

# Video Consultations and Virtual Nutrition Care for Weight Management



**T**HE IMPACT OF TECHNOLOGY on health care is escalating as a result of a diffusion of mobile devices and increased ubiquity of the online environment. In 2013, 74.4% American households had access to the Internet compared with 18.0% in 1997, while 63.6% had access to a hand-held computer such as a smartphone.<sup>1</sup>

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Improved accessibility and usability of video conferencing platforms has seen this technology increasingly being used for the delivery of telehealth services for remote health care. Through the combination of real-time audio and visual streams, video calls maintain a face-to-face element in remote health care delivery and may offer advantages to practitioners, such as attending to both verbal and nonverbal cues, compared with other technologies where communication is delayed (eg, e-mail) or is dependent on one information stream (eg, telephone or online chat).

More recently the term *telenutrition*, or the delivery of nutrition care provided virtually by a registered dietitian nutritionist (RDN) to patients at a remote location, has been introduced.<sup>2</sup> In general, the majority of care provided by RDNs lends itself to virtual care models that are supported with video consultations, and this modality has the potential to extend the reach of dietetics-related services. For example, evaluations of the implementation of obesity management guidelines by RDNs highlight that practitioners believe resource restrictions (eg, cost) and logistical constraints (eg, time and location) impede the provision of nutrition care that aligns with recommendations.<sup>3-6</sup> Video consultations have the potential to overcome these barriers faced by RDNs, and may further assist in achieving best practice.

A number of studies have demonstrated the utility of video consultations for the delivery of nutrition care either alone or as part of a multidisciplinary team for chronic kidney disease,<sup>7</sup> diabetes,<sup>8</sup> weight management,<sup>9,10</sup> and home parenteral nutrition,<sup>11</sup> as well as for various conditions in the contexts of rural locations<sup>12</sup> and aged care,<sup>13</sup> or as part of established call centers.<sup>14</sup> However, despite some use of video consultations within dietetics and a growing interest among RDNs to incorporate video consultations into practice, there is limited

guidance on the practical requirements to support the delivery of nutrition care via this mode.

Using the frameworks of the American Telemedicine Association standards,<sup>15</sup> the Nutrition Care Process,<sup>16,17</sup> and guidelines for adult obesity management,<sup>5,18-20</sup> the aim of this article is to identify and address the unique characteristics that arise when using video consultations as part of the broader context of virtual weight management delivered by an RDN. A checklist to support RDNs in the delivery of effective and efficient virtual nutrition care in this context has been developed and is provided in the [Figure](#).

## GENERAL PRIVACY AND SECURITY STANDARDS FOR VIRTUAL NUTRITION CARE

The protection of patient information is paramount in the delivery of telenutrition. Within the United States, any identifiable information to be transmitted electronically as part of nutrition care should be performed in accordance with the Health Insurance Portability and Accountability Act (HIPAA),<sup>21</sup> and any state, federal, and/or facility regulations.<sup>2</sup> HIPAA requires RDNs (as a covered entity) to “adopt and maintain appropriate technical, administrative and physical safeguards to protect the confidentiality, integrity, and security of all individually identifiable health information (called protected health information or PHI) created, received, maintained or transmitted in an electronic form as part of patient care.”<sup>21</sup> PHI is “any information created or received by an RDN or other covered entities or business associates that can identify an individual, including demographic information (eg, name, date of birth, and address) and information relating to provision of health care; the past, present, or future health condition; or the payment for health care.”<sup>22</sup>

RDNs must have in place suitable systems to protect the electronic PHI from anticipated security threats or

hazards and any unauthorized access, and to ensure their employees and/or colleagues are aware of the restrictions and associated implications for use of electronic PHI.<sup>21</sup> Implementation of HIPAA standards is the responsibility of RDNs; however, there is some flexibility within the standards to account for the diversity in the size, capabilities, and resources that exist among sole practitioners through to large organizations.<sup>21</sup>

In addition, if an RDN uses any third-party individuals, organizations, or software platforms to provide elements of nutrition care that collect, receive, store, or transmit electronic PHI (such as video conferencing software, electronic health records, or administrative and payment systems), these parties are considered business associates under HIPAA. As such, an RDN must enter into a formal written agreement with any business associate regarding the electronic PHI. For further information regarding HIPAA and the use of business associates for RDNs, see the article by Boyce.<sup>23</sup>

Compliance with HIPAA is a mandatory requirement for all RDNs who use electronic PHI. As such, dietetics practice in the virtual environment has important flow-on effects with regard to the general technical and administrative requirements and the specific clinical components in the context of weight management.

## ADMINISTRATIVE REQUIREMENTS

Undertaking a risk assessment with regard to the security of electronic PHI is a requirement and will assist RDNs with meeting HIPAA regulations.<sup>21</sup> Similar to in-person consultations, standard operating procedures are needed for delivery of nutrition care in the virtual environment. These procedures should cover elements relating to privacy and confidentiality, documentation, federal and state regulations (including obtaining prior informed consent as required) and affiliated accrediting bodies, equipment use, and patient rights and responsibilities.<sup>15</sup> Some dietetics-related associations have also produced resources in relation to licensure and associated legalities of telehealth.<sup>2,24</sup> RDNs must inform patients of the expectations regarding virtual nutrition care, including technical requirements, responsibilities, and

processes involved before, during, and following the consultation.

Logistic aspects of appointment scheduling, service payment, and reimbursement need careful consideration in the online environment. HIPAA-compliant, web-based booking and payment systems are available and may be used if privacy and security requirements are met and the appropriate business associate contracts are established. Other elements of workflow planning, such as a process for patients who arrive early or late and the establishment of systems for the collection of service fees before or after the consultation, can be addressed through clear patient information and relevant protocols addressing expectations (eg, the RDN will initiate the video call). Documentation of nutrition care in the virtual setting should be performed in a manner similar to in-person consultations and in accordance with relevant health care regulatory and legislative requirements.<sup>2,15</sup>

## TECHNICAL REQUIREMENTS

Due to the fluidity of consumer video conferencing software development, specific platform recommendations are outside the scope of this article. Instead, guidance on the generic requirements is provided. Only video conferencing platforms that offer business associate agreements (BAA) should be considered for use, and each RDN must enter into a written BAA with the software owner. In addition to the video conference platform, any other tools used for the collection, storage, and transmission of electronic PHI must also align with minimum HIPAA security standards (see the [Figure](#)). Data that are “at rest” or stored in a digital form (eg, electronic patient notes) on any device, including when stored on a portable device such as a mobile/smartphone or laptop, must be protected.

Because the aim of video consultations is to replicate in-person care, consideration of other program features (eg, screen sharing and file sharing) is necessary for efficient nutrition care and RDN–patient interactivity. For example, screen sharing allows desktop applications and files on an RDN’s computer to be shared with patients, and vice versa. The hardware such as webcam, microphone, and speakers will influence the

quality of the video stream; therefore, careful selection of equipment is required. The physical space of the video consultation has important implications for the experiences of both patients and practitioners. Factors within the video consultation environment such as the privacy and security of the room for preventing unexpected access, background noise, lighting, colors, and objects in the room may also influence satisfaction and quality of the interaction.<sup>25,26</sup> Finally, a poor-quality video stream, including disconnections, may negatively influence the experience for both parties. It is recommended that a second method of communication (eg, telephone) is in place to ensure continuity if the video call fails and timely reconnection cannot be established.<sup>15</sup>

## CLINICAL FACTORS RELATING TO VIRTUAL NUTRITION CARE FOR WEIGHT MANAGEMENT

Although virtual nutrition care offers many benefits, not all patients may be suitable for care delivered using video consultations. Professional judgment should be applied to determine whether or not virtual care should be offered to a patient seeking dietetics-related intervention for weight management. The characteristics of an individual patient, such as presenting condition and comorbidities and computer skills and equipment, are factors that should be considered by an RDN when determining suitability.

### Communication

Highly developed communication skills are the foundation of an effective patient–practitioner interaction within a dietetics consultation and are important throughout steps of the nutrition care model.<sup>16,17</sup> In particular, rapport and empathy are essential elements of positive patient experiences in dietetics consultations.<sup>27–29</sup> Evidence on the communication experience during RDN-led video consultations is limited. However, research conducted more than 10 years ago suggests that although patients were satisfied with these consultations, RDNs believed some of the interpersonal connection was diminished due to connection quality.<sup>12</sup> More recent evaluations in telemedicine report no differences in practitioner communication,<sup>30</sup> which

Virtual nutrition care component and description	Practice tips	
<b>General privacy and security standards<sup>21,22</sup></b>		
Virtual nutrition care must be delivered in accordance with HIPAA <sup>a</sup> standards and specifications	<ul style="list-style-type: none"> <li>• Administrative, technical, and physical safeguards protect ePHI,<sup>b</sup> and consist of security standards and implementation specifications</li> <li>• At a minimum, the required HIPAA security specification must be implemented. The addressable specifications must be implemented where reasonable and appropriate to do so</li> <li>• Documentation and justification of implementation decisions is mandatory</li> </ul>	<p>Resources to assist in the delivery HIPAA-compliant virtual nutrition care</p> <ul style="list-style-type: none"> <li>• Health Information and Management Systems Society Resource Library Privacy and Security Toolkit, including guidance on HIPAA and other relevant laws and regulations, and best practices (<a href="http://www.himss.org/library/healthcare-privacy-security/toolkit">www.himss.org/library/healthcare-privacy-security/toolkit</a>)</li> <li>• US Department of Health and Human Services</li> <li>• (<a href="http://www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/securityruleguidance.html">www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/securityruleguidance.html</a>)</li> <li>• In addition to online resources, RDNs<sup>c</sup> are encouraged to seek independent advice to ensure HIPAA compliance for their practice</li> </ul>
<b>Administrative requirements<sup>21</sup></b>		
Security assessment and development of implementation plan	<ul style="list-style-type: none"> <li>• HIPAA administrative safeguards address the 9 standards necessary to manage the security of ePHI, including processes and protocols, staff training, contracts, and agreements</li> <li>• RDNs should undertake an assessment to determine the specific vulnerabilities, threats, and risks relevant to the availability, confidentiality, and integrity of ePHI in their virtual nutrition care setting</li> <li>• Identified risks must be addressed and HIPAA standards implemented to protect ePHI</li> </ul>	<ul style="list-style-type: none"> <li>• Security Risk Assessment Tool (<a href="http://www.healthit.gov/providers-professionals/security-risk-assessment-tool">http://www.healthit.gov/providers-professionals/security-risk-assessment-tool</a>)</li> <li>• The risk assessment process and implementation of HIPAA security standards should be documented and reviewed on a regular basis, especially before a change to existing protocols and/or the introduction of a new electronic tool or process</li> </ul>
Standard operating procedures	<ul style="list-style-type: none"> <li>• Documentation of the specific processes and protocols for the delivery of nutrition care via video call should be developed and implemented</li> <li>• As part of organization quality assurance measures, regular evaluation of procedures should occur regularly and be completed by all relevant stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures should cover all elements of the virtual nutrition care service administration, including:               <ul style="list-style-type: none"> <li>◦ Privacy and security requirements</li> <li>◦ Patient and RDN rights and responsibilities, including professional licensing and state and federal regulations</li> </ul> </li> </ul>
<i>(continued on next page)</i>		

**Figure.** Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.

Virtual nutrition care component and description		Practice tips
	<ul style="list-style-type: none"> <li>RDNs should consider the patient user experience when developing standard operating procedures for virtual nutrition care, and ensure that processes before, during, and following the consult are streamlined as much as possible for the patient</li> </ul>	<ul style="list-style-type: none"> <li>Use of HIPAA-compliant booking, payment, and reimbursement processes</li> <li>Processes to address patients who may “arrive” early or late for the scheduled consultation or for reallocation of appointments following cancellations</li> <li>Patient education on the video consultation, including preparation (eg, collecting weight information before the consultation) and expectations of the interaction, hardware, and software requirements, and a secondary communication method to be used if video connection is lost</li> </ul>
Consultation environment	<ul style="list-style-type: none"> <li>Certain elements of the physical consultation space in which the video call is to take place will influence quality and experience for both the RDN and patient</li> </ul>	<ul style="list-style-type: none"> <li>Use a space that is secure and private, with consideration given to lighting, background colors, and noise</li> </ul>
<b>Technical requirements<sup>21</sup></b>		
General requirements relating to security	<p>HIPAA safeguards address the 5 technical and 4 physical standards necessary for the protection of ePHI</p> <ul style="list-style-type: none"> <li>Controlled access to ePHI through use of authentication for each user (via a unique identifier), with policy for emergency situations; the level of user access should be appropriate for role and permit the minimum necessary access to ePHI</li> <li>Automatic log-off or timeout after a period of inactivity with reauthorization, ability to remotely erase content, or deactivate linked accounts on devices that are stolen or lost</li> <li>Regular data backup and periodic purging of files from mobile devices</li> </ul>	<ul style="list-style-type: none"> <li>Software platforms (including cloud-based) and other tools, such as mobile apps and wireless devices, that collect, store, transmit, or receive ePHI must comply with HIPAA security standards</li> <li>When an RDN uses these products or services a BAA<sup>d</sup> between the software/app/device owner (business associate) and the RDN is required</li> </ul>
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**Figure.** (continued) Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.

Virtual nutrition care component and description		Practice tips
Video conferencing software platform and connection	<ul style="list-style-type: none"> <li>The most reliable connection to the Internet should be used where possible (eg, wireless vs wired connections)</li> </ul>	<ul style="list-style-type: none"> <li>Avoid video conferencing platforms that                             <ul style="list-style-type: none"> <li>Provide no detail on security protocols or ability to adjust privacy settings</li> <li>Provide no or limited control for initiating the video call to the RDN or allow for multiple concurrent calls</li> <li>Incorporate social media functions that alert contacts of the patient or other user when logged in</li> </ul> </li> <li>Additional platform features such as screen sharing and file sharing (with ability to annotate documents) should be considered because these are likely to maximize interaction and efficiency during the consultations (eg, discussing and tailoring materials)</li> <li>A minimum bidirectional bandwidth of 384 Kbps and providing at least 640×480 resolution at 30 frames per second is recommended; however, lower connection speeds that do not affect call quality can be used<sup>15</sup></li> </ul>
Video conferencing hardware	<ul style="list-style-type: none"> <li>Webcam, speakers, and microphone selection will influence call quality at both the RDN and patient ends and should be carefully considered</li> </ul>	<ul style="list-style-type: none"> <li>A headset should be considered to ensure a secure environment with minimal distractions (eg, background noise)</li> <li>Poor-quality calls may result from incompatibility between hardware and software; RDNs may consider using online diagnostic tools as part of the appointment scheduling to check Internet connection speed and/or hardware compatibility</li> </ul>
<b>Clinical factors: Nutrition Care Process<sup>16,17</sup> for weight management</b>		
Communication	<ul style="list-style-type: none"> <li>The RDN should establish rapport and trust with the client in a similar manner to an in-person consultation</li> </ul>	<ul style="list-style-type: none"> <li>Transmission latency (ie, “lag time”) will affect video call quality; it is often network-dependent and outside the control of the RDN</li> <li>If a suitable connection cannot be established or the connection deteriorates, the secondary communication method should be used as soon as possible</li> </ul>
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**Figure.** (continued) Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.

Virtual nutrition care component and description	Practice tips	
<b>Nutrition assessment: Collection, evaluation, and interpretation of information</b>		
Anthropometric measurements (height, weight, body mass index waist circumference, and weight history)	<ul style="list-style-type: none"> <li>Measures may be self-reported, assessed via visual examination during the consult, or transmitted via device or app</li> <li>Most nutrition assessment information may be collected before the consult; however, additional questions during the consult may be needed to elicit information on eating patterns and behaviors; nutrition knowledge, skills, and beliefs; and patient's food environment</li> <li>Some patient information may also be available (with permission) through the EHR<sup>®</sup> of other organizations; however, this is dependent on interoperability between the EHR and the RDN's systems and is currently difficult to consistently achieve</li> <li>Nutrition content is included in Health Level 7 Consolidated Clinical Document Architecture Release 2; this standard provides designated data that should be included in 9 different document types that are exchanged between facilities and/or providers (<a href="http://www.hl7.org/Implement/standards/product_brief.cfm?product_id=379">www.hl7.org/Implement/standards/product_brief.cfm?product_id=379</a>)</li> </ul>	<ul style="list-style-type: none"> <li>For waist circumference, provide patients with instructions (ideally visual) on how to record measures. Clothing size may be used as a proxy for body size; however, limitations do exist. If weight is measured remotely using wireless scales and transmitted to a third party platform/app that is accessible (with permission) by the RDN, a BAA is required.</li> <li>Various methods may be used to collect patient nutrition assessment information before the consult, including online forms as part of the appointment booking process or smartphone apps. If using a third-party software platform/app to access ePHI, either to receive or transmit between patient and RDN (eg, patient's app) or to collect and store assessment information collected during the consult (eg, EHR), a BAA should be used.</li> <li>The RDN can also develop his or her own online systems or portals to manage ePHI associated with the nutrition assessment and the entire Nutrition Care Process. Although this does not require a BAA, the minimum security standards within the developed system must be in place to protect ePHI. Further, RDNs should consider collecting data in a structured format (built into the system and available via drop-downs, radio button, or checklist in the software application) and/or in coded format (using recognized health coding systems) to allow for longitudinal comparisons and outcomes reporting within the system.</li> </ul>
Biochemical data, medical tests and procedures (lab data such as electrolytes and glucose), and tests (eg, gastric emptying time, resting metabolic rate)		
Food/nutrition-related history (food and nutrient intake, food and nutrient administration, medication/herbal supplement use, knowledge/beliefs, food and supplies availability, physical activity, and nutrition quality of life)		
Client history (personal history, medical/health/family history, treatments and complementary/alternative medicine use, and social history)		
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**Figure.** (continued) Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.



Virtual nutrition care component and description		Practice tips
<b>Nutrition diagnosis: Identification of nutrition problem, its cause(s), and related evidence</b>		
Nutrition problems may be categorized into 4 domains: intake, clinical, behavioral—environmental, and other	<ul style="list-style-type: none"> <li>Information collected during the assessment is documented in relevant patient EHR or system</li> </ul>	<ul style="list-style-type: none"> <li>Ensure collection method for anthropometry is recorded, so that the same (where possible) method can be used for monitoring progress</li> </ul>
<b>Nutrition intervention: Aims to resolve the nutrition problem through addressing its cause</b>		
Set and prioritize goals Selection of intervention(s) and develop plan	<ul style="list-style-type: none"> <li>Aim for an initial weight loss of 5%-10% of body weight over 6 mo,<sup>18</sup> with the weight loss goals negotiated with patient</li> <li>The intervention selected should be tailored to the individual's needs, preferences, and readiness to change</li> </ul>	<ul style="list-style-type: none"> <li>The same education and counselling strategies delivered in person can also be delivered via video call</li> <li>Electronic copies of existing education materials can be annotated during the consultation via screen-sharing software's function; this document can be shared immediately in the video conferencing platform, retrieved via a secure cloud-based drive and/or secure e-mail</li> <li>Evidence-based web-based programs/apps may be used to supplement virtual nutrition care and acknowledge limitations and supplement gaps with additional advice as necessary; as highlighted under Nutrition Assessment, the same requirements for accessing patient ePHI remain when used as an intervention component</li> </ul>
Interventions may include 1 or more of the following: nutrition education, nutrition counseling, food and/or nutrient delivery, and coordination of care	<ul style="list-style-type: none"> <li>A comprehensive lifestyle approach should be used and include                             <ul style="list-style-type: none"> <li>reduced-calorie diet that is individualized to the patient,</li> <li>increased physical activity, and</li> <li>behavior modification strategies<sup>5,18-20</sup></li> </ul> </li> <li>Education may include calorie content of foods, portion control, and recipe modification</li> <li>Counseling: A variety of strategies may be used as part of behavior and cognitive therapy (eg, goal-setting, self-monitoring, stimulus control, problem-solving, cognitive restructuring, and self-efficacy)</li> <li>Consideration of other strategies such as food and/or nutrient delivery (eg, meal replacements) and the need for referral to other medical and health professionals (eg, exercise physiologist, psychologist, and physician)</li> </ul>	
<b>Nutrition monitoring and evaluation: Monitor, measure, and evaluate changes in nutrition problem to determine progress</b>		
Follow-up/review schedule <sup>18,19</sup>	<ul style="list-style-type: none"> <li>Intensive interventions are most effective at promoting greater weight loss. These provide regular follow-up consisting of:                             <ul style="list-style-type: none"> <li>~ Fortnightly for the first 3-6 mo</li> <li>Continued regular review (eg, monthly or more frequent) over a minimum of 12 mo until <math>\geq 5\%</math> weight loss or goal weight achieved</li> <li>Ongoing follow-up to continue weight loss and/or prevention of weight regain</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Follow-up video consultations may be supplemented with support via e-mail, web-based programs, and apps as appropriate.</li> </ul>
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**Figure.** (continued) Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.

Virtual nutrition care component and description		Practice tips
Outcomes measured	<ul style="list-style-type: none"> <li>Anthropometry; biochemical data, medical tests, and procedures; food/nutrition-related; and nutrition-focused physical findings</li> </ul>	<ul style="list-style-type: none"> <li>Outcomes can be measured using methods and resources outlined for Nutrition Assessment above</li> </ul>
<p><sup>a</sup>HIPAA=Health Insurance Portability and Accountability Act.  <sup>b</sup>ePHI=electronic protected health information.  <sup>c</sup>RDN=registered dietitian nutritionist.  <sup>d</sup>BAA=business associated agreement.  <sup>e</sup>EHR=electronic health record.</p>		

**Figure.** (continued) Practice checklist for the delivery of video consultations and virtual nutrition care in weight management.

may be due to increased exposure to this form of telecommunication and/or improved technology and quality of video calls. However, as with an in-person setting where the length of the interaction may be influenced by previous contact between practitioner and patient, including consultation type (ie, initial or review),<sup>31</sup> similar factors are likely to have an influence on RDN–patient interactions in a virtual setting.

**Nutrition Care Process**

The [Figure](#) summarizes the key elements of obesity guidelines and the relationship with the Nutrition Care Process, and offers a practice checklist to support RDNs in the delivery of quality virtual nutrition care.

**Assessment.** Best-practice guidelines for weight management<sup>5,18-20</sup> emphasize important elements that must occur during the assessment stage, including collection of anthropometry, medical history (eg, comorbidities, medications, and family history), and psychological and nutrition-related factors (eg, weight history, dietary intake, eating patterns, physical activity, and readiness to change). This information can still be collected when nutrition care is delivered via video call. However some important differences exist between modes.

In the virtual setting, anthropometry cannot be independently measured using direct contact and alternative methods should be used. Recent evidence suggests self-reported height and weight have become more accurate over time among overweight and

obese individuals<sup>32</sup> and are of acceptable validity when collected over the Internet.<sup>33,34</sup> Although highly specific for classifying individuals as obese, body mass index lacks sensitivity for identifying excess levels of adiposity among overweight individuals.<sup>35</sup> Other physical measures to assess distribution of adiposity, such as waist circumference, can also be collected in the virtual setting. Evidence on the use of self-reported measures of waist circumference suggests that this can be accurate and reliable,<sup>36</sup> especially when video instructions are provided.<sup>37</sup> However, as with height and weight, it can be biased among women with greater central adiposity.<sup>38</sup> Further, clothing size has been shown as a reliable and valid proxy measure of waist circumference.<sup>39</sup> Regardless of the method used, establishing rapport and trust with a patient is therefore vital for ensuring that he or she reports these anthropometric measures accurately and consistently.

The use of video consultations also provides an opportunity to explore areas of the patient’s home food environment, including the kitchen and pantry. For example, factors such as equipment for food preparation and measuring portions<sup>40</sup> and size of serving vessels (eg, plates, bowls, and mugs) also may influence intake.<sup>41</sup> Assessment of these factors may become more accessible to RDNs in virtual environments.

**Diagnosis.** Although some variation exists in the methods used to complete the virtual nutrition assessment compared with an in-person consultation, there should be no difference in the

approach used to derive the nutrition diagnosis. It is, however, important that the methods used in the assessment are clearly documented by the RDN so that the same (or similar) method can be used for reassessment and evaluation of progress (eg, anthropometry via self-report as opposed to direct measurement). The potential for improved efficiency through collecting assessment information before the consult in a virtual setting may also assist RDNs with selecting an appropriate nutrition diagnosis. However, collection, storage, and transmission of this electronic PHI should be performed using secure platforms.

**Intervention.** RDN-delivered interventions for obesity management should be tailored to the individual and include nutrition and physical activity advice in combination with behavior modification strategies.<sup>5,18-20</sup> Dietary and lifestyle behavior counseling are important strategies for successful weight loss and maintenance,<sup>42</sup> and can be delivered via video conferencing. Traditional nutrition education materials (eg, patient handouts) relating to weight management knowledge and skills can be easily utilized in electronic form when combined with the screen-sharing functions of the video conferencing software platform. These materials can be part of the real-time discussion, with annotations made to the document and a copy then shared with the patient.

Virtual environments offer the potential for existing technology-based interventions to complement nutrition advice provided by RDNs. For example,



web-based programs and smartphone apps could be used to supplement the advice provided by an RDN via video or as an intervention strategy (eg, dietary self-monitoring). Evaluations of web-based weight loss programs indicate efficacy for weight loss.<sup>43–45</sup> Because these programs are web-based, opportunities arise to integrate with video call technology. Smartphone apps are a more recent resource to assist in weight loss. However, reviews of these apps have consistently concluded that more complex cognitive and/or behavior strategies (eg, relapse prevention, self-talk, and problem solving) have little or no representation.<sup>46,47</sup> Therefore, because no evidence currently exists on the most effective use of apps in clinical settings,<sup>46</sup> these are best used in addition to individualized dietetic support.

Web-based programs and mobile apps used by patients for their own self-monitoring and on their own device are not subject to HIPAA regulation. RDNs should review the privacy policy and end-user license agreement for apps they recommend, and inform patients of the risks that may exist with using the app (eg, intended use of collected data by the app owner or sharing of data with other parties). If any electronic PHI collected by the patient's app is to be shared electronically with the RDN, compliance with the HIPAA security rule is required, including a BAA.

**Monitoring and Evaluation.** Obesity management guidelines recommend frequent face-to-face follow-up every 2 weeks, especially during the initial weight loss phase,<sup>18,19</sup> with regular contact with an RDN a predictor of success.<sup>48</sup> Weight loss maintenance requires frequent support, reinforcement, and use of skills to solve problems and prevent relapse.<sup>49</sup> Current care models make it challenging to provide the intensity of follow-up that aligns with best-practice recommendations because a number of logistic and health policy issues restrict regular and extended access to nutrition support.<sup>3–6</sup> Virtual nutrition care via video conferencing may reduce these access barriers to in-person support and hold potential as a long-term weight management strategy. Evidence-based online programs and smartphone apps could also

supplement video consults with an RDN, whereas follow-up support using secure e-mail has produced high levels of satisfaction among both patients and medical practitioners.<sup>50</sup> Moreover, use of video support may provide additional options to facilitate the coordination of care with others in the medical team.

### PRIORITIES FOR RESEARCH

From the preceding discussion and mapping of the practice requirements of virtual nutrition care for weight management (see the [Figure](#)), two clear future research directions emerge. Firstly, clinimetric studies comparing the nutrition care components delivered in person and via video are needed. These studies should aim to quantify the communication and clinical processes used by an RDN for weight management within each delivery mode, and would have broader applications to other areas of medical nutrition therapy.

Second, an opportunity exists to design and test new nutrition care models that take advantage of the improved accessibility to expert face-to-face nutrition-related advice that video consultations can provide. The most suitable combination of behavior components for weight loss and maintenance, including technology type and features, and the structure and timing of one-on-one RDN video contact must be investigated. Adaptive models “step” intervention components depending on an individual's response, with models that add different technology-based components depending on the rate of weight loss currently being evaluated.<sup>51</sup> In models where a mix of technologies are used in combination with video support, it is conceivable that more frequent but shorter duration consultations are possible, further improving access to face-to-face support for a larger number of people. New nutrition care models are now possible, and their efficacy and cost-effectiveness for long-term weight management warrants investigation.

### CONCLUSIONS

With the global prevalence of overweight and obesity remaining high,<sup>52</sup> effective care models with a broad reach and that are economical, practical, and sustainable are urgently

needed. With careful consideration of privacy and security requirements, the use of video consultations for virtual nutrition care can allow RDNs to promote expertise and higher-level services that complement, rather than compete with, existing and emerging technologies. As society becomes more connected and health behaviors become more quantifiable through ubiquitous devices, opportunity exists to combine with these technologies to produce and evaluate new models of nutrition care for long-term weight management.

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## DISCLOSURES

### STATEMENT OF POTENTIAL CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

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