

# AAC in ICU/ Acute Care: Changing Roles for Speech- Language Pathologists

[www.childrenshospital.org/acp](http://www.childrenshospital.org/acp)

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## Agenda

- **Communication Vulnerability and risks to care**
- **Illness and the child's perspective**
- **Three profiles of Patient need and clinical considerations**
- **Review Domains of Assessment for ICU/Acute care**



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Children's Hospital Boston Statistics 2008

- 397 beds (~50% medical)
  - 42 bed multidisciplinary ICU
  - 32 bed cardiac ICU
  - 24 bed neonatal ICU
  - 12 bed medicine ICU
  - 13 bed stem cell transplantation unit
  - 10 bed clinical research center
- 23,750 inpatient admissions
- 23,460 surgical procedures
- 492,698 outpatient visits
- 58,329 emergency department visits
- 100 outpatient programs
- 1026 medical and dental staff
- 1,596 nurses (Full time)



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Augmentative Communication Program

Outpatient (Waltham campus)

Inpatient (Longwood campus)



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# Communication Vulnerability

(Patak, et.al. 2008)



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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/environment



\*Serious communication disabilities in hospitalized patients.  
Egan D. N Engl J Med. 1998  
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## Patients with communication vulnerability

- Congenital conditions
- Acquired conditions
- Degenerative conditions
- Condition related to medical intervention (surgery)
- Condition related to medical treatment
- Related to cultural diversity/mismatch with the hospital culture.



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**Guidelines for admission to Pediatric ICU**

American Academy of Pediatrics and the Society of Critical Care  
Medicine  
*Pediatrics*, V 103, No. 4 April 1999.

**Severe or potentially life threatening pulmonary or airway disease requiring:**

- Endotracheal intubation and potential mechanical ventilation
- Rapid progressing pulmonary disease with risk of respiratory failure
- High supplement of oxygen



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**Children's Hospital Boston**

recent data (Oct 09 - Jan 10):

135 patients 3 years or older with an average time on the ventilator of 104.7 hours.



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**Guidelines for admission to Pediatric ICU**

American Academy of Pediatrics and the Society of Critical Care Medicine  
*Pediatrics*, V 103, No. 4 April 1999.

**Children with severe, life threatening or unstable cardiovascular conditions**

- Includes children with high risk cardio vascular procedures



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**Guidelines for admission to Pediatric ICU**  
American Academy of Pediatrics and the Society of Critical Care Medicine  
*Pediatrics*, V 103, No. 4 April 1999.

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**Neurological conditions or seizures**

- Spinal cord compressions
- Head trauma
- Progressive neuromuscular dysfunction



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**Guidelines for admission to Pediatric ICU**  
American Academy of Pediatrics and the Society of Critical Care Medicine  
*Pediatrics*, V 103, No. 4 April 1999

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**Hematology/oncology disease: tumors or masses compressing (or threatening to compress):**

- vital vessels
- airway
- nerves of the face



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**Guidelines for admission to Pediatric ICU**  
American Academy of Pediatrics and the Society of Critical Care Medicine  
*Pediatrics*, V 103, No. 4 April 1999

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**Endocrine/metabolic disease**

- inborn error of metabolism and acute deterioration requiring respiratory support
- acute dialysis management of intercranial hypertension



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## In general, these conditions include

issues of :

- Airway patency/management of blood gasses
- Muscle function, strength and coordination
- Neuro-cognitive/neuro-linguistic impairment



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## Communication vulnerability may be related to one or all of these



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## Why is this topic timely?

In US, announced changes to hospital standards for accreditation that address "communication vulnerability" in 2011.

Increased focus nationally and internationally on the impact of communication vulnerability on patient care.

Increased focus on International Joint Commission Standards



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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



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## 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)

### Shannon's story



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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"



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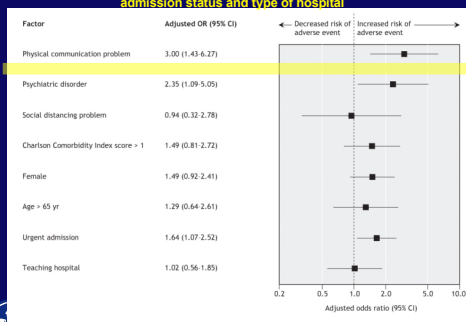
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Figure 3: Odds ratios (ORs) and 95% confidence intervals (CIs) for factors associated with preventable adverse events, adjusted for age, sex, Charlson Comorbidity Index score, admission status and type of hospital.



Bartlett, G. et al. CMAJ 2008;178:1555-1562  
Hospital Boston 2010  
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CMAJ • JAMC

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### Risk for Serious Medical Events (TJC)

Communication-vulnerable patients are:

- Twice more likely to experience medical physical harm
- Increased risk of non-adherence to medication
- Misreported abuse
- Decreased access to medical care
- Decreased use of medical care
- Increased diagnosis of psychopathology
- More likely to leave hospital against medical advice
- Asthmatics more likely to receive intubation
- Less likely to return for follow-up appointments after Emergency Room visits



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### Risk for Serious Medical Events (TJC)

Communication-vulnerable patients are:

- Higher rates of hospitalization
- Higher rates of drug complications
- Highest use of resources to provide care
- Lowest levels of satisfaction with care
- Increased risk of delayed care
- Increased failure to treat and prevent devastating disease states and death
- Increased risk of malpractice
- Increased length of hospital stay



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### Health Care Systems Working Against Effective Communication

- No standardized system in place to identify communication needs
- Lack of supporting resources, training, and time needed to effectively communicate
- Limited evidence and awareness of best practice



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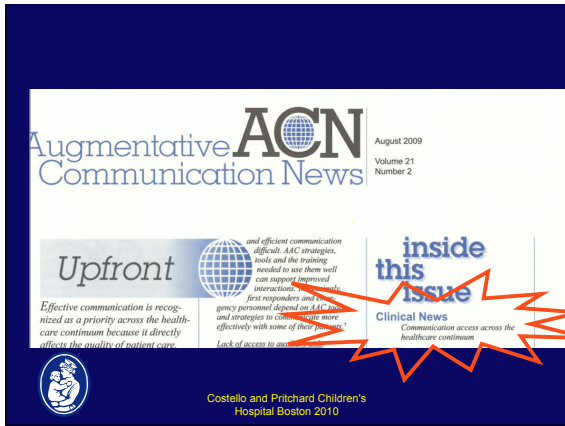
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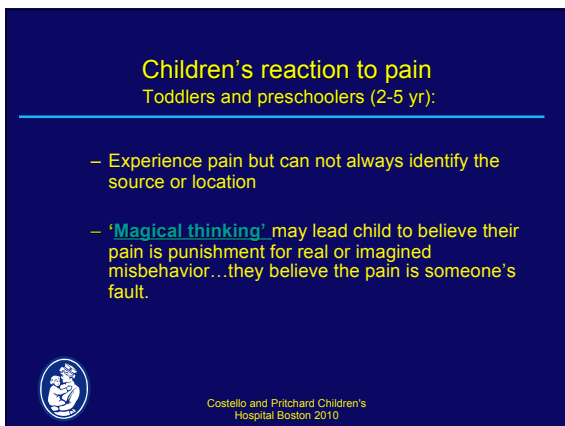
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Toddlers and preschoolers (2-5 yr)

**Communication needs:**  
 At this stage, children may view procedures as punishment for bad behavior

This makes it particularly important to communicate: fear, anxiety and solicit parents and loved ones for comfort, explanation and protection



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**Children's reaction to pain**  
 School age (6 - 12 years)

- Can tell the location of pain
- Know that illness is caused by germs and believe that staff's response depends on how well they express pain

Brewster, Arlene B. Chronically Ill Hospitalized Children's Concepts of Their Illness  
 PEDIATRICS Vol. 69 No. 3 March 1982, pp. 355-362



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School age (6 - 12 years)

**Communication Needs:**  
 Children need to be able to effectively communicate matters of comfort and pain



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## Children's reaction to pain Adolescents (13 and older)

- Begin to understand that there are multiple causes of illness, that the body may respond to many different factors and illness is caused by physical weakness or susceptibility.
- Children understand that different interventions may be needed to address illness and that staff act with necessary intent and empathy.



Perrin, Ellen C., Gerrity P. Susan, There's a Demon in Your Belly: Children's Understanding of Illness PEDIATRICS Vol. 67 No. 6 June 1981, pp. 841-849

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## Adolescents (13 and older)

### Communication need:

At this more mature stage, a child may be particularly anxious to be able to ask questions, interact with staff and understand the intent of intervention.



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## CYCLE OF STRESS RESPONSE ACCH, 1985



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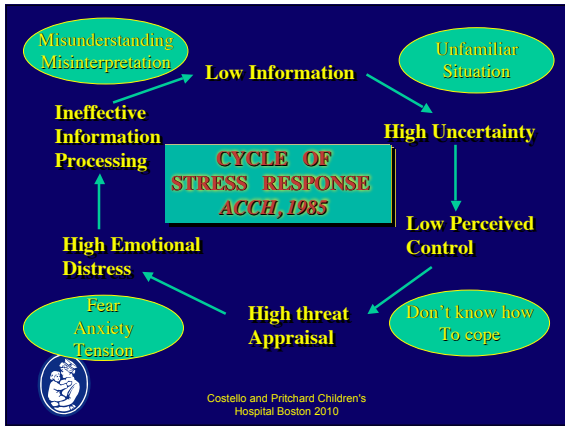
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**Impact of communication vulnerability:  
Impact on the child**

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, etc.

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

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### Family/Primary Care Providers

- Parents have expressed fear of their child's inability to communicate basic needs
- Fear that child may feel abandon and not be able to call for parents
- Parents feel helpless to assist child who is going through distress



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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) “ parents, although completely exhausted, refuse to leave or sleep due to their concern that their child will require assistance and no one will be there to interpret the child's efforts to get help”



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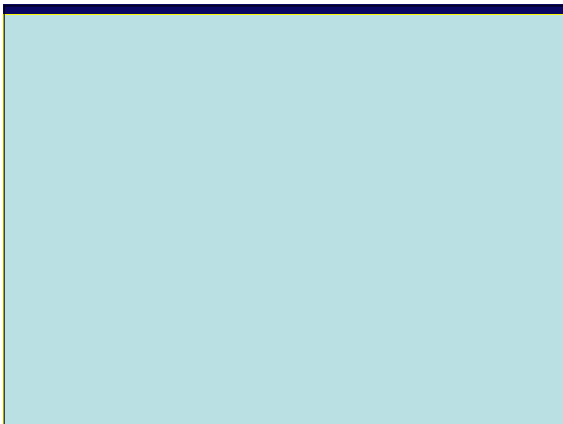
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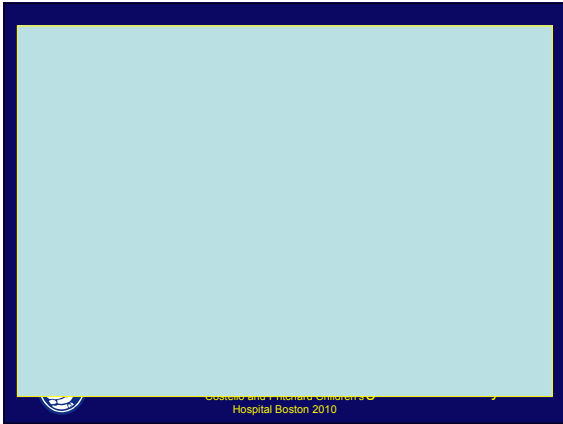
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*My son's ability to communicate, allowed me to advocate for him*



Post heart-transplant,  
a mother's perspective



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### Medical Staff

- The need to identify appropriate means to communicate with intubated/vent dependent patients identified as a high research priority
- Because of duties, medical staff must limit the time available to interpret
- Nurses have reported patients being angry and then abandoning attempt because of nurse inability to interpret



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**video (nurse)**


**When ... board**



- Saves the frustration of both the nurse and the patient and instead of the patient getting madder and madder...

Patient gets what they want when they need it, instead of the nurse having to figure it out.

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

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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\*

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**CHB Profile/Phases of Communication Vulnerable Patient**

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Phase 1: Emerging from sedation

Phase 2: Increased wakefulness

Phase 3: Need for broad and diverse communication access

**\* Not always static**

Costello, et al. In press. Costello and Pritchard Children's Hospital Boston 2010. Journal of Pediatric Rehabilitation Medicine




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**Phase 1**  
**Emerging from Sedation**

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



Costello, et al.  
In press

Costello and Pritchard Children's Hospital Boston 2010  
Journal of Pediatric Rehabilitation Medicine

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**Phase 2**  
**Increased wakefulness**

- Require all of phase 1 strategies
- Require more relevant vocabulary
- Picture boards
- Alphabet boards
  - ABC
  - QWERTY
- Multi-message voice output devices
- Digitally recorded messages \*\*\*\*
- Voice amplification



Costello, et al.  
In press

Costello and Pritchard Children's Hospital Boston 2010  
Journal of Pediatric Rehabilitation Medicine

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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



Costello, et al.  
In press

Costello and Pritchard Children's Hospital Boston 2010  
Journal of Pediatric Rehabilitation Medicine

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## Impact of AAC

**Patients taught to use communication tools such as picture boards, word boards or simple communication devices, reported improved satisfaction and comfort when compared to care without communication support**

(Patak et.al 2007, Costello 2000, Slovsky, Rudy & Dragonete, 1988)



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## First: getting the referral

**KEY:  
staff recognizing communication  
vulnerability and then  
recognizing that it is NOT alright**

\* Huge opportunity for nurse /staff training by SLP



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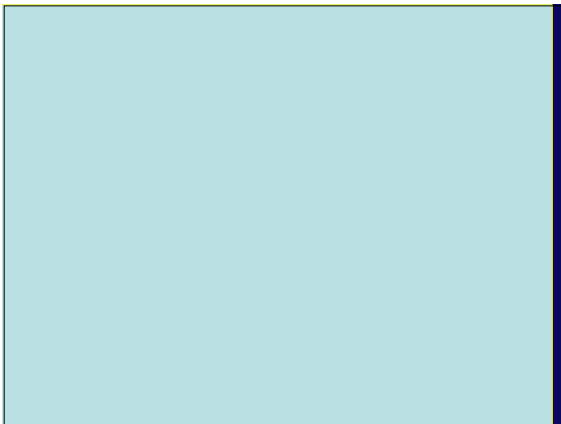
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Cognitive status:

- Alertness
- Awareness
- Orientation
- Pre-morbid status



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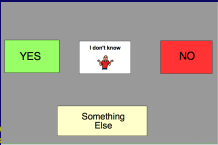

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Cognitive Assessment considerations:

- Often status is first reported by bedside care providers
- Observe patient's wakefulness and fatigue (impact participation and length of assessment)
- Patient's ability to follow simple directions
- Patient's ability to respond to simple questions ( yes/ no / don't know response)

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Cognitive Assessment considerations:

- Potential presence of delirium  
- Impact of medications (example Versed)
- Quality and quantity of sleep
- Potential presence of dementia 



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Feature match/intervention considerations

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- Will determine if assessment happens over time, postponed or continued.
- May need to re-assess often and adjust recommendations frequently
- May require range of supports to be used at different times of day
- Will impact complexity of instructional language and strategies introduced
- May suggest selection of memory book or orientation strategies through visuals, visual schedule
- Use of symbols versus written word



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Sensory domain:

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- Vision
- Hearing
- Comparison to pre-morbid status?



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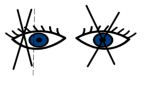
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Sensory Assessment considerations

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- Does s/he wear glasses? If yes, are they here?
- Does s/he have hearing aids? If yes, are they here?
- If physical status will not support glasses or hearing aids (swelling, incision site, etc.), what accommodations can be made
- Have C.I.? Available?

I have NO sight in my right eye OR in the outside half of my left eye





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### Sensory Assessment considerations

If using ventilation mask, what type of mask (impact on vision/binocularity and positioning of materials)

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### Feature match/intervention Considerations (sensory)



F.M. trainer to provide focused auditory input



Remove one or both arms of the glasses



Ubi Duo for wireless patient-provider text based communication

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### Feature match/intervention Considerations (sensory)

- Consideration for communication with family/friends via phone:  
<http://ip-relay.com> OR TTY
- Use of web cam/Skype video for sign communication with family/friends



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### Feature match/intervention Considerations (sensory)

- Use of voice output technology if minimal/no hearing
- Feedback loop of speech generating device
- Use of auditory scan component
- Use of tactile markers and keyguards



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### Feature match/intervention Considerations (sensory)

- Symbol set/representation selection
- characteristics of text
- Size of targets
- Color contrasts
- Complexity of layout
- Use of symbols versus text
- System that supports keyguard
- System that supports tactile markers



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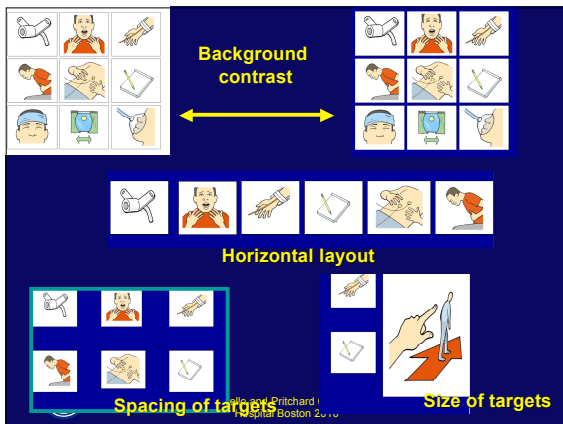
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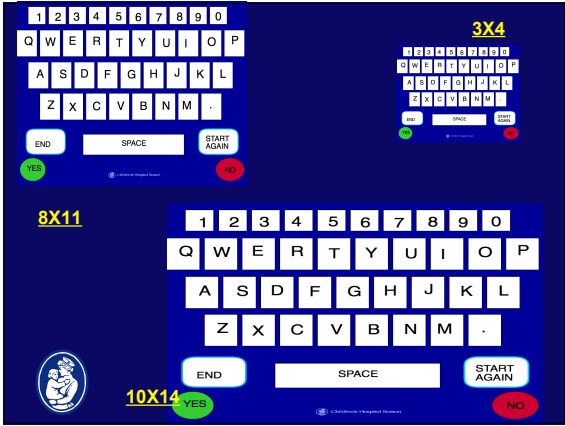
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### Motor Domain

- Use of gestures/pantomime
- Control/access
- Physical positioning
- Direct selection (hand, eyes, other?)
- Ability to write/draw


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### Assessment considerations

- Ability to point with hand
- Ability to point with eyes
- Ability to point with head light
- Use of splints to support pointing
- Indirect access through scanning
- Indirect access through partner assist
- Access changed by positioning?


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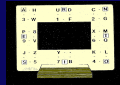
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## Feature match/intervention Considerations (motor)

- Inventory of natural gestures
- Basic sign language
- Adapted nurse call system
- Keyboard
- Paper and pen
- Use of keyguard
- Single switch access to technology
- Partner assisted scanning
- Eye gaze/Etran - Eye Linking
- Eye tracking



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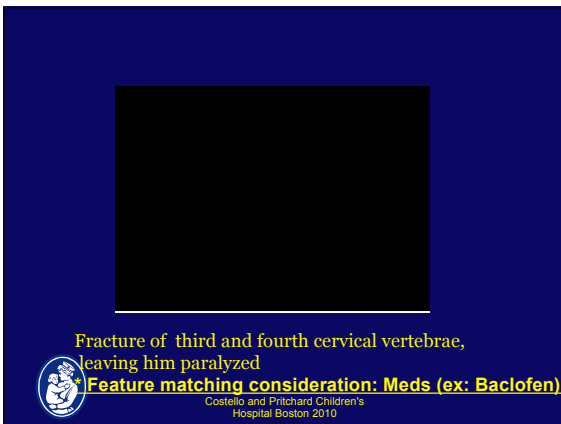
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Fracture of third and fourth cervical vertebrae,  
leaving him paralyzed

**Feature matching consideration: Meds (ex: Baclofen)**

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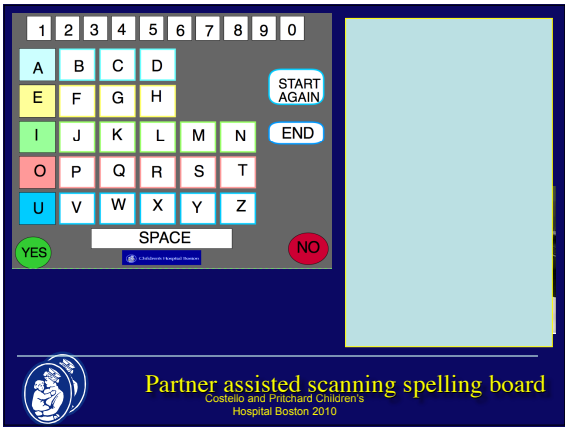
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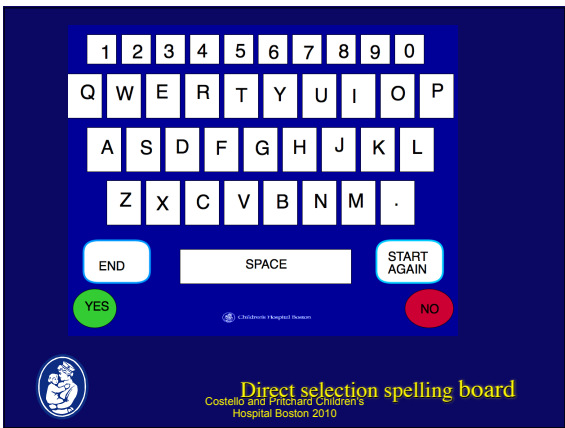
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Step by Step  
From Ablenet, Inc

nurse call



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adjust 	up 	on stomach 	head 	pain 
pillow 	down 	on side 	arms 	okay 
out of bed 	sit in chair 	rub 	legs 	itchy 
uncomfortable 	IV 	massage 	feet 	untie hands 

body comfort



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**Eye gaze displays to participate  
In decision making**



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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
I love you	cold	hot	open curtain	bathroom
listen tube out mouth	television	listen to music	read book	close curtain



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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....

card	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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itchy

hurts

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itchy

hurts

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### Eye Linking

Partner User

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Resource: <http://www.cini.org>

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\* Sue Russell & Loc line

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## Positioning

Cuff inflation may vary by positioning and impact need for AAC vs. ability to use speech.

Access skill may change with physical positioning (in bed/in chair) and require different strategies or mounts

Medical procedure may impact positioning which will impact feature match

- spinal fusion/rod insertion
- reconstruction surgery with tissue grafting



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## Language Comprehension Domain

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Native language?  
Comprehension  
Ability to follow directions  
Able to answer yes/no questions  
Health literacy



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## Feature match/intervention Considerations (language)

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Post how patient indicates yes/no in obvious space in room

- Examples: thumbs up/down
- Squeeze eyes or blink eyes
- Squeeze hand once or twice



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### Sample Bedside Signs

Please offer me choices using your hands...

- Ask me a question.
- Hold up YOUR right hand and give me my first choice.
- Then hold up YOUR left hand and give me my second choice.
- I will look at the one I want.



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### Sample Bedside Signs, Cont.

I understand what you are saying.

Please speak directly to me.

I move the fingers on my RIGHT hand to indicate YES.

I move the fingers of my LEFT hand to indicate NO.



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### Sample Bedside Signs, Cont.

Messages I Frequently Communicate:

- I need to be suctioned.
  - I'm tired.
- I need to go to the bathroom.
- I need the bed pan.
- I need to roll over.
- I need cough assist.
  - Move my leg in.
  - Move my leg out.
- Move my hips to the right.
- Move my hips to the left.



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### **Feature match/intervention Considerations (language)**

- Use of visuals (symbols, photos, text)
- Intervention may focus on simple single message output devices
- May focus on strategies to support control and impact on environment



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### **Feature match/intervention Considerations (language)**

- ALWAYS use QUALIFIED MEDICAL INTERPRETER services when patient does not speak English/uses ASL
- Use of digitally recorded communication aids for communication in native language and English (approved by qualified medical interpreter)



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### **iPad (or itouch) and iASL**



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## Andrew MVA in Shanghai

**English and Chinese recorded**

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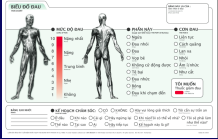
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## Communication Boards with Language Translation




**Vietnamese**



**Spanish**

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## Feature match/intervention Considerations (language)

Selection of tools/strategies with transparent organization versus requiring meta understanding of navigation/organization \*

- \* may change rapidly with medical status change

Selection of sophisticated tools and integrated features for environmental control, web access, etc.

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### Literacy Domain Feature Match considerations

- Use of written words
- Use of alphabet for generative communication
- Encoding strategies
- Use of keyboard based systems
- Keep pen and paper at bedside along with easily accessible strategy to request (simple voice output tool)



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### Literacy Domain Feature Match considerations

- Use of cell phone/text messaging for communication
- Use of letter cues/topic cues
- \*\*\*Note: good decoding skills and reading comprehension does not mean patient has good encoding skills
  - May be able to use canned text but not generate novel text.



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### Feature Match: QWERTY vs Alphabetical

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### For Patient who

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### Letter Cue board

THE WORD BEGINS WITH.....

Q	W	E	R	T	Y	U	I	O	P
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M	<i>Start again</i>		
br	er	fr	gr	tr	pl	str	<i>Next word</i>		
bl	cl	fl	gl	sw	dw	tw	<i>End</i>		
sl	sc	sk	sm	sn	sp				
sw	squ	spl	spr	scr					

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## Topic Cue board

<b>People</b>	<b>Food</b>	<b>Emotions</b>
<b>Places</b>	<b>Colors</b>	<b>Questions</b>
<b>Animals</b>	<b>Entertainment</b>	<b>Body</b>
<b>School</b>	<b>Home</b>	<b>Community</b>



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## Speech Production



Reduced volume?  
Tracheostomy

- Why?
  - Type (cuffed/cuffless)?
  - Airleak?
  - Changes with positioning?
  - Candidate for speaking valve?
  - Tolerance of valve?
- Vent?



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## Speech Production

- Moderately compromised intelligibility?
- Severely compromised intelligibility?
- Type of intubation/ cannula ?
- Impacted by cpap/bipap mask and type of mask?
- Impacted by fixation or other hardware?



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### Voice Amplification or use of Electrolarynx


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### Vocabulary Selection

- Patient needs
- Patient personality
- Patient's developmental status
- Patient interest
- Address medical, personal and psychosocial needs


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### Comparison of MessageMate

KYLE

Mom	MOM	NURSE	you?	food	drink	brush your	feet	time?	
Patrick	DAD	PATRICK	wash dish	suction	help	toilet	urinal	glasses	television
Dad	scared	please	thank you	good morning	path	hip	leg	arm	
Hi	BYE	rotate leg in circle	get my leg	stretch my leg	false bed	lower bed	move my leg	switch table	

PATRICK

help	nurse	come here	ACHITAMA	I love you	rub my head	hold hand	can't wait	
thirsty	cough	falling	Machine Off	bed up	bed down			
bathroom	insert in	blanket off	legs	Chuck	glasses	what is that?		
TV	ventilator	ipod						


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bulary selection

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### Domain of Assessment: Environmental

- Lighting
- Noise (including noise from vent and other medical equipment)
- Available real estate/furniture for mounting/access
- Nurse route of access maintained

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### Electromagnetic Interference (EMI)

Current evidence based data demonstrates Electromagnetic Interference (EMI) affects medical devices. Currently, types of wireless devices include but are not limited to:

- all cell phones
- hand held messaging devices (Blackberry, itouch, ipad, etc..)
- multi-communication devices that combine the use of Wi-Fi, Blue tooth and cellular-capable computers (Kindle, blue tooth ear pieces. Etc..).

Integrated SGD's

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## Electromagnetic Interference (EMI)

The Emergency Care Research Institute (ECRI) addresses the issue of whether the use of cell phones should be restricted in health care facilities because of problems concerning EMI with medical devices.

### Recommended Practice:

- When using a wireless device, a minimum distance of at least 1 meter, an "arm's length" from medical devices is recommended.
- cell phones should be prohibited in highly instrumented clinical areas and should be powered off by patients and visitors in these areas.



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## Electromagnetic Interference (EMI)

EMI events have included:

- loss of control of dialysis machines,
- ventilator malfunctions,
- infusion pump shutdowns and rate changes



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Yours



ACCESS TO COMMUNICATION TOOL

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