Research Contribution

*Journal of Foodservice Management & Education, Volume 15, Number 2, Pages 8-13– XX .* ©2021
Published jointly by the Foodservice Systems Management Educational Council and the National Association of College & University Food Services

# IMPLEMENTATION OF INTERNATIONAL DYSPHAGIA STANDARDS FOR FOOD AND DRINK MODIFICATION: A MODEL PROCESS FOR FOOD SERVICE OPERATIONS

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**ABSTRACT**

The International Dysphagia Diet Standardisation Initiative is a global guide to improve the lives of those with dysphagia. To standardize and improve patient care, Intermountain Healthcare transitioned from the national dysphagia standards to the international dysphagia standards. A five-step process including recipe testing, recipe modification, and updated training and educational materials for foodservice employees and caregivers involved in dysphagia care was used in the transition. Foodservice employees play a vital role in ensuring patient safety by adhering to and implementing current dysphagia standards. Intermountain Healthcare's implementation of the international guidelines provides a transition model for other foodservice operations.

**Keywords:** dysphagia management, IDDSI implementation, hospital foodservice, healthcare

**Acknowledgements:** The authors wish to acknowledge Dr. Sarah Bellini, PhD, RDN, CD and Dr. Nathan Stokes, PhD for their guidance on the review process, Ali Spencer, MS, RDN, CD at Intermountain Healthcare, and the help provided by the foodservice staff and management at the Intermountain Healthcare facilities.

## INTRODUCTION

Foodservice personnel play an important role in dysphagia management as they prepare food and beverages. Dysphagia refers to swallowing difficulties or dysfunction (Minshall & Pownall, 2019). Normal swallowing occurs in three phases: oral, pharyngeal, and esophageal (Baijens et.al., 2016). Swallowing difficulties may occur during any of the phases and may include the inability to chew food or form a bolus properly during the oral phase or inability to clear food or liquid from the mouth or pharynx after swallowing (Baijens et al., 2016; Minshall & Pownall, 2019). Dysphagia is estimated to affect eight percent of the general population and causes are often related to other underlying medical conditions (International, 2016).

Complications of dysphagia include aspiration and malnutrition. Aspiration is foreign matter entering the airway that causes the individual to choke (Gallegos et al., 2017). Repeated aspirations may lead to respiratory infections and other serious complications requiring further medical treatment (Minshall & Pownall, 2019). Individuals with dysphagia often experience malnutrition and dehydration from reduced intake because eating and drinking can be painful and embarrassing, and when aspiration occurs, can be fatal. (Gallegos et al., 2017; Minshall & Pownall, 2019; Taylor, 2019).

### Dysphagia Management

Oral nutrition, or feeding by mouth, is the preferred feeding method for patients with dysphagia as it is less invasive and expensive than nutrition support (Leonard et al., 2014). Speech and language therapists (SLT) strive to prevent aspiration and choking by carefully determining diet and fluid modifications, providing swallow therapy, and educating patients (Minshall & Pownall, 2019). Based on the recommendations of the SLT and the swallowing ability of the patient, thin liquids are thickened, and foods are softened and modified in size to reduce the risk of aspiration (Leonard et al., 2014; Taylor, 2019). If a patient is considered to be at nutritional risk, a registered dietitian nutritionist (RDN) is consulted to help with the dysphagia diet implementation by evaluating the adequacy of the patient's nutrient intake and monitoring for malnutrition (Taylor, 2019). Foodservice employees implement the SLT and RDN recommendations. The training and management of foodservice employees is key in providing appropriate dysphagia care.

### Dysphagia Diets and Standards

Since the early 2000s, the National Dysphagia Diet (NDD) standards have provided guidance for dysphagia management (McCullough et al., 2003). The NDD standards provided standardized terminology for dysphagia diets based on a continuum of different foods and textures (McCullough et al., 2003; Zwiefelhofer, 2012). The NDD contained three levels of modified food: level 1, Dysphagia Pureed; level 2, Dysphagia Mechanically Altered; and level 3, Dysphagia Advanced or Soft (McCullough et al., 2003). The NDD also contained three levels of liquid modification: nectar like, honey like, and pudding thick (Gallegos et al., 2017).

Even though the NDD was standardized in terms of food and liquid levels, these standards were not implemented by all dysphagia care teams and healthcare facilities in the United States or internationally (International, 2016; Zwiefelhofer, 2012). This variability in dysphagia management created confusion for patients and caregivers when labels, levels, and terminology did not translate from different facilities, areas, or countries who provided dysphagia care to the same individual (International, 2016). The International Dysphagia Diet Standardisation Initiative (IDDSI) was created in 2013, published in 2015, and updated in 2019 (International, 2016). The IDDSI committee reviewed existing literature on dysphagia and dysphagia care and developed a framework with standardized descriptors for food and drink modifications for individuals with dysphagia (International, 2016). The publication of new dysphagia standards introduced the need for foodservice operations to review and update menus and recipes and train foodservice employees in preparing modified food and drinks to meet the new standards.

### IDDSI Framework

The IDDSI framework consists of eight levels (0-7) of food textures and drink thickness on one continuum (See Figure 1). Liquids are levels 0 through 4 with thickness increasing with each level. Level 0 is naturally thin liquids such as water. Level 1 contains liquids that are slightly thicker than water, but can be easily sipped through a straw. Level 2 contains mildly thick liquids that require more effort but can still be sipped through a straw. Liquidized foods and Moderately Thick

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liquids share similar consistencies and are on level 3. Level 4 contains extremely thick liquids and shares the same consistency as Level 4 pureed foods (International, 2019). Food textures are contained in levels 4 through 7. Level 4 contains pureed foods. Transitional foods (Levels 5 through 7) are foods that begin as one texture but change into another when moisture or heat is added (International, 2019).

## METHODS

### Implementation of IDDSI at Intermountain Healthcare: A Model Approach

Intermountain Healthcare (Intermountain) is comprised of 23 major hospitals throughout the Intermountain west. All Intermountain hospitals provide care for patients with dysphagia. Prior to 2020, Intermountain used the NDD standards for their dysphagia management. In 2018, Intermountain made plans to adopt and implement the new IDDSI guidelines. The implementation process covered a two-year period and included the following steps to implementation:

1. Creating an interdisciplinary implementation team
2. Conducting testing procedures on existing dysphagia menu items
3. Standardizing dysphagia recipes across the healthcare system
4. Creating foodservice training and educational materials
5. Implementing foodservice training

The 5-step process used by Intermountain provides a model approach for other foodservice operations.

### Creating an Interdisciplinary Implementation Team

Implementation of the IDDSI framework involved the creation of a healthcare systems level interdisciplinary implementation team (team) who defined the processes and tasks needed to transition to the IDDSI guidelines. The team consisted of administrative foodservice dietitians, clinical dietitians, a dietetic intern, chefs, nutrition services directors, and representatives from nursing, speech therapy, pediatric care, and computer systems. The team met monthly to discuss the implementation process. Each representative was responsible for keeping their disciplines informed. The director of the team, a RDN and clinical nutrition manager, assigned each team member/workgroup with tasks related to their area of expertise. Workgroups were formed as needed to accomplish tasks. The foodservice/culinary workgroup was comprised of the director of patient meals, the systems-level chef, and the dietetic intern. This workgroup was responsible for all recipe testing, menu modification, and foodservice employee education and training to meet the IDDSI framework guidelines.


**Figure 1. IDDSI Framework (International, 2019).**



### Conducting Existing Menu Items Testing to Determine Modification Needs

Intermountain utilizes one adult dysphagia menu across the system and one children's dysphagia menu. Each item (drink and food) on the NDD based dysphagia menu was tested to see if it met the new IDDSI standards or required modification. Testing was completed over a four-month period. The testing methods used to determine the accuracy of food and liquid consistency for each level were referenced from the IDDSI framework, along with descriptions and characteristics of the level and the rationale for each level (International, 2019). Testing methods included the fork pressure test, the spoon pressure test, the spoon tilt test, the fork drip test, and the gravity flow test (International, 2017). Table 1 shows a description of each test and testing method. Additional details are available at https://iddsi.org/resources/ under Framework Documents: IDDSI Framework and Detailed Level Definitions.

Recipe testing occurred at both adult and pediatric facilities. The NDD -based dysphagia menu items and closest corresponding IDDSI level were organized on a spreadsheet with columns for the results of each test (i.e. size, fork pressure, etc.) for both the drink (IDDSI Levels 1-3) and food (IDDSI Levels 4-7) items. Levels 2-4 aligned well with the NDD nectar, honey, and pudding thick levels respectively. Levels 4-6 on the IDDSI framework aligned well with NDD levels 1-3. Level 7 on the IDDSI framework does not have a corresponding level from the NDD. The spreadsheet included a column for notes on how to modify each menu item to meet the IDDSI guidelines.

The workgroup worked with the chef and kitchen manager at each facility to complete the testing. On testing days, food preparation timing was coordinated so that each menu item being tested was cooked in a staggered manner to allow for sufficient testing on each dish and recording of results and notes.

**Drink Testing.** Each drink item was tested using the methods described in the IDDSI framework for levels 1-3. (see Table 1 for detailed descriptions). Each drink item that met the IDDSI framework requirements was recorded on the testing procedure spreadsheet. For the drinks that did not meet the testing requirements, thickener amount was adjusted until the drink met the framework level requirements. The amount of thickener needed was noted on the spreadsheet. Table 2 lists key findings and recommendations for drink testing.

From the test results, a drink reference preparation chart was created specifying the amount of thickener needed for each drink item and preparation notes such as stirring time and thickening period. This reference chart is used by foodservice employees in the kitchen and by nurses on the patient unit when thickening beverages.

**Food Testing.** Food testing began at level 4 Pureed/Extremely Thick. Only the food items that were made in house were tested. Intermountain purchases several items as preformed pureed products that meet IDDSI standards for the Pureed level. Each food item for

**Table 1. IDDSI Framework Level Descriptors and Accompanying Testing Methods (International, 2017)**

| Framework Level | Description | Testing Methods |
|---|---|---|
| Level 0: Thin Liquids | Liquid should flow quickly like water | **Gravity Flow Test** (no liquid in syringe after ten seconds) |
| Level 1: Slightly Thick | Liquid should be thicker than normal water. | **Gravity Flow Test** (between one and four milliliters (mL) of liquid left in the syringe) |
| Level 2: Mildly Thick | Liquid should require effort to drink through a standard straw. | **Gravity Flow Test** (between four and eight mL liquid left in the syringe) |
| Level 3: Moderately Thick/Liquidized | Liquid can be eaten with a spoon but not a fork. | **Gravity Flow Test** (at least eight mL of liquid left in the syringe)<br>**Fork Drip Test** (liquid drips slowly through the prongs of a fork)<br>**Spoon Tilt Test** (pours) easily from a spoon when tilted |
| Level 4: Extremely Thick/Pureed | Food or drink cannot be sucked through a straw or drunk easily from a cup. | **Fork Pressure Test** (the tines of a fork leave a clear indentation when pressed on the sample)<br>**Fork Drip Test** (does not flow continuously through the prongs of a fork)<br>**Spoon Tilt Test** (hold its shape on a spoon but slip easily off when tilted) |
| Level 5: Minced and Moist | Food at this level must be soft and moistened throughout. Biting is not required, and minimal chewing is needed. | **Size Check** (particle sizes 4 millimeters (mm) in width and 15 mm in length or less for adults, and 2 mm in width and 8 mm in length or less for children)<br>**Fork Pressure Test** (does not return to original shape and must not make the nail blanch white)<br>**Fork Drip Test** (must not easily fall through the prongs of a fork)<br>**Spoon Tilt** (must be able to hold its shape on a spoon and should slide off easily when tilted) |
| Level 6: Soft and Bite-Sized | Chewing is required for this level. | **Size Check** (8 mm or less for children and 15 mm or less for adults)<br>**Fork Pressure Test** (must not return to its original shape when pressed. Pressure required to squash food blanches nail white)<br>**Spoon Pressure Test** (side of spoon can cut food into smaller particles, and when pressed with a spoon the sample does not return to original shape) |
| Level 7: Easy-to-Chew/Regular | Easy-to-Chew: foods are naturally soft and tender in texture and require no further modification. No hard, chewy, crunchy, or stringy foods are allowed on this level. Regular refers to normal foods with no texture requirements. | Testing methods are the same for Easy-to-Chew as Level 6. Testing methods for Regular food are not applicable. |

levels 5-7 were tested using the methods described in Table 1. As the NDD menu did not have a food level that corresponded with Level 7 Easy to Chew, the workgroup only tested regular menu items that the head chef determined may be naturally soft and tender without need for food modification. The menu items that met the testing requirements for this level were labeled as appropriate for the Easy-to-Chew diet order. Examples include tuna salad, ham and egg scramble, and blueberry muffins.

**Testing Results.** Over 300 menu items were tested and approximately 40% failed the initial tests, meaning they would require modification to meet IDSSI standards. Table 2 summarizes the key findings and recommendations from the testing. All the issues were recorded next to the corresponding menu item on the spreadsheet with notes for modification. The head chef reviewed the initial testing results and determined the need for further testing and modification. The testing results were also shared with the other members of the IDDSI implementation team.

### Standardizing Recipes

The next step in the IDDSI implementation process was recipe modification and standardization. The former dysphagia recipes were edited and standardized to address the needed changes to meet the IDDSI guidelines found during the testing process. The workgroup standardized the dysphagia recipes to address the issues with each menu item.

The head systems chef created a draft version of the new recipes with modifications on techniques and ingredients based on the initial test results. Each menu item was then prepared by facility chefs following the new recipe and was retested by the workgroup. Recipe revisions were made for clarification based on the retest and feedback from the facility chefs. One example of a revision was to add the fork reference information along with the size requirement to each recipe for levels 5 and 6. This enabled the chefs to easily gauge if the food particles were the correct size for the recipe they were following. For example, on level 6 recipes this information was included after the particle size requirement of 15 mm - "15 mm, approximately the width of a room service fork." These additions were necessary to ensure the recipe yielded the same size particles each time when followed. Prior to these additions, the chefs were not sure what 15 mm looked like and thus the recipes they tested did not consistently pass the size requirements.

The recipes were adjusted for simplicity in terms of equipment and techniques needed to enable the cooks to feel confident in their ability to make each recipe correctly. The chefs provided creative ideas and insights for plating techniques such as arranging food items in rows or shapes. The workgroup refined the plate presentation of the modified foods for visual appeal and took photographs of the final designs as a reference for cooks and other foodservice employees.

At the completion of recipe testing and modification, a product evaluation was held for the IDDSI implementation team. Samples of the updated dysphagia menu items were presented in a taste panel for evaluation of quality, flavor, and presentation. Team members sampled modified food and drink items for each level of the IDDSI framework, along with preformed products for level 4 Pureed. The

| Table 2. Key Findings and Recommendations from Recipe Resting | |
|---|---|
| **Drink Modification Findings** | **Recommendations** |
| Oral nutrition supplements thicken inconsistently compared to juice or water.<br>(For example, Ensure Clear requires significantly more thickener and Boost requires less thickener than the recommended amount). | • Test each supplement and specify the amount of thickener needed for each level of modification in the recipe<br>• Do not rely on the manufacturer recommendations based on fluid amount as they will not be consistent across supplements |
| Beverages thicken over time | • Amount of thickener will depend on the amount of time it takes to be delivered to patient after thickening<br>• Make note of the average delivery time to allow for adequate thickening and to avoid using too much thickener |
| Carbonated beverages form high amounts of bubbles when thickened and stirred, causing inaccurate gravity flow test results. | • Shake or stir carbonated beverages prior to thickening to reduce the amount of bubbles<br>• Stir slowly when mixing in the thickener to prevent further bubble formation<br>• Reducing the bubble amount significantly reduces the palatability of the carbonated beverage |
| Beverages are offered in different sizes. | • A recipe for thickening needs to be created for each beverage size offered at the facility |
| **Food Modification Findings** | |
| Particle sizes of foods can be too large for IDDSI guidelines. | • For Level 5 Minced and Moist meats use a food processor to meet size requirements<br>• Use couscous for all pasta dishes on Level 5 to meet size requirements (chopping pasta creates a gummy texture inappropriate for this level) |
| Estimating particle size in millimeters may be difficult. | • Add size requirement with references (such as width between fork tines) to each recipe so the cooks know what the size should look like |
| Liquid separates from the food. (IDDSI guidelines state that foods with separately liquid cannot be served unless the patient can tolerate thin liquids safely). | • Drain the liquid if possible (example: fruit cups). If not possible remove from the dysphagia menu |
| Some foods have hard or tough textures. | • Increase cooking time to tenderize<br>• Steam instead of bake or roast to soften<br>• Steam fibrous meats then pulse in a food processor |
| Some foods have an unappetizing appearance once modified. | • Develop new plating arrangements<br>• Use scoops to shape foods on Levels 4 and 5 if possible (example: use #60 scoop to shape Level 5 meatballs to resemble unmodified meatballs)<br>• Pediatric menus should especially strive for appetizing plating |
| Sandwiches/bread items fail the pressure test and require moistening to pass. | • Remove sandwiches from menu, replace with softened wraps (tortillas soften easier than bread)<br>• Freeze pancakes and waffles, chop to meet size requirements, heat to temp and stir in melted butter and syrup to soften |
| Soups with chunks don't pass the size requirements for Level 5. | • Puree or blend soup prior to service |

workgroup answered questions from the implementation team about the menu modification process and received feedback on the items. The team members were pleased with the new recipes and products, and were especially complementary of the palatability of each food item. No further modifications were made as a result of the product evaluation.

### Creating Foodservice Training and Education Materials

Communicating, orientating, and training foodservice personnel involved in dysphagia care was an important piece of the IDDSI implementation process. A dysphagia diet curriculum for training foodservice staff was developed. The curriculum included lesson plans, a skills pass-off sheet, and a reference flipbook. Two lesson plans were created for managers to use in training foodservice staff, one on preparing foods on the dysphagia menu and a second on performing IDDSI testing for food and drinks. These lesson plans were used as a template by the other disciplines on the IDDSI team to create profession and area specific training. The skills pass off sheet was designed for managers to assess foodservice employees' knowledge of the IDDSI levels and competency in preparing foods and conducting testing methods (see Figure 2). The flipbook was developed as a visual guide for foodservice employees to reference when preparing modified food and drinks. The Theory of Planned Behavior (TPB) was used to develop foodservice curriculum and training. The TPB states that peoples' beliefs predict behavior, and that intention to act is shaped by belief (Bosnjak, Ajzen, & Schmidt, 2020). The TPB allows educators to learn what motivates their audience to perform certain behaviors. This knowledge can then be used to help the audience become aware of their own beliefs that influence and direct their behavior (Bosnjak et al., 2020).

### Implementing Foodservice Training

Previously, dysphagia diet training was performed at the facility level but as part of the IDDSI implementation process, training will be provided at the system level and implemented by each facility. A foodservice champion for each facility was selected from nutrition service managers by the IDDSI implementation team. Champions were selected from each involved discipline to receive the system-level training for their profession and to lead the training at their facility. Each champion was provided with the skills and resources to train foodservice employees on the implementation of the IDDSI framework at their facility. A train the trainer event was facilitated by the foodservice workgroup where champions were instructed on using the curriculum described above to train foodservice employees.

***Competency Verification Method Key:**
**D** = Demonstrated/observed in simulation or actual patient care; **V** = Verbalized; **R** = Reviewed supporting documents; **O** = Other/see comment e.g. **N/A** Not Applicable in this clinical area

| **Behavioral Objectives** (Complete all applicable skills or write "n/a" and explain in Comments) | **Competency Verification (see key above*)** | | **Comments** (Please initial and date comments) |
|---|---|---|---|
| | **Method*** | **Initials** | |
| Levels 1-4 Tests (Slightly, Mildly, Moderately, and Extremely Thick/Pureed)<br>• Correctly performed a gravity flow test for liquids on levels 1, 2, 3, and 4<br>• Correctly performed a fork drip test for liquids on levels 3 and 4<br>• Correctly performed a spoon tilt test for liquids on levels 3 and 4<br>• Correctly performed a fork pressure test for liquids on level 4<br>• Correctly performed a fork pressure test for foods on level 4<br>• Correctly performed a fork drip test for foods on level 4<br>• Correctly performed a spoon tilt test for foods on level 4 | **D** | | |
| Levels 5 Tests (Minced and Moist)<br>• Identified the correct particle size requirement for level 5 for adults<br>• Identified the correct particle size requirement for level 5 for children (if applicable)<br>• Correctly performed a particle size check for foods on level 5<br>• Correctly performed a fork pressure test for foods on level 5<br>• Correctly performed a fork drip test for foods on level 5<br>• Correctly performed a spoon tilt test for foods on level 5 | **V&D** | | |
| Level 6 Tests (Soft and Bite-sized)<br>• Identified the correct particle size requirement for level 6 for adults<br>• Identified the correct particle size requirement for level 6 for children (if applicable)<br>• Correctly performed a particle size check for foods on level 6<br>• Correctly performed a fork pressure test for foods on level 6<br>• Correctly performed a spoon pressure test for foods on level 6 | **V&D** | | |
| Liquids<br>• Explained the different properties of hot and cold thickened liquids<br>• Identified when thickened liquids should be tested (after thickening and prior to serving to patient)<br>• Identified where to find directions on liquid thickening (IDDSI flipbooks or Computrition) | **V** | | |
| Modified Foods<br>• Explained the characteristics of foods on level 4 (Pureed)<br>• Explained the characteristics of foods on level 5 (Minced and Moist)<br>• Explained the characteristics of foods on level 6 (Soft and Bite-sized) | **V** | | |

**Figure 2. Excerpt from IDDSI foodservice Skills Pass Off: part of the IDDSI implementation training and educational materials**

**CONCLUSIONS AND APPLICATIONS**

Intermountain successfully implemented the IDDSI guidelines by following a five step process. Managers of foodservice operations in healthcare facilities can successfully transition to the IDDSI guidelines by first, creating an interdisciplinary implementation team that includes representation from those involved in dysphagia care. Clearly defined responsibilities for each team member/workgroup will enable an effective implementation of the IDDSI guidelines. Second, complete initial testing of current dysphagia menu items to identify where each item lies on the IDDSI framework with the current recipes. This data collection will provide guidance on the amount of recipe modification required to meet the IDDSI framework guidelines. Third, modify and standardize recipes. Based on the initial testing results, alter dysphagia recipes and standardize to ensure they meet the corresponding descriptors for each level of the framework. This step also should include product evaluation by those involved (chefs, foodservice staff, patients with dysphagia etc.). Fourth, develop foodservice training and educational materials. This step may include the creation of lesson plans and reference materials to be used by foodservice employees and other professionals involved in dysphagia care. Fifth, implement foodservice training. Training should include educating employees in both knowledge of and the ability to prepare dysphagia menu items that meet the IDDSI guidelines.

Facilities implementing the new IDDSI guidelines will need to continually update their recipes as new items are added to the dysphagia menu. Regular evaluation of dysphagia items will ensure compliance with the new recipe guidelines. Various methods can be used to gauge the outcomes of the transition to IDDSI, including patient safety reports from aspiration incidents, skills evaluations of employees who prepare and test the dysphagia menu items, and evaluations of food products.

The IDDSI website provides all the resources for the food and drink guidelines and testing methods. IDDSI resources can be accessed here: https://iddsi.org/resources/. Collaboration with all disciplines involved in dysphagia care is vital to successfully making the transition. Adequate time should be given to complete all steps of implementation, and regular communication across the implementation team is essential for success.

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