



# Evaluation of the implementation of selected nutrition guidelines at daycare facilities in Bremen

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## Summary

One of the main carriers for daycare facilities in Bremen funded the development of a nutrition concept for children under the age of three years which was subsequently implemented at 67 daycare facilities. The objectives of this evaluation were to a) examine the implementation of selected quality standards regarding nutrition in this setting and b) to compare the implementation of quality standards at daycare facilities by catering system ('cook and serve' vs. 'external catering'). The evaluation included a survey of kitchen and/or facility managers and the assessment of 54 submitted meal plans.

Twenty-six daycare facilities that accepted children from the age of 8 weeks on stated that nutrition with breast milk was possible at their facility. Twenty-two of these facilities reported that they partially or entirely considered recommendations from the nutrition concept when selecting convenience products as supplementary food. The "Bremen Checklist" was implemented in more than 80% of the examined 54 meal plans. The results indicate that the nutritional quality is similar across the different daycare facilities of the carrier. The results of the evaluation also provide important information for future implementation of the nutrition concept at daycare facilities.

**Keywords:** catering system, nutrition, children, daycare facility, quality standard, "Bremen Checklist"

daycare facilities is evident because many children benefit of it. In March 2015, approximately 2.01 million children in Germany were provided with lunch in a daycare facility [4]. In 2015 in Bremen, over 24,500 children were cared for in daycare facilities, approx. 3,900 under the age of three years [5]. Approximately 89% of children under the age of three years received lunch at daycare facilities in Bremen; for children aged three years and above (until entering school), the corresponding figure was approx. 93% [6].

## Background

Since 1999, the Leibniz Institute for Prevention Research and Epidemiology (BIPS) and the State Association of Protestant Daycare Facilities for Children in Bremen (a carrier for daycare facilities, subsequently referred to as the "State Assoc. Prot. Daycare Facilities") collaborate to provide expert nutritional consulting to the daycare facilities of the carrier.

During the time of this evaluation in 2013/2014, the "State Assoc. Prot. Daycare Facilities" covered 67 daycare facilities, including branches. These cared for about 4,500 children aged eight weeks to ten years, including approx. 600 children under the age of three years (♦ Table 1). Lunch was provided in all facilities. In 23 facilities, up to 50 children participated in the lunch, in 34 daycare facilities between 51 and 100 children,

## Introduction

To warrant a healthy development, a child must be provided with an enjoyable and balanced diet that is appropriate to his or her needs. Thus, the provision of high quality and balanced meals for children is an indicator of the quality of an individual daycare facility [1]. A balanced nutrition contributes to a healthy physical development and may help prevent nutrition related diseases later in life [2]. Moreover, nutritional experiences in early childhood have an impact on behavioral patterns related to eating and drinking [3]. The relevance of nutrition at

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Number (%) of facilities (N = 67)	Age of children at admission
26 (39 %)	older than 8 weeks
8 (12 %)	at the start of the 9 <sup>th</sup> month
33 (49 %)	after completion of the first year of life

Tab. 1: Age of children at the time of admission to Bremen Protestant daycare facilities (2013/2014)

in seven daycare facilities between 101 and 150 children, and in two daycare facilities between 151 and 200 children; one facility provided no data. In 47 (70%) of the facilities, lunch was prepared on site (referred to below as ‘cook and serve system’). Eighteen facilities (27%) were supplied with warm food and two (3%) received deep frozen food; both are referred to below as ‘external catering’. In daycare facility kitchens with a ‘cook and serve system’, experienced staff with professional training in domestic economy or trained cooks are responsible for the quality of meals.

### Nutritional counseling of the BIPS

The nutritional counseling is mainly targeting the staff of the daycare facilities with a responsibility for meal preparation. The BIPS holds several advanced study courses annually including some for kindergarten teachers, as well as meetings with the kitchen managers. This cooperation is intended to ensure that the food provided is of good quality and it supports the development of healthy eating habits among children.

### “Nutrition Concept – Meals in Daycare”

The concept “Meals in Daycare” [“Essen in der Kinderkrippe”] exists since January 2011 as part of the conceptual framework for the care for children under the age of three years of the Bremen State Assoc. Prot. Daycare Facilities [7]. The nutrition concept was developed based on scientifically established recommendations in collaboration with representatives of

the carrier, kitchen and daycare staff, and the BIPS. It includes quality standards and recommendations for meal plans and for nutrition education during meals targeting children below or older than one year. One of the objectives of the carrier was to ensure that nutrition was similar in the different facilities. One reason for developing a specific nutrition concept for the carrier was the expectation that a tailored concept might increase the acceptance among the carrier’s daycare facility staff. The concept was transferred to the individual facilities by providing specific training as part of the nutrition counseling of the BIPS.

### Recommendations for the nutrition of children under 6 years of age in Germany

For children aged four to six months, no other form of nutrition can be as unreservedly recommended as breast milk. If breast feeding is not possible, several industrially produced formulated foods are available [8]. Recommendations for the composition and preparation of supplementary foods are provided in the recommendations issued by medical associations [8, 9]. Several aspects should be considered when transitioning to solid foods at the age of about ten months: Foods with little or no seasoning should be offered to children, foods with sharp edges that children might choke on should be avoided [10].

small amounts of	high fat and high sugar foods
moderate amounts of	animal products
large amounts of	drinks and plant-based foods

Tab. 2: The OptiMIX® concept [2]

The Research Institute of Child Nutrition in Dortmund (FKE) developed the OptiMIX® concept, a prevention-focused nutritional concept for children aged one year and older which takes both the D-A-CH reference values for nutrient intake, as well as prevalent eating habits and preferences in Germany into account [2, 11]. Three basic rules are summarized (♦ Table 2).

Other recommendations concern food selection, but will not be further described here [2].

### Dietary requirements at daycare facilities

The recommendations for child nutrition in daycare facilities are the same as for nutrition in families [12]. The nutrition concept for the Protestant daycare facilities in Bremen contains recommendations regarding nutrition in the first year of life and “transitional food” which are based on the recommendations of scientific societies [8–10]. In September 2011, the German Nutrition Society (DGE) first added nutrition recommendations for children under three years to their “Quality Standard for Nutrition in Child Daycare Facilities” [13]. The provision of nutrition for children in the first year of life can be a challenge for the facilities because it requires special knowledge and resources. Attention must also be paid to the development of each individual child (e.g. dental status, interest in new foods). Several different concepts for the provision of nutrition and nutrition education in daycare facilities are currently available. In addition to “Quality Standard for Nutrition in Child Daycare Facilities” of the DGE [13], the OptiMIX® concept



can be applied in daycare facilities [2, 14]. Furthermore, the “Bremen Checklist” of the BIPS provides instructions for the planning of a 5-day meal plan and daily lunch at daycare facilities [15] (◆ Overview 1). The Bremen Checklist was developed in 1992 on the basis of the “optimized balanced diet” [2] and is regularly updated. During the course of the collaboration with the Bremen daycare facilities, the Bremen Checklist proved to be a feasible and practice-oriented tool for quality assurance of meal plans; it is therefore included in the overall nutrition concept as one of the quality standards [7].

### Catering systems

There are five different systems for providing nutrition in daycare facilities (◆ Box). However, the fresh food system – without ready-to-use components, such as deep frozen vegetables – is now hardly ever employed in communal catering [16]. In Germany in 2015, 55% of daycare facilities were provided with warm meals, 30% prepared the meals on site with the ‘cook and serve’ system, 7% employed the ‘frozen food’ system, and 3% the ‘cook and chill’ system [4].

### Objective

In 2013, the State Association of Protestant Daycare Facilities in Bremen commissioned the BIPS to evaluate the implementation of the nutrition concept in the facilities. The evaluation was performed between December 2013 and February 2014, with the aim of evaluating

- the implementation of a selection of carrier-specific quality requirements of the nutrition concept.
- the implementation of the quality requirements for meals in daycare facilities varying by catering system (‘cook and serve’ and ‘external catering’).

#### OVERVIEW 1: BREMEN CHECKLIST [15]

Components of a balanced meal plan for one week (= 5 days)
one high quality meat dish
one stew or casserole (if possible vegetarian)
one vegetarian wholefood dish
one salt-water fish dish
one children’s special request
two to three times fresh fruits
two to three times raw food or fresh salad
at least two times fresh potatoes

### Methods

Because there were many different requirements included in the nutrition concept, some requirements were jointly selected for evaluation with the carrier. For example, for children under the age of one year, the requirement for feeding with breast milk and for supplementary food, as well as the provision and planning of “transitional food” was examined. For children above the

age of one year, information about the meal planning and the quality of foods used was evaluated. Whenever possible, the information was evaluated for the entire sample of daycare facilities and, in addition, analyzed by catering system.

To assess the above mentioned parameters, persons responsible for the provision of nutrition and nutrition education and daycare facility managers completed a questionnaire. The comprehensibility of the questionnaire was checked in a preliminary test in three daycare facilities outside of Bremen. The questions were mostly closed; personal comments were in part allowed. The results were analyzed using SAS 9.3. Sixty-six of the 67 facilities participated in the survey.

In order to validate the information provided in the questionnaires, the submitted 5-day meal plans for specified calendar weeks in 2013 were evaluated. Fifty-four meal plans were evaluated, including 43 meal plans of daycare facilities with the ‘cook and serve’ system and 11 of

In the ‘**cook and serve**’ system, the dishes are prepared on site from fresh and ready-made components. The advantage is that a wide variety of dishes can be provided. In addition, the sensory quality of the dishes is good if they are kept warm for only short periods of time. Loss of nutrients is low and there is high flexibility to respond to the children’s wishes and needs [16]. Under favorable conditions, children may be involved in the meal preparation in the kitchen which is valuable in terms of nutrition education and appreciation of individual dishes [3]. However, the demands for space, equipment and staff are high.

For ‘**cook and hold**’, warm meals are delivered to the facility. The food is portioned at the daycare facility and distributed to the children. If the food has to be transported over long distances or kept warm for long periods, it may lose flavor and nutrients, and may not look appealing. Demands for space, equipment and staff are relatively low [16]. Depending on the food supplier, special requirements for child nutrition can be taken into account.

This is also the case for the ‘**frozen food**’ system (**deep frozen food**). Deep frozen meal components are stored at the daycare facility at a minimum of –18 °C and heated up on site. The advantages are the simple handling and the possibility of avoiding long heating times.

‘**Cook and chill**’ (cooled food system) resembles the ‘cook and freeze’ system. Instead of frozen foods cooled dishes are delivered and heated up on site [16].

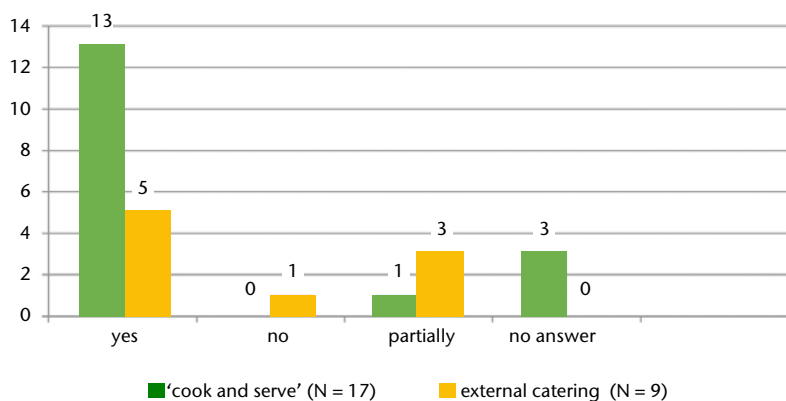


Fig. 1: “In the meal plans at our facility, additives subject to labelling are specified in a clear and comprehensible manner and explained in an adjacent display.” Evaluation by catering system

daycare facilities with ‘external catering’. The meal plans were evaluated manually, using the Bremen Checklist. There was not sufficient information on the children’s special request: Therefore, these results are not reported here.

## Results

Fifty-four of the surveyed 66 daycare facilities confirmed that they had received the nutrition concept. Seven stated that this was not the case, including five with ‘external catering’. Two daycare facilities were unable to answer the question; both had ‘cook and serve’ systems. Information of three facilities was missing. Knowledge of the content of the nutrition concept was not assessed.

### Catering for children under the age of one year

This group of questions was answered by 26 facilities taking in children from the age of 8 weeks on (♦ Table 1).

Seventeen of these facilities employed the ‘cook and serve’ system and nine had ‘external catering’ (eight employed ‘cook and hold’ and one used ‘cook and freeze’). Twenty-five facilities reported that feeding of breast milk was possible at their facility.

Many facilities used industrially produced convenience products as supplementary food due to strict legal requirements of the German diet regulations [17]. Appropriate nutrition for babies is possible with ready-to-use products, if attention is paid to the composition when selecting the product. It is essential that the quantity and variety of ingredients in the convenience baby food are similar to that of ingredients listed in recipes for cooking baby food at home [8, 9]. Twenty-two (85%) of 26 facilities reported that they fully or partially complied with the recommendations of the nutrition concept [7] when selecting convenience supplementary food products (♦ Figure 1).

An additional eight facilities taking in children from the age of nine

months (N = 34, ♦ Table 1) were asked to comment on the statement: “In our facility, the transition to solid foods starts gradually towards the end of the first year of life, at about nine or ten months of age”. Thirty-one facilities stated that they prepared transitional food; two partly confirmed this statement and one answer was missing. The statement “The selection and quality of the foods provided by us as transitional diet correspond with the quality criteria for a transitional diet described in the nutrition concept.” was confirmed by 28 daycare facilities, including 23 daycare facilities with a ‘cook and serve’ system and five with ‘external catering’. This statement was only in part confirmed by five daycare facilities and one answer was missing.

### Nutrition after completion of the first year of life

These questions were answered by all daycare centers participating in the evaluation (N = 66).

### Menu planning, labelling and composition

Forty-six (98%) facilities with a ‘cook and serve’ system and ten (53%) with ‘external catering’ stated that they implemented the Bremen Checklist when preparing the meal plans.

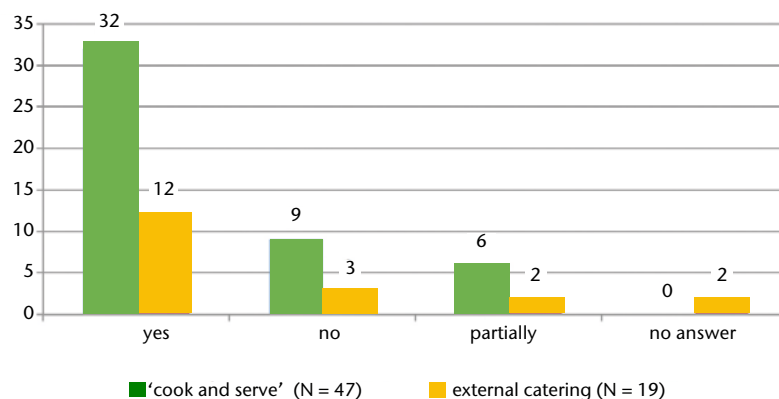


Fig. 2: “In the meal plans at our facility, additives subject to labelling are specified in a clear and comprehensible manner and explained in an adjacent display.” Evaluation by catering system



Labeling of food additives is legally mandated and specified in the German Additives Authorization Regulation (“Zusatzstoff-Zulassungsverordnung”)[18]. Allergen labeling, which has only been mandatory since December 2014, is not yet a component of the nutrition concept [19]. In total, 44 (67%) of the 66 daycare facilities reported that they highlighted the additives in the meal plans, eight daycare facilities (12%) only partially confirmed this statement, twelve (18%) reported not highlighting additives, and two answers were missing (♦ Figure 2). The recommendation to display the meal plan in a “child-friendly way”, e.g., as a picture [7, 13], was implemented in twelve daycare facilities, including one with ‘external catering’ (♦ Figures 3 and 4).

**Quality of food products**

“Products containing artificial flavors, taste enhancers, artificial food coloring, or preservatives are largely avoided in our facility.” Fifty-two (79%) of the 66 daycare facilities confirmed this statement, including 39 (83%) of the 47 daycare facilities with ‘cook and serve’ and 13 (68%) of the 19 daycare facilities with ‘external catering’.

“In our facility, vegetables, salad and fruits are purchased (...) in accordance with their seasonal availability.” Fifty (76%) of the 66 facilities confirmed this statement, in-

cluding 37 (79%) of the 47 daycare facilities with ‘cook and serve’ and ten (53%) of the 19 daycare facilities with ‘external catering’. However, when examining the list of vegetables and salads offered at the facilities reported in the questionnaire of the “past week” (January/February 2014), we found that, of the total of 42 specified sorts of vegetables and salads, only 21 had been in season or that the reported vegetables and salads were stock goods (♦ Table 3). Twenty-nine facilities provided information on the percentage of organic foods purchased within their 2013 food budget. Thirty-seven daycare facilities answered the question with “don’t know”, including 18 of the 19 daycare facilities with ‘external catering’. The lowest proportion of organic foods purchased was 0%, the highest 80%. One of the recommendations of the nutrition concept is to spend a minimum of 10% of the food budget on organic foods.

**Evaluation of the submitted meal plans**

In the 54 submitted meal plans, more than 80% of the criteria of the “Bremen Checklist” were implemented – independent of the catering system (♦ Figure 5). The comparison between responses given in the questionnaires and results of the evaluation of the meal plans shows

that daycare facilities with external catering subjectively rated their meal plans lower than they actually were.

Compared to results of assessments in daycare facilities reported by other studies [4, 20–22], the requirements “one vegetarian main dish”, “one salt-water fish dish”, “two to three times fruits” and “two to three times raw food/salad”, respectively within five days, were fulfilled to a great extent.

**Discussion**

**Transfer of the nutrition concept**

The nutrition concept was available at 81% of the surveyed daycare facilities. The other daycare facilities may not have been reached with the information regarding the nutrition concept or the title “Nutrition in Daycare” may not have sparked their interest. Five of seven daycare facilities without nutrition concept received ‘external catering’ and may therefore have regarded the nutrition concept as irrelevant to their facility.

**Nutrition in the first year of life**

The results regarding the feeding of breast milk and the selection of convenience supplementary food products shows that the recommendations were implemented in more than 80% of the facilities – regardless of the catering system. The recommendation regarding transitional food which was included in the nutrition concept was followed in 82% of daycare facilities, including all 23 of daycare facilities with a ‘cook and serve’ system and in five of the eleven daycare facilities with ‘external catering’ [7, 10]. The differences between the catering systems indicate that daycare facilities with ‘cook and serve’ systems are more likely to have the necessary knowledge and requirements (than those with

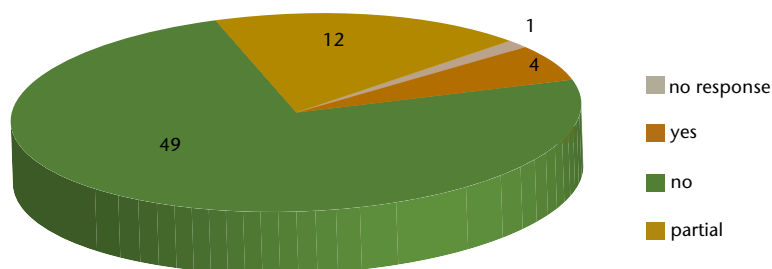


Fig. 3: “At our facility, there is a child-friendly display of the weekly meal plan in addition to the written version” (cf. [7] catering concept p. 26) (N = 66, overall evaluation)





Fig. 4: Example of an illustrated meal plan (Prot. daycare facility Immanuel, Bremen)

‘external catering’) and that not all caterers providing transitional food may follow the recommendations.

### Nutrition after completion of the first year of life

It was noteworthy that daycare facilities with ‘external catering’ subjectively rated their meal plans lower than they actually were. Possible reasons may be that interviewees felt that the dishes supplied were of low quality, that they generally disapproved of external catering or that they lacked knowledge regarding the criteria of the Bremen Checklist.

About one third of the daycare facilities – regardless of catering system – failed to fulfil the legal requirements to mark additives in the meal plans [18]. This subject is regularly covered in workshops; additional coaching on site may be necessary.

Facilities with a ‘cook and serve’ system more often reported that they largely avoided products with artificial flavors or artificial food coloring and preservatives. Contrary to the answers provided in the questionnaire, the majority of day-

care facilities did not offer seasonal vegetables. The survey took place in winter and it is possible that many children are generally not familiar with certain types of winter vegetables and initially reject them. Regular provision of small quantities of these types of vegetables or salads – prepared in different ways – might improve acceptance [3].

Despite similar food budgets of daycare facilities with the same catering system, a wide range regarding the proportion of organic foods used could be observed. It is therefore conceivable that the decision to use organic foods is not exclusively based on cost but that other factors may play a role when considering the use of organic products. With one exception, daycare facilities with ‘external catering’ were unable to provide information on the proportion of organic foods used. This suggests that in these facilities available information about the quality of meals is inadequate.

Twelve daycare facilities displayed child-friendly meal plans. This component should receive more attention in the future, possibly as an additional quality standard because it is an important part of nutrition-

al education in daycare facilities. It would be easier to manage the additional work related to displaying a child-friendly meal-plan if both kindergarten teachers and kitchen staff regarded this task as essential for nutritional education [4].

### Limitations

The written survey of the daycare facilities was not anonymous. However, the results were presented to the carrier in an anonymous form. Socially desirable responses in the rating of the implementation of the quality standards were expected and were reflected in the answers given regarding the provision of seasonal vegetables.

Employees of the suppliers for the ‘cook and hold’ foods were not surveyed. The statements regarding the quality of external catering may have been influenced by dissatisfaction with the meals supplied at daycare facilities with ‘external catering’. The results of the analysis of the meal plans somewhat validate this assumption.

The selection of meal plans is not representative because only one single 5-day menu was evaluated per daycare facility. Moreover, the meal plans in the daycare facilities with ‘external catering’ were often provided by the same food supplier and were therefore included more than once in the overall evaluation of the total 54 meal plans. A higher number of analyzed meal plans would have been necessary

1. Cucumber (52)	6. Kohlrabi (30)
2. Carrots (51)	7. Leeks (17)
3. Tomatoes (39)	8. Cauliflower (16)
4. Bell Pepper (37)	9. Broccoli (13)
5. Lettuce (31)	10. Celery (12)

Tab. 3: “Which vegetables and salads (fresh or deep frozen) were on the menu at your daycare facility last week? Please list” (frequency of answers, multiple answers allowed)

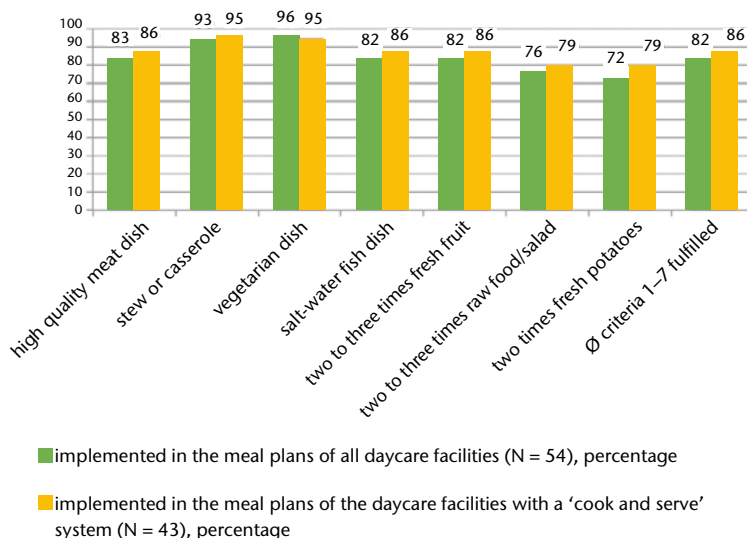


Fig. 5: Comparison: Implementation of the Bremen Checklist (without the “children’s special request”) at all daycare facilities and at daycare facilities with the ‘cook and serve’ system

to further consolidate our results. Moreover, meal plans can only provide information regarding balance and variety of the meals and the tailoring of the meals to the needs of the target group. Statements about nutrients cannot be made without prior calculation of the recipes [23].

### Conclusion

In general, the results indicate that the quality standards were effectively implemented at the daycare facilities studied – even when taking a slightly positive bias due to socially desirable answers into account. Regarding individual criteria, there is evidence for quality differences between the different catering systems. However, these differences cannot solely be explained by the existence of these systems. Considering the many years of professional support provided by the BIPS, no reliable conclusion can be reached about how the nutrition concept influenced meal quality because trained staff at daycare facilities with a ‘cook and serve’ system attended workshops conducted by the BIPS for years. Staff of daycare fac-

ilities with ‘external catering’ attended these workshops less frequently. The daycare facilities with ‘external catering’ where the nutrition concept was available may still have benefited from the information provided in the concept.

It makes sense, however; to have binding and precise instructions for nutrition in daycare facilities because the implementation of these instructions can be evaluated which may inform necessary adaptations at the daycare facilities and lead to improved counseling and training. Hence, the current evaluation also provides information for future implementation of the nutrition concept.

**Transfer:** One possible approach to transporting nutrition requirements into daycare facilities is to develop a carrier-specific nutrition concept. The title and contents should be selected in such a way that all facilities of the carrier feel that they are being addressed, e.g. that it may be applied to different age groups of children and to different catering systems. If at all possible, the implementation of the nutrition concept should be binding, ideally via contractual agreements with external caterers.

It is also important to have clear communication and transparency regarding the content and scope of the services when cooperating with external caterers.

**Training and information:** If facility managers, kitchen staff or kindergarten teachers in daycare facilities with ‘external catering’ are responsible for the nutritional quality, they must be familiar with and be able to apply the nutrition concept of the carrier, including the recommendations for a balanced diet at the facility and the requirements for a balanced meal plan. It would be desirable for them to participate in training workshops possibly in the form of targeted short in-house training sessions. In addition, it may be helpful to issue a summary of the nutrition concept to ensure that all employees, parents and interested third parties receive a quick overview [4].

Lived nutritional education is an essential duty of daycare facilities [13] and should be part of the pedagogical daily routines, particularly when children do not experience the daily preparation of warm meals. The quality of the meals provided, the context of the meals, nutrition education activities related to eating and drinking and the design of the meal plans are all important factors. Hence, daycare staff ought to be continuously trained on these issues. In view of the high quality requirements for the provision of nutrition in daycare and the continuously increasing responsibilities of daycare staff, regular checks on whether the available resources of funds, space, time, and personnel are adequate at the facilities, are necessary [20]. In addition, general motivation to implement a nutrition concept might be increased by further promoting the concept and by internally and externally emphasizing the health promoting effects of the provision of a balanced diet [4].



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#### Conflict of Interest

The authors declare no conflict of interest.

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<sup>1</sup> For an update of the cited article, please refer to p. M716 in this issue.