

Dysphagia Screening: State of the Art Invitational Conference Proceeding From the State-of-the-Art Nursing Symposium, International Stroke Conference 2012

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Dysphagia screening is a recurring topic of discussion in stroke care and other acute and chronic conditions that can affect swallowing. Many would agree with Wolf and Rudd that “[s]wallowing screening is so obviously important that a trial is not needed, but the hard evidence that screening saves lives is absent.”¹ Paradoxically, the 2010 Joint Commission retired the dysphagia screening performance standard for acute stroke because the National Quality Forum could not endorse it, stating that there are no standards for what constitutes a valid dysphagia screening tool, and no clinical trials have been completed that identify the optimal swallow screening.² Consequently, dysphagia screening was removed from the “Get With The Guidelines” stroke guidelines. This has led to concern among multidisciplinary stroke professionals that dysphagia screening will be entirely omitted from stroke care, leading to worsening outcomes among stroke patients at risk for swallowing problems. An invitational symposium was held January 31, 2012, at the State-of-the-Art Nursing Symposium in New Orleans, LA, to explore the issues and state of the science in dysphagia screening. The present report serves as a conference proceeding that aims to (1) educate multidisciplinary stroke professionals about the important issues related to identifying valid and reliable dysphagia screening tools, (2) identify the strengths and limitations of currently available dysphagia screenings, (3) describe how facilities may make cogent decisions about dysphagia screening selection, based on their specific needs, and (4) provide an example for establishing a dysphagia

screening in a stroke care unit. As part of the discussion during the symposium, several expert recommendations were made regarding dysphagia screening in stroke care, which are also presented here. We will begin the report, as we will end, with this caveat: Because dysphagia screening is not a “one size fits all” process, neither the symposium nor the present report aimed to suggest that a single tool will meet the needs of multidisciplinary stroke professionals at every level of stroke care.

Why Is Dysphagia Identification Important?

Stroke is the leading neurological cause of dysphagia (difficulty swallowing), with 42% to 67% of patients presenting with dysphagia within 3 days of stroke. Fifty percent of these patients aspirate, and one third of patients who aspirate develop pneumonia that requires treatment.³ In addition, swallowing abnormality is associated with a 3-fold higher mortality rate, largely attributable to pneumonia.

Early identification of dysphagia and aspiration risk is critical to avoid adverse health consequences for stroke patients. These adverse health consequences include not only aspiration and pneumonia but also dehydration, malnutrition, weight loss, and susceptibility to other illnesses, as well as death.⁴ Furthermore, these dysphagia-related adverse health consequences may lead to reduced patient satisfaction caused by the length of time spent nil per os (NPO), longer length of hospital stay, reduced ability to participate in rehabilitation, and reduced level of independence at discharge.

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Operational Definitions

As stated previously, the symposium's purpose was to look at the state of the science in dysphagia screening and begin a dialogue about what factors are most important when considering poststroke dysphagia screening. However, to do this, we must begin by establishing operational definitions to establish the importance of differentiating between a dysphagia screening and a dysphagia assessment (clinical or instrumented). We suggest that perhaps a misunderstanding of the differences between a dysphagia screening and a dysphagia assessment may have led to confusion about what role each discipline plays in identifying and treating individuals with dysphagia after stroke. First, a dysphagia screening (definition developed by the American Speech-Language-Hearing Association; Table 1), for the purposes of our discussion, is a pass/fail procedure to identify an individual who may need a complete dysphagia assessment.⁵ A clinical swallowing evaluation is a behavioral assessment of swallowing function that consists of an extensive cranial nerve evaluation and direct examination of swallowing using food and liquids of various textures and consistencies. Finally, an instrumental dysphagia study, such as the videofluoroscopic swallowing assessment, aims to identify (1) the swallowing impairment (eg, delayed onset of the pharyngeal swallow, reduced tongue base retraction) and (2) the effects of compensatory strategies (eg, chin tuck, thickened liquids) before the patient changes diets or begins dysphagia rehabilitation.

Dysphagia Screening Considerations

In the late 1990s and early 2000s, we began to see a proliferation of research into the feasibility of swallowing screening conducted by nurses and physicians,⁶⁻⁹ along with an increased understanding of the important factors for identifying dysphagia and risk of aspiration (eg, abnormal volitional cough, abnormal gag reflex, dysphonia, dysarthria, cough after swallow, and voice change after swallow)⁸ and their predictive qualities.¹⁰⁻¹²

The growing body of research up to 2005 indicated a need for valid and reliable dysphagia screenings with adequate

sensitivity, specificity, and predictive strength to accurately detect risk of dysphagia aspiration that could be administered by a range of frontline professionals who have the earliest contact with acute stroke patients. There was consensus that keeping stroke patients NPO while waiting for a full-scale dysphagia assessment is not satisfactory and may present other risks to the patient's health status. By 2007, the American Heart Association/American Stroke Association guidelines indicated that swallowing should be screened before oral intake, including aspirin,¹³ the Veteran's Health Administration guideline recommended that swallowing be screened in all individuals admitted with stroke symptoms prior to oral intake,¹⁴ and the United Kingdom's National Institute for Clinical Excellence recommended screening of swallowing within 4 hours of admission for acute stroke patients (2010).¹⁵

Currently (2012), we find ourselves in the following situation. The Joint Commission retired the dysphagia screening performance standard in 2010 because the National Quality Forum could not endorse it.² The lack of endorsement from the National Quality Forum arose because no systematically defined standard exists for what constitutes a valid dysphagia screening tool, and because no single swallow screen has been identified through controlled clinical trials as being superior. Meanwhile, evidence has been accumulating that unscreened individuals are at greater risk for pneumonia than those who pass 1 of several simple swallow screens. Removal from The Joint Commission recommendations does not mean to stop screening.

In the January 2012 symposium, we reviewed the characteristics of valid and reliable screening and assessment tools; reviewed the psychometric properties, strengths, and limitations of those most commonly used; discussed criteria that may be used by an institution in choosing a screening instrument; and finally, provided a "best practice" example of an interdisciplinary continuous quality improvement (CQI) approach to dysphagia screening.

What Constitutes a Good Screening Instrument?

A screening tool should be valid. In the case of dysphagia, the tool should measure dysphagia and aspiration risk, suitability for oral feeding, and need for further evaluation by a specialist. Second, the tool must be reliable, which means that various people can administer the test with similar results (interrater reliability) and that a single individual can administer the test to a person and get similar results compared with the first administration (intrarater reliability).

Furthermore, a good screening tool must be sensitive to the condition being measured (risk of dysphagia) and specific to the problem. Does the screening tool capture the patients it is intended to capture (sensitivity)? Does it rule out the patients who do not have the problem (specificity)? Ideally, a good dysphagia screening tool has both high sensitivity (ie, the capability of capturing the patients who are at risk for dysphagia) and specificity (ie, the capability of ruling out the patients who are not at risk for dysphagia).

Table 1. Operational Definitions

Dysphagia screening: "Swallowing screening is a pass/fail procedure to identify individuals who require a comprehensive assessment of swallowing function or a referral for other professional and/or medical services." (American Speech-Language-Hearing Association, 2004)⁵

Clinical swallowing evaluation (CSE): Behavioral assessment of swallowing mechanism and swallowing function using different consistencies of food and liquid.

Instrumental dysphagia evaluation: Videofluoroscopic swallowing study (VFSS); fiberoptic endoscopic evaluation (FEES). Completed to determine specific swallowing impairment and response to compensation. Required before compensation or rehabilitation can be implemented.

Sensitivity: The probability that a diagnostic sign (eg, cough after swallow) will be present given that the disease (dysphagia) is truly present (true-positive).

Specificity: The probability that a diagnostic sign will be absent given that the disease is truly absent (true-negative).

An effective dysphagia screening tool must have a specific purpose: to identify dysphagia and aspiration risk. The adequate screen needs a scoring system that meets the purpose. For example, if “Pass,” the patient can be fed orally; if “Fail,” the patient should remain NPO, and a speech-language pathologist (SLP) should be consulted. There should be a stated time to administer the test that should include serial screening if an SLP cannot evaluate those who fail in a timely manner. Serial screening also allows rescreening of swallowing in patients who originally passed but are demonstrating neurological decline. Finally, the ideal screen specifies the appropriate screeners and the level of training required to reliably administer the screening.^{16–18}

As stated previously, the ideal screening should have both high sensitivity and high specificity; however, most available tests focus on high sensitivity because of the concern about increased morbidity and mortality associated with failing a dysphagia screening. The ideal screening should be a quick and minimally invasive process that can determine (1) the likelihood of dysphagia and aspiration, (2) whether the individual needs further swallowing assessment, and (3) whether it is safe to feed the patient orally. Controversies remain regarding who is the best health-care worker to conduct screenings (nurses, physicians, or SLPs) and what protocol to use: assessing nonswallowing behaviors, assessing swallowing behaviors, or both. In many places, screening has fallen to SLPs. However, the reality of clinical practice is that SLPs are in short supply. A requirement that screening be conducted only by SLPs means that newly admitted stroke patients may wait a long time before it is determined whether they can take food or medications orally. Therefore, there is a need in stroke care units for an optimal dysphagia screening that may be administered by other stroke care professionals.

Important factors to consider when selecting a screening tool are quality of the research study, validity of the tool, reliability in administration, and feasibility in implementation. We review in Table 2 a number of validated screening tools available to nurses and other disciplines in acute care. These screening tools vary in length, with the most simple having 1 item and the most complex having 16 items. Detail is provided regarding how these tools were derived, along with their sensitivity, specificity, strengths, and limitations. Only a few of the strengths and limitations of each study are listed. The interested reader is encouraged to review each study to determine the quality of the research. A recently completed systematic review suggests that continued work is required in the development of stroke dysphagia screening tools.^{30,31}

Choosing a Screening Instrument

However, there is more to choosing an appropriate screening tool for a facility than understanding its sensitivity and specificity. The consequences of missing someone who has difficulty swallowing could mean increased morbidity or even death caused by aspiration for that individual. The consequences of identifying someone as having a swallowing

problem who does not include delay in oral medication and discomfort for the person who cannot have any food or liquid, possibly resulting in decreased hydration and nutrition and ultimately, poor patient satisfaction. Thus, the choices for dysphagia screening tend to favor tools with high sensitivity and tolerate unhappy patients who might have had liquids or food earlier. As Jeff Edmiaston noted in the symposium, the perfect dysphagia screening would be a simple question: “Do you have strokelike symptoms?” A “yes” answer would have perfect sensitivity (because 55% of people with strokelike symptoms also have dysphagia) and zero specificity (because 45% do not). The clinical benefit would be no dysphagia-related complications, but this comes at the cost of low patient satisfaction, because almost half would be kept unnecessarily as NPO.

Other factors that influence the selection of a screening instrument are contextual: elements of the organizational structure, patient flow, and composition of healthcare personnel. Size of hospital, size of stroke unit, volume of patients, nursing staffing, 24-hour availability of specialized personnel (eg, SLPs), and availability of radiology services (ie, video-fluoroscopy) will all influence the type of screening that is used for a particular facility. Because of these contextual differences, a single dysphagia screening will not be appropriate for every stroke care unit.

Edmiaston demonstrated how multidisciplinary stroke professionals in any size facility could use the Kepner-Tregoe Decision Matrix (K-T Matrix) to make cogent decisions about which of the valid and reliable dysphagia screening tools available would best suit their needs. The K-T Matrix is an easily developed heuristic device that can display evidence-based data derived from the literature for potential dysphagia screening instruments by column and factors deemed most important to the institution in rows.³² The rows can be further divided into items that are weighted by importance for a given institution (ie, “must” items are given greater emphasis, whereas weighted “want” items will vary based on an institution’s needs). The “must” elements are bolded and have to be present before one proceeds to evaluate the weighted items (Tables 3 and 4).

For the sake of illustration, we provide 2 examples of how the K-T Matrix could be used by multidisciplinary stroke professionals. We have purposely used “hypothetical” dysphagia screenings to encourage interested parties to go through the decision-making process themselves. Table 3 represents the decision-making process a larger institution with more resources to dedicate to the screening process would use. Review of the “must” items illustrates that this institution has a greater tolerance for lower specificity, because the resources exist to address those patients who fail the screen in a timely manner. Furthermore, whereas both tests 2 and 3 have all of the “must” items, the weighted “want” items tend to favor test 2. On the other hand, Table 4 represents a smaller institution with fewer resources. The “must” items are the same as for the larger institution, but the “want” items are weighted differently. In this case, the item weighting reflects a lower tolerance for false-positives. Therefore, Table 4 demonstrates that for the second, smaller institution, test 3 is the best choice.

Table 2. Characteristics of Selected Swallow Screening Tests

Test	Characteristics	Who Administers	How Derived	Psychometrics	Strengths	Limitations
Toronto Bedside Swallowing Screening Test (TOR-BSST) ¹⁹	Stroke: acute and rehab; includes swallowing and nonswallowing items; discontinue if any item is positive; 4 h training; up to 10 min to administer	RN	N=311 acute and rehab stroke patients; validated against VFSS within 24 h	Sensitivity 91%; specificity 67%; reliability: intraclass correlation 92% in first 50 patients	High sensitivity; good reliability; consecutive admissions; blinding; validated against instrumental assessment; outcome was dysphagia, not just aspiration	Low specificity; questionable feasibility; small sample; only 20% of subjects contributed to validation; extended time between tests; limited operational definitions; proprietary
3-oz Water Swallow Test (WST) ^{20,21}	Screening for all patients regardless of diagnosis; single swallowing item	Discipline not stated (SLP in papers)	N=3000 patients with heterogeneous diagnoses; validated against FEES, which was administered immediately before screen	Sensitivity 97%; specificity 49%; no reliability data	High sensitivity; single item suggests high feasibility; large sample; no delay between tests; validated against instrumental assessment; operational definitions provided	Low specificity; reliability not evaluated; no training information; referrals not consecutive admissions; no blinding; outcome was aspiration, not dysphagia
Any 2 ¹⁰	Acute stroke; swallowing and nonswallowing items; administer all items; screening positive if any 2 items are present	SLP	N=59 acute stroke patients; validated against VFSS within 48 h	Sensitivity 92%; specificity 67%; no reliability data	High sensitivity; blinding; consecutive admissions; validated against instrumental assessment; operational definitions provided	Low specificity; reliability not evaluated; no information on training or administration time; small sample size; extended time between tests; outcome was risk of aspiration, not dysphagia; not designed as frontline screening tool to be administered by other disciplines
Bedside Swallowing Assessment ²²⁻²⁵	Acute stroke; swallowing and nonswallowing items; discontinue if any item positive	MD and SLP	N=94 acute stroke patients; Validated against VFSS within 3 days	Sensitivity ranged from 47% (SLP) to 70% (MD); specificity ranged from 66% (MD) to 86% (SLP); reliability varied among MDs and SLPs ($\kappa=0.24-0.79$)	Blinding	Generally low sensitivity and specificity; poor reliability among clinicians; complex protocol; operational definitions not described
Standardized Swallowing Assessment ⁶⁻⁸	Swallowing and nonswallowing items; discontinue if any item present	RN, SLP, and junior doctors (5 practice sessions)	123 Consecutive admissions of acute stroke patients; outcome was dysphagia, as documented by SLP (validation therefore was from chart review, not concurrent)	Analysis based on 68 completed screening episodes by independently competent nurses and a comparison with summative clinical judgment of swallow function (taken from chart review); sensitivity 0.97; specificity 0.9 for detection of dysphagia, with positive and negative predictive values of 0.92 and 0.96, respectively; sensitivity of gag reflex to presence of dysphagia: 0.71; specificity of gag reflex for presence of dysphagia: 0.625; positive predictive value of gag function for dysphagia: 0.77; negative predictive value of gag function for dysphagia: 0.55	Multiple providers trained; strong sensitivity and specificity (but on a subsample); operational definitions, based on literature review	Validation with a subsample with unclear attempts to R/O bias in selection; validation from chart review with unknown time from assessment; feasibility (not clear how long training needs to be and whether reliability is maintained); not validated against instrumental examination

(Continued)

Table 2. (Continued)

Test	Characteristics	Who Administers	How Derived	Psychometrics	Strengths	Limitations
Gugging Swallow Screen (GUSS) ²⁶	Acute stroke; swallowing and nonswallowing items; discontinue if any item present; swallowing involves multiple volumes and viscosities; discontinue if any item present	RN or SLP	N=19 acute stroke patients (SLP); N=30 acute stroke patients (RN); validated against FEES within 2 h	Validation for SLP: sensitivity 100%, specificity 50%. External validation with nurses: sensitivity 100%, specificity 69%. Reliability: 95% agreement (tested with SLPs only)	High sensitivity; consecutive patients; blinding; minimal delay between tests; validated against instrumental assessment; operational definitions provided	Low specificity; no reliability for nurses; feasibility unknown given complexity; small sample size; outcome was risk of aspiration, not dysphagia; operational definitions not clear
Acute Stroke Dysphagia Screening (also called Barnes Jewish Hospital Stroke Dysphagia Screen) ²⁷	Acute stroke patients; nonswallowing and swallowing items; discontinue if any item positive; 10 min training	RN	N=300 acute stroke patients; validated against MASA within 32 h	Sensitivity 91% for dysphagia, 95% for aspiration; specificity 74% for dysphagia, 68% for aspiration; reliability: $\kappa=93.6$	High sensitivity; good reliability; appears feasible; large sample of consecutive patients; blinding; outcome was dysphagia and aspiration	Low specificity; extended time between tests; noninstrumental reference standard; no operational definitions
Emergency Physician Dysphagia Screening ²⁸	Acute stroke patients; nonswallowing and swallowing items; discontinue if any item positive; training: brief explanation	Emergency physician	N=convenience sample of 84 acute stroke patients; validated against CSE; outcome was modified diet within 24 h	Reliability agreement 97%; sensitivity 96%; specificity 56%	High sensitivity; good reliability; blinding	Low specificity; feasibility unknown because no training/administration time provided; small sample, not consecutive stroke admissions; extended time between tests; noninstrumental reference standard; diet recommendations not a reliable outcome
Modified Mann Assessment of Swallowing Ability (MMASA) ²⁹	Acute stroke patients; nonswallowing items only	Stroke neurologists	N=150 consecutive acute stroke patients; validated against MASA within 2 h	Sensitivity 90%; specificity 85%; reliability: $\kappa=0.76$ (98% dysphagia/no dysphagia)	High sensitivity; high specificity; good reliability; consecutive patients; blinding; minimal delay between tests; outcome was dysphagia; operational definitions provided	Feasibility unknown; no information on training and administration times; small sample; not validated against instrumental examination; overlap in items on screening and reference standard

CSE indicates Clinical Swallowing Evaluation; ED, emergency department; FEES, Fiberoptic Endoscopic Evaluation; MASA, Mann Assessment of Swallowing Ability; MD, medical doctor; rehab, rehabilitation; RN, registered nurse; R/O, rule out; SLP, speech-language pathologist. and VFSS, Videofluorographic Swallowing Study.

Note that in both Tables, test 1 has the highest point total for the “want” items but is missing all of the “must” items and is therefore excluded from consideration.

Integrating Dysphagia Screening Into Stroke Care

Janice Weinhardt presented a case study example of how one interdisciplinary stroke unit translated the current science into practice using a CQI approach to dysphagia screening. The project began because of a high level of patient, physician, and nurse dissatisfaction about stroke patients being kept NPO until an SLP could conduct a formal dysphagia screening. The standing rule was, “No ice chips, no oral medications, no water, no exceptions.”^{21,33} Unfortunately, because the SLPs were not available 7 days a week, many patients were NPO for an extended period of time. Thus, a clinical interdisciplinary team was formed to determine whether the time

from admission to screening could be reduced. The team used the interdisciplinary CQI intervention trial as their conceptual model.³⁴ Stakeholders were identified, and they then sequentially built a method for reaching agreement on a clinical process, building the dysphagia screening model, commencing screening implementation, documenting the process and intervention, evaluating the outcome, and providing continuous feedback to the process. A brief description of how the CQI process unfolded is described below for readers interested in using the process in their own facilities.

Agree

The first stage of the process was to gain consensus among the major stakeholders. The team leaders presented the evidence base for swallowing screening and assessment; demonstrated the need; discussed the benefits to patients, providers, and the health system; identified the costs; and demonstrated consistency with the health system mission.

Table 3. Decision-Making Process (Kepner-Tregoe Decision Matrix) for Larger Institutions

	Test 1	Test 2	Test 3
Easily administered		X	X
Valid		X	X
Reliable		X	X
High sensitivity (>90%)		X	X
High specificity >70% (1 pt)	1	0	1
Evidence-based (10 pts)	10	10	10
Minimal training (5 pts)	5	5	0
Easily documented (7 pts)	7	7	7
Total	23	22	18

Pt(s) indicates point(s). Bolding indicates “must” items (ie, institution requires that the test have these characteristics).

Build

The building phase required the creation of a team that could develop the plan. The result of identifying the stakeholders was a team composed of an advanced practice nurse as the lead and the SLP, stroke neurologist, research nurse, quality improvement nurse, and staff nurse representative. Although this group did not use the decision K-T Matrix described previously, they considered many of the same items in choosing a dysphagia screening tool, including validity and reliability of existing screenings, ease of administration, administration time, safety for patient at risk, input from nurses, available resources, and whether or not an existing dysphagia screening could be tailored to meet the institution’s needs.³⁵ In particular, the group sought to find a screening, through review of the literature, that could be used by bedside nurses, in contrast to a full swallowing evaluation performed by an SLP.³⁶ Because no existing dysphagia screening met their needs, they developed an in-house dysphagia screening using 3 consistencies of thin to puree textures. The team established that the reliability of their dysphagia screening would be tested using nurse screening compared with SLP evaluation.³⁷

On the basis of a guideline that a swallow screening should be performed in the first 24 hours after stroke³³ to avoid prolonged NPO status, the team had to establish the optimal place to perform the dysphagia screening: the emergency department, stroke unit, critical care unit, or hospital-wide. The group chose to conduct a pilot project on 1 inpatient unit and use the results to determine how to take it hospital-wide. In that unit, the leadership team developed the protocols and forms for documentation, educated the nurses in the use of the tool through demonstration and internet self-learning packets, and made all of the logistical decisions about supplies and storage.

Commence and Document

During the pilot project, trained staff nurses screened a selected number of patients using the dysphagia screening, and the SLP performed an independent swallowing evaluation within an hour. A research nurse used an electronic database to document pertinent information, including patient demographics, clinical status, and response to the trial liquids (swallow, cough, vocal quality).

Table 4. Decision-Making Process (Kepner-Tregoe Decision Matrix) for Smaller Institutions

	Test 1	Test 2	Test 3
Easily administered		X	X
Valid		X	X
Reliable		X	X
High sensitivity >90%		X	X
High specificity >70% (7 pts)	7	0	7
Evidence-based (10 pts)	10	10	10
Minimal training (1 pt)	1	1	0
Easily documented (5 pts)	5	5	5
Total	23	16	22

Pt(s) indicates point(s). Bolding indicates “must” items (ie, institution requires that the test have these characteristics).

Evaluate

At the end of the pilot project, the team evaluated the following questions: Was the tool valid? Was it easy, efficient, and safe? Were modifications needed? Was there congruence between nurse and SLP? Was there compliance in keeping the patient NPO until the screen was completed? Data were also kept to answer important long-term questions regarding aspiration pneumonia rate, patient satisfaction, physician satisfaction, readmission, length of stay, and cost-effectiveness.

Feedback

The feedback phase involved communicating short-term and long-term outcomes through various channels to the all key stakeholders: stroke steering/program implementation committee; staff nurses; physicians; educators—staff development/clinical nurse specialists; patient and family; unit secretary; nurse technicians; nurse aides; and dietary staff. The team used the feedback phase to finalize policy, protocol, forms, order sets, and plan of care, and to establish protocols for future education and competency testing. In addition they used the feedback phase to resolve other issues that arose during the trial. For example, they established procedures for screening outcomes and established screening competencies and documentation. Recognizing that competency depends on frequency of “practice,” the team decided to complete annual testing for nurses on units where dysphagia screenings occurred infrequently.

Conclusions and Recommendations

The presentations and discussion at the symposium indicated a consensus about the following:

- Dysphagia screening in stroke patients is critical to prevent adverse outcomes related to aspiration and inadequate hydration/nutrition.
- Absence of consensus on the best screening instrument does not mean no screening should be performed.
- Numerous dysphagia screenings exist at this time. Multidisciplinary stroke care teams and/or administrative-clinical groups should use the existing data to make informed decisions about dysphagia screening selection.
- Use of nonvalidated, internally developed dysphagia screenings is no longer necessary and should be avoided.

- The ASHA (American Speech-Language-Hearing Association) definition (“Swallowing screening is a pass/fail procedure to identify individuals who require a comprehensive assessment of swallowing function or a referral for other professional and/or medical services”⁵) should be used to guide dysphagia screening selection.
- Although nursing administration of water swallow trials is feasible, sensitive, specific, and valid, results about implementation and interpretation over time remain unknown.
- More work on facilitating implementation is required.

Recommendations for future directions include the following:

- **Advance research initiatives to address Joint Commission concerns about dysphagia screening for stroke patients.**

Given the high morbidity consequences of not adequately identifying dysphagia, we recommend that agencies and professional societies that fund stroke research prioritize and fund dysphagia screening and outcomes research. Second, because dysphagia screening is not a “one size fits all” process, we recommend that multidisciplinary teams of clinical investigators compare existing screening tools that have strong psychometric properties, identify better raters to ensure that screening will be performed by the most appropriate person, and identify the critical time point(s) for dysphagia screening.

- **Advance clinical improvement initiatives to address dysphagia screening for stroke patients.**

Nurses, clinicians, and hospital administrators need to institute CQI systems concerning stroke care that include

support for teaching and training of nurses who deal with stroke patients and dysphagia. Interprofessional coalitions should also be developed to work with national professional organizations in this area. Although there is a need for further research into optimal screening, training, and timing for dysphagia screening, the panel did not believe that further development of nonvalidated tools was warranted.

The use of the CQI process in local stroke units offers the best avenue for improving dysphagia care. As noted in the presentations, this involves identifying champions in all relevant units, making dysphagia screening part of the standardized intake, and having a program of continuous education and skill validation.

The panel further recognized that both the research and CQI initiatives have applicability well beyond stroke. There is probably hidden dysphagia among people with other neurological problems and nonneurological chronic disease and frailty (congestive heart failure, for example). Furthermore, the growing use of electronic health records and the ability of clinicians to search these records may help derive practice-based research about the incidence and consequences of hidden aspiration.

In conclusion, the panel’s recommendations are based on the caveat mentioned earlier: Because dysphagia screening is not a “one size fits all” process, neither the symposium nor the present report aims to suggest that a single tool will meet the needs of multidisciplinary stroke professionals at every level of stroke care. Every dysphagia screening described in Table 2 has strengths and limitations and a recent systematic review found that more research is needed even on the existing dysphagia screenings. Perhaps a next logical step is to design clinical trials using the most rigorously validated dysphagia screenings available.

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†Significant.

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