

**Communication Vulnerability and Patient Safety: The
Role of Augmentative Communication
OR
Has Your Intubated Patients Talked to You Today?**

**ISAAC DANMARK and
Aargus Universitetshospital, Skejby**

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1. Introduction
2. Where I work and describe program and services
3. What is communication vulnerability
4. Barriers to communication success
5. How we started our inpatient AAC program
6. Joint Commission Standard for Communication Vulnerability
7. Cycle of Stress
8. Phases of Communication Vulnerability and interventions



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Programs and History



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Children's Hospital Boston at Waltham




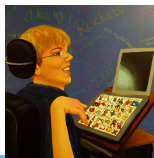
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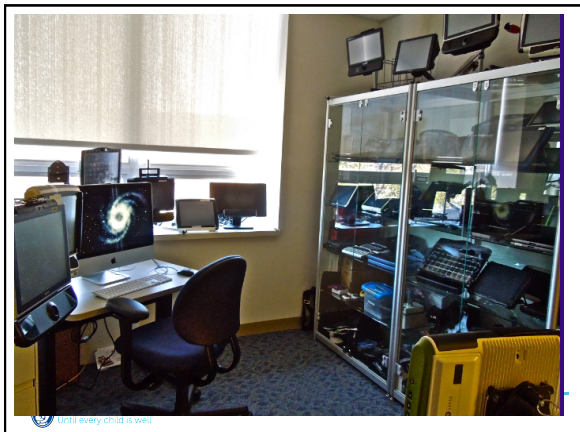
Augmentative Communication Program

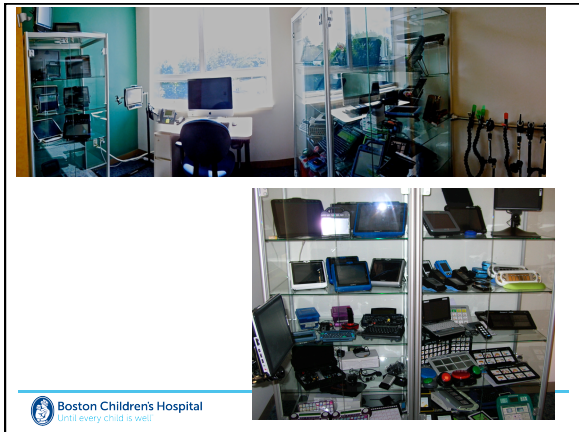
- **Outpatient (Waltham campus)**
- **Inpatient (Longwood campus)**



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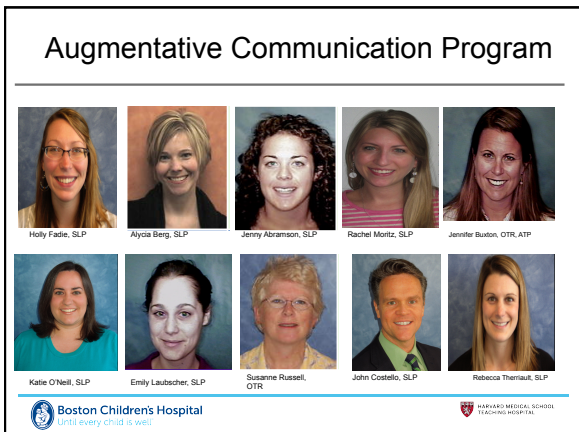
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**Inpatient
 Augmentative
 Communication
 Closet**

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Augmentative Communication Program



Holly Fadie, SLP



Alysa Berg, SLP



Jenny Abramson, SLP



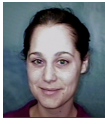
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Suzanne Russell,
OTR



John Costello, SLP





Rebecca Therault, SLP

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Children's Hospital Boston Statistics (2011)

- **395 beds (~50% medical)**
45 bed multidisciplinary ICU
30 bed cardiac ICU
- 24,943 **inpatient admissions**
- 228 specialized clinical programs with more than 557,620 visits annually.
- the hospital performed 26,534 **surgical procedures**
- **1,200 nurse** Children's Hospital is a certified Magnet Hospital for nursing excellence, (highest level of recognition of hospital nursing awarded by the American Nurses Credentialing Center)

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Communication Vulnerability: What is it?

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What is communication vulnerability?

- Vision so poor that the patient is unable to read/see, even with corrective lenses*
- Inability to understand loud speech, even with hearing aids*
- Inability to produce speech that is intelligible to the team*
- Altered mental status*
- Inability to speak or understand the language of the medical team

*Serious communication disabilities in hospitalized patients.
Ebert, D. N Engl J Med. 1998

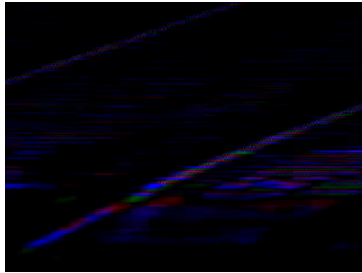
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COMMUNICATION VULNERABLE PATIENTS

Individuals with:

1. **Pre-existing hearing, speech, cognitive disabilities** who may (may not) have access to communication tools supports
2. **Recent communication difficulties** occurring as a result of their disease/illness/accident/event
3. Communication difficulties that occur as a **result of medical treatment** (e.g., intubation, sedation)
4. **Linguistic** differences
5. **Limited health literacy**
6. Limited ability to **read/write**
7. **Cultural differences/mismatch**

Jeff Burns, M.D., Anesthesiology and Director of Multidisciplinary Intensive Care Unit and Andrew (16 y.o. with Duchenne Muscular Dystrophy) October 1996)





Barriers/challenges

Barriers to communicative success according to The Participation Model



(Beukelman and Mirenda 1988)

- Access Barriers
 - Physical/motor
 - Cognitive
 - Literacy
 - Visual/auditory

- Opportunity Barriers
 - Policy
 - Practice
 - Knowledge
 - Skill
 - Attitude






What are some of the current barriers in many hospital settings?

Practice barriers

- A person is often in the hospital for life saving or life sustaining measures.
- The clinical priorities of the medical team focus on the urgent medical needs of the patient before communication.
- It is only in rare instances that poor patient communication and the ensuing stress and fear related to that communication vulnerability is recognized as a direct factor in a patient's medical state and recovery.*
- "We do not welcome staff who are not part of our unit"

Attitudinal barriers

- medical thinking – nurse/doctor knows best
- the medical environment is too scary, new and complicated to expect a novice to be a partner in the process
- It is easier to provide medical care if the patient does not interfere by asking questions, negotiating or challenging decisions.

Knowledge barriers

- Nursing has identified communication as an area of need for more than 20 years.
- Information about resources (tools and professionals) is frequently not available to nurses.
- The practice of AAC for patients who are nonspeaking, is not familiar to nurses as this is not part of nurse training and minimal information in the nursing literature addresses the issue of communication vulnerability.
- The lack of knowledge regarding the assessment process, identification of appropriate tools and strategies and implementation expertise is a significant barrier to patient care (*What can they do for him? They work with speech?*)

Resource barriers

- Resources may be described both in terms of clinical tools and access to clinical experts.
- Tools: While it is not uncommon for an ICU to use marker and paper, a letter board or a dry erase board, even generic communication boards or simple voice output aids are typically not available.
- Clinical expertise in the assessment and implementation process may not be available to the institution
- *Even within field of speech pathology, professional preparedness has not kept up with the growing interest in augmentative communication services especially as it relates to hospital services

Environmental Barriers

- The hospital environment is dense with medical equipment and supply carts.
- Patient bedside may have limited room for additional equipment/material
- Due to storage limitations, communication tools and equipment may not be readily available (at a bedside OR even on the unit).
- Electromagnetic Interference (EMI) considerations may be barrier for some technology

How did our Inpatient AAC program begin?

Why is this topic timely in the United States and in a growing number of nations?

- Changes to hospital standards for accreditation that address "communication vulnerability" in 2011 (measured as of 2012 July).
- Increased focus nationally and internationally on the impact of communication vulnerability on patient care.
- Increased focus on the Joint Commission International Standards of Care

Importance of communication and potential impact on patient outcomes is recognized by:

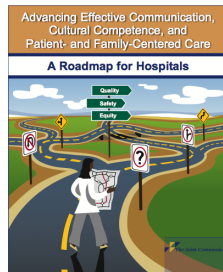
- American Association of Critical Care Nurses
- Society for Critical Care Medicine
- National Institute of Health
- The Joint Commission

Roadmap 'Guide' to help facilities implement standards

p. 10 Recommended issues and related practice examples to address during Admission:

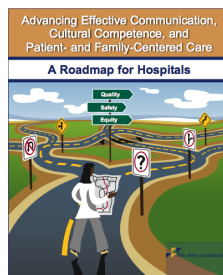
Identify whether the patient has a sensory or communication need ... "it may be necessary for the hospital to provide auxiliary aids and services or augmentative and alternative communication (AAC) resources to facilitate communication."

Identify if the patient uses any assistive devices... "make sure that any needed assistive device are available to the patient throughout the continuum of care."



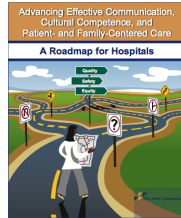
Roadmap 'Guide' to help facilities implement standards

p. 18 Monitor changes in the patient's communication status ... "Determine if the patient has developed new or more severe communication impairments during the course of care and contact the Speech Language Pathology Department, if available. Provide AAC resources, as needed, to help during treatment"



p. 59 **New Standard** PC.02.01.21 The hospital effectively communicates with patients when providing care, treatment, and services:

...” Patients may have hearing or visual needs... or be unable to speak due to their medical condition or treatment. Additionally, some communication needs may change during the course of care. Once the patient’s communication needs are identified, the hospital can determine the best way to promote two-way communication between the patient and his or her providers in a manner that meets the patient’s needs”

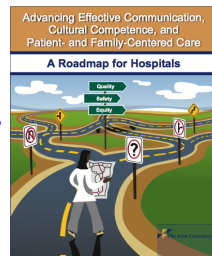


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New Standard PC.02.01.21
(cont'd)

“Examples of communication needs include the need for personal devices such as hearing aids or glasses, language interpreters, communication boards and devices...”



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Communication
Saturday, November 14, 2009
www.patientprovidercommunication.org

About PPC

About Patient Provider Communication

The Patient Provider Communication Forum is a national and international effort to promote information sharing, cooperation and collaboration among individuals who are committed to seeking improvements in patient-provider communication across the entire health care continuum—from a doctor’s office, emergency room, clinic, ICU, acute care and rehabilitation hospital, home health service and hospice.

Members of the group bring together a range of perspectives and experience in the area of patient-provider communication. The group works to share knowledge and resources and to raise awareness at both the practice and policy levels of the need to overcome existing communication barriers and to increase communication access across health care settings.

The Patient Provider Communication Forum seeks to achieve shared learning about patient-provider communication through:

- monthly conference calls among participants.
- an interactive website to share resources and tools and to seek feedback and opinions from the field.
- collaborative projects such as white papers, presentations and research studies that intersect the areas of interest and experience of group members.
- Special interest conversations about topics, such as (e.g., emergency preparedness, intensive care units (ICUs), The Joint Commission’s Proposed Standards related to effective communication, cultural competence and patient-centered care and information about specific populations and/or healthcare settings.)

Supported By:

ACI
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<http://www.patientprovidercommunication.org/>

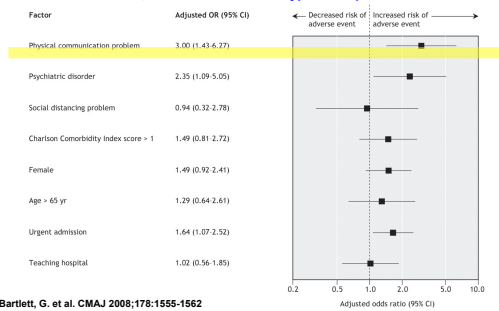
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Bartlett, G. et al.
CMAJ 2008;178:1555-1562

•“The presence of physical communication problems was significantly associated with an increased risk of experiencing a preventable adverse event”

•“We found that patients with communication problems were three times more likely to experience preventable adverse events than patients without such problems”

Figure 3: Odds ratios (ORs) and 95% confidence intervals (CIs) for factors associated with preventable adverse events, adjusted for age, sex, Charlson Comorbidity Index score, admission status and type of hospital



Bartlett, G. et al. CMAJ 2008;178:1555-1562

Research Data

- Happ (2004) and Patak et al. (2006)
- Patients with access to communication:
 - Receive less sedation
 - Are transitioned quicker
 - Have increased satisfaction with health care
 - Feel more in control...and generally do better...
- Available simple tools and strategies to improve communication usually go unused and ignored.

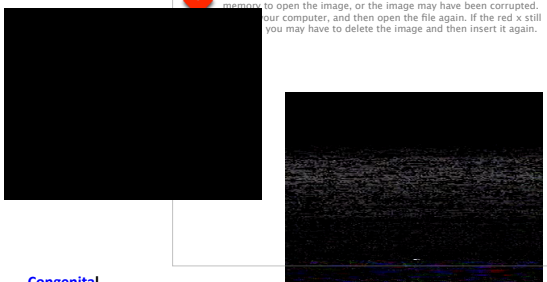
Poor Communication Impacts Patient Safety

- Communication vulnerable patients are at increased risk for:
 - Serious medical events (Cohen et al., 2005)
 - Sentinel events (The Joint Commission, 2007)
 - Poor medication compliance/ adherence (Andrulis et al., 2002; Flores et al., 2003)

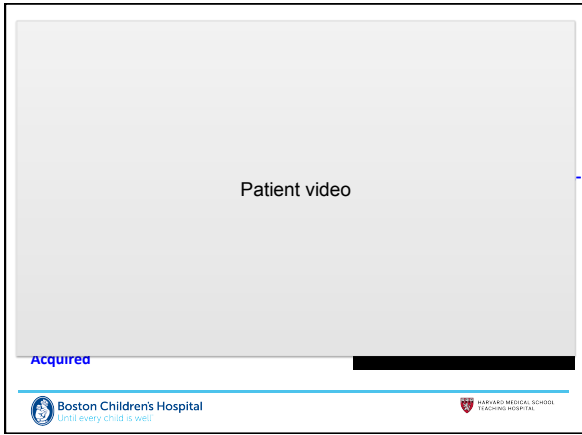
Profile of Patients with communication vulnerability

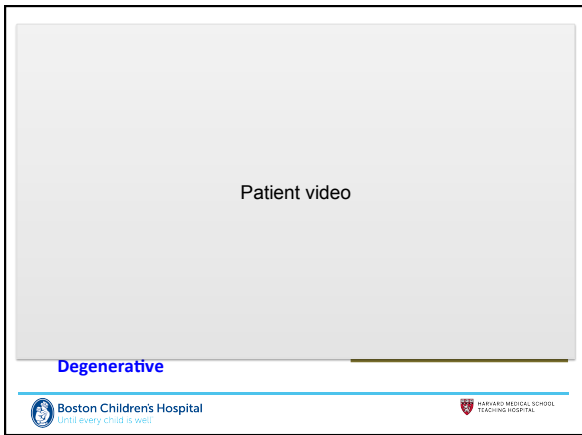
- **Congenital conditions**
- **Acquired conditions**
- **Degenerative conditions**
- **Condition related to medical intervention (surgery)**
- **Condition related to medical treatment**

Jeff – Nager Syndrome Congenital non-speaking condition



Congenital











Discussing to parents and links

Patient video





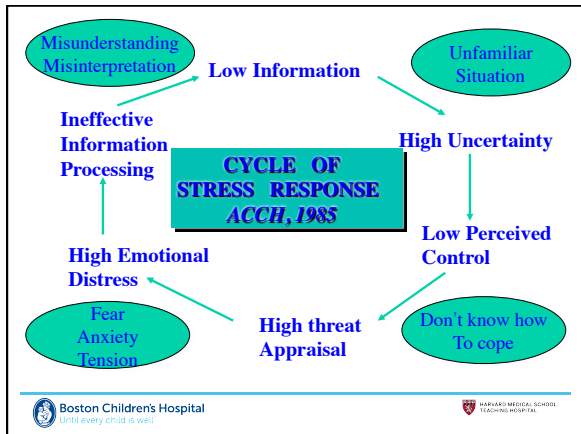
Patient video

Related to medical treatment



CYCLE OF STRESS RESPONSE
ACCH, 1985





**Impact of communication vulnerability:
Impact on the patient**

- challenges and needs of patient
 - » Powerlessness
 - » Loss of Control
 - » Disconnection from loved ones
 - » Inability to participate in own care
 - » Inability to ask questions, express needs, fears, PERSONALITY, etc.

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**Stress of the nonspeaking
condition reaches beyond the
patient**

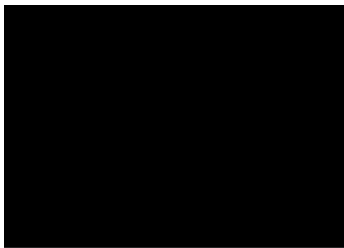
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Communication vulnerability: Impact on Family

- Stress for parents (Costello, 2000), fear child will feel abandoned as can not solicit loved one and has not way of advocating for self
- (Hurtzig and Dowden 09) “Family, although completely exhausted, refuse to leave or sleep due to their concern that their family member will require assistance and no one will be there to interpret the child’s efforts to get help”

Patient video

*My son's ability to communicate, allowed me to
advocate for him*



Post heart-transplant,
a mother's perspective

Communication Vulnerability: Impact on staff

1. Quality of care issue “all patients who described good communication with their providers told us they were treated in a caring, concerned and respectful manner”
-Duclos, et. Al. 2005 International Journal of Quality in Health Care v 17 # 6 page 483
2. Patients inability to communicate has a negative impact on the nurse/doctors tendency to communicate with them, (Ashworth, 84)

Patient video

to figure it out.

What strategies (if any)are used when a patient can not speak?

- Nurses rely on lip reading
- Have a familiar family member interpret
- Gestures
- Pen and paper
- Alphabet board
- Hand drawn pictures
- Medical staff ask yes/no questions*

Profile/Phases of Communication Vulnerable Patient

Phase 1: Emerging from Sedation

Phase 2: Increased wakefulness

Phase 3: Need for Broad and diverse
communication access

(Costello, Patak, and Pritchard, 2010)



Phase 1 Emerging from Sedation

- Yes - no - I don't know
- Pain scale and body board
- Call for nurse/modified nurse call
- Gain attention of loved ones/staff with simple voice output

Also – developmentally young/emergent communicators and 'control'



The image shows three communication boards. The top-left board is for 'Yes' and 'No', with a thumbs up icon for 'Yes' and a thumbs down icon for 'No', and a central icon of a person with arms raised labeled 'SOMETHING SEEMS TO BE HAPPENING'. The top-right board is for 'Itchy' and 'Hurts', with an icon of a hand scratching for 'Itchy' and a sun icon for 'Hurts', and two human figures. The bottom-left board is for 'Itchy' and 'Hurts' with two human figures. The bottom-right board is a pain scale with six faces and labels: 0 NO HURT, 2 HURTS LITTLE BIT, 4 HURTS LITTLE MORE, 6 HURTS EVEN MORE, 8 HURTS WHOLE LOT, 10 HURTS WORST.



Simple voice output aid such as Step-by-Step

- Allows for recording and playback of a series of messages
- Used for:
 - Gaining attention
 - Social scripts
 - Participation in motivating activities
 - Cause-effect
 - more



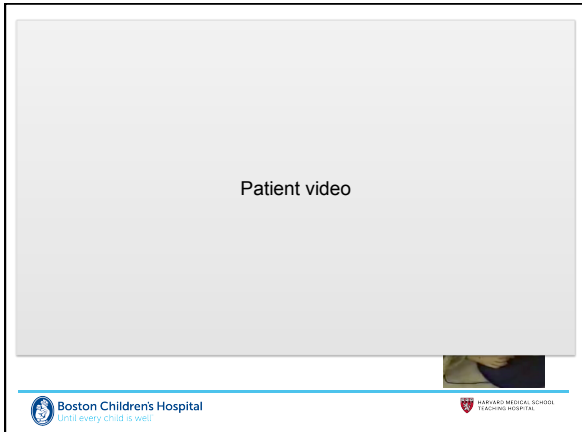
Powerlink Timer

- Timer for switch operated fan or radio for control
- Environmental control unit

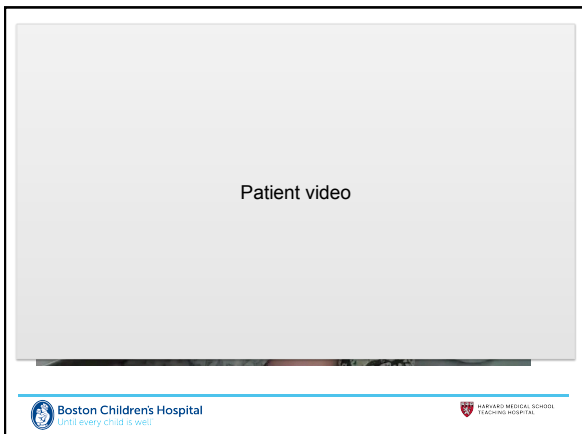


Phase 2 Increased wakefulness

- Require all of phase 1 strategies
- Require more relevant vocabulary
- Picture boards – needs, body/comfort, personal interests
- Alphabet boards
 - ABC
 - QWERTY
- Multi-message voice output devices with digital or synthetic messages
- Voice amplification





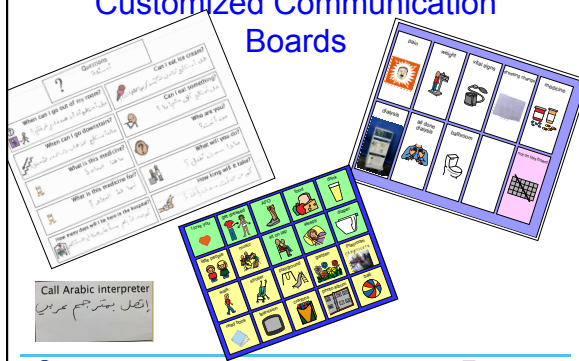


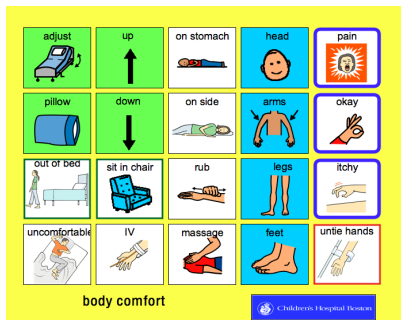
Communication Boards

- General comfort
- Body board
- Body positioning
- ABC
- QWERTY
- Customized



Customized Communication Boards





● I AM

short of breath, in pain, choking, feeling sick, to be suctioned, lip moistened, water, to be comforted, to sleep, hungry/thirsty, cold/hot, tired, dizzy, tv/video/telev, call light, it quiet, lights off/on, to go home, angry, afraid, frustrated, sad, to sit up, to lie down, to turn left/right, head of bed up/down, get out of bed

● I WANT

doctor, nurse, family, chaplain, ABCDEFGHI 123, JKLMNOPQR 456, STUVWXYZ 789, Thank You, I Love You

<http://www.vidatak.com/>

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PAIN CHART

LEVELS OF PAIN: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1

itches, how am I coping?, what day/night?, what is happening?, when is tube coming out?, stings, it, remove restraints, exercise, massage, hurts/lashes, leave me alone, don't leave, come back later, prayer, dull, sharp, radiating, burn, bathroom, cool cloth, pillow, glasses, I WANT PAIN MEDICINE: shot, one pill, two pills, can't move limbs, wash face, shampoo, comb/brush, teeth brushed, blanket, socks

<http://www.vidatak.com/>

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come back later, uncomfortable, fix pillow, swab mouth, lips dry, hold hand, stay with me, light on, washcloth on head, suction mouth, light off, I love you, cold, hot, open curtain, bathroom, close curtain, When tube out mouth, television, listen to music, read book, leave me alone

<http://www.vidatak.com/>

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mom	I love you	swab mouth	suction mouth	pray
dad	hold hand	medicine	happy	mad
stay with me	bathroom	okay	sad	hurt
TV	watch video	music	sit in chair	want go home

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I'm bored, I want to....

car	car	draw color	playroom
watch video	watch TV	paint	read book
watch DVD	change channel TV	Nintendo	computer
game	out of bed		

Play/playroom

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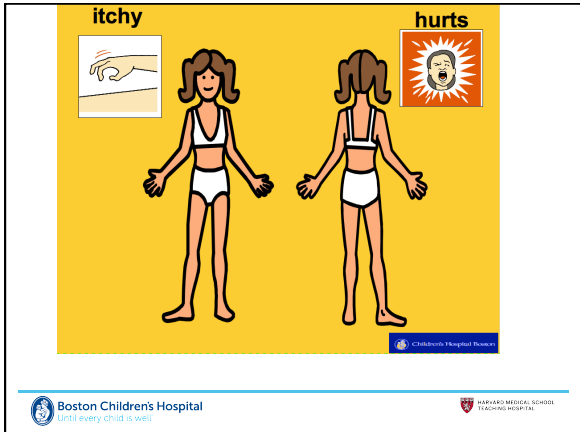
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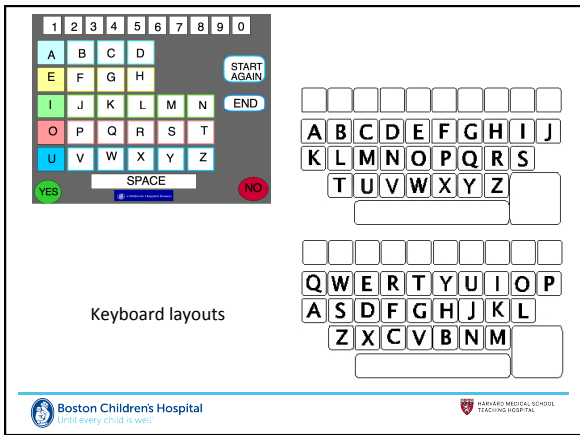
itchy	hurts

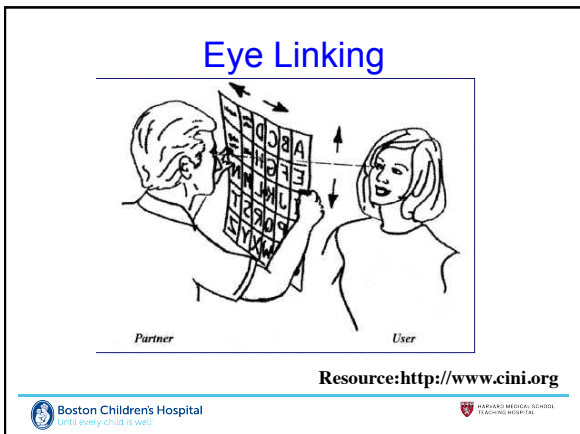
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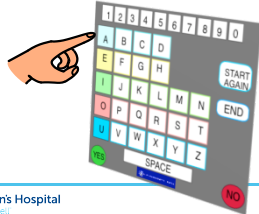






Partner Assisted Scanning

- Establish patient's "yes/no" response
 - Scan by row/column to identify target
- *** will discuss partner assist scan considerations later

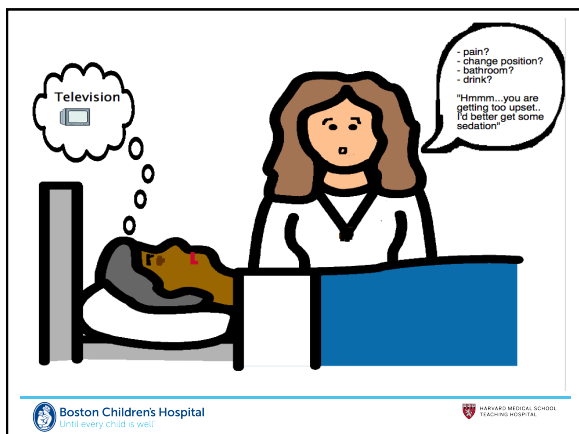


Key rule for partner assisted scanning...offer an 'out'


Potential scenario:

- Patient appears distressed
- Partner offers options that seem reasonable to the context
- Patient may become more upset or frustrated
- Heart rate increases and/or patient becomes emotional
- Medical management of distress/anxiety is considered





ALWAYS offer an 'out'otherwise someone is forced to totally Agree with you or totally disagree



- pain?
 - change position?
 - bathroom?
 - drink?
 - Hm, SOMETHING ELSE?
 - YES
 - family?
 - entertainment?
 - YES
 Oh!
 - Music?
 - TV?
 - YES!

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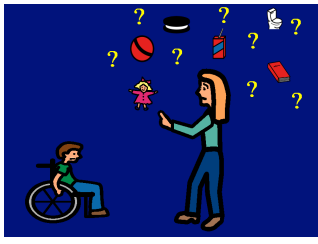
Offered choices may not be what Patient really wants!



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For all users of AAC, we often ask many questions based on what the partners 'thinks' is important



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SAMPLE PARTNER ASSIST AUDITORY-VISUAL SCAN Boston Children's Hospital
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Across categories	pain	move	people	comfort	needs	entertain	feelings	none
THEN	back	down	mom	back rub	suction	read	afraid	
Down Selected category	legs	bed up	father	cloth	medicine	music	sleepy	
	Head	turn	nurse	swab	toilet	tv	bored	
	none	none	none	none	none	none	none	

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Digital recording tool such as MessageMate 40

- Speech generating device
- Digitized voice
- Up to 40 messages
- Access: direct selection or switch scanning
- Can be mounted securely for optimal access




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GoTalk or Quick Talker

- Speech generating device
- Digitized voice
- Multiple levels and storage for overlays
- Core vocabulary
- Lightweight and portable



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Phase 3

Broad and Diverse Communication Access

- All options from phase 1 and 2
- Generative communication with alphabet and sophisticated page sets
- Word and grammar prediction
- Encoding strategies
- Music and video files
- Internet access
- telephone

More Speech-Generating Devices



Nova Chat 7



Dynavox Maestro

Lightwriter

- "Speaks" aloud typed messages
- Synthesized voice (multiple options)
- Dual screen
- Ability to store frequently used messages
- New Lightwriters = word prediction



Voice Amplifier

- Amplifies a weak voice
- Helpful for patients with vocal fold dysfunction and prolonged intubation
- Able to add headphones to amplify others speech for patient in need of auditory amplification





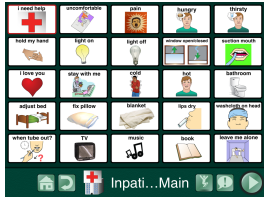
iPad

- Example Apps:
 - Assistive Chat
 - Predictable
 - Talk Assist
 - Touch Chat
 - Sounding Board
 - Proloquo2Go
 - SonoFlex
 - GoTalk Now



Communication Applications

- Picture Symbols



Answers HD-
YesNo



GoTalk NOW

Communication applications

- Full featured symbol based apps:
 - Picture symbols and text-to-speech



Proloquo2Go



TouchChat



SonoFlex

Phases of Communication Vulnerable Patient

- Not so black-and-white
- Timing of recovery *and* ability to participate in communication varies greatly

Key Components to Successful Intervention:

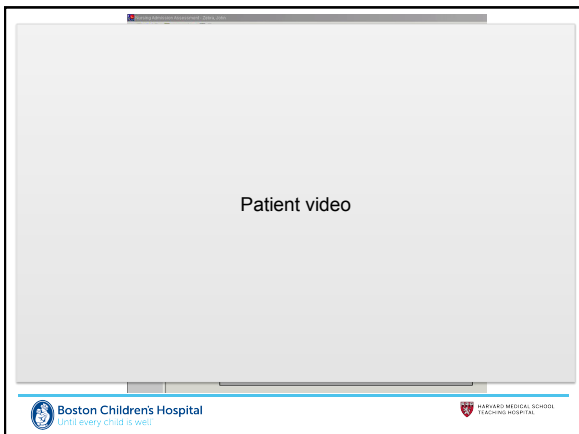
- Getting the Referral
 - Recognizing when a patient is communication vulnerable or *at risk* for communication vulnerability
- Providing effective resources
 - Making sure provided resources and materials are feature match to the patient (including customized as needed) and available and accessible to the patient at all points of care.
- Follow through
 - Implementation of communication supports and modification as needed throughout admission

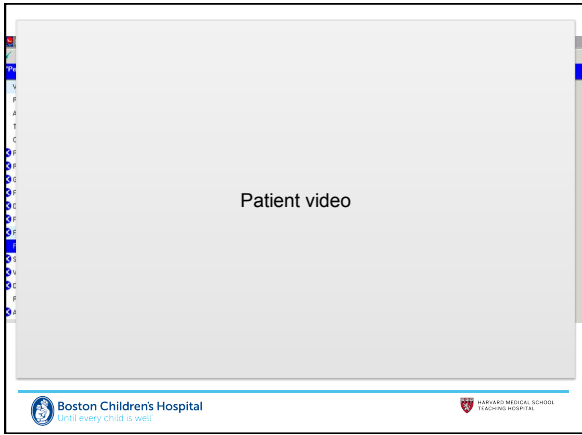
Questions to ask/consider at admission

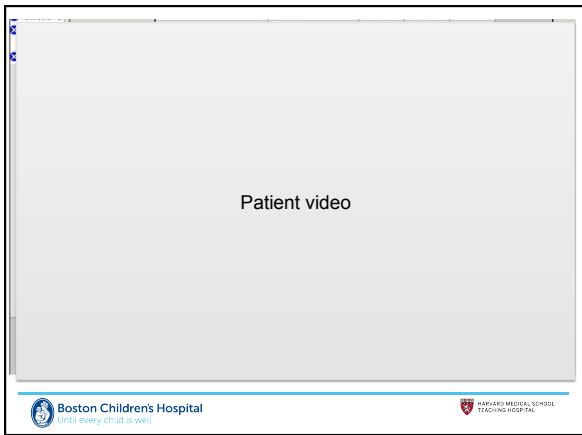
questions to ask:

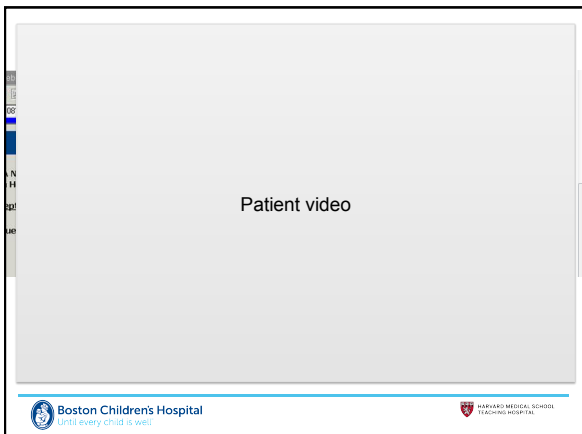
- Does the patient currently have difficulty communicating and participating in the admission process?
- Does the patient have an existing augmentative communication device or strategy that he/she employs for expressive and/or receptive language?
- Is a process or procedure during hospitalization expected to induce communication vulnerability?
- Will hospitalization make the use of current and needed vision or hearing aids not possible?

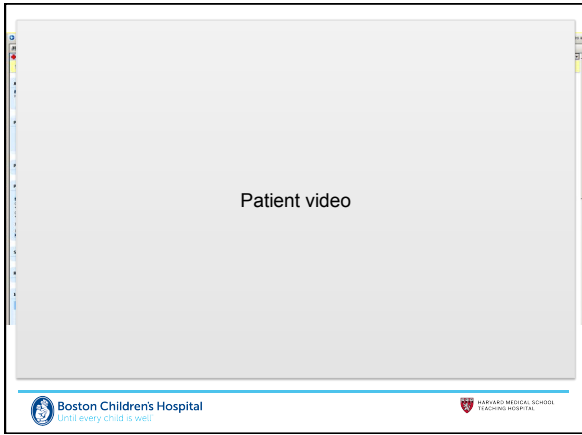
Patient video



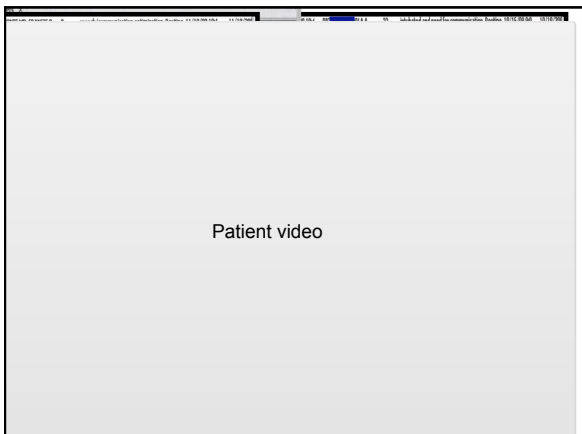












Referral source

- Craniofacial team
- Plastic surgery
- Tracheostomy team
- Organ transplant team
- Physicians
- Nurses
- Respiratory therapy
- Radiology
- Social work
- Child Life
- Psychiatry
- Pastoral care
- Pre-op clinic nurses *

You do NOT need fancy tools

You DO need a dedicated focus on problem solving communication supports and providing intervention

Sample Bedside Signs

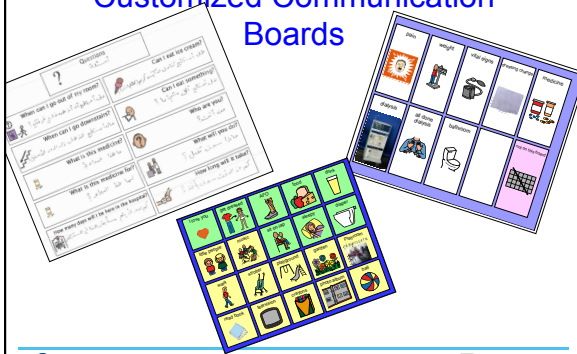
- “I can understand what you are saying. Please speak directly to me.”
- “I blink *once* for YES and *twice* for NO”
- Please write when speaking with me. Use the dry erase board or typewriter”

Communication Boards

- General comfort
- Body board
- Body positioning
- ABC
- QWERTY
- Customized



Customized Communication Boards



Patient video

Wall pops (erasable adhesive boards)

All about me...

Name: Rachel

Primary language: sign language

Important People: Ma, Fred, Lisa

Favorites: Game of Thrones

At home I use:

- specialized equipment
- glasses
- contact lenses
- hearing aid
- communication devices

I understand information best when:

What I am proud of:

Things that stress me out:

Things that calm me:

My comfort items are:

Other things I'd like you to know about me:

What I am learning:

My goal for today is:

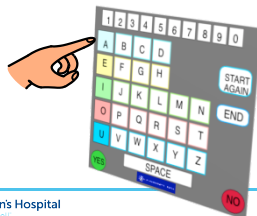
Activities/Hobbies: iPad, Boggle, Blue, Mac & Cheese, baked beans

Patient video

Partner Assisted Scanning

- Establish patient's "yes/no" response
- Scan by row/column to identify target

*** will discuss partner assist scan considerations later



Dry Erase Board

- Used to write messages
- Receptive and expressive language
- No training required



Boogie Board

- Used to write messages
- Can use fingernail
- Lightweight
- Often motivating



Simple voice output aid such as Step-by-Step

- Allows for recording and playback of a series of messages
- Used for:
 - Gaining attention
 - Social scripts
 - Participation in motivating activities
 - Cause-effect
 - more



Jellybean Switch

- Used for access to communication tools, computer, and switch toys
- Can be mounted securely for optimal access
- Used with adapted nurse call system



Powerlink Timer

- Timer for switch operated toys and appliances
- Environmental control unit
- Variety of control options
- Good for toys with plugs, switch toys, music players, etc.

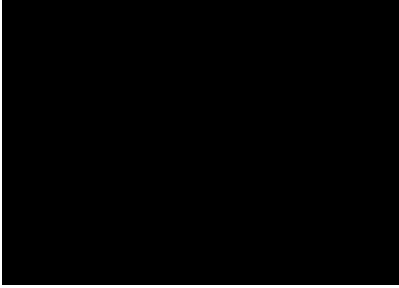


Digital recording tool such as MessageMate 40

- Speech generating device
- Digitized voice
- Up to 40 messages
- Access: direct selection or switch scanning
- Can be mounted securely for optimal access



Kyle and MessageMate w/ Scanning



GoTalk

- Speech generating device
- Digitized voice
- Multiple levels and storage for overlays
- Core vocabulary
- Lightweight and portable



Patient video

More Speech-Generating Devices



Nova Chat 7



Dynavox Maestro



Quick Talker

Lightwriter

- "Speaks" aloud typed messages
- Synthesized voice (multiple options)
- Dual screen
- Ability to store frequently used messages
- New Lightwriters = word prediction



Patient video



Voice Amplifier

- Amplifies a weak voice
- Helpful for patients with vocal fold dysfunction and prolonged intubation
- Able to add headphones to amplify others speech for patient in need of auditory amplification



C Eye

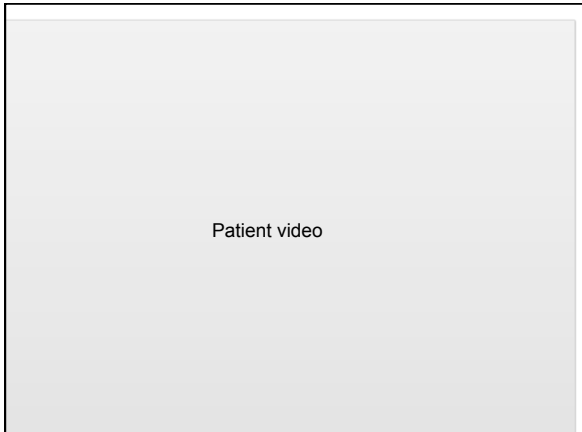
- Requires calibration
- Over-the-bed mount



iPad

- Example Apps:
 - Assistive Chat
 - Predictable
 - Talk Assist
 - Touch Chat
 - Sounding Board
 - Proloquo2Go
 - SonoFlex
 - GoTalk Now









Communication Applications


- Picture Symbols




Answers HD-YesNo




SoundingBoard



GoTalk NOW

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Communication applications

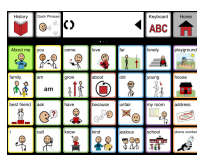
- Full featured symbol based apps:
 - Picture symbols and text-to-speech



Proloquo2Go



TouchChat



SonoFlex

Physical Access



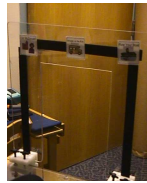
Bedside mount



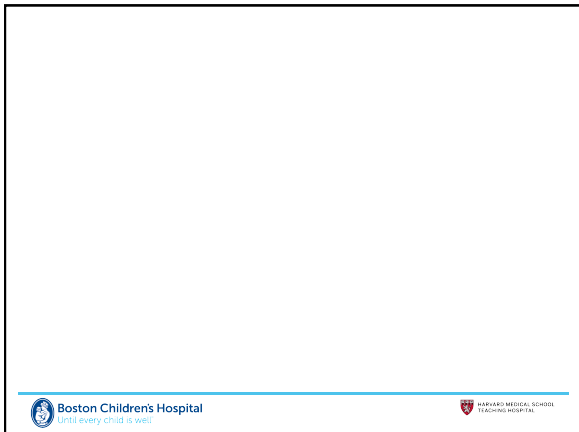
Angled switch



Rolling mount – Eye Gaze SGD
over the bed



Eye gaze frame



What are some of the AAC assessment considerations when a patient is “Communication Vulnerable”?

Domains of Assessment and Feature Matching in Bedside Assessment



(quick mention...as this is really a two-hour discussion!)

Bedside assessment considerations by domain

Assessment domain	Assessment considerations	System selection/Feature matching considerations
Cognition *Alertness/awareness *Premorbid status	<ul style="list-style-type: none"> Report of nursing staff Ability to remain awake Patient's ability to follow commands 	<ul style="list-style-type: none"> Will determine if assessment should occur over several sessions, be postponed or continue. Will determine complexity of instructional language and strategies introduced
Sensory	<ul style="list-style-type: none"> Pre-morbid vision status Current vision status Availability of vision aids Hearing Pre-morbid hearing status Ability to use hearing aids if needed 	<ul style="list-style-type: none"> Symbol set/representation selection including characteristics of text, symbols and overall layout Use of voice output technology Feedback loop of speech generating device. Use of FM system Use of auditory scan component
Language comprehension and literacy screening	<ul style="list-style-type: none"> Comprehension Ability to answer yes/no questions 	<ul style="list-style-type: none"> Match vocabulary and representation to current level of comprehension Consider initial use of single message system for soliciting attention/assistance Use of yes/no/maybe system or strategy



Bedside assessment considerations by Doman

Assessment domain	Assessment considerations	System selection/Feature matching considerations
Language comprehension and literacy screening (cont.)	o Non-English speaking:	o Native language based communication board to address immediate needs (bilingual format)
	o Literacy screening:	o Picture board o Use of digital voice recording for patient to nurse/nurse to patient communication of basic messages o Use of written words o Use of alphabet to generate novel utterances o Consideration for picture based system o Consideration for sophisticated speech generating device that incorporates generative literacy based encoding
Motor access assessment * in different positions	o Gestures/pantomime	o Natural gestures o Gestural codes o Yes/no signals
	o Control/access	o Signal of yes/no
	o Direct selection including hand/eyes/other	o Target layout on word/picture board o Use of keyboard o Use of dynamic display o Need for keyguard o Use of non-electronic eye gaze strategies or eye gaze encoding strategies o Considerations of electronic eye tracking technology
	o Indirect selection	o Technology based scanning o Partner assisted scanning
	o Ability to write/draw	o Use of alphabet/word communication board o Pen/paper o White board and marker

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Bedside assessment considerations by domain

Assessment domain	Assessment considerations	System selection/Feature matching considerations
Speech production	o Reduced volume	o Electrolarynx o Amplification
	o Moderately compromised intelligibility	o Display based letter casing/topic cueing o Writing/typing o Word or symbol based communication board o Speech generating device o Consideration for voice and message banking
Vocabulary selection	o Severely compromised speech production	o Alphabet board o Word symbol communication board o Speech generating device
	o Patient needs o Patient personality o Patient interests o Address medical, personal and psychosocial needs	o Pre-made commercial boards o Custom boards o Alphabet encoding o Speech generating device ranging from simple message display to complex storage and encoding strategies.
Environmental assessment	o Lighting o Noise o Mounting	o Impacts features of system(s) o Impacts availability of system(s)
Communication partners	o Native language o Literacy level	o May require communication system/ interpreter that meets the needs of diverse partners with varied linguistic and literacy skills.
Documentation/team teaching	o Team members	o Diversity of team members and limited time will require a tool that is functionally supported with minimal training.

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