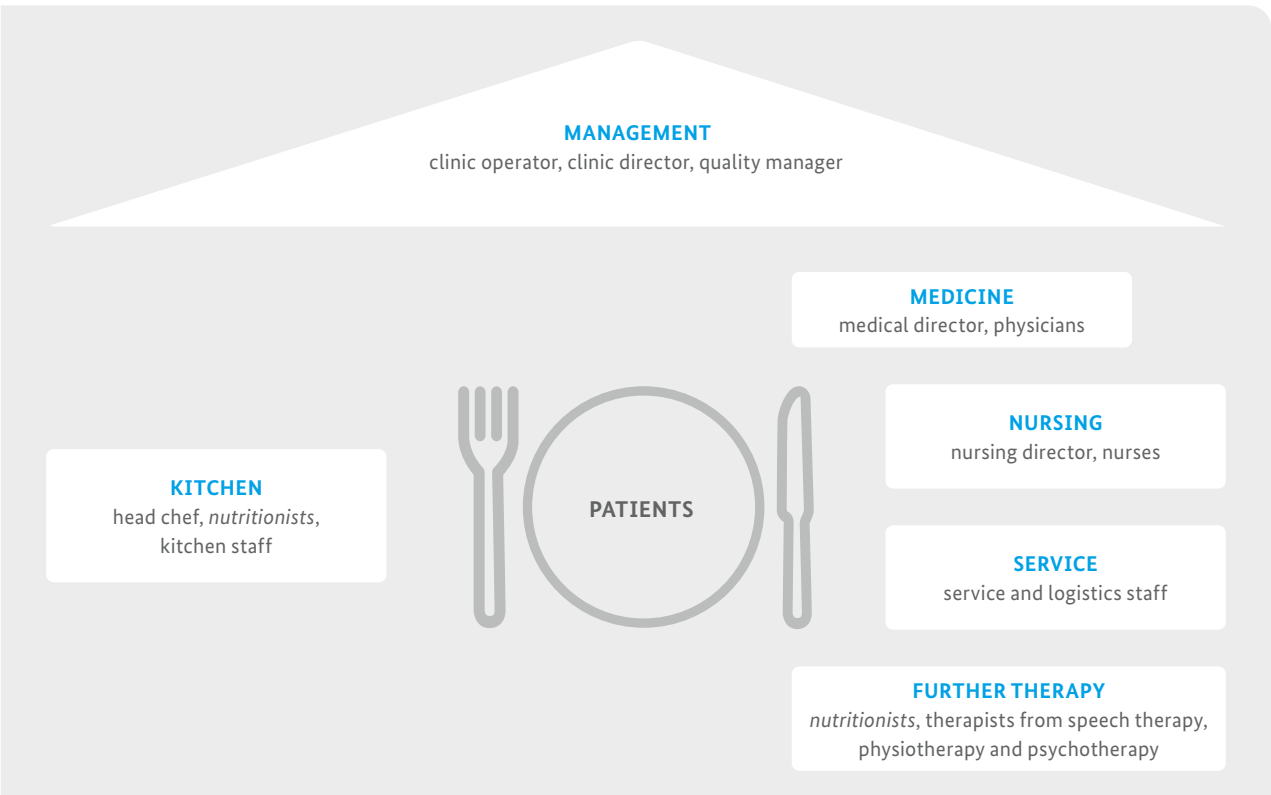

Figure 1: Divisions and staff involved in clinic catering

responsible for catering. These include managers of the kitchen/caterer, *nutritionists*, as well as employees of the clinic operator, clinic directors, employees in quality management, physicians, medical directors as well as directors of nursing, service and therapy.

The persons responsible for catering select and interpret contents and criteria of the DGE-Quality Standard for the staff in their division and consider the structural, personnel and financial conditions on site of their clinic. For this purpose, they transfer them into instructions for their employees and coordinate them with other divisions. Numerous additional information and implementation tools are available on the website **www.station-ernaehrung.de**.

1.3 What is the goal of the DGE-Quality Standard?

The DGE-Quality Standard supports persons responsible for catering in designing a health-promoting and sustainable meal offer in clinics so that patients may choose from a corresponding offer at mealtime.

Based on current scientific data, the DGE-Quality Standard specifies the **criteria** for optimal, health-promoting and sustainable catering. Each clinic may implement this Quality Standard step by step at its own pace. Every quality improvement of the catering results in healthier and more sustainable diets for the patients.

The majority of the criteria relates to the catering design (see chapter 4). Criteria are presented along the process chain with the 5 steps of **planning, purchase, preparation, serving** as well as **disposal** and **cleaning**. These kitchen process steps offer the potential to significantly influence the nutritional quality of food and beverages as well as to set the course for a sustainable diet.

However, good clinic catering is more than just offering health-promoting and sustainable dishes. Therefore, the DGE-Quality Standard also focuses on aspects beyond the kitchen. These aspects describe how patients may receive meals that are tailored to their special needs and requirements. Other aspects show how to create a pleasant eating and drinking environment in which patients are adequately supported. In addition, links to nutritional therapy and the transition at discharge are outlined (see chapter 5).

Additionally, to the catering aspects, persons responsible for catering are shown how to develop quality in clinic catering and which legal requirements must be observed.

Figure 2 shows different aspects that are considered in health-promoting and sustainable clinic catering and therefore addressed in the DGE-Quality Standard. The process chain plays a central role as a “pivotal point”.

1.4 How is the DGE-Quality Standard structured?

The DGE-Quality Standard includes 6 chapters with criteria and background information. Persons responsible for catering find answers to the following questions:

› How does the DGE-Quality Standard support persons responsible for catering on their efforts to improve the catering quality?
The role of the DGE-Quality Standard as an instrument of quality development and aspects that contribute significantly to more quality in clinic meals are explained in
↪ **chapter 2**.

› Which are the basic principles of the criteria for "designing health-promoting and sustainable meals"?
When talking about nutrition or catering, health and sustainability must be considered together. Underlying reasons and how the criteria described in chapter 4 are developed are discussed in
↪ **chapter 3**.

› How should a health-promoting and sustainable catering offer be designed?
Criteria for the catering design are described accordingly to the process chain in
↪ **chapter 4**.

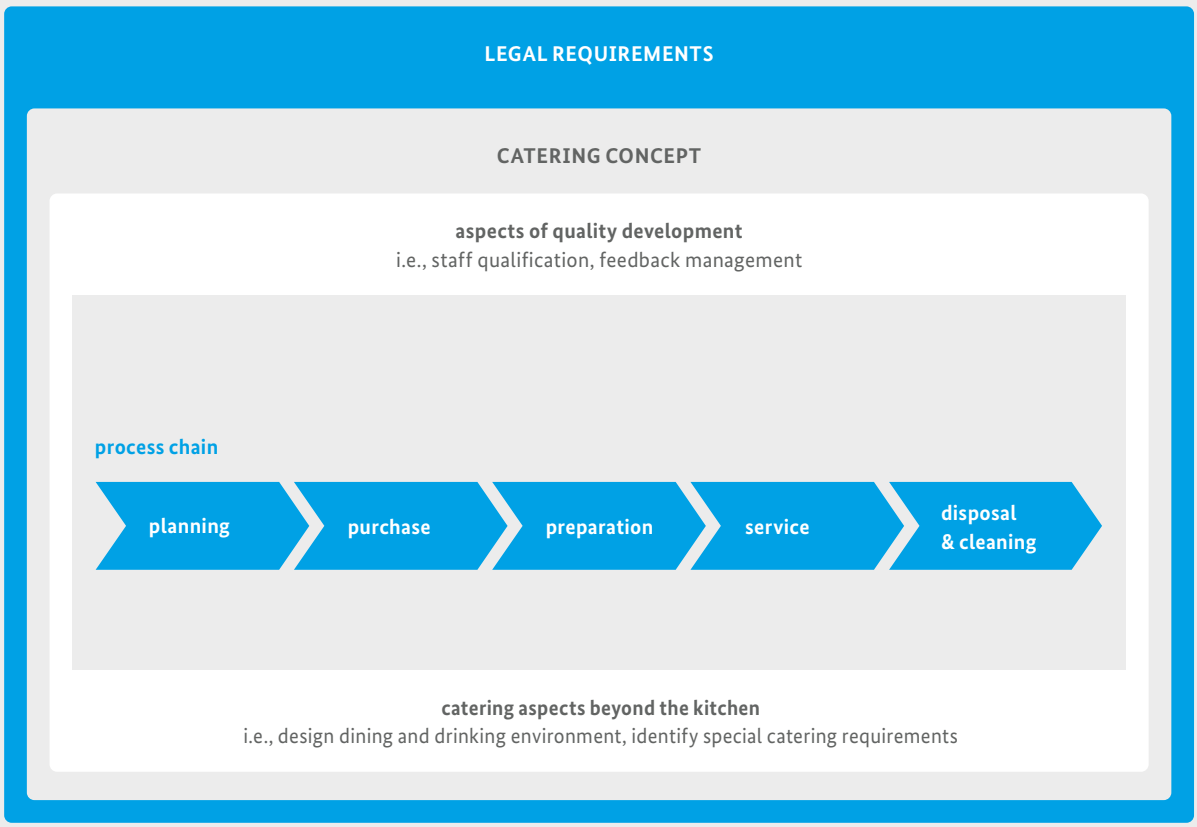

Figure 2: Aspects of health-promoting and sustainable clinic catering

› What additional aspects need to be addressed?
Aspects beyond the kitchen influencing the offer of sustainable and health-promoting food and beverages as well as the catering quality are described “beyond the plate” in
➥ **chapter 5**.

› What is legally required?
Anyone who produces and serves meals must observe legal regulations. An overview of the laws and legal requirements that apply to mass catering can be found in
➥ **chapter 6**.

1.5 What to keep in mind when reading?

› **Criteria** describing an optimal catering situation are listed and explained in text boxes with this symbol. The **checklist** starting on page 82 provides a criteria summary.

› Background information and advice on **sustainability** are marked with this symbol.

› This symbol additionally indicates **interesting facts**.

› This symbol highlights topics for which **further information** is available on the website www.station-ernaehrung.de in the category DGE-Quality Standard.

› **Italic** words or terms are technical terms that are defined in more detail in the **glossary**.

› The term **patient** is used synonymously for persons to be cared for in hospitals as well as in rehabilitation clinics.

› The term **clinic** includes both hospitals and rehabilitation clinics.

› When the text addresses **kitchens**, this term refers to kitchens in clinics as well as external kitchens, both in-house and externally operated. This applies synonymously to the employees in kitchens.

› Catering in the DGE-Quality Standard includes **oral nutrition** but not oral nutritional supplements like balanced powder supplements and ready-to-eat meals as well as enteral nutrition via tubes and parenteral nutrition. Corresponding information and recommendations are provided by the guidelines of the European Society for Clinical Nutrition and Metabolism (ESPEN) and the German Society for Nutritional Medicine (DGEM).

Further information:
www.station-ernaehrung.de
Keyword: Ernährungstherapie

2

Developing quality catering for clinics

This chapter explains what is defined as catering quality in the DGE-Quality Standard. It shows how those responsible may continuously develop the catering quality in clinics and thus improve their offer. In addition, aspects that contribute to and support this process are described. For all clinics and caterers that already realise the DGE-Quality Standard, it is also recommended to take a regular look at the current meals in order to identify possible deficiencies and initiate improvement strategies.

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2.1 Quality of clinic catering

Clinic catering according to the DGE-Quality Standard promotes the patients' health and is sustainable. Patients should be able to participate in clinic meals and their needs and wishes should be taken into account.

Thus, the criteria of the DGE-Quality Standard describe an ideal catering situation. Clinics may use them as orientation and benchmark for improving their catering service. Importantly, the persons responsible for catering should set priorities for criteria to be implemented first at their clinic.

DGE-Quality Standard as part of the clinic's individual catering concept

The development of a catering concept is an important first step. Each clinic should develop its own concept. It defines clinic-specific demands on the catering, describes the meals and diets offered as well as the service and reflects the structures on site. As part of such a catering concept, the DGE-Quality Standard defines the criteria for a health-promoting and sustainable diet and thus ensures that an appropriate offer is available for every meal. The question "Who is served where, when and how?" is therefore answered.

If the cafeteria is part of the catering concept for clinic employees, it may be based on the "DGE-Quality Standard for Meals in Companies, Public Authorities and Universities". Enjoyable and health-promoting meals for employees are a way of corporate health promotion to maintain performance and prevent illnesses. This way, the clinic directors express their appreciation for their employees and this may strengthen their loyalty to the clinic.

Information regarding Company Catering is available at: www.jobundfit.de

DGE-Quality Standard – a quality development instrument

Through quality development, the catering might become the clinic's flagship. The catering commissioner should initiate a joint development process towards health-promoting and sustainable clinic catering. **With the help of the criteria defined in the DGE-Quality Standard, all involved employees are able to improve the quality of clinic meals step-by-step together.**

Clinic catering always involves employees from several divisions (see Figure 1). In order to coordinate catering tasks, regular exchange through collaborative meetings and regular consultation is essential. This enables employees of different divisions to get to know the different perspectives and catering tasks, to ask questions and to address problems. This way, wishes, suggestions, specific expertise, and creativity can be expressed, and the patients' feedback from the feedback management may also be included. A common future-oriented *catering concept* may be developed and implemented together.

The collaborative, process-oriented quality development involves 5 steps that enable a continuous development towards health-promoting and sustainable meals. These are shown in Figure 3. The DGE-Quality Standard supports each of these steps.

ANALYSIS

In this step, the current catering situation – the **actual situation** – is examined. The catering, beginning with the presentation in the menu and ending with the dining atmosphere in the dining hall or the patient's room, as well as individual steps from planning to disposal and cleaning, are examined thoroughly. The checklist starting on page 82 helps to verify which criteria are already met by the clinic's catering and which are not.

Based on the analysis and description of the current catering situation, all those involved have the opportunity to discover which points are already implemented and what should and might be changed in the future. It is important that all those involved assess the situation and reflect on the conditions and structures prevalent at the clinic.

Checklist criteria on page 82 that have not been implemented in clinic catering so far may serve as **targets** for further quality development. It is recommended to prioritise and select those that could be implemented first. This way, it is possible to implement targets and the DGE-Quality Standard gradually. The partial implementation of a criterion is also an important positive progress. For instance: if the objective is to offer a meat dish at lunch a maximum of **3 times a week**, while currently it is offered **daily**, initially

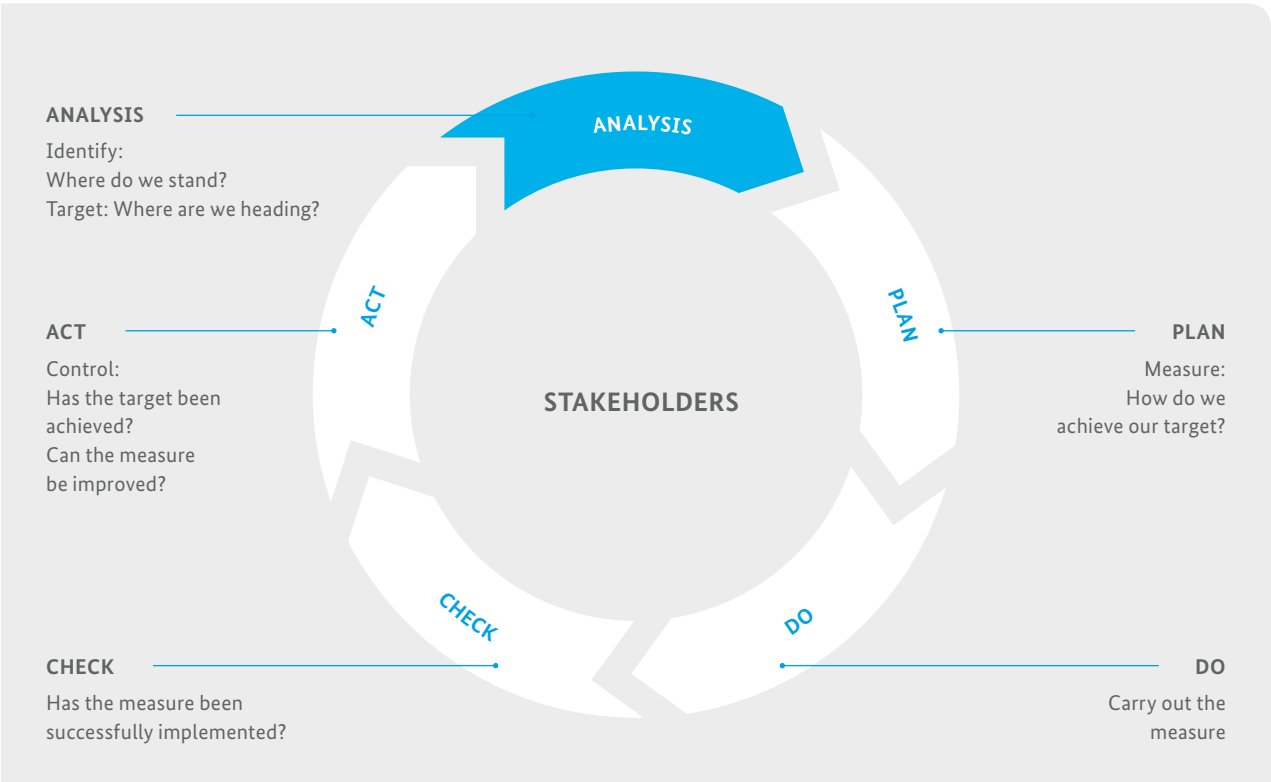


Figure 3: The 5 steps of collaborative, process-oriented quality development (PDCA-model, modified according to [4])

reducing meat to **5 times a week** counts as an important quality improvement.

PLAN
Once the targets are defined, specific measures to achieve them might be planned together. **Which** measures should be prioritised, **who** should implement them and **when**, and **with whom** should she/he work together? Therefore, it is helpful to prepare a plan describing the measures as precisely as possible. For example, measures may include changes in the food offer and in the preparation of dishes, or the remodelling of the dining room. Beforehand, all those involved should be thoroughly informed about the planned steps and the targets they are pursuing.

DO
Afterwards, the planned measures can be implemented. At the beginning of the new work process, structures, recipes or products are often unfamiliar for those involved. Therefore, the measures should be guided, and a contact person should be appointed for queries.

CHECK
Once the measures have been implemented, they are systematically reviewed and evaluated with all those involved. Could the measures be implemented as planned?

ACT
Has the chosen target been achieved? Are there possible improvements for the future implementation of the measures? Should other measures and targets be adapted?

These experiences form the basis for a joint strategic analysis of the entire catering situation. The collaborative, process-oriented quality development is thereby repeated. Hence, it is possible to implement targets step by step and to continuously improve meals in agreement with all those involved.

The following criteria apply:

- [ ] **A cross-divisional catering concept is in place.**
  The catering concept clarifies the understanding of catering and contains criteria for the implementation of a health-promoting and sustainable catering offer. A cross-divisional catering concept should be part of quality management.

- [ ] **All divisions are involved in quality development.**
  Networking and continuous exchange between all those involved in catering, such as the catering commissioner, persons responsible for catering in each division, aim to jointly improve the catering quality. Involving employees from all divisions right from the beginning ensures transparency in the quality development process and expresses appreciation towards the employees. This can significantly increase the motivation to cooperate as well as the understanding and acceptance of changes.

2.2 Interface Management

Health-promoting and sustainable clinic meals are a joint task in which several professions and groups of people participate (see Figure 1). Interfaces are points at which one person or a group of people completes their work process and passes the outcome to another. To ensure that the joint goal is achieved, it is advisable to:

- describe individual activities and work processes as precisely as possible (what, how, when, with what goal),
- define competences and responsibilities as well as rules for substitutes for the work processes (who),
- identify and regulate interfaces in work processes (who is responsible, who participates, to whom is information passed on).

Proper interface management improves the workflows, promotes communication and cooperation and ultimately saves time.

Examples for interfaces in clinic catering:

- Nurses or service staff record the patients' food and beverage wishes according to their diet. Kitchen staff prepares the food and beverages in accordance with these requests. Serving staff hands out the food and beverages to the patients.
- If necessary, nurses assist patients with their meals. If patients express praise or criticism, it is passed on to the kitchen. Nurses report possible irregularities in eating and drinking to physicians and *nutritionists* (see chapter 5.4.3).

Each clinic should have a catering commissioner for internal quality assurance and central coordination of the catering quality.

The catering commissioner:

- is the main contact person for catering,
- coordinates catering by encouraging communication and exchange between the respective responsible persons for catering in the different divisions,
- is responsible for the coordination and implementation of a joint cross-divisional catering concept,
- represents the interests of patients through the feedback management system,
- documents joint decisions on catering processes as operating procedures within the scope of quality management, thus making them transparent and ensuring smooth processes at the interfaces as well as
- continuously stimulates quality development.

The following criterion applies:

☐ **A catering commissioner exists.**
The large number of people responsible for catering in different divisions requires central coordination. Catering commissioners are supported by the DGE-Quality Standard and via information at www.station-ernaehrung.de

2.3 Staff qualification

In order to provide health-promoting and sustainable meals, employees with different professional qualifications, each with their own input, are required. Since the DGE-Quality Standard focuses on the "design of the meals", recommendations for the professional qualifications of the catering management as well as kitchen, serving and customer service staff and the *nutritionists* are given below. The job profiles differ depending on the field of responsibility:

Catering Management
The catering management requires a specific professional qualification. This includes professions and qualifications like:

- (operations) manager of home economics,
- home economist,
- chef,
- cook,
- *nutritionist* or dietician, if necessary, with additional business qualification as well as
- food service business economist.

Preparation and serving of meals

Staff skills and knowledge help to ensure consistent catering quality. Kitchen and service/distribution staff should therefore preferably have adequate vocational training. However, kitchen and service staff may also be employed without such qualifications, as long as they are instructed by qualified staff.

Employees who serve food contribute significantly to the meal's acceptance through their appearance and their communication. They should be able to provide information about the offered meals, their composition and allergens, name individual components and point out the health-promoting and sustainable choice to patients. A friendly manner, communicative skills, a good comprehension as well as flexibility, empathy and willingness to help are therefore crucial.

Nutritionists are in charge of **meals according to diets with medical indications**. Different persons may prepare them: chefs with the additional qualification "Dietetically trained Chef/DGE", "Dietetically trained Specialist/DGE" or "Certified Dietary Chef" (IHK), if the preparation follows standardised recipes with instructions and is planned and instructed by a *nutritionist*.

Further education and professional advanced training promote the staffs' competence, update the knowledge and give confidence in the daily work. The person responsible für catering should regularly attend training courses in the divisions of nutrition and sustainability in order to put new insights into practice. Topics that are suitable for all catering staff are, e.g.:

- basics of a health-promoting and more sustainable diet,
- offering diets,
- basic knowledge of ways to avoid food waste,
- preparation of creative vegetarian/vegan recipes,
- ways to implement and increase the percentage of organically grown food in mass catering, as well as organic certification,

- regeneration of “Cook & Chill” or “Cook & Freeze” dishes/components,
- allergen management and labelling,
- feedback management as well as
- communication and interaction with the catered people and a respectful attitude towards them

Further information:
www.station-ernaehrung.de
Keyword: Fortbildungsangebote

Mass catering staff carries a high responsibility regarding food hygiene. Regular instruction, e.g., on the Infection Protection Act, is obligatory for all employees who work with food (see chapter 6).

The following criteria apply for staff:

- ☐ **A *nutritionist* is available for special questions about nutrition and nutritional therapy.**
  A *nutritionist* should be available to discuss meals with patients and answer questions, especially in the case of diets that severely restrict the choice of food due to medical indications or where nutrition-specific expertise is required in the composition of the meal (e.g., diet for oncological diseases). In this way, even within the limits of the diet, the patients’ individual wishes may be incorporated into the selection of meals.

- ☐ **Employees know the meal requirements of the individual patients.**
  Employees who receive meal requests and serve meals at the buffet, on the buffet trolley or on trays should be informed about the patients’ diets and know the respective catering principles.

- ☐ **Catering staff receive continuous training.**
  Staff skills and knowledge help to ensure consistent catering quality.

- ☐ **Ergonomic workplaces and workflows are in place.**
  This includes, for example, back-friendly working heights, heat and noise protection as well as variety in tasks. Ergonomic workplaces and work processes maintain health, performance and satisfaction of employees.

- ☐ **Employees are valued.**
  Appreciation promotes satisfaction and motivation. Valuing employees is expressed through fair payment, open and objective communication and constructive interaction with each other.

2.4 Feedback Management

Dealing professionally with praise and criticism – feedback management – contributes to the evaluation of measures and to set targets in a joint quality development. It is important that praise and recognition as well as wishes, complaints and suggestions may be voiced by all involved. Nevertheless, in mass catering it is certainly not possible to satisfy every wish of the patients, and all involved. Therefore, it is even more important to listen to all involved and to discuss wishes and possibilities in a constructive way, as well as to develop realistic solutions. This increases mutual understanding and the willingness to reach a consensus. Feedback management means also a continuous process that includes the following steps:

Step 1
Receive praise and criticism
Feedback on meals is often unrequested and always an opportunity to improve the offer. Moreover, feedback should also be actively asked for at regular intervals. It is important to have the opportunity both to report appreciation and praise as well as to criticise and give suggestions for improvement in order to optimise processes. Often no negative feedback is equated with praise. Thereby, an opportunity to motivate employees is missed. Appreciation and praise may mean a lot, lack of praise can be frustrating. Possible ways are the personal dialogue in the patient's room, in the dining room or by telephone, as well as written or digital feedback, for example as questionnaires and/or post boxes. In addition to praise and criticism, the reasons behind them and specific suggestions for improvement should also be asked for. Patients appreciate the opportunity to personally influence the offered meals.

Step 2
Document and evaluate feedback
All feedback should be systematically documented and evaluated. If necessary, interventions for improvement are planned together with those involved. Praise is passed on to the addressed catering staff members.

Step 3
Implement interventions and inform about them
Adopted measures in response to the feedback and achieved results should be subsequently made visible to all. The employees are proud of their efforts and feel that their work is valued.

The following criteria apply for the feedback management:

- ☐ **Suggestions regarding the meals and dishes on offer are received and passed on.**
  Patients should be given the opportunity to express their wishes and criticism about the meals. This feedback provides helpful suggestions for designing the catering to meet needs as far as possible and thus ensures good acceptance.

- ☐ **Satisfaction with the meals on offer is regularly assessed.**
  This may be done, for example, by distributing questionnaires or by setting up a mailbox for feedback.

2.5 External quality control

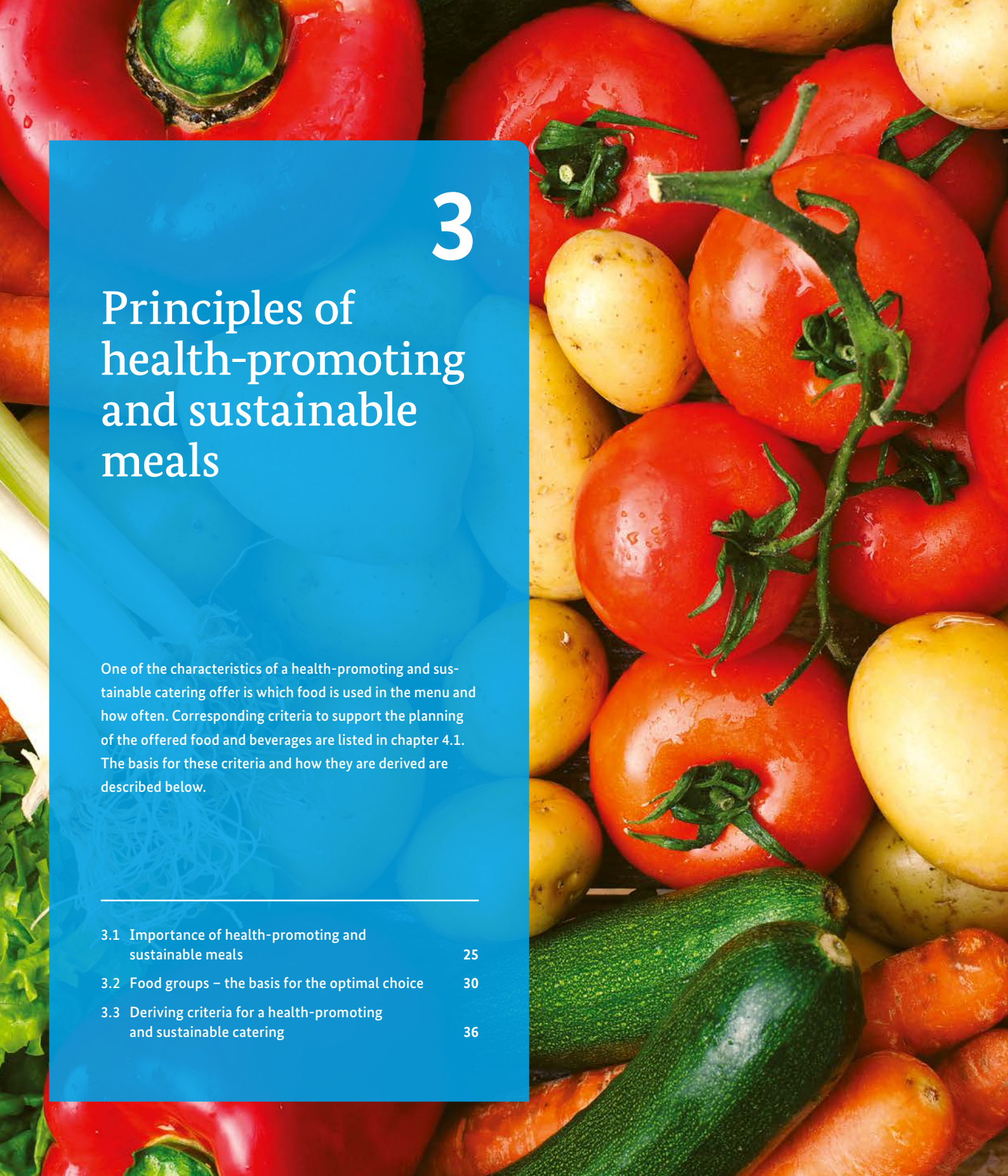
Whether the offered meals meet the set goals may be verified in an independent quality control. Usually, this is carried out by an external institution on the basis of different audit systems and audit criteria. In this way, persons responsible for catering ensure the quality of the offer and are able to demonstrate the performance publicly with an external seal of approval.

Further information:
www.station-ernaehrung.de
Keyword: Externe Qualitätsüberprüfung

2.6 Specification for tenders

When the clinic's catering is not organised and prepared by its own staff and the catering is outsourced, a specification must be established within the context of public tenders. This serves as the basis for the tender process and defines the type and scope of the catering service. For the compilation of a specification, the DGE-Quality Standard may serve as a reference. The more detailed the requirements like preparation methods, serving system or the use of qualified staff, the easier it is to compare different offers. It is not recommended to demand the implementation of the DGE-Quality Standard in general, but to describe in detail which of the individual criteria have to be fulfilled. The specification is fundamental for the contract between the contracting authority (e.g., clinic/sponsor) and the contractor (e.g., caterer). It is recommended to write the specification supported by external professionals who might also assist in the tender process.

Further information:
www.station-ernaehrung.de
Keywords: Ausschreibung und Vergabe
and Beratung und Coaching



3

Principles of health-promoting and sustainable meals

One of the characteristics of a health-promoting and sustainable catering offer is which food is used in the menu and how often. Corresponding criteria to support the planning of the offered food and beverages are listed in chapter 4.1. The basis for these criteria and how they are derived are described below.

3.1 Importance of health-promoting and sustainable meals 25

3.2 Food groups – the basis for the optimal choice 30

3.3 Deriving criteria for a health-promoting and sustainable catering 36

3.1 Importance of health-promoting and sustainable meals

We affect our health, quality of life, and well-being through what we eat and drink. A wholesome diet according to the recommendations of the German Nutrition Society (DGE) provides an adequate amount of energy and sufficient fluids. This diet ensures a balanced supply of the energy-supplying nutrients fat, carbohydrates and protein. Nutrients like vitamins, minerals, dietary fibre and phytochemicals are also contained in sufficient quantities. As a result, both *malnutrition* and overeating might be prevented. A wholesome diet also makes a decisive contribution to the prevention of diet-related diseases such as *obesity*, type 2 diabetes and cardiovascular disease. The wholesome diet is diverse and highlights the consumption of vegetal food [5–7].

However, eating and drinking is more than just the intake of energy and nutrients. How we eat affects not only our own well-being, but also the well-being of present and future generations. The so-called Brundtland Report already characterised "sustainability" in 1987 as a development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" [8], p. 43. In 2015, the United Nations adopted the UN 2030 Agenda, with 17 Sustainable Development Goals (SDGs).

The EAT-Lancet Commission Report [9], published in 2019, uses a global reference diet (Planetary Health Diet) to show the supply for a future world population of 10 billion people in 2050 while respecting planetary boundaries. This could prevent around 11 million cases of early death worldwide each year due to *malnutrition*. In a strict sense, the Planetary Health Diet is not a nutritional recommendation; it merely provides a framework for orientation. It is, therefore, necessary to realize country-specific adaptions of the food choices and quantities, as well as the locally available resources [9, 10]. The food-based dietary guidelines for Germany are issued by the DGE. In this DGE-Quality Standard, these are transferred to mass catering (see chapters 3.3 and 4) and are largely consistent with the statements of the Planetary Health Diet [11].

Further information:
www.station-ernaehrung.de
Keyword: Planetary Health Diet

Based on different definitions of sustainable nutrition [12–15] the Scientific Advisory Board on Agricultural Policy, Food and Consumer Health Protection (WBAE) [16] has formulated 4 central goal dimensions – health, environment, *social aspects*, animal welfare – for a more sustainable diet, which are explained in Figure 4. The DGE aligns its activities with these 4 goal dimensions, as set out in the "DGE position statement on a more sustainable diet" [17]. Accordingly, this DGE-Quality Standard follows these principles and thus helps to create *fair food environments* in clinic catering.

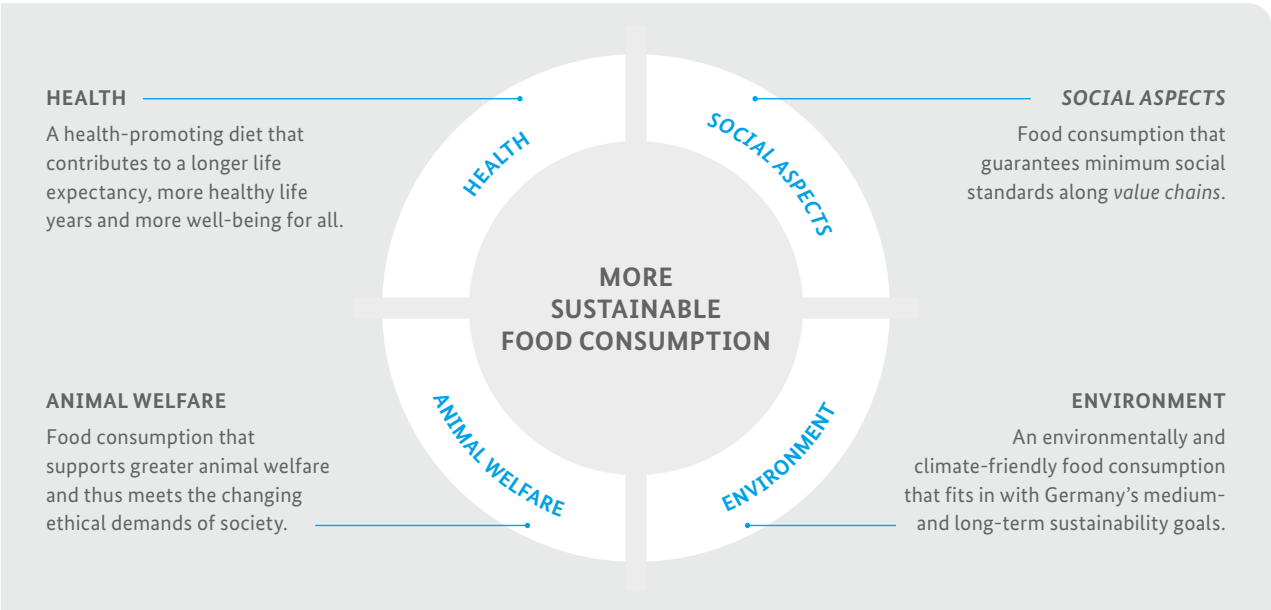


Figure 4: Goal dimensions of a more sustainable food consumption [16]

Many foods we consume cause a significant "footprint" in terms of environment, climate, *social aspects* and animal welfare [16]. Increasingly, our food is produced in complex and global **value chains**. The food value chain covers the input factors for agriculture, the agricultural production, up to processing, trade, and consumption. Aspects of sustainability, like environmental impact, can be tracked along these chains (see Figure 5). Therefore, the **entire life cycle of a product** must be considered in the evaluation of food.

The carbon footprint is one indicator of the environmental impact of food. It quantifies the amount of *greenhouse gas emissions* generated along the food value chain. It therefore represents its climate impact. In view of the limited availability of certain resources and the loss of biodiversity, other ecological footprints of food production, such as water, land, or biodiversity footprints, are also increasingly being considered [18, 19].

1/3 of the worldwide *greenhouse gas emissions* are caused by the food system [20]. Food production generates emissions of greenhouse gases like carbon dioxide (CO_2), methane (CH_4) or nitrous oxide (N_2O), e.g., through tractors or harvesting machines, fertiliser for the fields, heated greenhouses, and animal stables as well as by the animals themselves, food industry, through cooling or freezing food, its transport and ultimately the preparation of meals. In addition to *greenhouse gas emissions*, intensive agriculture has numerous other impacts on the environment and, as an open system, affects soil, water, animals, and plants. For example, intensive tillage can increase the risk of

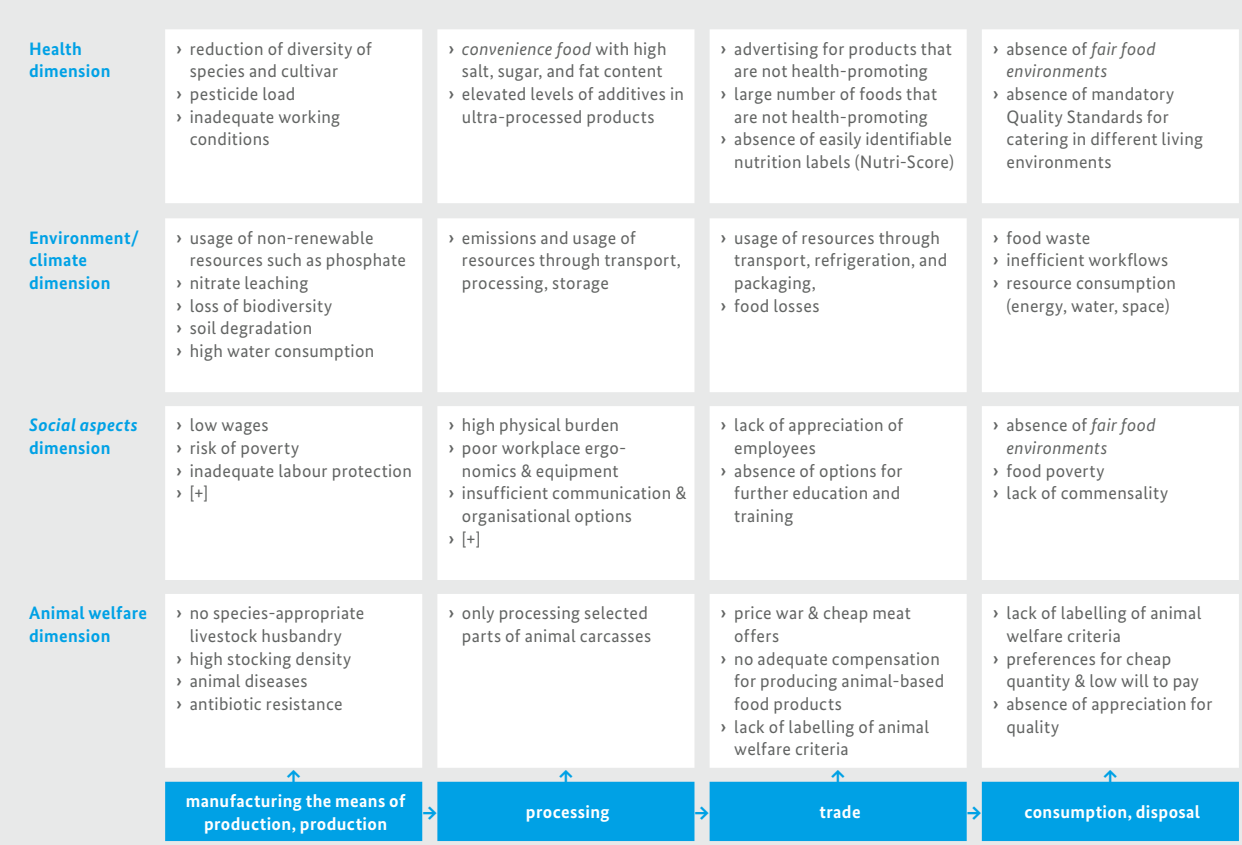


Figure 5: Examples of potential problem areas across the 4 goal dimensions of more sustainable nutrition and the value chain; modified according to [17]

erosion, lead to soil compactness and may cause the loss of soil fertility in the long term [21]. Intensive animal husbandry partly carries the risk of resistance due to the excessive use of antibiotics [22]. The application of fertilisers and pesticides significantly affects the biodiversity of plants and animals [23], and intensive nitrogen fertilisation is responsible for water contamination with nitrate [24].

Therefore, it is not sufficient to adjust nutrition and clinic catering to aspects of health promotion only. Rather, it is essential to design diets and catering options in a way to minimizes the impact on the climate and the environment and consider the other goals of a more sustainable diet, such as animal welfare and *social aspects*.

According to calculations of the project "KEEKS – Climate-friendly School Kitchens", it is possible to save approximately 40 % of *greenhouse gas emission* in school kitchens [25]. According to the data, about 3/4 of the *greenhouse gas emissions* in school catering are caused by food selection. Around 1/4 of the greenhouse gases are caused by kitchen technology, preparation, and food waste. Comparable dimensions for clinics were confirmed in the NAHGAST project [26].

The production of animal-based food like meat, eggs, milk, and dairy products (especially those derived from ruminants like cattle, sheep, and goats) causes particularly high *greenhouse gas emissions*. In contrast, the share of vegetal food like grains, vegetables and fruits in *greenhouse gas emissions* is usually much lower. Generally, there are also differences within a food group. For example: Tomatoes from Germany grown in greenhouses heated with fossil fuels in winter cause 10 times higher *greenhouse gas emissions* than *seasonally* harvested German tomatoes from unheated greenhouses or open field [16, 18].

Overall, in many cases the choice between different food groups makes the biggest impact on the environment, as differences between food groups are usually significantly higher than differences within a food or product group. For example, 1 kg of beef causes on average about 14 kg of CO_2-*equivalents* – whereas the same amount of ready-to-eat lentils causes 1.7 kg of CO_2-*equivalents* [18].

Even the production of nutritionally significant food like milk and dairy products, fish or nuts may have comparably negative impacts on the environment. Nevertheless, this food should be integrated into the diet in accordance with their recommended frequency and quantity due to their health-promoting impact (see Table 2).

Table 1 compares the estimated *greenhouse gas emissions* of selected food, expressed in kg of CO_2-*equivalent*. The data shown provide orientation and may vary if conditions change.

Table 1: Estimated *greenhouse gas emissions* of selected food [18]

vegetable food		kg CO_2-*equivalent*
grains, grain products and potatoes	1 kg rice	3.1
	1 kg bulgur	0.6
	1 kg pasta	0.7
	1 kg potatoes, fresh	0.2
vegetables and *salad*	1 kg lentils, dry	1.2
	1 kg carrots	0.1
	1 kg lamb's lettuce	0.3
fruits	1 kg pineapple, fresh, average	0.9
	1 kg apples, average	0.3
	1 kg walnuts, with shell	0.9
oils and fats	1 kg margarine, whole fat	2.8
	1 kg rapeseed oil	3.3

animal food resp. alternative vegetable products		kg CO_2-*equivalent*
meat, sausage, fish and egg and vegetable meat alternatives	1 kg beef, average	13.6
	1 kg chicken, average	5.5
	1 kg pork, average	4.6
	1 kg fish, aquaculture	5.1
	1 kg egg	3.0
	1 kg seitan	2.5
	1 kg tofu	1.0
milk and dairy products and vegetable milk alternatives	1 kg cheese, average	5.7
	1 kg yoghurt, plain	1.7
	1 kg whole milk, ESL	1.4
	1 kg milk alternative, oatmilk	0.3
	1 kg milk alternative, soymilk	0.4
oils and fats	1 kg butter	9.0

The data shown above illustrate that in clinic catering, the composition of the menu with predominantly vegetal food can make a major contribution to climate protection. Kitchen technology and food waste prevention also play a crucial role. Preparing, cooling and keeping ingredients and food hot may have a significant environmental impact. This is where infrastructure, production planning and staff behaviour are essential [25–28]. Once food is discarded, all invested resources and all steps from farm to fork – and thus the linked *greenhouse gas emissions* – are wasted. In addition, the disposal process itself produces small amounts of greenhouse gases.

The "DGE-Quality Standard for Meals in Clinics" combines aspects of health promotion and sustainability. In chapter 4, this DGE-Quality Standard specifies minimum frequencies for foods and food groups that are particularly recommendable from a health promotion and sustainability perspective. These include vegetal products, such as vegetables including *legumes* and *salad* as well as wholemeal products and fruits. Additionally, a maximum frequency is specified for food and food groups like meat, as well as ultra-processed and deep-fried products. There is scientific evidence that limiting these products is beneficial in terms of nutritional physiology and sustainability [29]. Regarding food qualities, the DGE-Quality Standard refers, as an example, to fish from sustainable fisheries or aquaculture and to meat that complies with certain animal welfare criteria (see chapter 4.2).

Furthermore, chapter 4 describes criteria for the design of a health-promoting and sustainable catering along the process chain – from planning and purchasing to disposal. In this context, the reduction of avoidable food waste plays an important role.

Further information:
www.station-ernaehrung.de
Keyword: Nachhaltigkeit

3.2 Food groups – the basis for the optimal choice

The food-based dietary guidelines of the DGE for a wholesome diet – as presented in the "DGE Nutrition Circle", the "Three-Dimensional DGE Food Pyramid" and the "10 Guidelines of the DGE for a wholesome diet" – are based on the "*Reference values for nutrient intake*" and the DGE's evidence-based guidelines regarding fat and carbohydrate intake [7, 30–32]. These recommendations serve as the basis for health-promoting and sustainable mass catering. The **food quality** – **as optimal choice** from each of the 7 food groups of the DGE Nutrition Circle as shown in Table 2 – combines the recommendations from the models mentioned above. Thus, there is food that should be consumed in different quantities and frequencies due to its nutritional composition, e.g., its *energy* and *nutrient density*, dietary fibre content and fat quality. For each food group, additional background information and aspects of sustainability are listed below, along with practical advice for the use in clinic catering

Food group
grains, grain products, potatoes

Grains and **grain products** like bread, *muesli*, pasta, or rice are important sources of energy, carbohydrates and dietary fibre. *Pseudocereals* or products made from them also belong to this group. Wholemeal varieties offer a higher *nutrient density* and are more filling than products made from refined flours or polished rice. *Parboiled* rice and other processed grains also provide a higher nutrient content than the polished variety.

Potatoes are among the possible sources of carbohydrates with high *nutrient density*.

Rice is a side dish containing starch with a comparatively large climate impact, as its cultivation releases larger quantities of climate-damaging greenhouse gases than potatoes or grains. Therefore, rice should only occasionally be integrated into the diet or replaced by local alternatives like spelt or green spelt.

Practical advice: Food from this group should be offered in different ways, whether as oatmeal in *muesli* or couscous with vegetables. Offering bread made from finely ground wholemeal is a good way to use wholemeal products and is also suitable for patients with chewing difficulties.

Food group vegetables and *salad*

Vegetables and ***salad*** are rich in vitamins, minerals, dietary fibre and phytochemicals. Thus, they provide many nutrients, little energy and contribute to a satiety feeling.

Vegetables and *salad* usually cause comparatively low *greenhouse gas emissions*. In particular, *seasonal* and locally produced vegetables and *salad* grown open-field or in unheated greenhouses are especially climate-friendly. Furthermore, *regional* production strengthens the local economy.

Legumes like beans, lentils and peas also belong to this food group. They are an important protein source in a *plant-based* diet [11]. In addition, they contain a lot of dietary fibre and provide other nutrients such as the vitamins B_1, B_6, folate and the minerals iron, magnesium, and zinc as well as phytochemicals. Combining food from this group with cereals, cereal products, potatoes, or animal-based products, increases the meal's *protein quality*. Examples here include a bean stew with potatoes, pasta salad with kidney beans, lentil Bolognese with wholemeal pasta and (wholegrain) bread with hummus.

Moreover, *legumes* excel in terms of sustainability; during growth, the crops fix the required nitrogen from the air, which is why less fertilizer is needed [33]. *Legume*-based dishes should therefore be a regular part of the diet. The "Protein Crop Strategy" of the Federal Ministry of Food and Agriculture (BMEL) aims, among other things, to increase domestic production [34, 35].

Practical advice: The possibilities for preparing vegetables and *salads* are as great as their variety. Whether as classic side dish, *salad dish*, *raw vegetable* sticks with dip, stew, vegetable pies, casserole and roulades – there are no limits for creative preparation. Fresh or frozen vegetables are the optimal choice. *Legumes* are more digestible if the dry goods are soaked overnight, and the soaking water is then discarded. Adding herbs such as savoury, marjoram, rosemary or caraway and pureeing cooked *legumes* may also improve digestibility. Some varieties, such as red or yellow lentils, are already peeled and thus often easier to digest [36].

Further information:
www.station-ernaehrung.de
Keyword: Gemüse und Obst

Legumes are more digestible if the dry goods are soaked overnight, and the soaking water is then discarded. Adding herbs such as savoury, marjoram, rosemary or caraway and pureeing cooked *legumes* may also improve digestibility. Some varieties, such as red or yellow lentils, are already peeled and thus often easier to digest [42].

Food group fruits

Fruits are rich in vitamins, minerals, dietary fibre and phytochemicals and therefore have a high *nutrient density*.

From a botanical point of view, nuts also belong to fruits. Being important sources of nutrients, they are part of a health-promoting diet.

Practical advice: Fruits should be available fresh or frozen, without added sugar and other *sweetening ingredients*, offered in a variety of ways on the menu. Examples are fresh fruits for breakfast or snack, briefly steamed for a sweet entrée, as fruit puree in yoghurt or cut into small pieces in *muesli*. Nuts and oilseeds finely ground or as pureed nuts, may be added to meals for patients with chewing and swallowing disorders. In the case of *malnutrition*, they are a good source to additionally fortify dishes with essential nutrients and energy.

Food group milk and dairy products

Milk and **dairy products** provide calcium, high-quality protein, iodine and vitamins A, B_2 and B_{12}. Cheese in particular contains a lot of calcium but compared to other dairy products often has a high fat content. Cheese should be offered regularly, and varieties with an *absolute fat content* of maximum 30 % should be preferred.

Practical advice: Dairy products may be combined in many ways with other food, such as yoghurt with fresh fruit, milk in *muesli*, cheese as a bread topping or in casseroles.

Food group meat, sausage, fish, and eggs

Meat is a good source for protein and, among others, for Vitamin B12, selenium, and zinc. In addition, it is a source of well available iron and high-quality protein. However, meat, especially in processed form like **sausage** also contains unfavourable ingredients. For example, it has a high proportion of saturated fatty acids which can affect certain blood lipid concentrations negatively. This is why lean meat is preferable. Sausage also contains a lot of salt. However, as part of a healthier and more sustainable diet, a small amount of meat can complement the choice of vegetal food, making it easier to obtain essential nutrients.

Due to their ingredients as well as the high *greenhouse gas emissions* of animal-based food – especially products derived from ruminants like cattle, sheep, and goats – they should be moderately included in the diet.

Practical advice: **The meat component in dishes may be reduced in favour of the vegetable and/or grain component. A more sustainable diet also includes the aspect of animal welfare. Organic farms and, for example, the Neuland Association advocate for meat from species-appropriate animal husbandry.**

Further information:
www.station-ernaehrung.de
Keyword: Tierwohl/Fleisch

Fish is a good source of protein as well. Fatty fish species, which include both freshwater and saltwater fish (see box), are additionally rich in valuable long-chain omega-3 fatty acids. Sea fish is also a good source of iodine.

Good sources for omega-3 fatty acids:
trout, herring, salmon, mackerel

Examples for iodine-rich fish:
cod, haddock, pollock

Practical advice: Today, many fish species are overfished. When buying fish, it is therefore important to look for fish from sustainable fisheries or aquacultures. The labels of the Marine Stewardship Council (MSC) and the Aquaculture Stewardship Council (ASC), for example, offer orientation.

Further information:
www.station-ernaehrung.de
Keyword: Fisch

Eggs are a good source of high-quality protein and fat-soluble vitamins. At the same time, the yolk is high in fat and cholesterol. Based on current studies, no upper limit for egg consumption can be derived for nutritional reasons. In the context of a *plant-based* diet, however, an unlimited amount is not recommended (see Table 2).

Food group oils and fats

Since fat provides twice as much energy as carbohydrates and protein, **oils** and **fats** should be used consciously. In addition to the quantity of fat, the quality of the fat, e.g., the fatty acid composition, is of special importance for health. Fats and oils contain saturated, monounsaturated as well as polyunsaturated fatty acids and vitamin E.

Consuming less saturated fatty acids, which are mainly found in animal-based food, has a positive effect. Instead, more food with unsaturated fatty acids should be used. Good sources are, e.g., vegetable oils, margarine, nuts, or fatty fish.

The preferred oil is rapeseed oil, a perfect all-rounder in the kitchen. It contains the lowest proportion of saturated fatty acids and at the same time a high content of monounsaturated and polyunsaturated fatty acids as well as vitamin E. The positive ratio of omega-3 to omega-6 fatty acids should also be highlighted.

Other recommendable oils with a notable content of omega-3 fatty acids are linseed, walnut, and soybean oil. Olive oil with its high content of monounsaturated fatty acids is also a good choice. Margarine made from the above-mentioned oils has a higher content of unsaturated fatty acids compared to butter and thus a better fatty acid composition. Additionally, margarine has a significantly lower impact on the environment [37, 38]. In contrast, coconut oil, palm (kernel) oil and palm (kernel) fat, as well as animal lard, contain large amounts of saturated fatty acids, which have a particularly unfavourable effect on blood lipids.

The cultivation of plants yielding coconut oil, palm oil and palm fat is primarily conducted in *monocultures* causing substantial impacts on biodiversity and must hence be accessed as negative from an ecological perspective [39–41].

Further information:
www.station-ernaehrung.de
Keyword: Palmöl

Practical advice: Rapeseed oil is multifunctional for cooking. It can be heated, offers neutral taste and is available everywhere. To promote flavour diversity, linseed, walnut, soy or olive oil can be used for typical dishes or even *salads*.

Food group beverages

Fluids are important. The task of **beverages** is to supply the body with water. Water as well as unsweetened herbal and fruit teas contain no calories and are therefore highly recommended.

The *guiding value* for the drinking amount for the reference group (adults aged 51 to under 65 years) is approximately 1.25 L per day. In some situations, the body needs more fluid, for example in very hot weather, or physical activity. Fever, diarrhoea, cardiac, or kidney diseases as well as medication like diuretics change fluid requirements, too.

Caffeinated beverages like unsweetened black or green tea and coffee are calorie-free beverages that add to the fluid balance. However, due to their caffeine content, they are not an optimal choice.

Purchasing products with the fairtrade label, like coffee and tea, helps improving the living and working conditions of small farming families and plantation workers in countries of the Global South.

Fruit juice drinks, nectars, fruit juices and mixed milk drinks are not suitable thirst quenchers. They contain a lot of sugar and thus provide many calories. Likewise, milk and smoothies do not count as beverages because of their nutrient content.

Avoiding bottled water contributes to climate protection. Tap water offers a climate-friendly and at the same time cost-saving alternative, as packaging materials and transport routes are no longer required.

Practical advice: Water should always be available in clinics, for example, by providing tap water in carafes in patients' rooms or by offering self-service water dispensers on the ward. Older people should also be reminded to drink regularly.

Further information:
www.station-ernaehrung.de
Keyword: Getränke

3.3 Deriving criteria for a health-promoting and sustainable catering

The way recommendations for a wholesome diet translate into criteria for mass catering on a scientific basis is described below. Figure 6 illustrates this path in 4 steps, which are explained in more detail in the following text.

From the background ...
Basis for the derivation of criteria for health-promoting and sustainable catering, especially the food qualities and frequencies in chapter 4.1, are the scientifically based *"Reference values for nutrient intake"* [32] and the evidence-based guidelines regarding fat and carbohydrate intake [30, 31]. The former specify amounts for the daily intake of energy and nutrients, including water and dietary fibre. These amounts are formulated for a total of 12 different age groups, each separately for both sexes. In addition, the food-based dietary guidelines of the DGE form a basis, like the "DGE Nutrition Circle", the "Three-Dimensional DGE Food Pyramid" and the "10 guidelines of the DGE for a wholesome diet".

... to theoretical derivation ...
Because of organisational and economic reasons, in mass catering it is not possible to provide meals whose energy and nutrient contents correspond to the respective age- and gender-specific reference values of the guests. Therefore, summarised values for the different living environments of mass catering were derived from the detailed *"Reference values for nutrient intake"* as follows:

The average age of patients in German hospitals is 55.6 years, in rehabilitation clinics 57.7 years [42]. Accordingly, the *"Reference values for Nutrient Intake"* for the age group 51 to under 65 years were used for the catering of patients. To derive the *guiding value* for energy intake, the *physical activity levels* (*PAL*) 1.2 for hospitals and 1.4 for rehabilitation clinics were used in the age group mentioned. For each activity level, the *guiding values* of women and men were combined, and the average value (arithmetic mean) was calculated. A different approach was used for the derivation of the reference values for vitamin and mineral intake: If the values for men and women differed, the higher reference value was used in order to ensure a minimum intake for all.

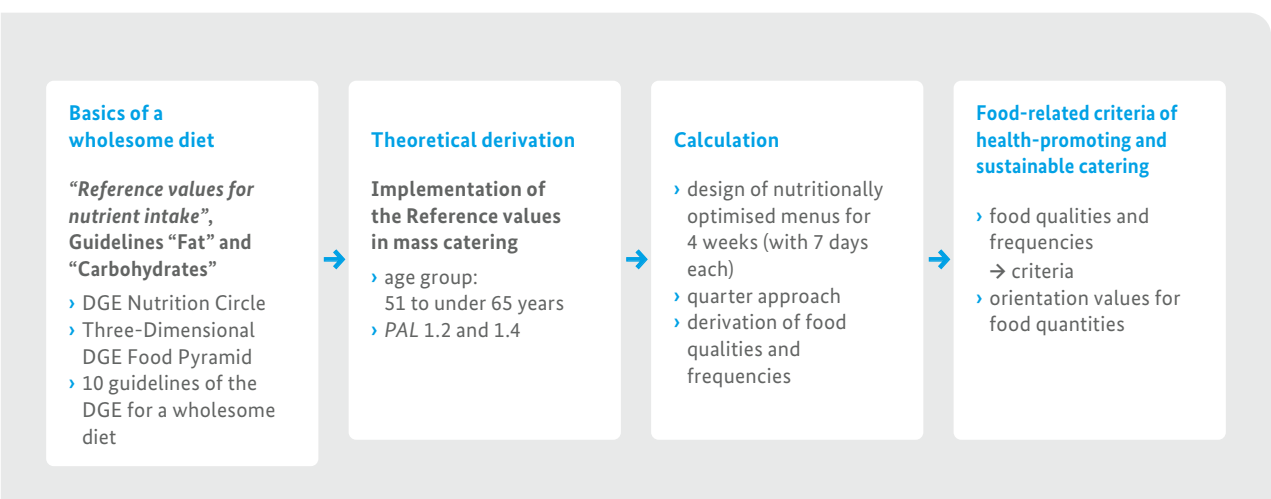


Figure 6: Path from the basics of a wholesome diet to food-related criteria for health-promoting and sustainable catering

Meals for patients in clinics that differ from the reference group, such as geriatric patients, pregnant women, breastfeeding women or children, should be based on the specific Reference values for the respective group. If necessary, the adjustment of the activity level is also required.

... and calculation ...

Based on these principles, nutrient-optimised menus for both a mixed diet and *ovo-lacto-vegetarian* diet including breakfast, snacks, lunch and dinner for hospitals and rehabilitation clinics were composed. They are exemplary for 4 weekly menus respectively 28 catering days and considering the usual eating habits in Germany. The following aspects were taken into account:

- reaching the derived Reference values for mass catering for groups of people aged 51 to under 65 years,
- *physical activity levels* (*PAL)* 1.2 and 1.4,
- energy is distributed to the individual meals according to the so-called “quarter approach”: 25 % each to breakfast, lunch and dinner and 12.5 % of the *guiding value* for energy intake to each of the 2 snacks,
- corresponding food qualities (see chapter 3.2),
- “5 a day” campaign (at least 3 portions of vegetables and 2 portions of fruit),
- with 90 % of the total energy, 100 % of the recommended reference values of nutrients (vitamins and minerals) are met, so that 10 % of the total energy may be allocated to food with low *nutrient* and high *energy density*, like chocolate, jam, cake or ice cream.

... to food-related criteria for health-promoting and sustainable catering

Based on the nutrient-optimised menus for 28 catering days, corresponding quantities per day or per week were determined for each food group. These orientation values for food quantities create the basis for the derivation of corresponding food frequencies. Once these food quantities and frequencies are implemented in practice, and the defined food qualities are considered (see chapter 3.2) it can be expected that most likely all nutrients will cover the reference values.

4

Designing health-promoting and sustainable meals

This chapter provides assistance in the design and implementation of health-promoting and sustainable food and beverages. The process chain (see Figure 2) is used to illustrate a menu for full catering that is tailored to the needs and requirements of patients. Optimally composed, this offers them the opportunity to make a healthy and sustainable choice for every meal. Enjoyment is important as the meals should be tasty and eaten with pleasure.

4.1 Planning 39
4.2 Purchase 49
4.3 Preparation 51
4.4 Service 54
4.5 Disposal and cleaning 55
4.6 Together and yet individual 58

The criteria in this chapter serve as a basis for all catering services of a clinic, correspondingly for all diets. Depending on certain catering principles of some diets, deviations from and additions to the criteria are necessary.

4.1 Planning

Planning | Purchase | Preparation | Service | Disposal & cleaning

Creating health-promoting and sustainable meals begins with planning. In this process step, among other things, the range of food and beverages is compiled, new recipes are developed, or existing ones are adapted, and the length of the *menu cycle* is determined. Proper planning not only affects the nutritional and enjoyment quality of the meals but may also contribute to reducing food waste and therefore to sustainability and economic efficiency.

The analysis of waste measurements in care facilities reveals that an increased amount of food waste is caused by overproduction and food returns [43]. To minimize overproduction, it is crucial to accurately assess the meal participant numbers and the required food quantities. Particularly in hospitals, due to the frequently unplanned admissions and discharges, the quantities produced, and the quantities required should be checked shortly before distribution. Another way to reduce food returns is to adjust portion or plate sizes and proactively offer guests at buffets and serving counters the option of "second helpings" [25, 43, 44].

By the way:
The Competence Center for Out-of-Home Catering (KAHV) informs and advises companies on the implementation of measures to reduce food waste. Measuring food waste is the first step towards better use of resources, lower waste costs and an improved carbon footprint.

Furthermore, through a targeted choice of food, menu planning influences the sustainability of the meals offered. The *greenhouse gas emissions* of food may vary greatly. Meals with a high proportion of vegetal components (e.g., vegetables, grains) generally generate fewer greenhouse gases than those with a high proportion of animal-based products (e.g., meat, cheese) [18].

Further information:
www.station-ernaehrung.de
Keyword: Lebensmittelabfälle vermeiden

Further information:
www.station-ernaehrung.de
Keyword: Nachhaltigkeit in der Gemeinschaftsverpflegung

4.1.1 Food qualities and frequencies as well as other aspects of menu planning

Table 2 in this chapter supports the planning of a health-promoting and sustainable catering offer. Based on the 7 food groups (see chapter 3.2), the 2nd column of the table shows the **food qualities – the optimal food choice**. Included is food that is highly recommended because of its nutritional composition.

By the way:
Although animal-based food has a high *protein quality*, the recommended protein intake should mainly be covered by vegetal food. In order to increase the *protein quality* of the catering offer, combining protein sources from different food groups (animal-based and vegetal or vegetal and vegetal) makes sense. This should be considered during menu planning, particularly in the case of *plant-based* catering (for further information see chapter 3.2.)

Additionally, columns 3 and 4 of the table show **how often** certain food or food groups must be used. Details for a mixed diet as well as for an *ovo-lacto-vegetarian* diet for 7 catering days are presented here. For the food groups that should be offered several times a day, like vegetables or grain products, the daily frequency is also shown in brackets. If the recommended frequencies are observed, the food may be served flexibly between the meals.

Moreover, **minimum and maximum requirements** are formulated to show particularly recommendable or less recommendable food from a nutritional and sustainable perspective. The criteria on the foods' qualities and frequencies allow a balanced and varied menu. If the criteria are consistently observed in menu planning, all nutrients are assumed to likely meet the recommended values in the sense of the implementation of the *Reference values* in mass catering.

By the way:
Food not listed in the tables, like jam, honey or butter, is not included as optimal choices because of their composition. Nevertheless, it is possible to use it.

One important parameter in the context of menu planning, purchasing and serving is the portion size of individual components. They provide orientation on how much of the food should be offered from a nutritional point of view. In Table 2, **orientation values for food quantities** are shown. The quantities are already intake quantities, e.g., peeling and cooking losses are factored in. They provide an orientation but are not a fixed parameter and must be calculated individually by each clinic. The wishes of the patients should be particularly reflected. Ultimately, a needs-based calculation is the precondition for responsible economic and ecological action.

The 4th column of Table 2 shows the criteria for the ***ovo-lacto-vegetarian* diet**. In addition, the following aspects should be considered if neither meat nor fish are offered:

Iron is a potentially critical nutrient in the *ovo-lacto-vegetarian* diet, as the human body tends to absorb this mineral more efficiently from animal-based sources than from vegetal ones. Enhancing iron absorption can be achieved by combining iron-rich plant foods such as *legumes*, millet, or oatmeal with foods high in vitamin C, citric acid (found in vegetables and fruits), or lactic acid (found in sauerkraut). Examples of such dishes include falafel sandwiches with coleslaw, lentil-stuffed peppers, millet casserole with fruit, and rye rolls, or sourdough bread served with soups or salads. These options should be incorporated into the *ovo-lacto-vegetarian* menu.

Fatty fish serves as the main source of **long-chain omega-3 fatty acids** and is, therefore a crucial component of a mixed diet. If no fish is consumed, e.g. because of an *ovo-lacto-vegetarian* diet, it is advisable to incorporate foods rich in alpha-linolenic acid, such as rapeseed oil, linseed oil, walnut oil, nuts, or oilseeds. While the human body can convert alpha-linolenic acid into long-chain omega-3 fatty acids, this process has limitations, and the complete substitution of fatty fish with other foods is not entirely feasible [45, 46]. Nevertheless, due to increasing demand, criteria for the *ovo-lacto-vegetarian* diet were included in the DGE-Quality Standard to ensure optimal nutritional provision.

The selection of food and its frequency of use listed in Table 2 provides a framework based on scientific principles. Within this framework, it is possible to design the catering offer in a varied and creative way or to optimise popular dishes. The use of wholemeal products, *legumes* or the offer of a popular vegetarian dish like pasta casserole instead of a meat dish helps to improve the catering.

Optimising means:
Changing a dish by substituting food in such way that the original character still persists while the *nutrient density* increases. Optimisation can also be achieved by supplementing individual components (e.g. *salad*).

Table 2: Food qualities and frequencies for health-promoting and sustainable catering on 7 catering days

food groups	food qualities – optimal choice
grain, grain products, potatoes	› wholemeal products › *pseudocereals* › *muesli* without added sugar and other *sweetening ingredients* › potatoes, raw or precooked › *parboiled* rice or brown rice
vegetables and *salad*	› vegetables, fresh or frozen › *legumes* › *salad*
fruits	› fruits, fresh or frozen › nuts and oilseeds, unsalted → each without added sugar and other *sweetening ingredients*
milk and dairy products	› milk, plain yoghurt, buttermilk, sour milk, kefir: max. *absolute fat content* 3,8 % › quark: max. *absolute fat content* 5 % → each without added sugar and other *sweetening ingredients* › cheese: max. *absolute fat content* 30 %
meat, sausage, fish and eggs[2]	› lean muscle meat › meat and cold cuts: max. 20 % fat
oils and fats	› rapeseed oil › linseed, walnut, soybean, olive oil › margarine made from the oils mentioned
beverages	› water › fruit and herbal tea → each without added sugar and other *sweetening ingredients*

1 The orientation values given for food quantities are consumption quantities, i.e. peeling and cooking losses are already factored in.

food frequencies on 7 catering days

orientation values[1] for food quantities on 7 catering days per patient each for *PAL* 1.2 and 1.4

mixed diet	*ovo-lacto-vegetarian* diet
min. 21 × (min. 3 × daily) *PAL* 1.2: ca. 2,100 g, *PAL* 1.4: ca. 2,500 g › thereof: min. 14 × wholemeal products max. 2 × *potato products*	**min. 21 × (min. 3 × daily)** *PAL* 1.2: ca. 2,100 g, *PAL* 1.4: ca. 2,500 g › thereof: min. 14 × wholemeal products max. 2 × *potato products*
21 × (3 × daily) *PAL* 1.2: ca. 2,800 g, *PAL* 1.4: ca. 3,100 g › thereof: min. 7 × *raw vegetables* min. 1–2 × *legumes* *PAL* 1.2: ca. 150 g, *PAL* 1.4: ca. 160 g 1 portion may be offered daily as vegetable juice or smoothie.	**21 × (3 × daily)** *PAL* 1.2: ca. 3,300 g, *PAL* 1.4: ca. 3,700 g › thereof: min. 7 × *raw vegetables* min. 2 × *legumes* *PAL* 1.2: ca. 210 g, *PAL* 1.4: ca. 220 g 1 portion may be offered daily as vegetable juice or smoothie.
14 × (2 × daily) *PAL* 1.2: ca. 1,700 g, *PAL* 1.4: ca. 1,900 g › thereof: min. 7 × fresh or frozen, without added sugar and other *sweetening ingredients* min. 3 × nuts or oilseeds *PAL* 1.2: ca. 70 g, *PAL* 1.4: ca. 90 g 1 portion may be offered daily as fruit juice or smoothie.	**14 × (2 × daily)** *PAL* 1.2: ca. 1,700 g, *PAL* 1.4: ca. 1,800 g › thereof: min. 7 × fresh or frozen, without added sugar and other *sweetening ingredients* min. 3–4 × nuts or oilseeds *PAL* 1.2: ca. 80 g, *PAL* 1.4: ca. 100 g 1 portion may be offered daily as fruit juice or smoothie.
min. 14 × (min. 2 × daily) *PAL* 1.2: ca. 1,900 g, *PAL* 1.4: ca. 2,200 g	**min. 14 × (min. 2 × daily)** *PAL* 1.2: ca. 2,000 g, *PAL* 1.4: ca. 2,400 g
max. 3 × meat / sausage for lunch › thereof: min. half of the offer lean muscle meat Total in all meals in 7 catering days: *PAL* 1.2: ca. 320 g, *PAL* 1.4: ca. 380 g **1–2 × fish** *PAL* 1.2: ca. 150 g, *PAL* 1.4: ca. 170 g › thereof: min. 1 × fatty fish	**omitted in an *ovo-lacto-vegetarian* diet[2]**
rapeseed oil is standard fat *PAL* 1.2: ca. 170 g, *PAL* 1.4: ca. 210 g	**rapeseed oil is standard fat** *PAL* 1.2: ca. 180 g, *PAL* 1.4: ca. 220 g
beverages are available anytime min. ca. 9 L	**beverages are available anytime** min. ca. 9 L

2 There is no recommendation on the number of eggs to be consumed. In the nutrient-optimised meal plans, approx. 60 g for *PAL* 1.2 and 70 g for *PAL* 1.4 (mixed diet) resp. 110 g for *PAL* 1.2 and 130 g for *PAL* 1.4 (*ovo-lacto-vegetarian* diet) of eggs per week were calculated.

In addition to the criteria for using food qualities and frequencies in Table 2, the following additional criteria should be considered when planning a varied, health-promoting and sustainable meal offer:

☐ ***Ovo-lacto-vegetarian* options are available every day for every meal.**

The various patients' wishes can be met, for example by offering an *ovo-lacto-vegetarian* diet or an *ovo-lacto-vegetarian* dish at lunchtime. Popular dishes without meat and fish are always enriching the menu, even for patients who do not follow a vegetarian diet. In case of an *ovo-lacto-vegetarian diet*, it must be ensured that the same variety of choices is available at all meals as with the mixed diet. Simply reducing the meat or fish components of the latter is not sufficient enough for a health-promoting and sustainable offer. Main components on the plate should be vegetables, *salad* and/or *legumes*.

By the way:
Mixed and *ovo-lacto-vegetarian* menus may include vegan lunches for up to 3 days, all while adhering to the criteria for food quality and frequency.

☐ ***Seasonal* and *regional* vegetables and fruits are included.**

Apart from having a positive effect on the environment, this also avoids or shortens storage times and longer transport distances. S*easonal* and *regional* products also give patients a feeling of *seasonal* orientation. Out-of-season products are transported long distances to Germany and/or produced in heated greenhouses. This costs energy and releases greenhouse gases.

Further information:
www.station-ernaehrung.de
Keywords: Saisonale Lebensmittel and Regionale Lebensmittel

☐ **Local food is preferred in the menu.**

Vegetables and fruits from Germany and other EU countries generally have fewer pesticide residues than products from non-EU countries [47]. By using local *seasonal* food, long transport routes might be avoided, energy consumption and costs reduced, and at the same time the local economy may be supported.

☐ **Grains, grain products and potatoes are offered in varied ways.**

When planning the menu, this food group allows for variety. In addition to potatoes, pasta and rice, spelt, green spelt, bulgur and millet may also be prepared in different ways.

... furthermore:

- [ ] **Deep-fried and/or breaded products are used at most twice in 7 catering days.**
  Deep-fried and/or breaded components like croquettes, battered vegetables, breaded schnitzels, chicken nuggets or fish fingers absorb larger amounts of fat during preparation. This category also includes dishes that are fried while floating in fat, like potato waffles or pancakes.

- [ ] **Meat and fish alternatives are offered for lunch no more than 1 time in 7 catering days.**
  This includes ultra-processed, ready-to-cook food like "sausages", "schnitzel" or fried patties based on soy, tofu, lupine, mushrooms or milk as well as seitan. Tofu, seitan and tempeh (whether nature or pickled) that undergo no further processing are not considered in this context.

- [ ] **Beverages are available at any time.**
  Drinking water should be available and offered at all times. Tap water offers an easily available and ecologically recommendable option, e.g., provided in patients' rooms or through self-service water dispensers in hallways or common rooms.

- [ ] **The lunch *menu cycle* is repeated after 4 weeks at the earliest.**
  The *menu cycle* should be as long as possible to ensure variety in the menu. Within a week the same components, like potatoes or carrots, are possible, but should be prepared differently and combined with other components in a varied way.

- [ ] **The dishes are colourful, and the composition varies.**
  As early as the planning stage, a colourful, appetising composition of the dishes or components should be kept in mind.

- [ ] **The patients' wishes and suggestions are considered in the menu planning as far as possible.**
  The patients' feedback should be reflected in the planning of the menu and the recipes (see Chapter 2.4). Offering popular dishes and menu components contributes to the acceptance of the catering offer.

- [ ] **Culture-specific, *regional* and religious eating habits are taken into account in the planning.**
  If these aspects are respected, the patients may identify themselves to a certain extend through the food. Themed weeks addressing traditional food from different countries or regions, special offers on holidays or major events (European and World Championships, cultural events) are particularly suitable for this purpose.

- [ ] **Snacks are available at any time.**
  Patients should receive a snack outside of mealtimes if they wish, because meal rhythms vary from person to person and may differ, especially during illness. In addition, snacks may be indicated for nutritional therapy purposes.

... furthermore:

- [ ] **Certain animal-based and vegetal food is not used for especially vulnerable groups due to possible contamination with pathogens.**
  Persons with a compromised immune system or pregnant women for example should not consume raw milk products, soft cheeses with a surface smear, raw eggs, fresh ground pork, steak tartare or spreadable rapidly matured uncooked sausages (e.g., fresh Mettwurst). Sprouts and frozen berries must be heated before consumption [48].

Further information:
www.station-ernaehrung.de
Keyword: Lebensmittelsicherheit

- [ ] **Alcohol is not on offer.**
  In this way, possible interactions with medication are ruled out.

Chapter 4.6 lists additional criteria to be taken into account in the planning process.

4.1.2 The use of *processed food (convenience food)* in mass catering

The use of *processed food* is a common practice in mass catering. This food is classified according to the degree of processing. The product range extends from low to ultra-processed:

Low-*processed food* is, e.g., pasta as dry products or pre-cut *salads*, frozen vegetables, and fruits, as well as dried fruits.

Food that has undergone several processing steps, is referred to as ultra-*processed food*. They include ready-made menu components like breaded schnitzels, spring rolls, meat substitutes, classic sauces and dressings (dry or wet products) or ready-made entrées like frozen lasagna or pizzas as well as ready-made soups. Depending on the product group, they may have a high content of sugar, fat, especially unfavourable saturated fatty acids, and salt.

The German Federal Ministry of Food and Agriculture initiated the "The National Reduction and Innovation Strategy: Less sugar, fats and salt in processed foods" in 2018 with the goal of reducing the content of sugar, unfavourable fats and salt as well as the energy content in *processed food*. As part of the strategy, the food industry committed to reduce the sugar, fat, salt and/or calorie content in their products by 2025 with the help of concrete targets [49].

Further information:
www.station-ernaehrung.de
Keyword: verarbeitete Lebensmittel

When using *processed food (convenience food)* the following criteria apply:

☐ **Products without palm (kernel) fat, palm (kernel) oil or coconut fat are preferred.**
The mentioned fats contain large amounts of unfavourable fatty acids and are therefore not recommended from a nutritional perspective. If products with palm oil are used, be sure to use only those made from sustainably certified palm oil. Products with rapeseed, walnut, linseed, soybean or olive oil should be preferred.

Further information:
www.station-ernaehrung.de
Keyword: Palmöl

☐ **Unprocessed or low-*processed food* like fresh or frozen vegetables and fruits, meat or fish is preferred to be processed further on-site.**
Due to the higher nutrient content, vegetables and fruits, fresh or frozen food is preferred to canned products. From an environmental perspective, unprocessed or low-*processed food* is also favourable, as the level of resource utilization tends to increase with food processing.

☐ **Ultra-*processed food* is always combined or supplemented with low-*processed food*/components.**
Ready-to-cook vegetable patties for example may be combined with boiled potatoes and *salad* made from *raw vegetables* with home-made dressing.

☐ **Food with a low content of sugar, fat, saturated fatty acids and/or salt and a low *energy density* is selected.**
There are significant differences in the sugar, fat, saturated fatty acid, salt and energy content of *processed food* within the product groups. Therefore, food should be carefully chosen and those of them that are considered to be more favourable from a nutritional perspective should be preferred. The document "Evaluation of selected convenience foods in mass catering and recommendations for optimisation" provides assistance for evaluation of selected *processed food* [50] as well as the results of the "Start Low" project (see further information). Data from this project is available for estimating the sugar, salt and saturated fat content.

Further information:
www.station-ernaehrung.de
Keyword: Zucker, Fett, Salz

4.1.3 Menu

Similar to the way a business card contains all important information about a person, the menu should also transparently present all relevant information about the meals. It is source of information for patients and employees and represents the kitchen's flagship. Legal aspects must be considered when designing the menu. Chapter 6 provides background information.

When designing and providing the menu, the following criteria apply:

- ☐ **The current menu is accessible in advance on a regular and barrier-free basis.**
  To allow patients and employees to inform themselves regularly about the catering offer, the menu is available in advance (e.g., digitally or on display). It is handed out in case of immobility or communicated in case of visual impairment.

- ☐ **Information is provided on allergens and food additives requiring labelling.**
  For further information see Chapter 6.3.

Further information:
www.station-ernaehrung.de
Keyword: Kennzeichnung

- ☐ **Food is named clearly.**
  When using non-standard or ambiguous names, e.g., fantasy names like "Autumn Pan Feast", non-German language indications like "Ratatouille" as well as general names like "vegetable stew" patients can only assume which dishes or components are meant. Therefore, it is important that the main ingredients of the dish are indicated on the menu. This also applies to classic garnishes like "Gardener's style" or "Hunter's style".

- ☐ **For meat, sausages and fish, the animal species is named.**
  It is easier to choose when the animal species is known. This may also be important for religious reasons.

- ☐ **The basis of alternatives to meat, fish, egg, milk, and dairy products is clearly defined.**
  The alternatives to meat, fish, egg, milk, and dairy products have grown considerably in recent years, offering a diverse range. Soybean, pea, lupin or wheat protein, as well as beans, sunflower seeds, milk, eggs and jackfruit, for example, serve as the basis for meat and fish substitutes. *Plant-based* beverages made from soy, oats, rice or almonds are available as milk alternatives. To enable guests to choose consciously, the menu should indicate the source of the alternatives, for example by stating "with pea protein" or "soy-based". Descriptions like "*plant-based* yoghurt alternative" or "vegan schnitzel" are insufficient.

- ☐ **If nutritional values are declared, the legal requirements are observed.**
  For further information see Chapter 6.3.

- ☐ **Several menu lines are clearly presented.**
  The choice of components within a menu line or a meal should be obvious.

4.2 Purchase

Planning | **Purchase** | Preparation | Service | Disposal & cleaning

In addition to the planning of food and beverages, purchasing also has a significant influence on quality and sustainable aspects.

For purchases the following criteria apply:

☐ **Organic food is used.**

Organic food contains minimal pollutants and residues. In addition, organic farming makes significant contributions to environmental, climate, water, soil, and *resource protection*. E.g., soil and water conservation by avoiding the use of synthetic chemical pesticides and mineral fertilizers, by using antibiotics in animal husbandry only in emergencies and by reducing environmental pollution with pesticides. These examples have a positive effect on biodiversity [47, 51]. The full potential of organically produced food is realized when sourced locally and *seasonally* [52]. Incorporating a high proportion of organic food in mass catering serves as a crucial tool in fostering an increased demand for *seasonal* organic produce from the respective region. The new Organic Out-of-Home Catering Ordinance (Bio-AHVV) simplifies organic certification for professional catering facilities. Among other things, this regulation allows gastronomic facilities to showcase the organic share of 20 % or more of the total food input´s monetary value with a three-stage logo after obtaining appropriate certification [53].

The guideline "On the way to more sustainability in company catering" a publication of the project "NACHHALTIG B|UND GESUND" shows ways to increase the organic share in mass catering even with a fixed and limited budget [54].

Further information:
www.station-ernaehrung.de
Keyword: Ökologisch erzeugte Lebensmittel

☐ **Fair trade products are used.**

Purchasing fair trade food like nuts, coffee, tea or bananas contributes to securing a fair income for people in producing countries as well as providing better working and living conditions. This applies as well to direct purchasing agreements with producers.

Further information:
www.station-ernaehrung.de
Keyword: Fair gehandelte Lebensmittel

... furthermore:

☐ **Fish is purchased from sustainable fisheries.**
The Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) labels, as well as the EU-label for organic produced fish and organic labels like Bioland or Naturland, provide orientation when purchasing fish.

Further information:
www.station-ernaehrung.de
Keyword: Fisch

☐ **Meat from species-appropriate animal husbandry is preferred.**
Species-appropriate animal husbandry is promoted, for example, by organic farms or the Neuland-Verein as well as the animal welfare initiative "Eine Frage der Haltung" of the German Federal Ministry of Food and Agriculture (BMEL). If it is not possible to purchase only meat from species-appropriate animal husbandry for economic reasons, e.g., the offer may be limited to a lesser extent.

Further information:
www.station-ernaehrung.de
Keyword: Tierwohl/Fleisch

☐ **Environmentally friendly packaging is preferred for all food.**
In order to contribute to the reduction of packaging waste, food in disposable packaging should be avoided and instead reusable packaging in bulk containers preferred. When purchasing it is recommended to look for recyclable, mono-material packaging.

☐ **The first-in-first-out principle applies.**
Food that has a shorter shelf life or was stored first should be consumed first. This helps to use food before it spoils and contributes to wasting less food and saving costs.

4.3 Preparation

Planning | Purchase | **Preparation** | Service | Disposal & cleaning

Apart from the food choice, the way meals are prepared and the following time they are kept hot have an impact on the nutritional and sensory quality. Selecting and using kitchen equipment in a thoughtful way might also contribute to a higher level of sustainability.

The following criteria to the preparation of food apply:

☐ **Recipes, if required with preparation instructions, are used.**
With recipes, consistent food quality is ensured, even with staff turnover. They simplify the preparation process and provide a reliable basis for calculating products as well as for a functioning allergen management. Proven and optimised recipes additionally help avoiding food waste.

Recipes and menus are available at:
www.station-ernaehrung.de category service

☐ **Fat is used consciously.**
Due to its high energy content and differences in composition, fat and high-fat food should be used consciously, e.g., in moderate amounts and preferably in the form of high-quality vegetable oils. Dairy products with a high fat content, like high-fat cheeses, crème fraiche, sour cream or sweet cream, should only be used in low quantities when preparing dishes like casseroles, dressings, sauces or desserts.

Further information:
www.station-ernaehrung.de
Keyword: Zucker, Fett, Salz

☐ **Sugar is used sparingly.**
Sugar-sweetened food and beverages increase the risk of caries, overweight and *obesity* as well as secondary diseases like type 2 diabetes. The addition of sugar and other *sweetening ingredients* like honey or fruit syrups should therefore be kept to a minimum. To get used to a less sweet taste, a gradual reduction in recipes is recommended. Instead of sugar, the sweetness from fresh or frozen fruits is often sufficient enough.

☐ **Iodised salt is used, it is salted sparingly.**
Too much salt in food increases the risk of high blood pressure and thus cardiovascular diseases. The guidance level for table salt intake for adults is 6 g per day [55]. Food like bread, sausage and cheese already contain larger amounts of salt, so there is only a small amount left to add. When using salt, choose iodized salt, which is an important source of iodine alongside sea fish, milk and dairy products. In order to promote the acceptance of low salt food, the addition of salt may be reduced slowly and gradually, and more herbs and spices may be used instead.

... furthermore:

☐ **Herbs (fresh, frozen, dried) and spices are used in a variety of ways.**
Herbs and spices don't simply help to save salt, they may also create a greater variety of flavours.

☐ **Nutrient-preserving and low-fat cooking methods are used.**
In addition to appearance, taste and consistency, the cooking method also influences the nutritional quality of the food. To keep losses of vitamins and minerals to a minimum, vegetables and potatoes should be cooked without or with little fat and water by sautéing, steaming, or grilling.

When preparing meat, sautéing, roasting, stewing, grilling and low-temperature cooking in little fat are recommended as low-fat cooking methods. For fish, these are steaming, sautéing, grilling and short frying in low fat.

☐ **Cooking periods are kept as long as necessary and as short as possible.**
Extended cooking results in unnecessary vitamin losses and additional energy consumption, while appearance, taste and texture of the food also suffer. If vegetables and fruits are puréed afterwards, a short cooking period is also sufficient.

☐ **Maximum holding time for cooked food is 3 hours.**
The longer the food is kept hot, the more heat-sensitive vitamins are lost, and the food appearance, taste and consistency suffer. Keeping food hot for a longer period of time also consumes additional energy. According to DIN 10508:2022-03 [56] and the "Hygiene rules in the catering sector" of the Federal Centre for Nutrition and the Federal Institute for Risk Assessment [57] the hot-keeping period, e.g., the time between the end of the cooking process and serving of the meal to the last guest, should be maximum 3 hours long. If a 3-hour hot-keeping period is not feasible, the food must be cooled down immediately after preparation and regenerated in batches before serving, according to DIN 10536:2023-03 [58].

☐ **The holding temperature of cooked food is at least 60 °C throughout the food.**
To protect food from spoiling and minimise the risk of foodborne infection or poisoning, the minimum temperature for keeping food hot is 60 °C according to DIN 10508:2022-03. For safety reasons in practice, the mentioned norm recommends a temperature of 65 °C throughout the food. This applies to storage as well as transportation and serving [56].

Further information:
www.station-ernaehrung.de
Keyword: Heißhalten und Regenerieren

☐ **Chilled food is stored at a maximum of 7 °C.**
Chilled food like *salads* or desserts can also spoil easily. According to DIN 10508:2022-03 [56], a storage, transport and dispensing temperature of 7 °C should not be exceeded as a precaution. Until serving, chilled food should be cooled accordingly and consumed immediately after serving.

... furthermore:

- **Resource-efficient kitchen appliances are used.**
  Kitchen appliances differ widely in their energy and water consumption. Gas and induction appliances are usually very efficient. The size of the appliances should be chosen according to the amount of food to be prepared. Too large appliances consume unnecessary energy and water. In addition, for energy-intensive processes like cooling, freezing or dishwashing, the use of energy-efficient appliances is advisable. Replacing old models with new ones can amortise in a relatively short time [25].

- **Appliances are only turned on during operating times.**
  Appliances should not be operated longer than necessary in order to save energy. For this purpose, the power-on times of all kitchen appliances can be compared with the actual needed times of use and adjusted accordingly [59]. In addition, in energy-intensive processes like cooling, freezing or dishwashing, it is important to ensure efficient utilisation of the appliances. The efficient loading of dishwashers is for example a way to save energy [25].

4.4 Service

Catering does not end at the kitchen door – only when the meal is handed over to the patients, it reaches the guests. Thereby, the presentation of the food components, no matter whether it takes place in the kitchen or later by the serving staff, as well as the sensory quality of the meal are of great importance for the meal to be accepted. The service is an important interface between the kitchen and the patients. Here, patients receive information, have the opportunity to give feedback and express wishes about what is being offered or about portion sizes. Feedback that serving staff receive from the patients and pass on to the kitchen is again helpful and an important information for planning.

This chapter provides criteria on how to design the serving situation, e.g., by presenting the food in an appealing way on the plate or at the buffet. The hot-keeping periods and temperatures as well as cold storage temperatures mentioned above also play an important role in serving. In addition, friendly and competent communication with the patients in the sense of health-promoting and sustainable catering can contribute significantly to an appropriate choice.

The following criteria are to be considered for service:

- ☐ **Proper timing between kitchen and serving is realised.**
  Good organisation or regeneration of food in batches, for example, allow for short hot-keeping periods. Towards the end of service time, smaller containers should be used for refilling buffets and serving counters [60]. This also helps to avoid or minimize food waste. For longer transport routes, good coordination with logistics and efficient route planning are crucial.

- ☐ **Serving staff is informed in detail about the current menu.**
  This includes portioning during serving as well as pre-portioning in the kitchen. Employees who portion or serve food know the meal components, the calculated portion size or number of pieces and which components may be exchanged. Practically speaking, a short consultation between the kitchen and the serving staff is beneficial. This way, the serving staff keeps track, is able to advise patients at the buffet or buffet trolley, respond to their wishes and, if necessary, reorder components. Ladle plans and portioning aids support the serving of calculated quantities.

- ☐ **Patients are given opportunities to influence portion sizes.**
  If patients are able to express their wishes regarding portion sizes or independently measure out portions, this affects their satisfaction as well as the quantities of food returns positively. Regularly comparing the served with the calculated quantities helps to plan them accurately. By regularly recording the reasons for the patients' food returns, the kitchen is able to avoid food waste.

... furthermore:

- ☐ **Components of the health-promoting and sustainable meal along with the calculated individual quantities are communicated to the patients.**
  Particularly in the case of self-service, sample plates and the allocation of corresponding ladles or portion trays provide orientation for the patients. Staff members who ask for menu requests in patients' rooms or at the serving counters may verbally inform about the offer.

- ☐ **Questions about a wholesome diet and food intolerances are answered**
  At least 1 responsible person is appointed for answering detailed questions about the dishes. Basically, the offer of health-promoting and sustainable meals should be known and supported throughout the team. This implies their positive attitude towards the food served to the patients. All serving staff should be trained and able to provide information. Further aspects on this topic are explained in Chapter 4.6.1 and Chapter 6.

4.5 Disposal and Cleaning

Planning | Purchase | Preparation | Service | **Disposal & cleaning**

After serving food and beverages, it is beneficial to access both overproduction and food returns, which contributes significantly to food waste. As far as possible, the food returns per component should be measured over a period of time. The results help to reflect on and, if necessary, adjust the menu planning, the procedure and organisation of ordering, purchasing, production, the presentation of the meals as well as their calculated quantities. All these are starting points to avoid overproduction and food returns. While non-regenerated components can be re-integrated into the menu the following day as long as maintaining the cold chain, food returns have to be discarded. The resource-saving handling of food and the avoidance of food waste is an important aspect of calculation, menu planning and final disposal and should also be included in the catering concept. Reducing food waste is an ongoing process that must be constantly reviewed and, adjusted if needed [43].

In order to raise patients' awareness on this topic, food waste prevention strategies are important. This may result in activities like the introduction of a waste barometer or a patient survey on portion sizes. In addition, for interpreting the food returns, good communication between service and patient as well as between service and kitchen is of great importance. In the kitchen, there is often a lack of information about the causes of food returns. Was the portion size not appropriate? Did individual components not taste good? Was the mealtime too short? By systematically collecting this information and passing it on to the kitchen, they are able to react accordingly to the food returns [61].

Measuring food waste is a simple method to identify potential savings. It is worth making the (alleged) effort, as measuring offers the possibility of saving costs for purchase, disposal and unnecessary labour! Further suggestions are available through the Competence Center for Out-of-Home Catering (Kompetenzstelle Außer-Haus-Verpflegung, KAHV).

Further information:
www.station-ernaehrung.de
Keyword: Lebensmittelabfälle vermeiden

The following criteria apply to the disposal of waste:

- [ ] **Food returns are recorded separately by meal and component and the outcomes are used for future menu planning.**
  Are the portion sizes calculated correctly? Which dishes are less popular and cause larger quantities of returns? Controlling the food returns provide a basis for optimising menu planning, preparation, and presentation.

- [ ] **Unavoidable food waste is made available for energy utilization.**
  Organic waste and food returns may be used to produce heat and electricity in biogas facilities and used fat to produce biodiesel. Today, a number of companies have specialised in the collection and sustainable utilisation of such residues.

When cleaning the food counter and kitchen area as well as the storage rooms, there must be a defined cleaning plan and, if applicable, a corresponding disinfection plan. The plans contain information on the cleaning agents and disinfectants to be used, as well as their usage and dosage.

The following criteria for cleaning and disinfection apply:

- [ ] **Attention is paid to the use of environmentally friendly cleaning agents.**
  Large quantities of cleaning agents are used in kitchens every day to clean surfaces, dishes and laundry. After use, they are discarded as wastewater. Depending on the ingredients, they can be hazardous to the environment and health. Therefore, environmentally compatible cleaning agents are preferable, for example those labelled with the EU Ecolabel and/or the ecolabel "Blauer Engel" (Blue Angel). If the cleaning agents contain palm (kernel) oil-based tensides, sustainably certified palm oil should have been used.

- [ ] **Dosing aids are used.**
  Besides the cleaning agents' ingredients, it is also important to know how much detergent to use. Dosing aids help to ensure that not more cleaning agent than necessary is used. This protects the environment and reduces costs at the same time.

- [ ] **Hygiene requirements are observed.**
  The principles of good hygiene practice and the *"Hazard Analysis and Critical Control Points"* concept (HACCP concept) must be strictly observed. Excellent hygiene practices and compliance with relevant laws and standards ensure the health of staff and patients (see Chapter 6).

Further information:
www.station-ernaehrung.de
Keyword: Hygiene

4.6 Together and yet individual

In addition to the processes for providing health-promoting and sustainable meals described above, the patients' own expectations also affect the offered catering. In clinics, there is often the question of how much individuality mass catering can provide. The group of patients is very heterogeneous, and it is not possible to determine all requirements for catering and to incorporate them into the meals.

However, even in the community catering, some of the patients' special requirements, such as personal needs, allergies and intolerances, illnesses or poor nutritional status, must be accommodated.

During the clinic stay, catering intends to provide patients with food and beverages. If necessary, it must fulfil medical requirements that fall within the scope of nutritional therapy. In this case, meals are used as a remedy.This chapter describes how individual requirements may be met in the context of mass catering. Chapter 5 provides additional information on this topic.

4.6.1 Offering different diets

In order to meet the various special requirements of patients in clinics, diets are offered. Their application is determined by the patients' needs (e.g., *ovo-lacto-vegetarian* diet, religious requirements) and/or medical indications (e.g., lactose intolerance, kidney diseases). For each diet, catering principles define the basic framework.

Diets differ in their catering principles with regard to:

- the choice and quantity of food and thus often also their energy and nutrient content,
- the preparation method as well as texture, and/or
- the frequency and size of meals.

Catering requirements vary depending on the medical units and specific treatment or therapeutic programmes of the clinic. The provision of diets and how these are defined are coordinated together by physicians, *nutritionists* and kitchen managers for their clinic in accordance with the catering requirements. In this regard, the "Manual of Nutritional Therapy in Patient Care" (LEKuP) [1] provides orientation.

If possible, a diet should only serve one need or indication. Only if patients have several catering requirements these should be reflected in the diet. For example, a diet does not have to cover several food allergies. Through incorporating numerous requirements the catering effort can be reduced. However, excluding several food or types of preparation unnecessarily restricts the range of meals for patients who are not affected.

In the context of **health promotion**, the entire range of diets should be based on a whole foods diet, described in the "Manual of Nutritional Therapy in Patient Care" (LEKuP) and thus reflect a wholesome diet [1]. Some diets may require deviation from these criteria due to their catering principles.

Regular reviews must be carried out to ensure that diets continue to meet the current needs of the clinic and that the underlying scientific data is still up to date.

Further information:
www.station-ernaehrung.de
Keyword: Ernährungstherapie

The following criteria apply:

☐ **In the case of food intolerances like allergies, an appropriate choice of food is possible.**
If certain food or ingredients are not tolerated, alternative meal components or appropriate diets should be available, e.g., a gluten-free diet.

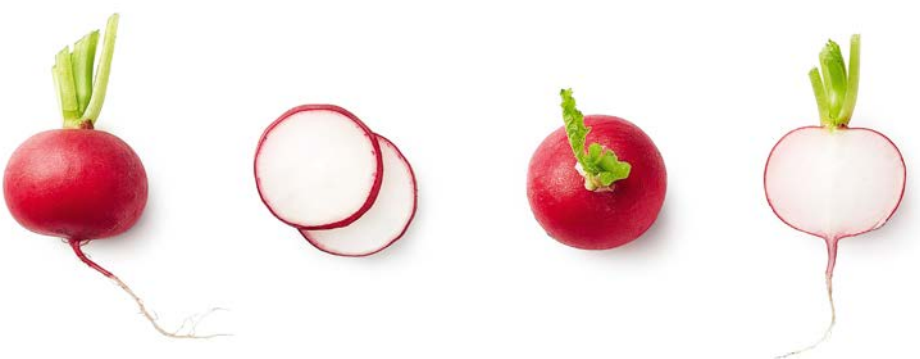
Further information:
www.station-ernaehrung.de
Keywords: Lebensmittelunverträglichkeiten and Kennzeichnung

☐ **Diets are available for different nutritional situations and diseases.**
By offering corresponding diets, medically indicated catering requirements, for example in the case of overweight, *malnutrition* or diet-related diseases, are met.

Nutritionists are in charge for the implementation of medically indicated diets in clinics. For more information, see chapters 2.3 and 5.

☐ **Food and beverages with adapted textures are available for patients with corresponding indications.**
Meals in different textures, such as pureed or soft food, are provided especially for patients with chewing and swallowing disorders or poor dental status. In the case of swallowing disorders, thickened beverages may also be indicated. If possible, meals and beverages of different textures are prepared variedly out of the daily menu and served in such a way that the individual components are easily recognisable and look delicious.

Further information:
www.station-ernaehrung.de
Keyword: Kau- und Schluckstörungen



4.6.2 Diet catalogue

A clinic's own diet catalogue is recommended. This catalogue presents all diets offered by the clinic with their respective divisions of application/indications and catering principles. It provides a standardised presentation and communication of the range of diets both internal for the employees of all departments as well as external for patients, funding agencies and external service providers. Thus, it is an important instrument for standardising the catering offer. A diet catalogue should be compiled by *nutritionists* in consultation with physicians and the kitchen management. The "Manual of Nutritional Therapy in Patient Care" (LEKuP) [1] may serve as a template for deriving a diet catalogue.

If catering services are tendered to external service providers, the diet catalogue is an indispensable part of the specifications. It also supports quality assurance as part of a clinic's own catering concept (see also chapter 2).

4.6.3 Individual choice of food

Patients who lack appetite over a longer period of time, who are seriously ill or in the deceasing phase should be able to eat and drink according to their individual wishes. The selection of food and beverages as well as the arrangement of meals irrespective of the diet should be coordinated by a *nutritionist* together with the patients or persons from their household or friends and family. The goal is to motivate patients to eat and drink and to make meals as pleasant as possible.

4.6.4 Standardised meals

Due to organisational reasons, food and beverages often have to be ordered and quantities calculated before patients are admitted to the clinic and before they can be given an individual diet resp. specify their food preferences. In this case, patients receive standardised meals or the quantities for a buffet are calculated in a standardised way. This regular diet should be health-promoting, sustainable and designed in a way that it covers the catering requirements of the majority of patients in the clinic or medical unit. Diets should be assigned, and food requests recorded as soon as possible after admission. Further information on the assignment of the diet provides chapter 5.2.

5

Beyond the plate

The planning and provision of health-promoting and sustainable meals and beverages for patients is the focus of the DGE-Quality Standard. These processes primarily take place in the kitchen and are carried out by kitchen staff. In addition, other aspects beyond the kitchen may influence the success of an overall good catering service and the design of *fair food environments*. Some of these aspects also represent important interfaces to the catering processes in the kitchen.

5.1 Identify special catering requirements 64

5.2 Assigning diets 65

5.3 Assisting in the selection and order of food and beverages 66

5.4 Design of dining and drinking environment 67

5.5 Nutritional therapy intervention 70

5.6 Discharge and transition 71

This chapter is dedicated to catering aspects beyond the kitchen and addresses the employees in the respective divisions (see also Figure 1):

- Employees of the clinic operator and the clinic management who plan and are responsible for the overall catering concept and catering structures.
- Catering commissioners and quality managers who have an overview of the various catering areas, coordinate them and connect those involved.
- Physicians who consider nutrition as an important factor influencing health in medical diagnostics and therapy. If necessary, they coordinate nutritional therapy with other therapy areas, like physiotherapy or psychotherapy.
- *Nutritionists* who support physicians with their expertise in diagnosing nutritional risks and nutritional problems. In addition of being in charge for planning and preparation of diets with medical indications in the kitchen, they carry out further nutritional therapy measures. Nutritional therapy requires regular exchange among *nutritionists* and with staff from other divisions. To ensure this, it is recommended to work together in a multidisciplinary nutrition team.
- Nurses and service staff who work with patients directly, are involved in determining special catering requirements, support patients at mealtimes and therefore monitor the catering. The DGE-Quality Standard does not describe the tasks of nurses related to catering in detail. The “Expert standard on nutrition management for Ensuring and Promoting Oral Nutrition” [62] provides orientation for nurses.

Through their cooperation and constant exchange, those involved in the various divisions offer patients not only meals that meet their needs and requirements but also support their recovery with nutritional therapy measures and contribute to a health-promoting diet after the clinic stay. Through their work, together with the kitchen, they influence the quality of clinic catering decisively.

In hospitals and rehabilitation clinics, the responsibilities and tasks mentioned above may be assigned to varying divisions.

The following section aims to raise awareness of selected aspects beyond the kitchen as important success factors for health-promoting and sustainable catering.

5.1 Identify special catering requirements

Special requirements for catering may result from the patients' **personal needs**. Examples are the request for an *ovo-lacto-vegetarian* diet, for support in case of physical or mental impairments, for certain diets due to religious or cultural eating habits as well as the need for soft food because of poor dental status.

Furthermore, special catering requirements may occur because of medical diagnoses. **Medical indications** for special meals can be, for example, certain illnesses that are related to nutrition, a poor nutritional status such as *malnutrition* or *obesity*, cognitive and/or motor impairments, food allergies and certain surgical procedures or forms of therapy.

On admission to the clinic, some health- and nutrition-related information about the patients is already available from reports by referring physicians. Further information is requested when documenting the medical and nutritional history and collected through examinations. Some of the information may represent special catering requirements.

According to the guidelines of the German Society for Nutritional Medicine (DGEM), the assessment of the nutritional status should always be part of the medical examination upon admission to the clinic. The German Network for Quality Development in Nursing recommends the *malnutrition screening* of each patient by the nurses [62]. If a nutritional risk is identified, further measures have to be initiated.

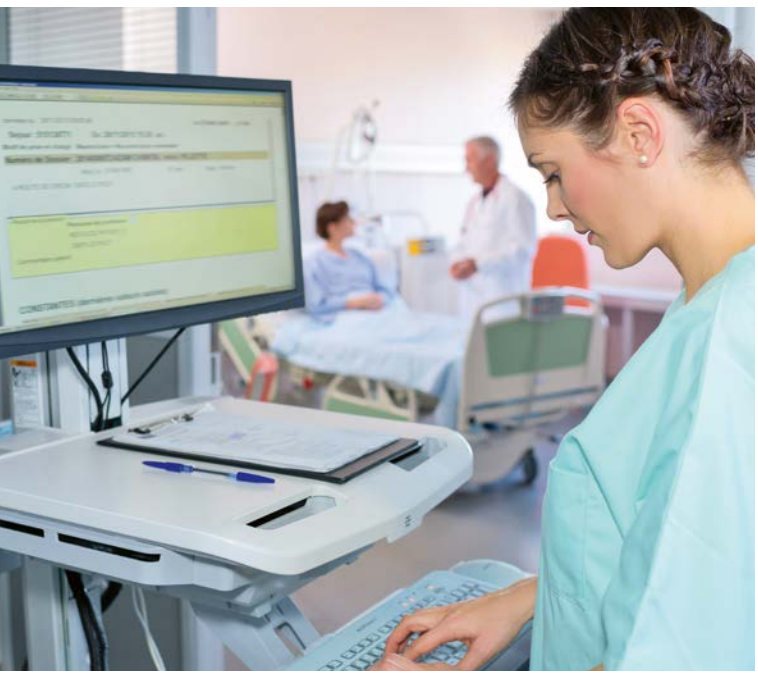
Further information:
www.station-ernaehrung.de
Keyword: *Mangelernährung*

In general, staff need to be mindful of such special requirements. They may notice signs of loss of appetite, chewing problems, aversions, swallowing disorders and symptoms of intolerances, or the need for previously unknown support. These indications of nutritional risks or nutritional problems need to be passed on to physicians and *nutritionists* so that necessary measures are initiated. Especially for patients with *malnutrition*, information about drinking and eating amounts is crucial for nutritional therapy.

Individualised special catering requirements serve as basis for assigning the diet for this person. If necessary, they also provide indications of assistance at mealtimes or build the basis for the required nutritional therapy.

The following criterion applies:

- [ ] **Individual food intolerances of the patients are identified by specialists.**
  Accordingly, food that is not tolerated should not be offered to the patient.



5.2 Assigning diets

During their clinic stay, patients are assigned to a diet that determines the principles of their catering. If there are special dietary requirements (see chapter 5.1), these are reflected in the assignment of the diet. Needs-oriented diets, for example an *ovo-lacto-vegetarian* or religious diet, may be chosen by the patients themselves. Staff members of the clinic or the caterer introduce the dietary options on offer and are available for questions and advice.

A medically indicated diet is a measure of nutritional therapy and is prescribed by a physician in consultation with the patient. For standardised medical interventions, such as gastrointestinal surgeries, it is recommended to standardise the assignment of diets accordingly. The physician or *nutritionist* informs the patient about the principles of the diet and about the health-promoting goals in connection with his/her indication. This allows the patient to understand any necessary food selection or special preparation methods better, which may encourage acceptance and participation.

Should the special requirements change during the clinic stay, the diet is adapted accordingly.

The diet is documented in the patient's file as well as in the catering management software for transparent communication to all involved in the catering process.

Physicians who prescribe diets and staff who advise patients on the choice of a diet should be very familiar with the indications and catering principles of the clinic's own diets.

5.3 Assisting in the selection and order of food and beverages

The patients' well-being and satisfaction during their clinic stay may also contribute to the improvement of their health status and quality of life. If patients are given the opportunity and support to choose their own meals and beverages, they can express their personal preferences.

The following criteria apply:

- **Requests for meals, beverages and portion sizes are collected.**
  Patients are offered the opportunity to choose the meal components and portion sizes according to their personal needs within the limits of their diet. They either choose independently in advance using selection lists or are asked by trained staff.

- **Patients receive advice and assistance with the selection and order of beverages and meals.**
  Guidance for the food and beverage offer and the selection options within the limits of the diet simplify the choice. The individual components are highlighted on the buffet or buffet trolley, or staff at the serving counter inform the patients. If expertise is required for the selection of food for medically indicated diets, a *nutritionist* discusses this with the patient as part of the nutritional therapy.

At the buffet, food and beverages are chosen and served at the same time. In addition to the selection at the buffet, Chapter 4.4 describes criteria for serving.

5.4 Design of dining and drinking environment

Consuming health-promoting food and beverages should also be possible for patients with physical and/or mental impairments and at the same time be pleasant and safe. When eating and drinking, the focus is not only on the absorption of nutrients, but also on enjoyment and pleasure. Mealtime criteria are described in the following chapters, which apply equally to eating and drinking in the patient's room as well as in the dining room.

5.4.1. Establish and observe mealtimes

In clinics, meals structure the day for both patients and staff. Silence and sufficient time allow for mindful eating and enjoyment. Beverages and snacks are also available outside of mealtimes.

The following criteria apply for mealtimes:

- ☐ **Mealtimes are fixed and adhered to.**
  Mealtimes are communicated to patients and staff so that they may consider them in their schedules. If in individual cases the serving of meals is delayed, patients and staff are informed in time.

- ☐ **Mealtimes are kept free of any interruptions.**
  No ward rounds, examinations or treatments are scheduled during mealtimes. This is also required by the "Expert Standard on Nutrition Management for Ensuring and Promoting Oral Nutrition" [62].

- ☐ **A substitute meal is provided if a patient skips a meal.**
  In individual cases, e.g., when an examination or treatment takes place during mealtime, the patient should get the opportunity to eat afterwards. If the prepared meal is kept until then, this should be done in a hygienic and nutrient-preserving way (see criteria in chapter 4). Periods during which patients need to remain fasting, e.g., before examinations or surgery, should be kept as short as possible. Especially for patients with *malnutrition*, longer fasting periods should be avoided.

- ☐ **Reasonable mealtimes are observed.**
  Sufficient time is planned for meals so that patients may enjoy food and beverages comfortably. People with motor and/or cognitive impairments, often need more time for meals.

5.4.2 Design of dining atmosphere

Enjoyment and well-being while eating and drinking are also significantly affected by the environment. The design of a pleasant dining atmosphere is based on the needs of the patients.

The following criteria apply for the design of the dining atmosphere:

- ☐ **Rooms where eating and drinking take place offer a bright and friendly ambience.**
  Appropriate lighting, good ventilation and a pleasant room temperature create a sense of well-being at mealtimes.

- ☐ **Eating and drinking in peace and quiet is possible.**
  Patients should be distracted or disturbed as little as possible during meals. In dining halls, for example, room dividers are beneficial.

- ☐ **The eating place is attractively designed.**
  Feeling welcome and valued at mealtimes supports enjoyable eating and drinking. Friendly and helpful service contributes to the feeling of well-being. Even in patient rooms, eating and drinking at a table should be possible.

- ☐ **Rooms where meals are eaten offer sufficient space for patients with impairments.**
  Patients who depend on a wheelchair, walker or wheeled walker are able to reach their table safely and there is sufficient space for their walking aids. There should also be space for another person to assist with eating and drinking.

5.4.3 Encourage and assist eating and drinking

The patients' independence should be encouraged when eating meals. Daily practice helps those with disease- or age-related impairments to maintain or regain their own skills and to remain both independent and flexible. If patients rely on help with eating and drinking due to physical and/or mental impairments, they receive assistance.

Especially older people with a reduced sense of thirst should be reminded to drink several times a day.

The following criteria apply:

- ☐ **Eating and drinking aids are available and used as needed according to individual abilities.**
  Eating and drinking aids include, for example, special cutlery with extra-large handles, plates with higher rims, drinking tubes non-slip pads or plates with a warm-keeping function.

- ☐ **Individual and tailored assistance with eating and drinking is provided as needed.**
  If necessary, food can be cut into bite-sized pieces and served. Particularly in the case of patients with swallowing disorders, attention should be paid to prevent choking. For example, patients in need of assistance should be placed in a suitable position when eating and drinking. If necessary, assistance should also be provided beyond mealtimes.

Further information:
www.station-ernaehrung.de
Keyword: Ernährungsbezogene Aspekte für Pflegende

5.5 Nutritional therapy intervention

"Scientific studies show that targeted nutritional intervention in daily medical practice is of comparable importance to the prescription of disease-specific medication for many diseases" [63]. Providing patients with an appropriate diet on the basis of a medical indication is such a nutritional therapy intervention. For some diseases and in certain nutritional situations, this intervention promotes recovery (e.g., *malnutrition*). For other diseases, e.g., those that are not curable, the diet serves to prevent the disease progression or to avoid the occurrence of symptoms resp. to alleviate them (e.g., in phenylketonuria). Some medical interventions or therapies (e.g., chemotherapy) require therapeutic diets for both preparation and aftercare. The provision of a medically indicated diet is preceded by the identification of special requirements (see chapter 5.1) and the assignment of the therapeutic diet (see chapter 5.2).

If necessary, physicians also prescribe measures affecting the patients' nutritional behaviour, like instruction, training and counselling by *nutritionists*. A *nutritionist* coordinates and carries out the measures.

Part 2 of the "Manual of Nutritional Therapy in Patient Care (LEKuP)" provides information on nutritional therapy according to indications [1].

The aim of nutritional therapy is to improve the nutritional situation and thus the patient's state of health and to promote recovery. Ideally, nutritional therapy is coordinated with the use of medication and, if necessary, other therapeutic areas such as speech therapy, psychotherapy or exercise therapy.

The average **hospital** stay is about 7 days [2]. Primarily, the focus is on acute disease treatment and improving the state of health. In this context, catering for patients according to the medical indication is one of the most important measures of nutritional therapy. If necessary, patients receive nutritional recommendations for the time after discharge, e.g., through nutritional counselling or training. These recommendations reflect the principles of the diet and thus the catering.

The average stay in **rehabilitation clinics** is 26 days [3]. In addition to the above-mentioned measures in hospitals, the longer stay allows to influence the patients' nutritional behaviour in the long term through group training, nutrition talks, buffet and shopping classes as well as training and instructions in the teaching kitchen. This also reflects the demands of funding agencies. Patients should be given the opportunity to reflect on their previous eating habits and, if necessary, to change them with the professional support of a *nutritionist* or a nutrition team. By strengthening their personal responsibility, they are enabled to transfer the principles of a health-promoting diet to their everyday life at home after discharge.

Further information:
www.station-ernaehrung.de
Keyword: Ernährungstherapie

5.6 Discharge and transition

Frequently, the nutritional therapy started in the clinic needs to be continued after the stay. It may be necessary to follow nutritional principles or to participate in nutritional therapy services like nutritional counselling or training. Patients should always be informed about their nutritional situation, the principles of catering at the clinic and necessary nutritional measures, also after discharge (see chapter 5.5). Primary care physicians at home, *nutritionists*, as well as relatives and caregivers/facilities need this information for the subsequent care or treatment of the patients. Physicians, *nutritionists*, nurses and therapists at the clinic collect this information and recommendations in the patient's file during the stay. Physicians pass this on with the discharge letter as part of the transfer and discharge management.

6

Legal requirements for catering

Catering in clinics must observe a wide range of legal requirements. Food and hygiene law is of central significance, with the primary goals of food safety, protection against misleading and fraud, as well as the provision of information to consumers. More than 200 European and national legal norms regulate how these goals are to be achieved. Not all of them need to be known by those responsible for mass catering in detail. However, in terms of the duty of care under food law, they must know and comply with all responsibilities relevant to their food business activity. They are also obliged to keep up to date with any changes in the law.

6.1 Food law key regulations 73

6.2 Hygiene and infection control 76

6.3 Labelling and public information 78

6.4 Product liability and retained samples 81

6.5 Waste management and the obligation to offer reusable (food) packaging 81

6.1 Food law key regulations

Key regulation of the food law is the Regulation (EC) No 178/2002 laying down the general principles and requirements of food law (Lebensmittel-Basisverordnung, [LM-BasisVO]). Like all EU regulations, it applies directly in all EU member states and fundamentally regulates how the protection of health and the prevention of fraudulent or deceptive practices is to be guaranteed at all stages of the process ("from farm to fork"). In particular, it stipulates that only safe food may be distributed and prohibits practices of fraud and deception. It also regulates the companies' obligations in crisis situations, such as public notification or removal of unsafe food from the market. The principle of staged responsibility applies to the adherence to food law regulations: Each food business operator is responsible for what happens in his/her own, controllable field. His/her primary responsibility ends when other business operators influence the food, e.g., at the beginning of the next value chain level. If, for example, frozen vegetables are delivered to a mass catering facility for further processing, the kitchen management can generally assume that the goods are safe. However, they must always fulfil their own duties of care under food law by, for example, checking the temperature and packaging when receiving the goods, complying with the temperature specifications during storage and further processing, and defining and implementing criteria for selecting suppliers.

The German Food and Feed Act (Lebensmittel- und Futtermittelgesetzbuch, [LFBG]) is also important for food companies in Germany. It complements the European Regulation (European LM-BasisVO) by incorporating national provisions related to aspects such as the structure of official food monitoring, penalties, and fines, as well as, regulations for public information.

The basis for food information and labelling is the European Food Information Regulation (FIR) (EU) No. 1169/2011, which regulates general labelling and further information for pre-packaged foods in an EU-wide standardized way. It also outlines essential requirements for mass catering, including allergen declaration, which is also required for unpackaged food (loose goods). In Germany, the national Food Information Implementation Regulation (Lebensmittelinformations-Durchführungsverordnung, [LMIDV]) supplementing the LMIV, is also required. The LMIDV stipulates, for example, that foods marketed in Germany must always be labelled in German or the allergen declaration on non-prepackaged foods. Table 3 provides an overview of selected food law regulations and interpretation aids for mass catering.

Table 3: Selected legal regulations and interpretation aids for mass catering

topic	law and regulations	
	EU-level	**national level**
basic regulations	› Regulation (EC) No 178/2002 laying down the general principles and requirements of food law	› German Food and Feed Code (Lebensmittel- und Futtermittelgesetzbuch [LFGB])
hygiene and infection control	› Regulation (EC) No 852/2004 on the hygiene of foodstuffs › Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin › Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs	› Food Hygiene Ordinance (Lebensmittelhygiene-Verordnung [LMHV]) › Animal Food Hygiene Ordinance (Tierische Lebensmittelhygiene-Verordnung [Tier-LMHV]) › Ordinance on foodstuff provisions to control zoonoses and zoonotic agents (Zoonose-Verordnung [ZoonoseV])
		› Infection Protection Act (Infektionsschutzgesetz [IfSG])
official monitoring	› Regulation (EU) No 2017/625 on official controls and other official activities	› Food Law Penalty and Fine Ordinance (Lebensmittelrechtliche Straf- und Bußgeldverordnung)
labelling and consumer information	› Regulation (EU) No 1169/2011 on the provision of food information to consumers (FIR) › Regulation (EC) No 1333/2008 on food additives › In the case of nutrient and health-related claims: Regulation (EU) No 1924/2006 on nutrition and health claims made on foods › In case of organic claims: Regulation (EU) 2018/848 on organic production and labelling of organic products	› Food Information Implementation Ordinance (Lebensmittelinformations-Durchführungsverordnung [LMIDV]) › Food-additive Implementing Regulation (Lebensmittelzusatzstoff-Durchführungsverordnung [LMZDV]) › In the case of organic claims: e.g. Ecological Production Act (Ökolandbaugesetz [ÖLG]), Organic Labeling Act (Öko-Kennzeichengesetz [ÖkoKennzG]), Organic Out-of-home Catering Ordinance (Bio-Außer-Haus-Verpflegung-Verordnung [Bio-AHVV])

	legally non-binding aids for practical implementation
	› Guidance on the Implementation of Articles 11, 12, 14, 17, 18, 19 and 20 of Regulation (EC) No 178/2002 on General Food Law (Dec. 2004)
	› "Guidelines of Good Hygiene Practice" » Guideline for good food hygiene practice in social facilities, (working version, 2022) » Guideline for good food hygiene practice in daycare facilities, (2nd edition, 2020) » Guideline for the gastronomy sector (3rd edition, 2022) › Selected DIN-Standards on Food Hygiene: » 10506: Food hygiene – Mass catering » 10508: Food hygiene – Temperature requirements for foodstuffs » 10514: Food hygiene – Hygiene training » 10516: Food hygiene – Cleaning and disinfection » 10524: Food hygiene – Work wear in food business » 10526: Food hygiene – Retained samples in mass catering » 10536: Food hygiene – Cook & Chill method – Hygiene requirements › Publications of the German Federal Institute for Risk Assessment » Safe food: Especially vulnerable groups in communal facilities, 2021 › Publication of the Federal Institute for Risk Assessment in cooperation with the Federal Centre for Nutrition » Hygiene rules in the catering sector, 2020 › European Commission Notice regarding » *HACCP* (Commission Notice 2022/C 355/01) » EU guidelines on food donation (Commission Notice. 2017/C 361/1)
	› Commission Notice on questions and answers on the application of the FIR (Commission Notice 2018/C 196/1) › Identifying the public perception: Designations of the German Food Code (Leitsätze des Deutschen Lebensmittelbuchs)

From legal obligation to practical implementation
Laws and regulations regulate a large number of legally binding matters for an undefined group of people. For example, food law applies to all food business operators – regardless their size or whether they only offer sandwiches or a comprehensive hot lunch. Therefore, it is sometimes difficult for food business operators to know how to implement the generally applicable legal obligations in relation to their individual field. Guidance is provided by various legally non-binding publications, like the technical standards of the German Institute for Standardisation (Deutsches Institut für Normung e. V., [DIN]), statements and recommendations by authorities like the Federal Institute for Risk Assessment (BfR) or the sector-specific "Guidelines of Good Hygiene Practice". In addition, the EU Commission sometimes publishes legally non-binding guidelines to contribute to the EU-wide harmonised application of EU law.

6.2 Hygiene and infection control

A comprehensive hygiene management is obligatory in every food business. The requirements that persons responsible for food law must fulfil are essentially determined from 2 European regulations:

- **Regulation (EC) No 852/2004 on the hygiene on foodstuffs:**
  As required by law, the hygiene in food businesses must meet a high standard in order to fulfil the principle of ensuring optimal product safety. It is therefore required, that the business hygiene management must put a so-called basic hygiene concept in place, which is supplemented by a mandatory *"Hazard Analysis and Critical Control Points"* concept (HACCP concept). Annex II of the regulation outlines fundamental requirements for operating facilities where food is handled. These must generally be clean, constantly maintained, and easy to clean. Various other specifications, such as lighting and ventilation, floor conditions, the number of washbasins, are also stipulated. The implementation of legally mandated hygiene measures in specific cases depends on the unique circumstances at each location. Interpretation aids for the practical implementation of Annex II are provided by sector-specific "Guides for good hygiene practice" and the relevant DIN standards, like DIN 10506:2018-07: Food hygiene – Mass catering as well as DIN 10508:2022-03: Food hygiene – Temperature requirements for foodstuffs.

- **Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin**
  The regulation complements Regulation (EC) No 852/2004 if a company processes food of animal origin. Excluded from its scope are foods that contain both ingredients of plant origin and processed food of animal origin, for example salami pizza or breaded schnitzel. Of practical importance for mass catering establishments are the storage temperatures for certain food regulated in the Annexes to Regulation (EC) No 853/2004 (see DIN 10508:2022-03). It is also regulated whether a mass catering business requires approval in accordance with Article 4(2)(d) of Regulation (EC) No 853/2004 or is only subject to registration.

In addition to these 2 key regulations, there are other European and national hygiene regulations that contain obligations for food business operators (see Table 3). For example, § 20a of the national Animal Food Hygiene Ordinance (Tier-LMHV) defines specific requirements for the distribution of raw egg products in mass catering.

Good hygiene practice

According to EU law, food business operators must establish their hygiene management with regard to the basic principles of good hygiene practice. Compliance with these principles ensures basic hygiene in the *company*. Elements of good hygiene practice are in particular

- guarantee of adequate constructional facilities,
- equipment and transport hygiene,
- hygienic handling of foodstuffs,
- personal hygiene,
- cleaning and disinfection,
- storage and pest management, and
- waste management.

Guidance on how these aspects should be implemented into practice is provided in particular by the sector-specific "Guidelines for good hygiene practice", e.g., in gastronomy or in kitchens of social facilities (see Table 3).

Obligatory self-monitoring according to *"Hazard Analysis and Critical Control Points"* principles

In addition to good hygiene practice, food business operators must introduce, apply and maintain a documented self-checking system in their business in accordance with the "Hazard Analysis and Critical Control Points" principles (see Article 5 of Regulation (EC) No 852/2004). This is based on the general hygiene policy of the business. The aim of such a self-checking system is to identify and evaluate possible health hazards already during food production and to minimise or eliminate them by taking appropriate precautions. If, for example, cooling temperatures are set for certain food and checked as scheduled, the necessary measures can be taken immediately in the event of deviations. Health hazards are already identified during the production process and can be ruled out. The safety of the end product is thus guaranteed by the self-monitoring system. The official food control checks the "Hazard Analysis and Critical Control Point" system, including associated documentation, as part of their control activities [64].

Further information:
www.station-ernaehrung.de
Keyword: Hygiene

Hygiene training obligation

Anyone who produces, handles, or distributes food or dishes to guests must be regularly trained in food hygiene matters (see Regulation (EC) No 852/2004, Annex II, Chapter XII in combination with the Food Hygiene Ordinance (LMHV) § 4). This regulation also applies to those persons who only serve food to customers and residents, regardless of whether these are employees of the clinic or external service providers. Annex 1 of the Food Hygiene Ordinance (LMHV) and DIN 10514:2009-05: Food hygiene – Hygiene training provides good orientation on essential requirements for this training. DIN 10514 also describes the training content for persons who are responsible for developing and applying the "Hazard Analysis and Critical Control Points" concept within the company. In terms of good hygiene practice, employees should be trained at least once a year. The standard also recommends a success assessment and documentation.

Instruction obligation for infection protection

According to § 43 of the Infection Protection Act (IfSG), there is also an obligation to instruct all persons who produce, handle or place food on the market or hand it out to guests. The purpose of the training is to educate employees about specific rights and responsibilities related to infection protection thereby reinforcing their individual accountability. The focus is on prohibitions on activities and employment in the event of certain illnesses or symptoms of illness, such as vomiting, and diarrhoea as outlined in § 42 of the IfSG. The local health authority is usually responsible for the initial instruction. It issues a corresponding certificate, which must be presented to the company. It must not be older than 3 months when the employee starts work. Subsequent training is required at this juncture and every 2 years thereafter. It can be conducted by the employer or an authorized person.

6.3 Labelling and public information

In mass catering, most meals are offered unpackaged. Certain information obligations also apply to them, but these are implemented somewhat differently than for packaged food, which are offered in supermarkets, for example.

However, a central principle of labelling law also extends to the menu catalogue or menu: All information must be accurate and must not mislead guests. This means that names on the menu catalogue or menu must be chosen carefully, ensuring they do not create false expectations in the target group and facilitate conscious consumer decisions. In the case of meat products, for example, specifying the animal species from which the meat originates is advisable. There are legally binding designations for some ingredients or dishes, such as "cheese". This term is protected by law and is reserved for products made from milk. The description "gratinated with cheese" may only be used if it contains cheese. For instance, a "pudding" is typically prepared with milk. If a comparable vegan dessert is offered based on rice drink, this should be indicated.

Assistance in selecting suitable names for dishes: The guidelines of the "German Food Code" describe, as a kind of anticipated expert opinion, what is generally expected of a "cordon bleu", a "rye bread" or a "milk ice cream", for example.

Special information requirements on allergens and food additives

Some people have an allergic reaction or suffer from intolerances when they eat certain foods. Others are sceptical about the use of additives and want to avoid them. For this reason, special information obligations apply to certain allergens and substances that trigger intolerances as well as additives. This enables everyone to make a conscious consumption decision, not only for packaged goods, but also for unpackaged foods. These obligations apply wherever food is typically offered unpackaged – in bakeries, restaurants, ice cream parlours and also in mass catering. The information requirements are based on EU law. Details on implementation are regulated by 2 national regulations:

- the Food Information Implementation Ordinance (LMIDV) regarding allergens (see § 4(2) LMIDV in conjunction with Article 9(1)(c) FIR in conjunction with Annex II FIR) and
- the Food-additive Implementing Regulation (see § 5 LMZDV).

The information obligation under Annex II of the FIR covers 14 foods or food groups that most frequently trigger allergies or intolerances in Europe – in common parlance, they are referred to as the "14 major allergens" (see box, p. 80). The obligation to provide information on additives does not apply to individual additives, but to certain groups of additives, including preservatives, sweetener and colorants. Information must always be provided on additives of certain classes if they are included in the food on offer. Detailed requirements are set out in § 5 (1) and (2) LMZDV (see Table 4).

Table 4: Overview of food additives subject to mandatory labelling

Class name or food additive	Labelling	Practical examples
colorants	› "with colorant"	› desserts, coatings
preservatives	› "with preservative" or "preserved"	› deli *salads*, mayonnaises
	› if only the food additives E 249 to E 252 are used: for food with curing salt "with curing salt", for food with sodium or potassium nitrate "with nitrate" and for food with curing salt and sodium or potassium nitrate "with curing salt and nitrate"	› meat products
antioxidants	› "with antioxidant"	› seasonings, instant soups, broths
flavour enhancers	› "with flavour enhancer"	› seasoning mixes, instant soups, sauces, flavoured products
iron salts E 579 or E 585 (no class name)	› "blackened"	› black olives
sweetener	› "with sweetener"*	› mustard, deli *salads*, sauces
	› for food with aspartame (E 951) or aspartame-acesulfame salt (E 962): "contains a source of phenylalanine"	› food with reduced energy value
	› for food with more than 10 % added polyhydric alcohols with the numbers E 420, E 421, E 953 and E 965 to E 968: "may have a laxative effect if consumed excessively"	
food additives with the numbers E 338 to E 341, E 343 and E 450 to E 452	› "with phosphate" only applies to meat products	› boiled sausages, cooked ham
food additives with the numbers E 445, E 471, E 473, E 474, E 901 to E 905 and E 914, which are used for surface treatment	› "waxed" only applies to fresh fruit and vegetables	› apples and pears, fresh citrus fruits, melons

* with the exception of tabletop sweetener: for these, the indication "based on …", supplemented by the name of the sweetener used, is mandatory.

Although the duty to provide information on allergens and additives is stipulated in different regulations, it is implemented according to a single principle: in both cases, written information must be available in German before purchase. There are various ways to do this:

- on the menu catalogue, the menu, drinks menus or in the price list, e.g., by stating "Wiener Schnitzel, contains egg and gluten" or "Bratwurst, with nitrite pickle salt" (footnotes, symbols or abbreviations are possible if these are listed in close proximity and clearly itemized),
- on a sign on or near the food,
- in other directly and easily accessible written or electronic information (e.g., folder, leaflet, electronically on a terminal, etc.).

Verbal information is also possible, but only by a person who is sufficiently well informed (about the relevant ingredients and processing additives) if the following requirements are met (see $ 4 (4) LMIDV):

- There must be an additional written documentation on the allergenic ingredients and food additives used in the production of the food in question (see above).
- There must be a clear reference to this information option, e.g., a sign in the dining room or a note on the menu.
- This written documentation is easily accessible to the authorities and guests on request.
- The required information must be provided immediately upon request before the purchase is made and before the food is handed over.

Organic claims on the menu catalogue or menu

The term "organic" (in German "öko" or "bio") is protected by law. The new Organic Out-of-Home Catering Ordinance (Bio-AHVV) specifies 2 options for organic food labelling for catering companies. Firstly, the labelling of exclusively organic ingredients used in the kitchen is permitted. Additionally, the AHV label can convey the monetary percentage of organic content in 3 categories (bronze: 20-49 %, silver: 50-89 %, gold: 90-100 %). Both the labelling of organic ingredients and the indication of organic content require a valid organic certificate, granted after a successful inspection by a state-recognized inspection body [53].

The 14 food or food groups (main allergens) are:

- **cereal containing gluten**
- **crustaceans**
- **eggs**
- **fish**
- **peanuts**
- **soy**
- **milk**
- **nuts**
- **celery**
- **mustard**
- **sesame seeds**
- **sulphur dioxide and sulphites**
- **lupin**
- **molluscs**

Nutrition declaration

Nutrition declaration is not obligatory for loose goods – in contrast to pre-packaged goods. However, anyone who voluntarily wish to provide information on nutritional values, must comply with the requirements of Article 30 (5) of FIR in conjunction with Article 32 in conjunction with Annex XV FIR.

According to this, either

- only the energy value (in kcal and kJ) or
- the energy value and the amounts of fat, saturated fatty acids, sugar and salt,

each per 100 g or 100 ml are listed. It is also permitted to refer the information to a portion, as long as it is clearly quantified[65].

Nutrition claims like “low-fat” or “rich in vitamin C” are only permitted if the requirements of Regulation (EC) No 1924/2006 on nutrition and health claims made on foods (HCVO) are met. For example, a food product advertised as “low-fat” in form of a dessert with a solid texture may contain a maximum of 3 g of fat per 100 g. Advertising the vitamin C content is only permitted above a certain minimum content [65].

Further information:
www.station-ernaehrung.de
Keyword: Kennzeichnung

6.4 Product liability and retained samples

Anyone who manufactures food is liable under the German Act on Liability for Defective Products (ProdHaftG) for damage to property and health resulting from defective products. This applies, for example, if a guest complains of stomach pains caused by eating a microbially contaminated dessert. In such cases, producers must prove that the dessert they produced was free of any defects when it was served. Otherwise, they are liable for any damage found. Liability exists regardless of fault.

In practice, **retained samples** can be used to prove that a company has adequately fulfilled its own duty of care under food law or to prove that the cause of the damage is to be found elsewhere. A retained sample is a representative product sample that is taken and stored under defined conditions. Guidance on this is provided by DIN 10526. The person responsible in the company usually decides whether retained samples are taken. There is no general legal obligation to do so. However, this can be useful for perishable food containing poultry, eggs, or fish.

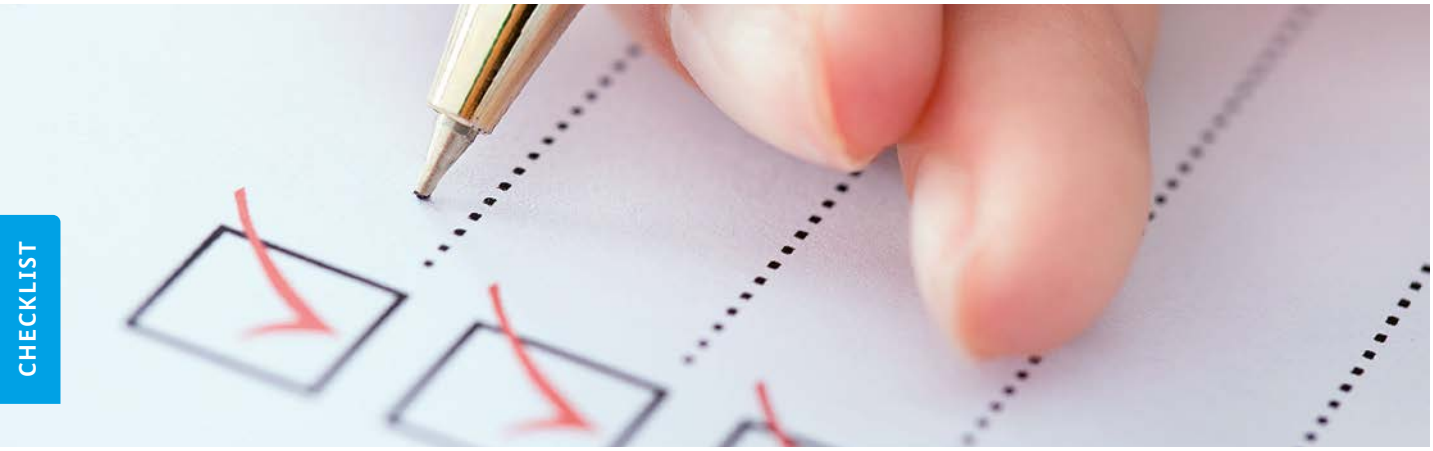
6.5 Waste management and the obligation to offer reusable (food) packaging

Waste naturally occurs in mass catering, which cannot be completely avoided even with good resource management. Several regulations apply in this context, and those responsible for operations must be familiar with them. This includes Animal by-products-Elimination Act (TierNebG) regarding the disposal of kitchen and food waste. EU hygiene legislation also outlines specific requirements for waste management. DIN 10506: Food hygiene in mass catering, for example, describes how these can be implemented in practice.

Efforts to minimize waste in mass catering are crucial, encompassing measures to reduce food waste. This may involve voluntarily redistributing surplus, still-edible food to interested third parties on-site.

Since January 2023, mass catering companies have been mandated to offer reusable packaging when offering food or beverages intended for immediate consumption takeaway: §§ 33 and 34 of the German Packaging Act (VerPackG) stipulate that, in addition to disposable plastic food packaging and disposable drinks cups, reusable alternatives must be offered, and customers must be informed of this choice. An exemption to this obligation is granted to companies with a sales area of up to 80 m^2 and a maximum of 5 employees.

Further information:
www.station-ernaehrung.de
Keyword: Verpackungen



Checklist

The following checklist provides an overview of all criteria of this DGE-Quality Standard. It enables clinics and caterers to independently review their current catering situation and, if necessary, identify potential for improvement. Thus, it might be the starting point for planning appropriate steps and supporting them on the way to more catering quality (see chapter 2). The criteria are listed along the individual chapters of the DGE-Quality Standard. For explanations of the criteria, see the respective chapter.

Development quality of clinic catering	not fulfilled	partially fulfilled	fulfilled
A cross-divisional catering concept is in place.			
All divisions are involved in quality development.			
A catering commissioner exists.			
A *nutritionist* is available for special questions about nutrition and nutritional therapy.			
Employees know the meal requirements of the individual patients.			
Catering staff receive continuous training.			
Ergonomic workplaces and workflows are in place.			
Employees are valued.			
Suggestions regarding the meals and dishes on offer are received and passed on.			
Satisfaction with the meals on offer is regularly assessed.			

Design of health-promoting and sustainable meals

	not fulfilled	partially fulfilled	fulfilled

Planning | Purchase | Preparation | Service | Disposal & cleaning

Food qualities and frequencies for 7 catering days in a MIXED DIET

grain, grain products, potatoes **min. 21 × (min. 3 × daily)** wholemeal products, *pseudocereals*, *muesli* without added sugar and other *sweetening ingredients*, potatoes (raw or precooked), *parboiled* rice or brown rice	☐	☐	☐
thereof: min. 14 × wholemeal products	☐	☐	☐
max. 2 × *potato products*	☐	☐	☐
vegetables and *salad* **21 × (3 × daily)** vegetables (fresh or frozen), *legumes*, *salad*	☐	☐	☐
thereof: min. 7 × *raw vegetables*	☐	☐	☐
min. 1–2 × *legumes*	☐	☐	☐
fruits **14 × (2 × daily)** fruits (fresh or frozen), nuts and oilseeds, unsalted → each without added sugar and other *sweetening ingredients*	☐	☐	☐
thereof: min. 7 × fresh or frozen; without added sugar and other *sweetening ingredients*	☐	☐	☐
min. 3 × nuts or oilseeds	☐	☐	☐
milk and dairy products **min. 14 × (min. 2 × daily), based on the following specifications:** milk, plain yoghurt, buttermilk, sour milk, kefir: max. *fat content* 3,8 %, quark: max. *fat content* 5 % → each without added sugar and other *sweetening ingredients* cheese: max. *fat content* 30 %	☐	☐	☐
meat, sausage, fish, eggs **max. 3 × meat and sausage for lunch** lean muscle meat and cold cuts as bread topping: max. fat content 20 %	☐	☐	☐
thereof: min. half of the daily offer lean muscle meat	☐	☐	☐
1–2 × fish	☐	☐	☐
thereof: min. 1 × fatty fish	☐	☐	☐
oils and fats **rapeseed oil is standard oil** rapeseed oil**,** walnut, linseed, soybean, olive oil**,** margarine made from the oils mentioned	☐	☐	☐
beverages **beverages are available anytime** water, fruit and herbal tea → each without added sugar and other *sweetening ingredients*	☐	☐	☐

	not fulfilled	partially fulfilled	fulfilled
Food qualities and frequencies for 7 catering days in a *OVO-LACTO-VEGETARIAN* DIET			
grain, grain products, potatoes **min. 21 × (min. 3 × daily)** wholemeal products, *pseudocereals*, *muesli* without added sugar and other *sweetening ingredients*, potatoes (raw or precooked), *parboiled* rice or brown rice	☐	☐	☐
thereof: min. 14 × wholemeal products	☐	☐	☐
max. 2 × *potato products*	☐	☐	☐
vegetables and *salad* **21 × (3 × daily)** vegetables (fresh or frozen), *legumes*, *salad*	☐	☐	☐
thereof: min. 7 × *raw vegetables*	☐	☐	☐
min. 2 × *legumes*	☐	☐	☐
fruits **14 × (2 × daily)** fruits (fresh or frozen), nuts and oilseeds, unsalted → each without added sugar and other *sweetening ingredients*	☐	☐	☐
thereof: min. 7 × fresh or frozen; without added sugar and other *sweetening ingredients*	☐	☐	☐
min. 3–4 × nuts or oilseeds	☐	☐	☐
milk and dairy products **min. 14 × (min. 2 × daily), based on the following specifications:** milk, plain yoghurt, buttermilk, sour milk, kefir: max. *fat content* 3,8 %, quark: max. *fat content* 5 % → each without added sugar and other *sweetening ingredients* cheese: max. *fat content* 30 %	☐	☐	☐
oils and fats **rapeseed oil is standard oil** rapeseed oil**,** walnut, linseed, soybean, olive oil**,** margarine made from the oils mentioned	☐	☐	☐
beverages **beverages are available anytime** water, fruit and herbal tea → each without added sugar and other *sweetening ingredients*	☐	☐	☐

	not fulfilled	partially fulfilled	fulfilled
Additional criteria for menu planning			
O*vo-lacto-vegetarian* options are available every day for every meal.			
S*easonal* and *regional* vegetables and fruits are included.			
Local food is preferred in the menu.			
Grains, grain products and potatoes are offered in varied ways.			
Deep-fried and/or breaded products are used at most twice in 7 catering days.			
Industrially produced meat and fish alternatives are offered for lunch no more than one time in 7 catering days.			
Beverages are available anytime.			
The lunch *menu cycle* is repeated after 4 weeks at the earliest.			
The dishes are colourful, and the composition varies.			
The patients' wishes and suggestions are considered in the menu planning as far as possible.			
Culture-specific, *regional* and religious eating habits are taken into account in planning.			
Snacks are available at any time.			
Certain animal-based and vegetal food is not used for especially vulnerable groups due to possible contamination with pathogens.			
Alcohol is not on offer.			
Criteria for the use of *processed food (convenience food)* in mass catering			
Products without palm (kernel) fat, palm (kernel) oil or coconut fat are preferred.			
Unprocessed or low-*processed food* like fresh or frozen vegetables and fruits, meat or fish, is preferred for further processing on site.			
Ultra-*processed food* is always combined or supplemented with low-*processed food*/ components.			
Food with a low content of sugar, fat, saturated fatty acids and/or salt and a low *energy density* is selected.			

	not fulfilled	partially fulfilled	fulfilled
Menu criteria			
The current menu is accessible in advance on a regular and barrier-free basis.	☐	☐	☐
Information is provided on allergens and food additives requiring labelling.	☐	☐	☐
Food is named clearly.	☐	☐	☐
For meat, sausages and fish, the animal species is named.	☐	☐	☐
The basis of alternatives to meat, fish, egg, milk, and dairy products is clearly defined.	☐	☐	☐
If nutritional values are declared, the legal requirements are observed.	☐	☐	☐
Several menu lines are clearly presented.	☐	☐	☐

Planning › **Purchase** › Preparation › Service › Disposal & cleaning

Organic food is used.	☐	☐	☐
Fair trade products are used.	☐	☐	☐
Fish is purchased from sustainable fisheries.	☐	☐	☐
Meat from species-appropriate animal husbandry is preferred.	☐	☐	☐
Environmentally friendly packaging is preferred for all food.	☐	☐	☐
The first-in-first-out principle applies.	☐	☐	☐

Planning › Purchase › **Preparation** › Service › Disposal & cleaning

Recipes, if required with preparation instructions, are used.	☐	☐	☐
Fat is used consciously.	☐	☐	☐
Sugar is used sparingly.	☐	☐	☐
Iodised salt is used, it is salted sparingly.	☐	☐	☐
Herbs (fresh, frozen, dried) and spices are used in a variety of ways.	☐	☐	☐

	not fulfilled	partially fulfilled	fulfilled
Nutrient-preserving and low-fat cooking methods are used.			
Cooking periods are kept as long as necessary and as short as possible.			
Maximum holding time for cooked food is 3 hours.			
The holding temperature of cooked food is at least 60 °C throughout the food.			
Chilled food is stored at a maximum of 7 °C.			
Resource-efficient kitchen appliances are used.			
Appliances are only turned on during operating times.			

Planning › Purchase › Preparation › **Service** › Disposal & cleaning

Proper timing between kitchen and serving is realised.			
Serving staff is informed in detail about the current menu.			
Patients are given opportunities to influence portion sizes.			
Components of the health-promoting and sustainable meal along with the calculated individual quantities are communicated to the patients.			
Questions about a wholesome diet and food intolerances are answered.			

Planning › Purchase › Preparation › Service › **Disposal & cleaning**

Food returns are recorded separately by meal and component and the outcomes are used for future menu planning.			
Unavoidable food waste is made available for energy utilization.			
Attention is paid to the use of environmentally friendly cleaning agents.			
Dosing aids are used.			
Hygiene requirements are observed.			

	not fulfilled	partially fulfilled	fulfilled
Together and yet individual			
In the case of food intolerances like allergies, an appropriate choice of food is possible.			
Food and beverages with adapted textures are available for patients with corresponding indications.			
Diets are available for different nutritional situations and diseases.			

Beyond the plate

Individual food intolerances of the patients are identified by specialists.			
Requests for meals, beverages and portion sizes are collected.			
Patients receive advice and assistance with the selection and order of beverages and meals.			
Mealtimes are fixed and are adhered to.			
Mealtimes are kept free of any interruptions.			
A substitute meal is provided if a patient skips a meal.			
Reasonable mealtimes are observed.			
Rooms where eating and drinking take place offer a bright and friendly ambience.			
Eating and drinking in peace and quiet is possible.			
The eating place is attractively designed.			
Rooms where meals are eaten offer sufficient space for patients with impairments.			
Eating and drinking aids are available and used as needed according to individual abilities.			
Individual and tailored assistance with eating and drinking is provided as needed.			

Please note: “Guidelines for DGE certification” including “DGE certification checklists” are available for DGE certification. These documents explain the criteria examined during the audit and provide guidance on verifying implementation.

Further information:
www.station-ernaehrung.de
Keyword: Externe Qualitätsüberprüfung

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Glossary

Absolute fat content: This declaration refers to the actual fat content of the ripened cheese, whereas the usual commercial information refers to the fat content in the dry matter. The absolute fat content is expressed in g/100 g of food. This information is part of the nutrition declaration.

Body Mass Index (BMI): BMI (kg/m²) is a parameter used to classify body weight into underweight, normal body weight and overweight. It is calculated by dividing the body weight in kg by the squared body height in m [66].

Convenience food: see *processed food*.

CO_2-equivalents: In addition to CO_2 other greenhouse gases (e.g., methane or nitrous oxide) have an impact on global warming. Their climate impact can be converted into the equivalent amount of CO_2 and thus offers the advantage of a standardised indicator of *greenhouse gas emissions*.

Energy density: The energy density of food is defined as the amount of energy (in kcal or kJ) per unit mass (g or 100 g). The energy density is affected, among other things, by water and fat content (9 kcal/g), and to a lesser extent by the carbohydrate (4 kcal/g) or protein content (4 kcal/g). Thus, foods with low energy density are often characterised by a high water and dietary fibre content compared to those with high energy density.

Erosion: The natural process whereby fertile soil on the earth's surface is eroded by wind and water. The process can also be triggered or intensified by agricultural use of soil [67].

Fair food environment: A food environment covers all environmental factors that influence eating behaviour throughout the entire behavioural process. Therefore, the influence of the food environment extends well beyond the actual decision at the moment of consumption and spans the entire behavioural process. This is divided into the 4 phases of exposition (perception, e.g., via advertising and social media), access (depending on price, availability of information, social food and behavioural norms), selection and consumption [16,17]. A food environment is described as fair if it is primarily aligned with human perception and decision-making capabilities and behaviours, and secondly, it is more health-promoting, socially, environmentally and animal welfare-friendly. Thus it contributes to sustaining the livelihoods of both current and future generations [16].

Greenhouse gas emissions: The most relevant greenhouse gases are water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and ozone (O_3). Greenhouse gas emissions are the emissions of these gases into the earth's atmosphere. Greenhouse gas emissions can be used, for example, as a measure of the climate impact of a product and are usually expressed in *CO_2-equivalents*.

Guiding values: Guiding values are stated in terms of aids for orientation and are given for nutrients that are not essential for the organism. In addition, guiding values are given if there is a need, but it varies widely depending on numerous influences (e.g., energy requirements depending on lifestyle, occupation, etc.). Preventive effects of these nutrients are factored in when deriving guiding values.

Hazard Analysis and Critical Control Points (HACCP): This concept aims to carry out a hazard analysis and control of critical control points in food handling

Legumes: Legumes are plant seeds that grow in a pod. They are harvested when fully mature and subsequently dried. Among vegetal food, dried legumes offer the highest protein content. Examples include peas, beans, lentils, soybeans, chickpeas and lupins. In addition to dried legumes, fresh varieties such as green peas, sugar snap peas and string beans also belong to this botanical group. They are not as rich in protein, are harvested unripe and prepared like vegetables [68].

Malnutrition: Malnutrition is a condition of deficiency of energy, protein or other nutrients that leads to altered measurable changes in physiological functions, results in an unfavourable course of disease and is reversible through nutritional therapy.

Menu Cycle: The menu cycle refers to the period of time after which the lunch meals sequence is repeated.

Monocultures: Monocultures are a form of agricultural land use where only one type of crop is grown on the same area for several years. In the long run, this can reduce the nutrient content of the soil and require the frequent use of pesticides or artificial fertilisers [70].

Morbidity: Morbidity refers to the frequency of diseases within a population group [71].

Mortality: Mortality describes the ratio of the number of deaths to the number of persons in the considered sample [72].

Muesli: Muesli consists of one or more cereals without added sugar and other *sweetening ingredients*. These cereals might be processed in different ways, like crushed, ground, or extruded. Other ingredients may include milk, natural yoghurt, quark, fruits (fresh or frozen), nuts or oilseeds.

Nutrient density: Nutrient density describes the amount of a nutrient in a food per unit of energy (e.g., mg/kcal); "nutrient-dense" food is food that is both low in energy and high in nutrients.

Nutritionist: In this DGE-Quality Standard, nutritionists are understood to be dieticians or, in the case of equivalent qualifications for nutritional therapy, also ecotrophologists or nutritional scientists.

Obesity: Obesity refers to the accumulation of body fat that exceeds the normal level. It is diagnosed using the *body mass index (BMI)*. Obesity is classified as *BMI* above 30 kg/m^2 [66].

Ovo-lacto-vegetarian: The ovo-lacto-vegetarian diet combines plant food with only those products of animal origin that come from living animals, e.g., milk, eggs or honey. The vegetarian diet basically excludes food from slaughtered animals, e.g., meat and meat products, fish as well as slaughter fats.

Parboiled: Parboiling is a technical process for treatment of rice or other grains. During this process, vitamins and minerals are pressed out of the outer layers into the grain. Parboiled varieties are therefore nutritionally more valuable than polished varieties.

Plant-based: A plant-based diet according to the recommendations of the DGE consists predominantly of vegetal food such as vegetables and fruit, whole grains and *legumes* as well as nuts and vegetable oils. This selection is supplemented by a small amount of food of animal origin. The term flexitarian diet refers to this type of diet. Other plant-based diets include the Mediterranean and Nordic diets, the Planetary Health Diet and vegetarian and vegan diets [73].

Physical Activity Level (PAL): The average daily energy need for the physical activity as a multiple of the basal metabolic rate. It is therefore a parameter that is included in the calculation of the guiding value for energy intake. PAL levels are derived for different occupational and leisure activities. Depending on the physical activity, the guiding value for energy intake can vary accordingly [32]. A PAL of 1.2 was used to create the nutrient-optimized menus in hospitals due to reduced physical activity and bedridden patients. In rehabilitation clinics, a PAL of 1.4 forms the basis due to the range of exercise therapies on offer.

Potato Products: These are processed food made from potatoes. Included are french fries, instant potato, mashed potato, potato dumpling and pre-shaped potato dough as well as fried potato and potato snack products.

Processed food: According to current legislation, processed foods are all primary products that have been significantly altered, for example by "heating, smoking, curing, maturing, drying, marinating, extracting, extruding or a combination of these different processes" [79].

Protein quality: The protein quality or biological value captures how dietary protein can be incorporated into the proteins of the organism`s body. The protein´s amino acid pattern and its digestibility are crucial factors. The protein quality is often indicated relatively by comparison with a reference protein (egg´s protein or cow's milk casein) [74].

Pseudocereals: These are grains that do not belong to the botanical group of sweet grasses like wheat and rye, but visually resemble them. They include quinoa, amaranth and buckwheat. Due to their nutrient composition, pseudocereals are good supplements to the food group grains and make an important contribution to the nutrient requirement.

Raw vegetables: Raw vegetables refer to raw, unheated vegetables or lettuce, with or without dressing.

Reference values for nutrient intake: The reference values specify quantities for the daily intake of energy and nutrients, including water and dietary fibre. The German Nutrition Society (DGE) publishes them together with the Austrian Nutrition Society (ÖGE).

Regional: A region is an area that forms a geographical, political, economic and/or administrative unit. The manufacturing food company is free to choose the region´s label, but it must be clearly comprehensible for consumers. This can be done by political-administrative borders (counties, administrative districts, federal states), by a kilometre radius around a place to be defined, by indicating metropolitan regions (e.g., southern Germany) or defined regions (e.g., Altes Land, Rhineland, Hessische Bergstraße) [75].

Resource protection: Natural resources, like soil, air or water, should be considered as components of nature. In this context, resource protection is the totality of all actions to preserve or restore natural resources [76].

Salad: Salad includes all leafy salads or preparations containing vegetables and/or lettuce as the main ingredient.

Screening: *Malnutrition* screening is a simple and quick process to determine whether a person is likely to be or at risk of *malnutrition*. If the screening results are positive, a detailed assessment must follow. Screening should be carried out systematically and routinely on all patients on admission to acute hospital using validated screening instruments [77].

Seasonal: If open-field vegetables and fruits growing in classical agriculture are harvested and sold during the harvest period, e.g., the most profitable time, they are referred to as seasonal food.

Social aspects: Social aspects of a more sustainable diet relate on the one hand to the conditions under which food and meals are produced. These include, for example, appropriate wages, compliance with labor rights and training as well as further education opportunities. On the other hand, they refer to the conditions under which food and meals are offered and consumed, e.g., the creation of fair food environments that allow everyone access to a healthy and sustainable diet, or eating and drinking in community (commensality) [78].

Sweetening ingredients: In this DGE-Quality Standard, sweetening ingredients are those ingredients that are used as an alternative to sugar to sweeten food. In addition to sweetener such as aspartame or sugar substitutes, these can also be honey or fruit syrups.

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IN FORM is German's national initiative to promote healthy diets and physical activity. It was initiated 2008 by the Federal Ministry of Food and Agriculture (Bundesministerium für Ernährung und Landwirtschaft [BMEL]) and the Federal Ministry of Health (Bundesministerium für Gesundheit [BMG]) and has since been active nationwide with project partners in every living environment. Aim is to permanently improve people's dietary and exercise habits.
Further information is available at **www.in-form.de**.