

# Insulin Management and Advancing Practice of the Registered Dietitian Nutritionist (RDN) in Diabetes Care

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## Abstract:

The complex nature of managing diabetes involves an interdisciplinary approach. Medical Nutrition Therapy (MNT) has been shown to be instrumental in helping individuals improve metabolic outcomes. The Registered Dietitian Nutritionist (RDN) who is skilled in providing nutrition-related diabetes care and services should consider using the Standards of Practice (SOP) and Standards of Professional Performance (SOPP) for Registered Dietitian Nutritionists in Diabetes Care (or SOP/SOPP) for self-evaluation and practice advancement. This article will illustrate the use of the SOP/SOPP by the RDN for advancing practice in insulin management by meal planning and insulin timing and titration.

## Introduction

Diabetes self-management is complex and challenging for both health care professionals and the person with diabetes. MNT provided by an RDN has demonstrated improved metabolic outcomes (1). The 2018 American Diabetes Association (ADA) Standards of Medical Care in Diabetes (Standards of Care) emphasizes the importance of the role of the RDN, specifying that all persons with diabetes should be referred to an RDN for MNT, ideally one who is knowledgeable and skilled in providing diabetes MNT (2). Research shows that following MNT

interventions leads to improvements in metabolic control, as measured by the hemoglobin A1c (A1C), in both those with Type 1 Diabetes (T1D) and Type 2 Diabetes (T2D) (1). In addition to the Standards of Care, there are two other publications that underscore the essential role of the RDN in diabetes self-management: the joint-position paper on self-management education in T2D (3) and the Diabetes Care and Education Practice Group of the Academy's "Revised 2017 Standards of Practice (SOP) and Standards of Professional Performance (SOPP) for Registered Dietitian Nutritionists (Competent, Proficient, and Expert) in Diabetes Care (SOP/SOPP)" (4). The position paper outlines the importance of frequent MNT interventions and at a minimum assessment at four critical times: at diagnosis; annually; when changes occur complicating self-management; and when there are transitions of care (i.e. hospital) (3). The SOP/SOPP is an important tool to be used in self-evaluation as well as a resource supporting expanding practice in the rapidly-evolving healthcare landscape (4). This article is intended to provide insight regarding how the SOP and SOPP can be used to best position the RDN for advancing practice and keeping up with the trends in health care and will focus on insulin management as one particular area in which the SOP/SOPP can be applied.

## SOP/SOPP in Advancing the Practice

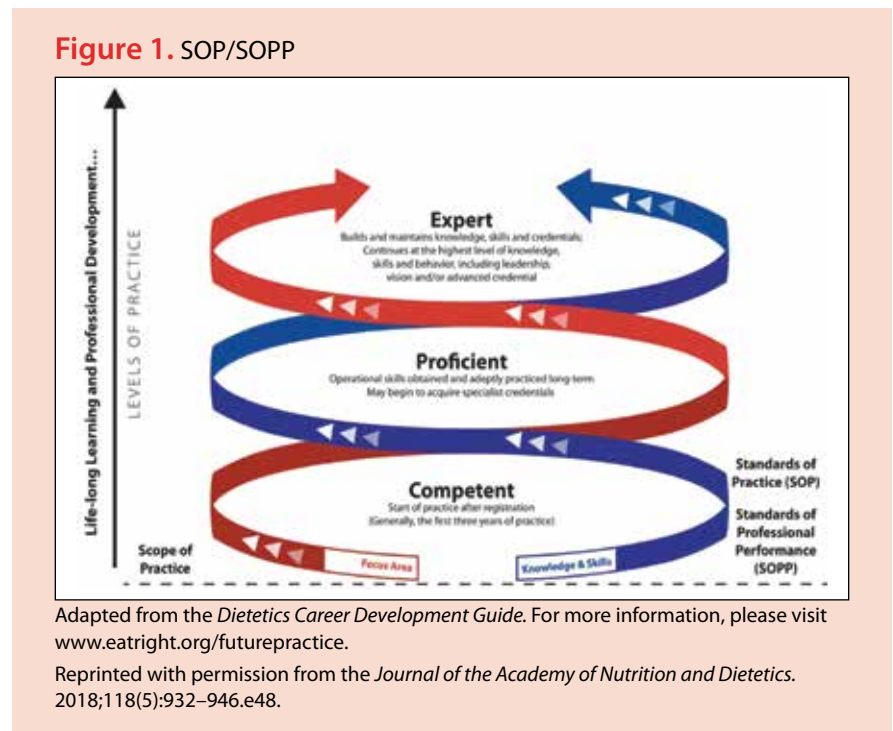
Medicare statutes defining MNT further support that the RDN has the clinical skills, training, and education for providing diabetes-related nutrition services and education. MNT is defined as "nutritional diagnostic, therapy, and counseling services for the purpose of disease management which are furnished by an RD" (5). As RDNs provide diabetes-related nutrition care and services in variety of settings, it is important to possess fluency in currently-available diabetes technology, medications and multifaceted treatment regimens which ensure that evidenced-based care is being provided. Diabetes self-management has shifted to a patient-centered empowerment model and innovative outpatient avenues such as the medical home. Due to this paradigm shift, the roles of the patient and the diabetes care provider have changed. RDNs have expanded their role in diabetes self-management education and support (DSMES) to include providing education and management for all of the DSMES content areas (i.e. medication, coping, physical activity) and have become integral members of the team. The SOP/SOPP serve as an evaluation resource for the RDN to assess competencies required to provide diabetes-related nutrition care. The overarching intent is to help guide an RDN's career development, enable open communication with regulatory agencies, organizations

and third-party payers, and expand the role of the RDN in a variety of practice settings.

There are three levels of practice defined in SOP/SOPP for diabetes care: Competent, Proficient and Expert. The distinction between the levels are based on knowledge, education, certifications and range of skills. Figure 1 illustrates how the RDN in diabetes care moves from Competent to Expert with a concurrent narrowing of breadth of specialty, specific nutrition knowledge and focus of practice. These standards address the expected knowledge, skills and competencies the RDN should obtain to provide diabetes nutrition related services at each level and are described in Table 1.

### Role of the RDN in Insulin Management

Many individuals with diabetes are using insulin or will need insulin at some point during their care. Insulin therapy may appear daunting given the multiple types of insulins available. Considering the critical role food and mealtimes play within an insulin management plan, the RDN is perfectly positioned to assist the primary care provider (PCP) with insulin management. To do so, the RDN must be knowledgeable about the insulin therapy options available



to a person with diabetes in order to advocate for optimal care.

#### Types of Insulin

Insulin formulations continue to evolve and expand with many options available to patients. The ultimate goal is to improve quality of life and keep the number of daily injections to a minimum (6). There are several types of insulins along the spectrum of rapid-acting to basal insulin (see Table 2. Insulin Types). Ways to improve metabolic outcomes have led to combination medications and concentrated

insulins. There are two combination long-acting insulin plus GLP-1 products available to date. Increased concentrations of insulin are becoming more common and include U-200, U-300 and U-500 products. More commonly, consideration as to the best treatment strategy for each patient originates from the PCP and is influenced by the patient’s insurance formulary preference and the individual’s ability to afford the insulin. Considerations of the total amount of insulin the patient is taking per day, risk of hypoglycemia and ability for

**Table 1. Levels of Practice, Knowledge, Skills and Professional Growth**

Category	Competent	Proficient	Expert
Mastery of Content and Practice	Entry level and new to diabetes; treating a limited number of individuals with diabetes	More than three years post RDN Credential; practice narrows to focus area of diabetes	Deepened knowledge in focus area (primarily diabetes); highest mastery of skills
Professional Growth	Acquisition of diabetes knowledge and initiates active professional affiliations	May have diabetes-focused credential (i.e. CDE); participates in committee work at the state and facility levels	Advanced skills acquisition, certification and autonomy; participates in committee work at the state, regional, national and facility levels; assumes leading role in practice
Type of Care	Provides basic MNT and diabetes care meeting the professional credential	Provides more expanded MNT and diabetes care	Provides more comprehensive and integrative advanced MNT and diabetes care

**Table 2. Insulin Types**

Types of Insulin	Onset	Maximum Effect	Duration	Manufacturer / Available Forms	Storage	Website/Prescribing Information								
Humalog (lispro) U100	0-15 minutes	30-90 minutes	3-5 hours	Eli Lilly: Vial 10 mL & 3mL; Disposable Pen 3 mL; Penfill cartridge 3 mL; Humalog JR pen 3 mL cartridge 1/2 unit dosing	Once in use 28 days Do not refrigerate once opened	<a href="https://www.humalog.com/hcp/">https://www.humalog.com/hcp/</a>								
Humalog (lispro) U200	0-15 minutes	30-90 minutes	3-5 hours	Eli Lilly: 3 mL Kwipen only, 2 pens per box	Once in use 28 days Do not refrigerate once opened	<a href="https://www.humalog.com/hcp/">https://www.humalog.com/hcp/</a>								
Admelog (biosimilar lispro)	same as lispro	same as lispro	same as lispro	Sanofi-Aventis: 10 mL Vial, 3 mL Solostar pen	Once in use 28 days Do not refrigerate once opened	<a href="http://www.admelogpro.com">http://www.admelogpro.com</a>								
NovoLog (aspart) U100	10-20 minutes	60-120 minutes	3-5 hours	Novo Nordisk: 10 mL vial, 3 mL Flexpen 3 mL Penfill, 3 mL FlexTouch	Once in use 28 days	<a href="https://www.novologpro.com/">https://www.novologpro.com/</a>								
Fiasp (aspart plus Vit B3 + arginine)	2.5 minutes; given pre or post meal	30-90 minutes	3-5 hours	Novo Nordisk: 10 mL vial, 3 mL Flexpen	Once in use 28 days	<a href="https://www.fiaspro.com/">https://www.fiaspro.com/</a>								
Apidra (glulisine) U100	15 minutes, given pre or post meal	1 hour	2-4 hours	Sanofi-Aventis: 3 mL Vial, 3 mL Solostar Pen, 10 mL vial	Once in use 28 days	<a href="https://www.apidra.com/hcp/default.aspx">https://www.apidra.com/hcp/default.aspx</a>								
Afreza (insulin human)	1-12 minutes	35-45 minutes	1 1/2-3 hours	MannKind Corporation: Single use cartridges of 4, 8, or 12 units	Sealed blister cards and strips 10 days out of refrigerator, opened strips 3 days	<a href="https://afrezza.com/hcp">https://afrezza.com/hcp</a>								
Novolin R/ Humulin R (insulin human injection)	30 minutes	2-5 hours	6-12 hours	Walmart ReliOn: Novolin R 10 mL vial or 3 mL Flexpen Humulin R 3 mL vial or 10 mL vial	ReliOn Novolin R vial 42 days; pen 28 days. Do not refrigerate once opened Humulin R 31 days in or out of refrigeration	<a href="http://www.novo-pi.com/novolinr.pdf">http://www.novo-pi.com/novolinr.pdf</a> <a href="https://pi.lilly.com/us/humulin-r-pi.pdf">https://pi.lilly.com/us/humulin-r-pi.pdf</a>								
Humulin R-U 500 (human regular insulin)	1/2-1 hours	2-8 hours	up to 24 hours	Eli Lilly: 3 mL Kwipen (2 pens per box) 20 mL Vial (10,000U)	vial 40 days, pen 28 days Do not refrigerate once opened	<a href="https://www.humulin.com/hcp/">https://www.humulin.com/hcp/</a>								
NPH U100 (Humulin N and Novolin N) (human insulin isophane suspension)	1.5-4 hours	4-12 hours	up to 24 hours	Eli Lilly Humulin N: 10mL Vial, 3mL Vial, 3mL Kwipen ReliOn Novolin N (WalMart) 10mL Vial	Vial-Humulin N: 31 days; Novolin N: 42 days Pen: Once in use 14 days Do not refrigerate once opened	<a href="http://pi.lilly.com/us/HUMULIN-N-USPI.pdf">http://pi.lilly.com/us/HUMULIN-N-USPI.pdf</a> <a href="http://www.novo-pi.com/novolinn.pdf">http://www.novo-pi.com/novolinn.pdf</a>								
Levemir (detemir) U100	0.8-2 hours	3.2-9.3 hours (dose dependent)	up to 24 hours	Novo Nordisk: Disposable Pen: 10 mL Vial, 3 mL Flexpen	Vial: Once in use 28 days Pen: Once in use 42 days	<a href="https://www.levemirpro.com/">https://www.levemirpro.com/</a>								
Lantus (glargine) U100	1-2 hours	Flat	24 hours	Sanofi-Aventis: 10mL Vial, 3 mL Solostar pen	Once in use 28 days Can store opened vial or pen at room temp or refrigerate	<a href="https://www.lantus.com/hcp">https://www.lantus.com/hcp</a>								
Toujeo (glargine) U300	up to 6 hours	Flat - median time to max 12-16 hours	36+ hours Steady state reached at 5 days	Sanofi-Aventis: 1.5mL Solostar pen 300/mL 450u/1.5 mL pen 3 pens per box	42 days Do not refrigerate once opened	<a href="http://www.toujeopro.com">http://www.toujeopro.com</a>								
Basaglar (biosimilar glargine)	same as glargine	same as glargine	same as glargine	Eli Lilly: 3mL Kwipen 100U/mL 5 pens per box	28 days Do not refrigerate once opened	<a href="https://www.basaglar.com/hcp/">https://www.basaglar.com/hcp/</a>								
Tresiba (degludec) U100 U200	1 hour	Peak concentration at 9 hours	42 hours; Steady state at 3-4 days	Novo Nordisk: U100, 100U/mL FlexTouchpen, 300U max dose, 80 units, 5 pens per box U200, 200U/mL FlexTouchpen, 600U max dose, 160 units, 5 pens per box dials in 2U increments	56 days Do not refrigerate once opened	<a href="https://www.tresibapro.com/">https://www.tresibapro.com/</a>								
Humulin or Novolin 70/30	70% Isophane Suspension (intermediate acting insulin) 30% Regular			Eli Lilly: Humulin: 10 mL Vial, 3mL Disposable Pen ReliOn Novolin: 10 mL Vial	Vial: Once in use 28 days Pen: Once in use 10 days	<a href="http://pi.lilly.com/us/HUMULIN-7030-USPI.pdf">http://pi.lilly.com/us/HUMULIN-7030-USPI.pdf</a> <a href="http://www.novopi.com/novologmix7030.pdf">http://www.novopi.com/novologmix7030.pdf</a>								
Humalog Mix 50/50	50% Lispro Protamine Suspension (NPL) (intermediate acting) 50% Humalog			Eli Lilly: 10 mL Vial, 3 mL Disposable Kwipen	Vial: Once in use 28 days Pen: Once in use 10 days	<a href="https://www.humalog.com/hcp/">https://www.humalog.com/hcp/</a>								
Humalog Mix 75/25	75% Lispro Protamine Suspension (NPL) (intermediate acting) 25% Humalog			Eli Lilly: 10 mL Vial, 3 mL Disposable Kwipen	Vial: Once in use 28 days Pen: Once in use 10 days	<a href="https://www.humalog.com/hcp/">https://www.humalog.com/hcp/</a>								
NovoLog Mix (70/30)	70% Aspart Protamine Suspension (intermediate acting) 30% NovoLog (Patients to discard pen when there is 12 units of insulin or less.)			Novo Nordisk: 10 mL vial, 3 mL Flexpen	Vial: Once in use 28 days Pen: Once in use 10 days	<a href="http://www.novo-pi.com/novolin7030.pdf">http://www.novo-pi.com/novolin7030.pdf</a>								
Ryzodeg Mix 70/30 (degludec/aspart)	70% Degludec U100 30% Aspart			Novo Nordisk: 3mL FlexTouch pen U100, 100U/mL	28 days	FDA approved but not available in US <a href="http://www.novo-pi.com/ryzodeg7030.pdf">http://www.novo-pi.com/ryzodeg7030.pdf</a>								
<b>Insulin/GLP-1 Combinations</b>														
		Medications		Available Forms	Storage									
Soliqua 100/33		U100 glargine/Lixisenatide 0.33 mcg per unit For doses of 15 to 60u		Sanofi-Aventis: 3mL pens, pkg of 5 pens	Once opened, 14 days	<a href="https://www.soliqua100-33.com/hcp">https://www.soliqua100-33.com/hcp</a>								
Xultrophy 100/3.6		U100 degludec/Liraglutide 3.6 mg/mL For doses 16-50u		Novo Nordisk: 3mL pens, pkg of 5 pens	Once opened, 21 days	<a href="https://www.xultrophy10036pro.com/">https://www.xultrophy10036pro.com/</a>								
<table border="0"> <tr> <td>Rapid Acting Analogs</td> <td>Basal Analogs</td> </tr> <tr> <td>Short Acting Analogs</td> <td>Premixed Insulins</td> </tr> <tr> <td>Concentrated Human Regular Insulin</td> <td>Premixed Insulins/GLP-1 Receptor Agonist</td> </tr> <tr> <td>Intermediate Acting Analogs</td> <td></td> </tr> </table>							Rapid Acting Analogs	Basal Analogs	Short Acting Analogs	Premixed Insulins	Concentrated Human Regular Insulin	Premixed Insulins/GLP-1 Receptor Agonist	Intermediate Acting Analogs	
Rapid Acting Analogs	Basal Analogs													
Short Acting Analogs	Premixed Insulins													
Concentrated Human Regular Insulin	Premixed Insulins/GLP-1 Receptor Agonist													
Intermediate Acting Analogs														

taking the insulin as prescribed also influence management strategies (7). For example, increased concentration may be helpful in those requiring larger volumes of insulin since it may reduce the number of injections required for a given dosage.

There are four types of long-acting, basal insulin: detemir; glargine; degludec; and a bio-similar glargine. Most of these insulins start working within 1-2 hours and last for 24 hours or longer. Degludec can be taken at any time of day, while most long-acting insulin needs to be taken at a consistent time each day (8). A recent study showed degludec to have 40% less hypoglycemia as compared to glargine (8). Basal insulin is typically the first insulin prescribed to a person with T2D. Insulin is not usually started at diagnosis of T2D unless A1C >10%, glucose over 300 mg/dl or with symptoms of hyperglycemia (6). The ADA Standards of Care suggest patients start basal insulin if A1C is not at goal, the patient is taking metformin and, in some cases, the patient has tried another non-insulin medication to lower blood glucose (BG) (6).

There are five commonly used rapid-acting bolus insulins: aspart, lispro, aspart with addition of vitamin B3 and arginine, biosimilar lispro and glulisine. These insulins generally start working within 15 minutes, peak at 1-2 hours and action is complete within four hours in most people. The newest bolus insulin, Fiasp, is regular aspart with Vitamin B3 added to increase the speed of absorption and L-arginine added to stabilize the product, leading to a faster onset of 2.5 minutes, compared to 10-20 minutes for regular aspart, and may be taken pre or post meal (9). Inhaled insulin is a less common rapid-acting insulin available in fixed doses that requires a spirometry test before prescribing and is not indicated for those who smoke,

recently stopped smoking and/or who have lung or pulmonary disease (10). Similar to those with T1D, many patients with T2D will require mealtime insulin along with basal insulin either at the largest meal of the day or all meals (11). For more information regarding dosing guidelines, please see Table 3.

Older formulations, such as NPH and regular insulin, are still used primarily in vial form especially when cost is a primary concern. Premixed insulin therapy can be a useful option for patients who are unable to take insulin with each meal or are seeking to simplify their regimen. These insulins may be more convenient and enhance ability to take as prescribed (7).

## Successful Insulin Utilization and Education

The 2018 ADA Standards of Care suggest that the need for DSMES should be evaluated in order for a

referral to be made upon diagnosis, annually, when new complicating factors arise that influence self-management, and when care transitions occur (2). Starting insulin falls into these criteria and research shows that adherence to medication is improved when patients receive DSMES (12). Individuals beginning insulin need to have an understanding of the role nutrition therapy plays in glycemic response. Working with an RDN is important to learn about carbohydrate in foods, portion sizes and how BG responds to carbohydrate when consumed in combination with protein and fat (2). Once basic dietary knowledge is reached, then education relating eating patterns to insulin becomes vital to patient success in insulin utilization. For people whose meal schedules or carbohydrate consumption is variable, regular counseling to help them understand the complex relationship between carbohydrate intake and insulin needs is important (2). Individuals with T1D

**Table 3. Dosing Guidelines for T1D and T2D**

**T1D:** Requires a combination of rapid-acting and basal insulin, or continuous subcutaneous insulin infusion (6).

**Starting Dose:**

0.4 to 1.0 unit/kg/day depending on stage of life; most clinicians start with 0.5 units/kg/day (11)

50% should be dosed as basal insulin and 50% as prandial insulin using insulin-to-carb ratio or 20% at breakfast, 10% at lunch and 20% at dinner (11)

Pre-meal BG target: <120mg/dl. Bedtime: <150mg/dl; use 1/50 insulin sensitivity factor for pre-meal glucose above goal (11)

**T2D:** Insulin should be initiated at diagnosis with A1C >10%, glucose over 300 mg/dl and/or symptoms of hyperglycemia (6). Insulin therapy should be considered for all people with T2D who are not achieving glycemic goals (6).

**Starting Dose:**

Start 10 units basal insulin/day or 0.1-0.2 u/kg/day, depending on the degree of hyperglycemia (6)

Adjust 10-15% or 2-4 units once or twice weekly to fasting BG target (6)

If hypoglycemia occurs, address cause, if unclear decrease dose by 4 units or 10-20% (6)

Adding mealtime insulin: 4 units/meal or 0.1 unit/kg or 10% of basal dose; if A1C <8% when starting mealtime insulin, basal insulin dose may need to be decreased (6)

and many others with T2D can learn about using an insulin-to-carbohydrate ratio with help from an RDN who will review food and glucose records as well as estimating how much insulin the individual needs to cover carbohydrate intake at meals (2). Others need to learn about consistent carbohydrate intake to avoid hyper- and hypoglycemia. Educating individuals on the timing of insulin administration specifically in relation to food intake is essential. The effect of activity on glucose should also be discussed. For example, some patients may need to include added carbohydrate before or during exercise to prevent hypoglycemia (2). Symptoms of hypoglycemia and its proper treatment should also be included in discussions with patients taking insulin. For insulin therapy to be the most successful, an explanation of the type of insulin, how it works, and peak time and action time should all be included in the education session. Expectations pertaining to how much the insulin will lower BGs, and additionally, the need for insulin doses to be regularly titrated to meet the needs of each specific patient, should also be discussed as listed in Table 4 (13).

### Successful Insulin Titration

The goal of insulin utilization is to improve glycemic control with the hope of reducing diabetes related complications (6). Healthcare costs, third party coverage, provider availability and an individual's lack of understanding about the medications they take are just some of the barriers to patients achieving glucose goals with insulin (14). One of the benefits of insulin therapy is the ability to individualize for each particular person's glycemic profile and lifestyle. However, many patients are not accustomed to this approach with medication, so they may or may not take the insulin and do not always see the desired results and begin to

lose confidence in the product (13). Individuals are usually given starting doses of insulin with the expectation that they will communicate back to the health care team for insulin adjustments. Failure to make insulin dose adjustments in a timely manner often delays improvement of clinical outcomes. RDNs can assist medical providers with efficient management of BGs until target ranges are reached. Individuals with diabetes can also be taught, by an RDN providing diabetes care and services, titration scales to do their own adjustments based on self-monitoring glucose results and following provider approved protocols (Standard 3.12 SOP) (4).

An online market research study conducted in the USA, France and Germany found that over 30% of patients started on basal insulin were unaware of the need to titrate and only 20% recalled titration being taught by their health care provider (although 80% of HCPs reported discussing titration at the visit) (13). Patients in this study reported a need for more discussion and education on glucose and A1C goals, expected time

**Table 4. Education Needs: Components of DSMES and Insulin Administration (6)**

<ul style="list-style-type: none"> <li>• Information on how the insulin works, including specific peak time and action time</li> </ul>
<ul style="list-style-type: none"> <li>• Expectation of how much the insulin will lower BG and titration concept</li> </ul>
<ul style="list-style-type: none"> <li>• When to test BG and take the insulin</li> </ul>
<ul style="list-style-type: none"> <li>• How to use the delivery device and storage guidelines</li> </ul>
<ul style="list-style-type: none"> <li>• Food considerations (consistent carb, carb ratio, etc.)</li> </ul>
<ul style="list-style-type: none"> <li>• How to minimize weight gain</li> </ul>
<ul style="list-style-type: none"> <li>• Effect of activity on BG and insulin</li> </ul>
<ul style="list-style-type: none"> <li>• Hypoglycemia monitoring and treatment</li> </ul>

to reach those goals and titration goals (13). Over half of respondents also reported fear of weight gain as one of the main reasons for not achieving glycemic targets (13). Allied health care providers can play a valuable role in helping patients not only with education needs but also with insulin adjustments (15). Zgibor, et al found an average 1% decrease in A1C with the use of allied health care providers following a facility protocol/ treatment algorithm (15). The RDN as an allied health care provider, is perfectly positioned to assist with medication advancement and specifically insulin adjustment when working with patients who have diabetes, as stated in the SOP/SOPP (Standard 3.12 of the SOP and SOPP Standard 1.2) (4). Food choices play a significant role in glycemic response in patients with diabetes. The amount of fat, protein and carbohydrate at a meal will affect glucose response and how much insulin the person should be taking (16). Because the RDN is looking closely at food intake, combined with glucose results and insulin doses, they are able to make informed insulin dose recommendations following provider and/or facility approved protocols and policies (SOP standard 3.12) (4). Cultivating relationship and trust with the prescribing physician is vital to their support of the expanding role of the RDN (4). PCPs will see the positive results of reaching glycemic goals faster by allowing other care team members, such as the RDN, to participate in medication advancement (please see Table 5 for titration case examples).

### Conclusion

The RDN brings unique skills to the real-world application of food and nutrition along with expertise in diabetes care positioning the RDN as a highly-valued team member who is capable of adeptly facilitating the overall care of individuals with diabetes in a variety of practice

settings. It is critical for the RDN to stay informed of advances in technology, the growing number of types of insulin and insulin delivery methods as well as other types of medications for managing diabetes. The SOP/SOPP serves as a valuable guide for RDNs to expand their practice capabilities and appropriately advocate for their patients' health, safety and disease management.

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**Table 5. Titration Case Examples**

### Basal Insulin Titration:

Case:

*65-year-old male. History of T2D for 10 years. He was started on 10 units of degludec at night several months ago by his PCP. RDN is seeing him for diet review but also reviews BG records. His pre-lunch and pre-dinner numbers are mostly <130 mg/dl, however, fasting BG numbers are consistently 150-180 mg/dl. He feels the insulin is not working well because his BG numbers remain high in the morning.*

Expert RDN can explain titration concept to patient. Based on facility protocol, RDN could instruct patient to increase insulin by 2 units every three days until fasting BG is <130 mg/dl or to contact the PCP for recommended increase to insulin dose.

### Bolus Insulin Initiation:

Case:

*55-year-old female. History of T2D for 8 years. She has been taking insulin glargine 35 units for several years. Her most recent A1C was 8.1% and she has noticed that her post-meal BG numbers are usually over 200 mg/dl. She is seeing the RDN to review carb counting because she feels she must be doing something wrong in a dietary sense because her BG numbers are going up.*

RDN reviews her food records and finds she is accurately counting her carbohydrates at 60g/meal. The RDN can contact the MD for prescription and starting orders and/or, if available, follow protocol to start mealtime insulin 4 units per meal (1 unit/15g of carb). May also consider reduction in glargine to avoid potential hypoglycemia with addition of bolus insulin. After instruction on mealtime insulin, a follow-up plan should be established to review if the starting dose of mealtime insulin is achieving the desired outcome/goals or not.

### T1D

Case:

*43-year-old male with T1D since age 10. He says at one time he was told to use 1:15g carbohydrate ratio, but he finds this doesn't work as he is "bad at the diet." He guesses at how much bolus insulin to take, usually 5-9 units/meal based on how he feels and what he is eating. BGs vary from 62-275 mg/dl pre-meal. He brings food records and the amounts of carbohydrates at meals appear to vary from 15g to 90g.*

RDN can determine how current insulin doses are or are not working based on food records and glucose results. Carbohydrate ratios can be suggested for each meal as a place to start with a dosing plan. Review of carbohydrate counting and balancing protein and fat should also be included in the discussion. Finally, generating a follow-up plan is critical in the evaluation of how new carbohydrate ratios will encourage the patient to try the new regime and evaluate its effectiveness.

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