

## CADTH ENVIRONMENTAL SCAN REPORT

# Feeding and Swallowing Assessment Services for Pediatric Populations in Canada: Service Provision, Practice Models, and Assessment Tools

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## Context

Pediatric feeding and swallowing assessment services are concerned with evaluating and diagnosing children who experience difficulty eating, drinking, and swallowing (also known as dysphagia).<sup>1</sup> Providing these services appropriately may require the skills of a number of health care practitioners, including speech-language pathologists (SLPs), physicians, occupational therapists (OTs), and registered nurses (RNs).<sup>1</sup>

Swallowing is a complex function; feeding and swallowing dysfunction can have many possible causes, from developmental delay to acute onset.<sup>2</sup> This complexity has resulted in a variety of assessment tools, outcome measurements, and approaches to service delivery.<sup>1-10</sup>

A CADTH Rapid Response Report<sup>5</sup> indicated that there are no evidence-based guidelines for assessing feeding and swallowing in children, and identified one systematic review that cautions that there is limited evidence regarding the validity and reliability of non-instrumental measurements of dysphagia in children.<sup>11</sup>

An Environmental Scan of feeding and swallowing assessment services for pediatric populations in Canada was requested. The information may be used to inform feeding and swallowing assessment services in Canadian pediatric hospitals.

## Objectives

The objective of this Environmental Scan is to identify and summarize information regarding the feeding and swallowing assessment services provided to pediatric populations in Canada. The following questions are addressed:

1. What practice models support best clinical practice and service provision for feeding and swallowing assessment in pediatric patients?
2. What instrumental and non-instrumental tools, equipment, and supports are used for pediatric feeding and swallowing assessment services, and who administers them?
3. What are the scopes of practice with respect to clinical practice in feeding and swallowing assessment for the following professions: speech and language therapists, OTs, registered dietitians (RDs), physicians, nurses?
4. What service provision is required for feeding and swallowing assessment in pediatric in-patient, outpatient, rehabilitation, and teleconsultation populations?

## Methods

The findings of this Environmental Scan are based on responses to the Feeding and Swallowing Assessment Services for Pediatric Populations in Canada Survey (Appendix 1) and a limited literature search.

A limited literature search was conducted using key resources, including PubMed and the Cochrane Library. Grey literature was identified by searching a selected list in the Grey Matters checklist (<http://www.cadth.ca/resources/grey-matters>) – including University of York Centre for Reviews and Dissemination databases and Canadian and major international health technology agencies – and through a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, and guidelines. The search was also limited to English language documents published between January 1, 2011 and August 16, 2016. Conference abstracts were excluded from the search results.

Stakeholder feedback was solicited by posting a draft version of the report on CADTH's website and by emailing survey respondents and CADTH's mailing lists subscribers.

This report focuses on feeding and swallowing assessment services provided to pediatric in-patient, outpatient, rehabilitation, and teleconsultation populations in Canadian jurisdictions. The following research areas are considered to be outside the scope of the report: eating disorders, mental health, and shape-down programs; children with short-term feeding requirements; children with autism or sensory feeding issues; and interventions for feeding and swallowing disorders.

## Findings

The main data sources for this Environmental Scan are the survey responses collected from key jurisdictional informants involved in administering or providing feeding and swallowing assessment services to children at the clinic, hospital, or health authority levels. These informants were identified by the requester and CADTH liaison officers through professional and clinical networks, or referred through other respondents. Contacts were identified in, and surveys were distributed to: Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, the Northwest Territories, Nova Scotia, Ontario, Prince Edward Island, Quebec, and Saskatchewan. Where possible, multiple organizations or sites within each jurisdiction were sent survey invitations, recognizing that practices may differ between sites within a single organization. Contacts were not identified in Nunavut or Yukon. Survey responses were received from organizations in all jurisdictions where invitations were sent (Appendix 2). Twenty-three respondents completed (n = 17) or partially completed (n = 6) the survey. Multiple responses were received from respondents in Alberta (n = 7), British Columbia (n = 4), New Brunswick (n = 3), and Quebec (n = 3). Single responses were received from organizations in Newfoundland and Labrador (n = 1), the Northwest Territories (n = 1), Nova Scotia (n = 1), Ontario (n = 1), and Saskatchewan (n = 1). One respondent did not specify their jurisdiction. Among the partially completed surveys, two (one from Alberta and one from an unspecified jurisdiction) did not include usable responses, and were excluded from the analysis. A total of 21 responses were included in the final analysis.

Survey responses were used to answer all research questions. Questions 2 and 4 were supplemented with information obtained through a limited literature search. Stakeholder feedback was used to supplement information received from survey respondents.

## Practice Models to Support Best Clinical Practice and Service Provision for Feeding and Swallowing Assessment Services in Pediatric Patients

Practice models include the types of pediatric patients (e.g., in-patients, rehabilitation patients) who receive feeding and swallowing assessment services; how these services are administered (i.e., team-based or program-based); and the health care providers involved in their provision. Team-based service models are those that include a specialized group of health care professionals who are responsible for working with pediatric patients to assess feeding and swallowing, regardless of their location within an organization. Program-based services are conducted by a group of health care professionals whose work is attached to a specific clinical area (e.g., pediatric intensive care, pediatric oncology) to assess feeding and swallowing within that program. There was no single model used consistently across or within jurisdictions.

The practice models used by respondent organizations are summarized in Table 1.

### Patient Groups Served

Respondents were asked which patient groups currently receive pediatric feeding and swallowing assessment services within their organizations. Rehabilitation patients are defined as those receiving specialized care designed to improve their independence in in-patient or outpatient settings. Six respondents provide services exclusively to in-patient and outpatient rehabilitation populations. The remaining respondents (n = 15) serve a mix of rehabilitation and non-rehabilitation pediatric patients. Seven respondents currently provide teleconsultation (remote) services to pediatric patients.

### Organization of Services

Seven respondents provide both team- and program-based services. Eight respondents reported offering team-based service alone, while three provide only program-based services. One respondent answered only questions about team-based services and one did not respond to the question about organization of services.

One respondent from Alberta provides community-based services only, and falls outside these organizational models. Feedback was provided by an additional stakeholder in Alberta, who indicated that the Pediatric Community Rehabilitation Program in the Calgary Zone of Alberta Health Services deals with feeding and swallowing in a community setting, community health centres, and schools.

### Health Care Professional Involvement

There was no consistency across the country in the involvement of health professionals providing pediatric feeding and swallowing assessment services. The health professions most frequently indicated as part of teams or programs are OTs (n = 18) and RDs (n = 18). SLPs are also commonly included in team- or program-based services (n = 16), as are physicians (n = 16, also including pediatricians, gastroenterologists, and radiologists) and RNs (n = 9). Other professions currently providing pediatric feeding and swallowing assessment services are psychologists, social workers, physiotherapists, respiratory therapists, feeding specialists, therapy assistants, nursing coordinators, and administrative support staff.

**Table 1: Practice Models Used to Provide Pediatric Feeding and Swallowing Assessment Services in Canada**

Province	Organization	Professionals	Service Model	Professionals
AB	Alberta Children's Hospital	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Psychologistsw</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Psychologists</li> </ul>
	Alberta Health Services <sup>a</sup>	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> <li>• Other: Comment applies to all: There is access for all of these patients, but it is very limited</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Therapy assistants</li> <li>• Radiologists</li> </ul>
			No response	• N/A
	Children's Allied Health <sup>a</sup>	<ul style="list-style-type: none"> <li>• Rehabilitation outpatients</li> </ul>	Neither: community-based program	• N/A
	Glenrose Rehabilitation Hospital <sup>a</sup>	<ul style="list-style-type: none"> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Psychologists</li> <li>• Social workers</li> <li>• Radiologists</li> </ul>
Northern Lights Regional Health Centre	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RTs</li> </ul>	
Stollery Children's Hospital <sup>a</sup>	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> </ul>	Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• RDs</li> <li>• Physicians</li> </ul>	

Province	Organization	Professionals	Service Model	Professionals
BC	BC Children's Hospital	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Pediatricians</li> <li>• Gastroenterologists</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>
	The Centre for Child Development	<ul style="list-style-type: none"> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Developmental pediatrician</li> </ul>
	Queen Alexandra Centre for Children's Health	<ul style="list-style-type: none"> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>
	Sunny Hill Health Centre for Children	<ul style="list-style-type: none"> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Social workers</li> <li>• Administration support</li> </ul>
Program-based			<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Social workers</li> </ul>	

Province	Organization	Professionals	Service Model	Professionals
NB	Horizon Health Network	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• PTs</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> </ul>
	Horizon Health Network – Saint John Area	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Psychologists</li> </ul>
	Saint John Regional Hospital	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Psychologists</li> </ul>
NL	Eastern Health	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Social workers</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• RNs</li> </ul>
NWT	Stanton Territorial Hospital	<ul style="list-style-type: none"> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>



Province	Organization	Professionals	Service Model	Professionals
NS	IWK Health Centre	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> <li>• Teleconsultation (remote) patients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• Psychologists</li> <li>• Feeding specialist</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>
ON	Holland Bloorview Kids Rehabilitation Hospital	<ul style="list-style-type: none"> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> </ul>
			Program-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
QC	Centre de réadaptation MAB–Mackay	<ul style="list-style-type: none"> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> <li>• Psychologists</li> <li>• Pediatricians</li> </ul>
	Centre de réadaptation Marie Enfant du CHU Ste-Justine	<ul style="list-style-type: none"> <li>• Rehabilitation in-patients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> <li>• Psychologists</li> <li>• Nurse coordinators</li> </ul>
	Montreal Children's Hospital <sup>a</sup>	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation outpatients</li> </ul>	No response	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

Province	Organization	Professionals	Service Model	Professionals
SK	Saskatoon Health Region	<ul style="list-style-type: none"> <li>• Non-rehabilitation in-patients</li> <li>• Non-rehabilitation outpatients</li> <li>• Rehabilitation outpatients</li> </ul>	Team-based	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• Composition of each team is slightly different and may include core members, virtual members, and other members as needed</li> <li>• Psychology and Social Work groups can be pulled into the rehabilitation team along with OTs and SLPs</li> <li>• In-patient and outpatient teams are primarily SLPs, with consultation to other professionals if necessary</li> </ul>

N/A = not applicable; OT = occupational therapist; PT = physiotherapist; RD = registered dietitian; RN = registered nurse; RT = respiratory therapist; SLP = speech-language pathologist.

<sup>a</sup> Partial response.

## Instrumental and Non-Instrumental Tools, Equipment, and Supports Used in Pediatric Feeding and Swallowing Assessment

Feeding and swallowing difficulties can be assessed in a number of ways. Assessments that use specialized equipment and procedures – such as videofluoroscopic swallowing studies or VFSS (also known as modified barium swallow studies) – are considered instrumental assessments. Non-instrumental assessments include physical examinations or screening tools, such as oral-motor assessments.

To help answer research question 2, respondents were asked if they currently used oral-motor assessments, feeding and swallowing assessments, VFSS, fibre-optic endoscopic evaluation of swallowing (FEES), or other types of assessment tools in their pediatric feeding and swallowing assessment teams and programs (Table 2).

Twenty respondents answered questions about the tools used for pediatric feeding and swallowing assessment in their organizations. The tools used vary between and within jurisdictions. Oral-motor assessment is used by all 20 respondents in both team- and program-based assessment services (if offered). Feeding and swallowing assessment is used by 19 respondents in both team- and program-based assessment services (if offered). VFSS is also common and used by 15 respondents, although not always in both team- and program-based services if both models are offered. FEES is used by only four respondents – three in Alberta and one in Quebec. Other assessment tools used include nutrition assessment, medical assessment, nursing assessment, social work needs assessment, behavioural assessment, growth and nutrition assessment, feeding observation, and salivagram. One respondent said that when patients require VFSS, they are referred to another regional hospital.

**Table 2: Instrumental and Non-Instrumental Assessments Used and Health Care Professional Roles in Pediatric Feeding and Swallowing Assessment Services in Canada**

Province	Organization	Service Model	Tools	Professionals Who Administer
AB	Alberta Children's Hospital	Team-based	Oral-motor assessment	• OTs
			Feeding/swallowing assessment	• SLPs • OTs
			VFSS	• SLPs • OTs
			FEES	• SLPs • OTs
		Program-based	Oral-motor assessment	• OTs
			Feeding/swallowing assessment	• SLPs • OTs
			VFSS	• SLPs • OTs
			FEES	• SLPs • OTs
	Alberta Health Services <sup>a</sup>	Team-based	Oral-motor assessment	• No response
			Feeding/swallowing assessment	• No response
			VFSS	• No response
			FEES	• No response
		Program-based	N/A	• N/A
	Children's Allied Health <sup>a</sup>	Community-based	Oral-motor assessment	• No response
			VFSS by referral to regional hospital	• No response
			Feeding observation	• No response
	Glenrose Rehabilitation Hospital <sup>a</sup>	Team-based	Oral-motor assessment	• SLPs • OTs
			Feeding/swallowing assessment	• SLPs • OTs • Psychologists
VFSS			• SLPs • OTs • Radiologists	
Northern Lights Regional Health Centre	Program-based	Oral-motor assessment	• SLPs • OTs	
		Feeding/swallowing assessment	• SLPs • OTs	
Stollery Children's Hospital <sup>a</sup>	Program-based	Oral-motor assessment	• SLPs	
		Feeding/swallowing assessment	• SLPs	
		VFSS	• SLPs	
		FEES	• SLPs • Physicians	

Province	Organization	Service Model	Tools	Professionals Who Administer	
BC	BC Children's Hospital	Team-based	Oral-motor assessment	• OTs	
			Feeding/swallowing assessment	• OTs	
			VFSS	• OTs	
		Program-based	Oral-motor assessment	• OTs	
			Feeding/swallowing assessment	• OTs	
			VFSS	• OTs	
	The Centre for Child Development	Team-based	Oral-motor assessment	• SLPs	
			Feeding/swallowing assessment	• SLPs • OTs	
	Queen Alexandra Centre for Children's Health	Team-based	Oral-motor assessment	• SLPs • OTs	
			Feeding/swallowing assessment	• SLPs • OTs • RDs • Physicians	
			VFSS	• SLPs • OTs	
			Nutrition assessment	• RDs	
			Medical assessment	• Physicians	
			Program-based	Oral-motor assessment	• SLPs • OTs
		Feeding/swallowing assessment		• SLPs • OTs • RDs • Physicians	
		VFSS		• SLPs • OTs	
		Nutrition assessment		• RDs	
		Medical assessment		• Physicians	
		Sunny Hill Health Centre for Children		Team-based	Oral-motor assessment
			Feeding/swallowing assessment		• SLPs • OTs • RDs • Physicians • RNs
	VFSS		• SLPs • OTs		
Growth and nutrition assessment	• RDs				
Medical assessment	• Physicians				
Nursing assessment	• RNs				
Social needs assessment	• Social workers				

Province	Organization	Service Model	Tools	Professionals Who Administer
BC	Sunny Hill Health Centre for Children	Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> <li>• RNs</li> </ul>
			Growth and nutrition assessment	<ul style="list-style-type: none"> <li>• RDs</li> </ul>
			Medical assessment	<ul style="list-style-type: none"> <li>• Physicians</li> </ul>
			Nursing assessment	<ul style="list-style-type: none"> <li>• RNs</li> </ul>
NB	Horizon Health Network	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
		Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
	Horizon Health Network – Saint John Area	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPS</li> </ul>
	Saint John Regional Hospital	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Psychologists</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
NL	Eastern Health	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Nuclear medicine – salivagram	<ul style="list-style-type: none"> <li>• Physicians</li> </ul>

Province	Organization	Service Model	Tools	Professionals Who Administer
NL	Eastern Health	Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• RN</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
NWT	Stanton Territorial Hospital	Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• OTs</li> <li>• RDs</li> </ul>
NS	IWK Health Centre	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• Psychologists</li> <li>• Feeding specialists</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Behavioural assessment	<ul style="list-style-type: none"> <li>• Psychologists</li> <li>• Feeding specialists</li> </ul>
		Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• OTs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• OTs</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• OTs</li> </ul>
ON	Holland Bloorview Kids Rehabilitation Hospital	Team-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> </ul>
			VFSS	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> <li>• RDs</li> <li>• Physicians</li> </ul>
		Program-based	Oral-motor assessment	<ul style="list-style-type: none"> <li>• SLPs</li> </ul>
			Feeding/swallowing assessment	<ul style="list-style-type: none"> <li>• SLPs</li> <li>• OTs</li> </ul>

Province	Organization	Service Model	Tools	Professionals Who Administer
QC	Centre de réadaptation MAB–Mackay	Team-based	Oral-motor assessment	• OTs
			Feeding/swallowing assessment	• OTs • RDs • Psychologists • Pediatricians
	Centre de réadaptation Marie Enfant du CHU Ste-Justine	Team-based	Oral-motor assessment	• OTs
			Feeding/swallowing assessment	• OTs • RDs • Physicians • Psychologists
		VFSS	• OTs • RDs • Physicians	
			FEES	• OTs • RDs • Physicians
SK	Saskatoon Health Region	Team-based	Oral-motor assessment	• SLPs • OTs
			Feeding/swallowing assessment	• SLPs • OTs
			VFSS	• SLPs

AB = Alberta; BC = British Columbia; FEES = fibre-optic endoscopic evaluation of swallowing; N/A = not applicable; NB = New Brunswick; NL = Newfoundland and Labrador; NS = Nova Scotia; NWT = Northwest Territories; ON = Ontario; OT = occupational therapist; QC = Quebec; RD = registered dietitian; RN = registered nurse; SK = Saskatchewan; SLP = speech-language pathologist; VFSS = videofluoroscopic swallowing study.

<sup>a</sup> Partial response.

## Practice Guidelines and Outcomes Measures

Respondents were asked if their organizations currently use any specific practice guidelines or outcome measures to support their team- or program-based pediatric feeding and swallowing assessment services. Additional practice guidelines and outcome measures were identified as part of a limited literature search.

### Practice Guidelines

Six respondents said they use practice guidelines as part of their pediatric feeding and swallowing assessment services: four in British Columbia, one in Newfoundland and Labrador, and one in Ontario. The remaining respondents said they do not use additional practice guidelines or did not respond to the question. Guidelines were a mixture of internal policies and procedures and external or professional guidance documents. Respondents identified 16 different resources. Only two resources for guidance documents are used by more than one respondent: the International Dysphagia Diet Standardization Initiative<sup>12</sup> and the advanced certification application and program of study: Videofluoroscopic Assessment of Swallowing Disorder in Paediatrics by the College of Speech and Hearing Health Professionals of British Columbia.<sup>13</sup> (Table 3). Eight additional guidance documents were identified in the literature search.

**Table 3: Practice Guidelines Used by Organizations Providing Pediatric Feeding and Swallowing Assessment Services in Canada**

Jurisdiction	Practice Guidelines
British Columbia	<ul style="list-style-type: none"> <li>• Pediatric Dysphagia Competency Document</li> <li>• IDDSI<sup>12</sup></li> <li>• BCCH Feeding Assessment and Intervention Policies and Procedures</li> <li>• BCCH Videofluoroscopic Feeding Studies Policies and Procedures</li> <li>• Feeding and Swallowing Clinic Policies and Procedures</li> <li>• <i>Health Professions Act</i><sup>14</sup></li> <li>• College of Speech and Hearing Health Professionals of BC – advanced certification application and program of study: Videofluoroscopic Assessment of Swallowing Disorder in Paediatrics<sup>13</sup></li> </ul>
Newfoundland and Labrador	<ul style="list-style-type: none"> <li>• Swallowing Rehabilitation Research Laboratory, Barium Recipes<sup>15</sup></li> <li>• Apneas, bradycardias, and desaturations during oral feedings in growing preemies: nature vs. nurture<sup>16</sup></li> <li>• IDDSI<sup>12</sup></li> <li>• Eastern Health Speech-Language Pathology Council guidelines (modified barium swallow studies, bedside/chairside swallowing evaluation)</li> <li>• Infant-driven feeding guidelines based on Supporting Oral Feeding in Fragile Infants (SOFFI) Method<sup>17</sup></li> </ul>
Ontario	<ul style="list-style-type: none"> <li>• Holland Bloorview Feeding Clinic guidelines for referral management</li> <li>• <i>Royal College of Speech &amp; Language Therapists Clinical Guidelines, 2005</i> – guidelines for disorders of feeding, eating, drinking, and swallowing (dysphagia) in children and adults<sup>18</sup></li> <li>• <i>ASHA Preferred Practice Patterns for the Profession of Speech-Language Pathology 2004</i><sup>19</sup></li> <li>• <i>New Zealand Speech-Language Therapy Clinical Practice Guideline on Videofluoroscopic Study of Swallowing (VFSS), April 2011</i></li> <li>• <i>CASLPO Practice Standards and Guidelines for Dysphagia Intervention by Speech-Language Pathologists 2007</i><sup>21</sup></li> </ul>

ASHA = American Speech-Language-Hearing Association; BCCH = BC Children’s Hospital; CASLPO = College of Audiologists and Speech-Language Pathologists of Ontario; IDDSI = International Dysphagia Diet Standardization Initiative.

### Literature Search Results

- Eight additional guidance documents were identified in the literature:
- American Academy of Neurology/American Association of Neuromuscular & Electrodiagnostic Medicine: Evidence-Based Guideline Summary: Evaluation, Diagnosis, and Management of Congenital Muscular Dystrophy (2013)<sup>22</sup>
- American College of Radiology ACR Appropriateness Criteria, Dysphagia (2013)<sup>8</sup>
- American Speech-Language-Hearing Association (ASHA) Guidelines for Speech-Language Pathologists Performing Videofluoroscopic Swallowing Studies (2003)<sup>23</sup>
- ASHA Role of the Speech-Language Pathologist in the Performance and Interpretation of Endoscopic Evaluation of Swallowing: Guidelines (2004)<sup>24</sup>
- ASHA Roles of Speech-Language Pathologists in Swallowing and Feeding Disorders: Technical Report (2001)<sup>25</sup>
- ASHA Pediatric Dysphagia<sup>1</sup>
- Joanna Briggs Institute Feeding and Swallowing (Children): Screening and Outcome Measurement<sup>26</sup>
- New South Wales Ministry of Health Feeding Difficulties in Children – A Guide for Allied Health Professionals (2016)<sup>27</sup>



## Outcome Measures

Outcome measures provide insight into baseline performance and/or the impact an intervention has on a patient. Sometimes assessment tools can also be used as outcome measures. Four respondents representing two jurisdictions (British Columbia and Ontario) said they currently use outcome measures as part of their pediatric feeding and swallowing assessment services. The remaining respondents said they do not use additional outcome measures or did not respond to the question. Respondents identified a total of nine outcome measures (Table 4). Two of them – the Penetration-Aspiration Scale<sup>9</sup> and the Canadian Occupational Performance Measure (COPM)<sup>28</sup> – are used by two organizations. Eleven additional outcome measures were identified in the literature.

**Table 4: Outcome Measures Used by Organizations Providing Pediatric Feeding and Swallowing Assessment Services in Canada**

Jurisdiction	Outcome Measures
British Columbia	<ul style="list-style-type: none"> <li>• Penetration-Aspiration Scale<sup>9</sup></li> <li>• COPM<sup>28</sup></li> <li>• Pediatric assessment scale for severe feeding problems<sup>29</sup></li> <li>• Growth, height, weight, BMI</li> <li>• Family satisfaction surveys</li> <li>• WHO growth charts<sup>30</sup></li> <li>• ESHA Research Food Processor Nutrition Analysis Software<sup>31</sup></li> </ul>
Ontario	<ul style="list-style-type: none"> <li>• Penetration-Aspiration Scale<sup>9</sup></li> <li>• COPM<sup>28</sup></li> </ul>

COPM = Canadian Occupational Performance Measure; WHO = World Health Organization.

## Literature Search Results

A limited literature search identified a number of other outcome measures for assessing pediatric feeding and swallowing<sup>3,6-8,10,26,32-35</sup>

Two 2015 reports from the Joanna Briggs Institute<sup>3,26</sup> recommended three assessments for evaluating feeding and swallowing in children: the Schedule for Oral Motor Assessment or SOMA,<sup>6</sup> the modified Functional Feeding Assessment or FFAM,<sup>34,35</sup> and the Dysphagia Disorders Survey.<sup>7</sup>

A 2016 CADTH Rapid Response Report on the three-ounce water swallow challenge for oropharyngeal dysphagia did not identify any literature to support this test's use in children.<sup>32</sup>

Guidance from the American College of Radiology Committee on Appropriateness Criteria<sup>8</sup> indicate that the following assessments for dysphagia may be appropriate or are usually appropriate in some situations: X-ray modified-barium swallow; X-ray pharynx dynamic and static imaging; X-ray biphasic esophagram; X-ray barium-swallow single contrast; and technetium (Tc)-99m transit scintigraphy esophagus.

A systematic review protocol from the Joanna Briggs Institute reports that an evaluation of clinical swallow assessment will be included in the final review.<sup>33</sup>

The Lefton–Greif Feeding/Swallowing Impact Survey or FS-IS is a tool designed to measure the impact of feeding and swallowing difficulties on children’s caregivers.<sup>10</sup>

## Assessment Tools and Supports Under Consideration

When respondents were asked about the instrumental and non-instrumental tools and supports being considered by their organizations’ pediatric feeding and swallowing assessment services, FEES was the most frequent response (n = 4) (Table 5).

**Table 5: Assessment Tools and Supports Under Consideration by Organizations Providing Pediatric Feeding and Swallowing Assessment Services in Canada**

Jurisdiction	Assessment Tool or Support
Alberta	FEES; working as part of a provincial committee to develop a skills document to develop core skills for feeding and swallowing assessment
British Columbia	FEES
Newfoundland and Labrador	FEES
Northwest Territories	VFSS, FEES
Quebec	Dysphagia evaluation protocol by Marie-Josée Tessier <sup>a</sup> ; Schedule for Oral Motor Assessment; <sup>6</sup> Alimenthèque; <sup>36</sup> homemade tools; Behavioral Pediatrics Feeding Assessment Scale; <sup>37</sup> food list from Geneviève Nadon; nutritional assessment (food journal); Penetration-Aspiration Scale; <sup>9</sup> meal observation

FEES = fibre-optic endoscopic evaluation of swallowing; VFSS = videofluoroscopic swallowing study.

<sup>a</sup> Available as part of a continuing education course offered by La Clinique Pédiatrique de Dysphagie et d’Ergothérapie, Brossard, Quebec.<sup>38</sup>

## Scope of Practice of Health Care Professionals Providing Pediatric Feeding and Swallowing Assessment Services

Respondents were asked which health care providers at their organizations are responsible for administering the assessment tools used. The scope of practice of health care professionals within pediatric feeding and swallowing assessment teams and programs is summarized in Table 2. Respondents were not asked whether health professionals administered assessment tools alone or together with other health care providers. Because of this, responses only indicate which professionals are involved in administering an assessment tool, not the relationship between different professional groups in an organization. Respondents who indicated physicians are involved in pediatric feeding and swallowing assessment services in their organization were not asked to indicate a specialty area of practice (if any). Physician specialties were only captured if a respondent specifically indicated one in a text response. As with previous questions, scope of practice varied both within and between jurisdictions. Scope-of-practice recommendations for SLPs were also identified in the literature search.

### Alberta

Only SLPs and OTs administer oral-motor assessments, feeding/swallowing assessments, and VFSS, but roles vary between organizations. One respondent indicated radiologists may also be involved in administering VFSS. For respondents who indicated they currently provide FEES for assessment, one respondent said both SLPs and physicians administer the test, while another said SLPs and OTs administer the test. Two stakeholders from Alberta who provided feedback indicated that otolaryngologists would also be included on pediatric feeding and swallowing assessment teams, particularly with regard to administering FEES.

## British Columbia

Oral-motor assessments and VFSS are administered by either SLPs, OTs, or a combination of both. Feeding and swallowing assessments are administered by SLPs, OTs, RDs, physicians, and RNs. VFSS is administered by SLPs and OTs. British Columbia was the only jurisdiction where a respondent indicated that growth and nutrition assessments, nutrition assessments, medical assessments, nursing assessments, and social needs assessments were also used. These are administered by RDs, physicians, RNs, and social workers.

## New Brunswick

In New Brunswick, VFSS is administered only by SLPs. Oral-motor assessments are administered by SLPs and OTs, and feeding/swallowing assessments by SLPs, OTs, RDs, and psychologists.

## Newfoundland and Labrador

Newfoundland and Labrador is the only jurisdiction where salivagrams are used. They are administered by nuclear medicine physicians. Oral-motor assessments, feeding/swallowing assessments, and VFSS are all provided by SLPs and OTs. Feeding/swallowing assessments are also provided by RDs.

## Northwest Territories

Both oral-motor assessments and feeding and swallowing assessments are provided in the Northwest Territories. SLPs and OTs administer the former, while OTs and RDs administer the latter.

## Nova Scotia

Feeding specialists, a position unique to Nova Scotia, administer both feeding and swallowing assessments and behavioural assessments. As in other jurisdictions, SLPs and OTs administer the bulk of assessment tools, including oral-motor assessments, feeding and swallowing assessments, and VFSS, though their responsibilities differ between team- and program-based service models. Feeding and swallowing assessments and behavioural assessments are also administered by psychologists. RDs, physicians, and RNs assess pediatric patients' growth and nutrition.

## Ontario

SLPs are responsible for administering oral-motor assessments at Holland Bloorview Kids Rehabilitation Hospital. Feeding and swallowing assessments and VFSS are performed by SLPs, OTs, RDs, and physicians.

## Quebec

Both respondents indicated that only OTs administer oral-motor assessments. Feeding and swallowing assessments are administered by OTs, RDs, psychologists, and physicians (including pediatricians). VFSS and FEES are administered by OTs, RDs, and physicians.

## Saskatchewan

In Saskatchewan, the respondent indicated that SLPs and OTs administer oral-motor assessments and feeding and swallowing assessments. SLPs are responsible for providing VFSS.

### Literature Search Results

Four documents produced by ASHA describe the various roles that may be appropriate for SLPs.<sup>1,23-25</sup> Scope-of-practice recommendations include conducting swallowing assessments using both instrumental and non-instrumental approaches,<sup>1,25</sup> performing and interpreting VFSS studies,<sup>23,25</sup> and performing and interpreting FEES studies.<sup>24,25</sup>

Guidelines from the American College of Radiology describe various assessments in which radiologists should be involved.<sup>8</sup> These include VFSS, X-ray imaging of the pharynx, X-ray barium swallow, X-ray biphasic esophagram, and technetium (Tc)-99m transit scintigraphy esophagus.

### Required Service Provision for Pediatric In-Patient, Outpatient, Rehabilitation, and Teleconsultation Populations

Guidance documents identified in a limited literature search were used to inform the requirements for pediatric feeding and swallowing assessment services.<sup>1,20,22,27</sup>

A team-based or multidisciplinary approach to feeding and swallowing assessment in children is consistently recommended because of the complexity of dysphagia and to ensure care is coordinated appropriately.<sup>1,20,22,27</sup> Multidisciplinary teams can include SLPs, generalist and specialist physicians, RDs, nurses, OTs, psychologists, social workers, lactation consultants, and physiotherapists.<sup>1</sup> Because of the nature of key instrumental assessments, radiology services should also be provided.<sup>20</sup>

## Limitations

The findings of this Environmental Scan are intended to present an overview of the current provision of feeding and swallowing assessment services to pediatric populations in some Canadian jurisdictions. They are not based on a systematic review of the topic. The findings of this report are based on a limited literature search and survey responses from a limited number of jurisdictions. Not all jurisdictions were contacted, and most respondents were only able to speak on behalf of a single site or organization, not about their jurisdiction's health care system as a whole. Findings from the literature are limited.

## Conclusion

Pediatric feeding and swallowing assessment services in Canada vary greatly both between and within jurisdictions. No single model of service emerged through survey responses or a limited literature search.

The types of pediatric patients to whom feeding and swallowing assessment services are provided depend on the organization. Whether services are organized in team- or program-based models also varies in Canada, although multidisciplinary team-based approaches are more common.

Regardless of the approach to service provision, pediatric feeding and swallowing assessment in Canada involves a multidisciplinary approach. OTs, SLPs, and physicians are most frequently involved in providing pediatric feeding and swallowing assessment services, but respondents also employ nurses, dietitians, and other health care professionals. The roles and responsibilities of these professionals in administering instrumental and non-instrumental assessments are inconsistent across Canada; however, SLPs or OTs are involved in providing at least some assessments in all of the organizations that responded to the survey.

FEES was the most frequently mentioned assessment tool under consideration within the jurisdictions. It is currently only used by respondents in Alberta and Quebec.

A variety of practice guidelines and outcome measures are being used across the country to support pediatric feeding and swallowing assessment services. Very few of these resources were mentioned by more than one respondent.

Little information about the requirements for pediatric feeding and swallowing assessment services was uncovered, with the exception of the need to ensure multidisciplinary teams are used when possible.

Complementing this Environmental Scan are three CADTH Rapid Response reports, published in 2015 and 2016, pertaining to the assessment of pediatric feeding and swallowing.<sup>4,5,32</sup>

The findings of this report conclude that pediatric feeding and swallowing assessment service practice models, professional scopes of practice, and use of assessments, tools, outcome measures, and practice guidelines vary across Canadian jurisdictions, and that there is limited information about service provision.

## References

1. Pediatric dysphagia [Internet]. Rockville (MD): American Speech-Language-Hearing Association; 2017. [cited 2017 Jan 24]. Available from: <http://www.asha.org/PRPSpecificTopic.aspx?folderid=8589934965&section=Assessment>
2. Dodrill P, Gosa MM. Pediatric dysphagia: Physiology, assessment, and management. *Ann Nutr Metab.* 2015;66 Suppl 5:24-31.
3. Slade S. Dysphagia (children): evaluation of feeding and swallowing difficulties. Adelaide (AU): The Joanna Briggs Institute; 2015 Mar 27.
4. Fiberoptic endoscopic evaluation of swallowing for pediatric patients with dysphagia: clinical effectiveness [Internet]. Ottawa (ON): CADTH; 2015 Nov 12. [cited 2017 Jan 24]. (Rapid response report: Summary of abstracts). Available from: <https://www.cadth.ca/sites/default/files/pdf/htis/nov-2015/RB0931%20FEES%20for%20Evaluation%20of%20Swallowing%20Disorders%20Final.pdf>
5. Assessment of pediatric feeding and swallowing: Guidelines [Internet]. Ottawa (ON): CADTH; 2016 Aug 24. [cited 2017 Jan 24]. (Rapid response report: Summary of abstracts). Available from: <https://www.cadth.ca/sites/default/files/pdf/htis/aug-2016/RB1016%20Assesment%20of%20Pediatric%20Feed%20and%20Swallowing%20%28Dysphagia%29%20Final.pdf>
6. Reilly S, Skuse D, Mathisen B, Wolke D. The objective rating of oral-motor functions during feeding. *Dysphagia.* 1995;10(3):177-91.
7. Sheppard JJ. Dysphagia disorder survey and dysphagia management staging scale (adult and pediatric applications). Lake Hopatcong (NJ): Nutritional Management Associates; 2002.
8. National Guideline Clearinghouse. Guideline summary: ACR Appropriateness Criteria® dysphagia. In: National Guideline Clearinghouse [Internet]. Rockville (MD): Agency for Healthcare Research and Quality; 1998 [cited 2017 Jan 24; revised 2013]. Available from: <https://www.guideline.gov/summaries/summary/47651>
9. Rosenbek JC, Robbins JA, Roecker EB, Coyle JL, Wood JL. A penetration-aspiration scale. *Dysphagia.* 1996;11(2):93-8.
10. Lefton-Greif MA, Okelo SO, Wright JM, Collaco JM, Grath-Morrow SA, Eakin MN. Impact of children's feeding/swallowing problems: validation of a new caregiver instrument. *Dysphagia [Internet].* 2014 Dec [cited 2017 Jan 25];29(6):671-7. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4359894>
11. Heckathorn DE, Speyer R, Taylor J, Cordier R. Systematic review: non-instrumental swallowing and feeding assessments in pediatrics. *Dysphagia.* 2016 Feb;31(1):1-23.
12. International Dysphagia Diet Standardisation Initiative [Internet]. Paddington (AU): IDDSI; 2017. [cited 2017 Jan 31]. Available from: <http://iddsi.org/>
13. Advanced certification application and program of study: Videofluoroscopic assessment of swallowing disorder in paediatrics [Internet]. Vancouver (BC): College of Speech and Hearing Health Professionals of BC; 2016 Aug. [cited 2017 Jan 25]. Available from: [www.cshhpb.org/docs/ac\\_application\\_and\\_program\\_of\\_study\\_certificate\\_j.pdf](http://www.cshhpb.org/docs/ac_application_and_program_of_study_certificate_j.pdf)
14. Health Professions Act: [RSBC 1996] Chapter 183 [Internet]. Victoria (BC): Queen's Printer; 1996; current to 2017 Jan 18. [cited 2017 Jan 31]. Available from: [http://www.bclaws.ca/civix/document/id/complete/statreg/96183\\_01](http://www.bclaws.ca/civix/document/id/complete/statreg/96183_01)
15. Barium recipes [Internet]. Toronto (ON): Swallowing Rehabilitation Research Laboratory; 2017. [cited 2017 Feb 7]. Available from: <http://steeswallowinglab.ca/srll/best-practice/barium-recipes/>
16. Ferrara L. Apneas, bradycardias, and desaturations during oral feedings in growing preemies: nature vs. nurture [presentation on the Internet]. St. Louis (MO): Dr. Brown's® Medical; 2014 Mar. [cited 2017 Feb 7]. Available from: <https://www.drbrownsbaby.com/medical/webinars/>
17. Ross ES, Philbin MK. SOFFI: an evidence-based method for quality bottle-feedings of preterm, ill, and fragile infants. *J Perinat Neonatal Nurs [Internet].* 2011 Oct [cited 2017 Mar 10];25(4):349-57. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3896260>
18. Royal College of Speech & Language Therapists: clinical guidelines. Oxon (GB): Speechmark Publishing Ltd; 2005.
19. Preferred practice patterns for the profession of speech-language pathology [Internet]. Rockville (MD): American Speech-Language-Hearing Association; 2004 Nov. [cited 2017 Jan 24]. Available from: <http://www.asha.org/policy/PP2004-00191.htm>
20. Miles A, Benoit A, Keesing M, McLauchlan H, Ong E, Rigby H, et al. New Zealand speech-language therapy clinical practice guideline on videofluoroscopic study of swallowing (VFSS) [Internet]. Auckland (NZ): New Zealand Speech-language Therapists' Association; 2011 Apr. [cited 2017 Jan 24]. Available from: <http://www.speechtherapy.org.nz/wp-content/uploads/2013/09/VFSS-April-2011.pdf>
21. Practice standards and guidelines for dysphagia intervention by speech-language pathologists [Internet]. Toronto (ON): College of Audiologists and Speech-Language Pathologists of Ontario (CASLPO); 2007 Sep. [cited 2017 Jan 25; reformatted 2014 Apr]. Available from: [http://www.caslpo.com/sites/default/uploads/files/PSG\\_EN\\_Dysphagia.pdf](http://www.caslpo.com/sites/default/uploads/files/PSG_EN_Dysphagia.pdf)
22. National Guideline Clearinghouse. Evidence-based guideline summary: evaluation, diagnosis, and management of congenital muscular dystrophy: report of the Guideline Development Subcommittee of the American Academy of Neurology and the Practice Issues Review Panel of the American Association of Neuromuscular and Electromyography Clinicians. In: National Guideline Clearinghouse [Internet]. Rockville (MD): Agency for Healthcare Research and Quality; 2015 May 31 [cited 2017 Jan 24]. Available from: <https://www.guideline.gov/summaries/summary/49881>
23. ASHA Special Interest Division 13, Swallowing and Swallowing Disorders (Dysphagia). Guidelines for speech-language pathologists performing videofluoroscopic swallowing studies [Internet]. Rockville (MD): American Speech-Language-Hearing Association; 2003. [cited 2017 Jan 24]. Available from: <http://www.asha.org/policy/GL2004-00050/>
24. ASHA Special Interest Division 13, Swallowing and Swallowing Disorders (Dysphagia) Committee on Endoscopic Evaluation of Swallowing Guidelines. Role of the Speech-Language Pathologist in the performance and interpretation of endoscopic evaluation of swallowing: guidelines [Internet]. Rockville (MD): American Speech-Language-Hearing Association; 2004. [cited 2017 Jan 24]. Available from: <http://www.asha.org/policy/GL2004-00059/>

25. Dysphagia Document Review and Revision Working Group. Roles of Speech-Language Pathologists in swallowing and feeding disorders: technical report [Internet]. Rockville (MD): American Speech-Language-Hearing Association; 2001. [cited 2017 Jan 24]. Available from: <http://www.asha.org/policy/TR2001-00150/>
26. Slade S. Feeding and swallowing (children): screening and outcome measurement. Adelaide (AU): The Joanna Briggs Institute; 2015 Mar 27.
27. Feeding difficulties in children - a guide for allied health professionals [Internet]. North Sydney (AU): Ministry of Health, NSW; 2016 Feb 12. [cited 2017 Jan 24]. (Guideline; no. GL2016\_007). Available from: [http://www0.health.nsw.gov.au/policies/gl/2016/pdf/GL2016\\_007.pdf](http://www0.health.nsw.gov.au/policies/gl/2016/pdf/GL2016_007.pdf)
28. Law M, Baptiste S, Carswell A, McColl MA, Polatajko H, Pollock N. Canadian Occupational Performance Measure (COPM). 5th ed. Ottawa (ON): CAOT Publications ACE; 2014 Feb 14.
29. Crist W, Dobbelsteyn C, Brousseau AM, Napier-Phillips A. Pediatric assessment scale for severe feeding problems: validity and reliability of a new scale for tube-fed children. *Nutr Clin Pract*. 2004 Aug;19(4):403-8.
30. The WHO child growth standards [Internet]. Geneva (CH): World Health Organization; 2017. [cited 2017 Feb 9]. Available from: <http://www.who.int/childgrowth/standards/en/>
31. Food processor nutrition analysis software [Internet]. Salem (OR): ESHA Research; 2017. [cited 2017 Mar 6]. Available from: <http://www.esha.com/products/food-processor-nutrition-analysis-software/>
32. Three-ounce water swallow challenge for oropharyngeal dysphagia: diagnostic accuracy and guidelines [Internet]. Ottawa: CADTH; 2016 Apr 4. [cited 2017 Jan 24]. (Rapid response report: Summary of abstracts). Available from: <https://www.cadth.ca/sites/default/files/pdf/htis/apr-2016/RB0977%20Water%20Swallow%20Challenge%20Final.pdf>
33. Romano M, Schultz T, Tai A. The Diagnostic Test Accuracy of Clinical Swallow Assessment for Oropharyngeal Aspiration: A Systematic Review. *JBI Libr Syst Rev*. 2012;10(56 Suppl):1-16.
34. Kenny DJ, Koheil RM, Greenberg J, Reid D, Milner M, Moran R, et al. Development of a multidisciplinary feeding profile for children who are dependent feeders. *Dysphagia*. 1989;4(1):16-28.
35. Gisel EG. Oral-motor skills following sensorimotor intervention in the moderately eating-impaired child with cerebral palsy. *Dysphagia*. 1994;9(3):180-92.
36. Alimentheque™ [Internet]. Montreal (QC): LOGICIELS Alimentheque; 2017. [cited 2017 Mar 6]. Available from: [http://www.alimentheque.com/index\\_E.html](http://www.alimentheque.com/index_E.html)
37. Crist W, Napier-Phillips A. Mealtime behaviors of young children: a comparison of normative and clinical data. *J Dev Behav Pediatr*. 2001 Oct;22(5):279-86.
38. Clinique pédiatrique de dysphagie et d'ergothérapie - trouble d'alimentation chez l'enfant [Internet]. Brossard (QC): Clinique Pédiatrique de Dysphagie et d'Ergothérapie. 2017 [cited 2017 Mar 7]. Available from: <http://www.cliniquepde.ca/index.php>

## Appendix 1: Feeding and Swallowing Assessment Services for Pediatric Populations in Canada Survey

Advanced survey logic, including branching, piping, and looping, was used to populate questions with responses from previous questions, to repeat sections of the survey as needed, and to avoid arms of the survey that were not relevant to respondents.

1. What is the name of your organization?

2. In which jurisdiction is your organization located?

- Alberta
- British Columbia
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Nova Scotia
- Northwest Territories
- Nunavut
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan
- Yukon
- Federal – Health Canada

3. What is your profession?

- Program Manager, please specify for which program(s)
- Practice Leader, please specify for which profession
- Speech-Language Pathologist
- Occupational Therapist
- Registered Dietitian
- Physician
- Registered Nurse
- Other, please specify...
- Do not wish to say



## A. Pediatric Feeding and Swallowing Assessment Service Models

The following questions are about your organization's *current* delivery model(s) for pediatric feeding and swallowing assessment services.

### 4. In your organization, which types of pediatric patients *currently* have access to feeding and swallowing assessment services, when needed?

- Non-rehabilitation in-patients
- Non-rehabilitation outpatients
- Rehabilitation in-patients
- Rehabilitation outpatients
- Teleconsultation (remote) patients
- Other, please specify...

### 5. Please attach your organization's eligibility/referral criteria for [PatientTypes] to your pediatric feeding and swallowing assessment service. If you are unable to attach a file, please describe your eligibility/referral criteria for [PatientTypes] in the text box below or, alternatively, please send your eligibility/referral criteria to [author's email address] and indicate you have sent an email in the box below.

Note: Choosing to send an email message will identify you to the researchers. Do not select this option if you do not wish to be identified.

## B. Organization of Pediatric Feeding and Swallowing Assessment Services

The following series of questions is about how your institution currently organizes the delivery of pediatric feeding and swallowing assessment services for pediatric patients. You will be asked to consider two ways these services may be organized:

- **Team-based**, that is, a dedicated or *specialized group* of health care professionals who are responsible for working with pediatric patients, *regardless of location*, to assess feeding and swallowing; or
- **Program-based**, that is, a health care provider or group of health care providers who are attached to a *specific clinical area* (for example, pediatric oncology, pediatric intensive care, pediatric neurology, pediatric cardiology), to assess feeding and swallowing *within that program*.

### 6. Does your organization currently offer team-based assessment services for pediatric feeding and swallowing services?

- Yes
- No

7. Please list the name(s) of your organization's team(s) for pediatric feeding and swallowing services:

Reminder: By team, we mean a *dedicated or specialized group* of health care professionals who are responsible for working with pediatric patients, *regardless of location*, to assess feeding and swallowing.

8. Which of the following health care professionals are currently involved in your organization's pediatric team(s) for feeding and swallowing assessment services?

- Speech-Language Pathologists
- Occupational Therapists
- Registered Dietitians
- Physicians
- Registered Nurses
- Other, please specify...

9. Which of the following does your organization currently offer as part of your team-based delivery of pediatric feeding and swallowing assessment services?

VFSS = Videofluoroscopic Swallowing Study; FEES = Fiberoptic Endoscopic Evaluation of Swallowing

- Oral-motor assessment
- Feeding/swallowing assessment
- VFSS
- FEES
- Other, please specify...

10. What health care professionals are *currently* part of your organization's pediatric feeding and swallowing assessment services team(s)?

11. Please indicate the health care professionals *currently* responsible for administering the following assessments for your organization's pediatric feeding and swallowing assessment services team(s):

12. Does your organization *currently offer* program-based pediatric feeding and swallowing assessment services?

Reminder: By program-based, we mean a health care provider or group of health care providers who are attached to a *specific clinical area* (for example, pediatric oncology, pediatric intensive care, pediatric neurology, pediatric cardiology) to assess feeding and swallowing *within that program*.

Yes

No

13. Please list the name(s) of your organization's programs that *currently* provide pediatric feeding and swallowing services:

14. Which of the following health care professionals are *currently* involved in your organization's programs for pediatric feeding and swallowing assessment services?

Speech-Language Pathologists

Occupational Therapists

Registered Dietitians

Physicians

Registered Nurses

Other, please specify...

15. Which of the following does your organization *currently* offer as part of your program-based delivery of pediatric feeding and swallowing assessment services?

VFSS = Videofluoroscopic Swallowing Study; FEES = Fiberoptic Endoscopic Evaluation of Swallowing

Oral-motor assessment

Feeding/swallowing assessment

VFSS

FEES

Other, please specify...

16. What health care professionals are *currently* part of your organization's pediatric feeding and swallowing assessment services program(s)?

17. Please indicate the health care professionals *currently* responsible for administering the following assessments for your organization's pediatric feeding and swallowing assessment services program(s):

## C. Instrumental and Non-Instrumental Assessment Tools or Supports Under Consideration

18. Please list any instrumental and non-instrumental assessment tools or supports your organization is *considering* to include as part of your provision of pediatric feeding and swallowing assessment services (both team-based and program-based):

## D. Practice Guidelines and Outcome Measurements for Pediatric Feeding and Swallowing Assessment Services

19. Does your organization *currently* use any practice guidelines in your team-based or program-based pediatric feeding and swallowing assessment services?

Yes

No

20. Please list the practice guidelines your organization *currently* uses in providing your pediatric feeding and swallowing assessment services.

21. Does your organization *currently* use any outcome measurements in your team-based or program-based pediatric feeding and swallowing assessment services?

Yes

No

22. Please list the outcome measurements your organization's team-based or program-based pediatric feeding and swallowing assessment services *currently* use:

## E. Contact Information

23. Would you be willing to be contacted by us to gather further information from you?

Yes

No

24. Contact information

Name

Organization

Email

Phone Number

## Appendix 2: Information on Survey Respondents

Province/Territory	Organization Represented by Survey Respondents
Alberta	Alberta Children’s Hospital
	Alberta Health Services <sup>a</sup>
	Alberta Health Services – Children’s Rehabilitation Services <sup>b</sup>
	Children’s Allied Health <sup>a</sup>
	Glenrose Rehabilitation Hospital <sup>a</sup>
	Northern Lights Regional Health Centre
	Stollery Children’s Hospital <sup>a</sup>
British Columbia	BC Children’s Hospital
	The Centre for Child Development
	Queen Alexandra Centre for Children’s Health
	Sunny Hill Health Centre for Children
New Brunswick	Horizon Health Network
	Horizon Health Network – Saint John Area
	Saint John Regional Hospital
Newfoundland and Labrador	Eastern Health
Northwest Territories	Stanton Territorial Hospital
Nova Scotia	IWK Health Centre
Ontario	Holland Bloorview Kids Rehabilitation Hospital
Quebec	Centre de réadaptation MAB–Mackay
	Centre de réadaptation Marie Enfant du CHU Ste-Justine
	Montreal Children’s Hospital <sup>a</sup>
Saskatchewan	Saskatoon Health Region
Unspecified <sup>b</sup>	N/A

N/A = not applicable.

<sup>a</sup> Partially completed survey with usable responses included in analysis.

<sup>b</sup> Partially completed survey with no usable responses.