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Augmentative and Alternative Communication in the Intensive Care Unit: A Service Delivery Model

Beverly Lloyd
bllloyd1@ilstu.edu

Ann R. Beck
Illinois State University

Amy L. Yacucci
ayacucc@ilstu.edu

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Augmentative and Alternative Communication in the Intensive Care Unit: A Service Delivery
Model

Beverly L. Lloyd

Illinois State University

Table of Contents

Introduction	4
What is Augmentative and Alternative Communication	4
Why is AAC Needed in the Intensive Care Unit	5
What are the Roles of ICU Nurses and Speech-Language Pathologist in an AAC Service Delivery Model	8
Starting an AAC Service Delivery Model in an ICU	9
Creating an AAC Team	9
Creating an AAC Station	12
Providing AAC Training.....	14
Framework for an AAC Service Delivery Model in the ICU	14
Obtain a Physician’s Referral	14
Assessment of Patient Communication Needs	15
Communicating Important Patient Communication Information	18
Providing Feedback on the Usability of the Service Delivery Model	19
Special Considerations for Planned ICU Admittance.....	19
Preoperative AAC Consultations.....	19
Informing Patients of Expected Communication Difficulties	20
Selecting AAC Tools for the Patient	20
Postoperative Bedside Evaluation.....	21
Ethical Considerations	23
AAC Materials and Explanations of Their Use.....	23
Written Communication as AAC.....	23
Written communication option 1: paper and pen	25
Written communication option 2: boogie boards and magic slates	26
Written communication option 3: type-to-speech keyboards	28
Electrolarynx as AAC.....	30
Alphabet Boards as AAC.....	33
Alphabet board option 1: keyboard type.....	35
Alphabet board option 2: alphabetical icons	40
Alphabet board option 3: partner assisted scanning board.....	44
Picture Boards as AAC	47
Picture board option 1: direct selection picture boards	48
Picture board option 2: partner assisted picture boards.....	50
Asking Yes/No Questions as AAC.....	57
Eye Gaze Boards as AAC	62
Eye gaze board option 1: alphabet board.....	63

Eye gaze board option 2: picture boards.....	65
Speech Generating Devices as AAC.....	68
SGD option 1: Sounding Board by Ablenet	70
SGD option 2: GoTalk Now.....	71
SGD option 3: Lingraphica: Small Talk Intensive Care.....	73
Mounting Equipment and Adaptive Switches	75
Typing stands.	75
Benefits of Implementing an AAC Service Delivery Model in the ICU.....	80
Appendix A	83
Appendix B	84
Appendix C	87
References	100

Introduction

What is Augmentative and Alternative Communication

Imagine waking up one morning to realize that you have lost the ability to speak. As the panic begins to set in, you might wonder, how will I greet my family members? Order my coffee? Share important information with my co-workers? Losing the ability to speak, either temporarily or permanently, does not have to mean losing your ability to communicate. As you go about your day, you would eventually find ways to communicate without speaking. Perhaps you would point to your coffee order on the menu or write messages to your co-worker to share important information. Individuals who have limited verbal speech rely on various forms and methods of augmentative and alternative communication (AAC). In its simplest form, AAC is defined as a variety of tools and techniques used to supplement or replace speech when an individual's ability to speak is limited or absent (ASHA, n.d). AAC allows individuals who cannot communicate verbally to ask questions, make comments, participate in social activities and share information such as their thoughts, feelings, wants and needs. The goal of AAC is to discover the strategies and tools that allow individuals to achieve the most effective communication so that they can reach their highest potential and quality-of-life (AAC Institute, n.d.).

AAC can be classified in one of three categories: no-tech, low-tech or high-tech (ASHA, n.d.). No-tech AAC does not require any additional materials or devices. No-tech AAC includes pointing, hand gestures, facial expressions and sign language. Low-tech AAC requires external supports, however, these supports are relatively inexpensive and do not require high tech devices with special hardware and/or software. Examples of low-tech AAC include writing messages or pointing to pictures on a communication board in order to make wants and needs known. High-

tech AAC is typically considered to be electronic devices with software that produces verbal speech output when selections are made. These electronic devices are often referred to as speech-generating devices (SGD). High-tech AAC software can be installed on a tablet device, such as an iPad, or can be accessed through a dedicated voice output system.

Figure 1: Types of AAC

See links below for examples of AAC

No-tech AAC

[ASL]. Retrieved from <https://www.jccmi.edu/student-life/activities-clubs/student-life-asl-helping-hands-communicate/>

Low-tech AAC

[Alphabet board]. Retrieved from <http://www.ceiimage.org/alphabet-board/>

High-Tech AAC

[High tech SGD]. Retrieved from <https://www.communicatewithkate.com/aac-augmentative-and-alternative-communication/>

Why is AAC Needed in the Intensive Care Unit

Admittance into an intensive care unit (ICU) can be a frightening experience for patients and their families. To add to the stress of the experience, many patients find themselves unable to speak. This may be due to the need for mechanical ventilation and/or a tracheostomy tube. Other patients may have limited speech due to fatigue or weakness caused by a chronic condition or they might be permanent AAC users and find themselves without their system while in the hospital. Providing patients with low- and high-tech AAC systems may provide patients with an effective and reliable way to communicate with their families and medical staff until they are able to return to their previous modes of communication. Hospitals, however, are often limited in the knowledge and accessibility to appropriate AAC support. AAC materials are often placed in ICU rooms; however, patients and family members do not use them because they do not know how. Instead, patients and their families attempt to communicate using lip-reading and/or gestures, only to become frustrated by the inefficiency of these forms of communication. (Boyles, Tate & Happ, 2012). In order to more effectively meet the needs of ICU patients, hospitals should provide expanded AAC service delivery models.

The Joint Commission, an independent organization that accredits many healthcare facilities in the United States, recognizes the need for AAC in acute care settings. Its accreditation standards require healthcare facilities to provide patients with safe, high-quality care and in 2010 it changed its standards to reflect the need for AAC in acute care facilities. The new standards explicitly require hospitals to provide AAC to patients who benefit from it, even if it is only required temporarily. Below are just two of the new standards that address AAC:

“For patients that experience sensory or communication impairment due to their current medical condition, it may be necessary for the hospital to provide auxiliary aids and services or augmentative and alternative communication (AAC) resources to facilitate communication” (Joint Commission, 2010, p.10).

“Anticipate the communication needs of the patient who is expected to develop communication impairments from scheduled treatment or procedures (for example, as a result of intubation, tracheostomy, sedation, or other interventions that may compromise the patient’s ability to communicate)” (Joint Commission, 2010, p.18).

The new standards require hospitals to meet the communication needs of patients during their entire hospital stay; from admittance to discharge. The Joint Commission implemented these changes because it recognizes that effective communication ensures patient safety and increases the quality-of-care received during hospital stays. Providing access to quality AAC is extremely important in the ICU as many patients recall experiencing significant pain accompanied by anxiety and distress (Fink, Makic, Poteet & Oman, 2015). One mechanically ventilated ICU patient described his fear and anxiety related to his breathing, saying: “I basically felt totally helpless. What is going to happen if I can’t get my next breath and so that’s what’s going through my head...” (Tate, Dabbs, Hoffman, Millbrandt & Happ, 2012, p.163). AAC can help

patients externalize their anxiety and pain, which allows healthcare professionals to provide treatments and information that minimize the anxiety and pain. Simply placing AAC materials in ICU rooms is not enough to meet these standards. In order for hospitals to comply with the Joint Commission's standards and provide patients with the best quality-of-care, they need an AAC service delivery model that provides patients with quality AAC materials and instructions on how to use them.

In addition to meeting the Joint Commission's guidelines, hospitals also need to provide access to AAC as a basic human right. The National Joint Committee for the Communication Needs of Persons with Severe Disabilities (NJC) created the Communication Bill of Rights (see Appendix A). The document states that all individuals, regardless of disability, "have a basic right to affect, through communication, the conditions of their existence" (National Joint Commission, 2016, p. 1). The document then continues to list 15 fundamental communication rights, one of which state that individuals have the right to "access functioning AAC (augmentative and alternative communication) and other AT (assistive technology) services and devices at all times" (National Joint Commission, 2016, p.1). Nonverbal patients in the ICU have these same communication rights which need to be honored. A patient's stay in the ICU often results in the need to make quality-of-life and sometimes end-of life decisions. In order for nonverbal patients to participate in these decisions that may greatly affect their lives, they require a way to clearly express their thoughts and preferences. For patients to actively participate in the decisions guiding their care and quality-of-life, they not only need access to AAC technology, tools, and systems; they require access to supports and instruction needed to use them effectively and efficiently.

AAC availability is becoming more common in acute care settings, however, it is not always effectively implemented. Hospitals frequently have alphabet boards and low-tech picture boards available to patients and their families, however, little instruction is provided to them about which systems to use or how to use them. It is not enough to simply leave AAC systems in patients' rooms and assume that they will use them; patients and family members need instruction (Boyles et al., 2012). A well organized and systematic AAC service delivery model needs to be implemented in the ICU. This service delivery model should include access to AAC tools and provide patients and their families with instructions in selecting and using the AAC. Implementation of a better AAC service delivery plan will allow hospitals to honor patients' communication rights and to better implement the Joint Commission's standards.

What are the Roles of ICU Nurses and Speech-Language Pathologist in an AAC Service Delivery Model

Intensive care unit nurses and speech-language pathologists (SLP) can work together to create and implement a systematic AAC service delivery model. SLPs are trained experts in communication and are familiar with AAC principles and technologies (ASHA, 2016). They know and understand the best practices for improving communication and can create and modify AAC tools that are useful for communicating the specific needs of individuals in the ICU. Additionally, SLPs can assess patients' communication needs and select AAC strategies that appropriately meet their needs. While SLPs have the specialized training needed to create and implement an AAC service delivery model, it would not be successful without the involvement of ICU nurses. Nurses are at patients' bedsides multiple times a day and communicate with patients more than other hospital staff (Dithole, Thupayagale-Tshwenagae, Akpor & Moleki, 2017). Therefore, it is important for nurses to be familiar with the AAC tools and strategies used

in the service delivery model. If a nurse is assigned to patients who are using AAC tools but does not know how to accurately interpret their communication, effective patient-provider communication cannot take place and patients cannot be active participants in their treatment. Nurses and SLPs must work together to implement an AAC service delivery model that best meets patients' communication needs. SLPs can provide nurses with training that teaches them to use the AAC tools and strategies so they can communicate with patients who use them. While nurses may feel overwhelmed by the idea of adding another responsibility to their already full workload, many nurses who have completed AAC training acknowledge that the training is beneficial. Some nurses even report that the use of AAC saves them time because they spend less time interpreting patients' unclear communication attempts (Handburg & Voss, 2017). Nurses can also provide valuable feedback about the AAC service delivery model. Because nurses spend the most time with patients and their family members, they can provide feedback about what techniques and tools work well and what improvements need to be made.

This user's manual serves as a framework for an AAC service delivery model. The materials and guidelines in this manual can be used by SLPs and nurses as they implement an AAC delivery model in an ICU that currently does not have one. It can also be used by SLPs to supplement in-service training sessions with nurses or as a reference tool for nurses as they work with patients and family members using the AAC tools.

Starting an AAC Service Delivery Model in an ICU

Creating an AAC Team

The first step in implementing an effective AAC service delivery model is to create and develop an AAC service delivery team. This team should include the ICU physicians, nursing staff, SLPs, respiratory therapists, occupational therapists and physical therapists (Garrett, Happ,

Costello, & Fried-Oken, 2007; Hurting & Downey, 2009). Each team member's role is important to the successful and effective implementation of the service delivery model. Therefore, the roles of each member should be clearly defined and understood by the other team members. Below is a description of each team member's roles on the AAC team.

- **Physicians:** A physician's referral is required in order for an SLP to assess and treat a patient. However, physician referrals for speech and language services in the ICU are currently not a common practice due to physicians' unfamiliarity with AAC (Beukelman & Mirenda, 2013). It is important for ICU physicians to be aware of the availability of AAC tools and technologies and to recognize how they benefit patients. When physicians observe or suspect communication difficulties in a patient, or hear family members mention difficulties with communication, a referral to an SLP for an AAC assessment and consultation should be made.
- **SLPs:** After obtaining a physician's referral, the SLP should assess patients and select appropriate AAC tools, strategies and technologies for the patients to use during their ICU admittance (Garrett et al., 2007; Hurting & Downey, 2009). The SLP should provide patients and their family members with brief, simple instructions on how to use the selected AAC and address their questions or concerns related to communication. Additionally, it is the responsibility of the SLP to provide AAC training to the other team members.
- **Nurses:** AAC tools and strategies are only effective if patients' messages are understood by their conversation partners. It is imperative for ICU nurses to be familiar with the AAC tools and strategies in order to accurately interpret

patients' communication using AAC systems. Because nurses are the team members that spend the most time with the patients, they can provide valuable feedback about their satisfaction with the AAC tools and strategies. If the originally selected AAC tool does not meet a patient's current communication needs or is too difficult to use, the nurse can relay this information to the SLP and appropriate changes can be made to the AAC.

- **Respiratory therapists:** Respiratory therapists are also valuable members of an AAC service delivery team. Respiratory therapists monitor ventilated patients' pulmonary functioning and maintain artificial airways. The respiratory therapist's expertise is needed when providing AAC services to patients with tracheostomy tubes and/or mechanical ventilation. These patients have compromised respiratory systems and the SLP should avoid selecting methods of AAC that are too effortful or strenuous for a patient's respiratory system. Therefore, the SLP should consult the respiratory therapist before selecting AAC tools and strategies for these patients.
- **Occupational therapists (OT) and Physical therapists (PT):** The collaborative work of OTs and PTs can help patients efficiently and effectively access and use their AAC systems. They work safely positions and postures patients so that they have the greatest possible mobility to use the AAC tools and technologies. Additionally, OTs can provide patients with splints to assist with writing and pointing. PTs can also assist with the positioning of alternative access switches for patients with limited range-of-motion and/or strength (Hurtig & Downey, 2009).

Many individuals from various professions are involved in and comprise the AAC service delivery team. It is important to create a way to communicate essential information between each team member. If the service delivery team is exceptionally large, consider forming a committee with one or two representatives from each profession involved in the team. The committee could meet periodically to discuss the strengths and needs of the delivery model. Mass email newsletters, listservs or notices posted in the nurses' stations can also be used to inform all team members of important information regarding the service delivery model.

Creating an AAC Station

Once an AAC team is developed, an AAC station needs to be created. An AAC station is a singular area where AAC systems and other necessary equipment are stored and made readily available for use. This could consist of a cart or a space within the nurses' station that is easily accessible to all staff members who may need access. The main goal of an AAC station is to ensure that materials are readily available for staff members to use. The AAC station should be well stocked with both low- and high-tech AAC options as well as additional tools and equipment needed to utilize the AAC systems (Hurting & Downey, 2009). For a complete list of materials to include in an AAC station, see Table 1 below. Materials should be organized so that they are quickly and easily found. Consider organizing the communication boards into a clearly labeled accordion file or file folders that are placed in a hanging file box. Place larger equipment, such as electrolarynxes, switches and adaptive pointers in plastic file drawers with each drawer clearly labeled. Additionally, create a way to easily charge high-tech SGDs and consider color coordinating chargers and devices with colored tape. Place disinfectant wipes at the station as well to clean materials between uses. An SLP should be designated to oversee the AAC station and check it once a week (or more frequently if needed) to ensure that it is fully stocked and

make additional copies or replace/repair equipment when needed. The SLP's name and contact number should also be visibly placed within the station so staff members can contact him or her if unexpected copies or repairs need to be made (Garrett et al., 2007).

Table 1. Materials for an AAC Station

<p><u>Writing Utensils:</u></p> <ul style="list-style-type: none"> ● Spiral notebooks ● Felt tip pens ● Pencil grips ● Large black markers ● Magic Slates or Boogie Boards <p><u>Communication Boards</u></p> <ul style="list-style-type: none"> ● Alphabet boards, multiple ● Quick Words board ● Pain Information board ● Wants/Needs boards ● Family communication board ● Feelings board <p><u>Electrolarynx</u></p> <ul style="list-style-type: none"> ● electrolarynx ● Oral adapters 	<p><u>Eye Gaze Boards</u></p> <ul style="list-style-type: none"> ● Plexiglass eye gaze display ● Alphabet/number overlay ● Quick words overlay ● Wants needs overlay ● Pain information overlay ● Family communication overlay ● Feelings overlay <p><u>Speech Generating Devices (SGD)</u></p> <ul style="list-style-type: none"> ● iPads installed with the GoTalk Now, Sounding Board, Lingraphica Small Talk Intensive Care & Talk for Me apps ● iPad compatible wireless keyboards ● Protective cases for the iPads ● Tobii Dynavox LightWriter SL40 Connect <p><u>Switches</u></p> <ul style="list-style-type: none"> ● Jelly Bean ● Specs Switch ● Grasp Switch ● Micro Light ● Imperium Sip and Puff ● Angle bracket made from thermoplastic splinting material 	<p><u>Mounting Equipment</u></p> <ul style="list-style-type: none"> ● Typing stands ● Gooseneck pipe and spring clamps ● Gooseneck Mounting Arm with Super Clamp ● Mounting system with universal mounting plates <p><u>Additional Tools & Supplies</u></p> <ul style="list-style-type: none"> ● Page protectors ● Adhesive Velcro ● String ● Dry erase markers ● Metal binder rings ● Clear tape ● Sticky notes ● Badge clips ● Three-ring binders <p><u>Adaptive Equipment</u></p> <ul style="list-style-type: none"> ● Universal cuff ● Adaptive styluses ● Head and glasses mounted laser pointers ● BIGmack switch ● TalkingBrix switch
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Table adapted from (Hurting & Downey, 2009), (Garrett et al., 2007) & (Beukelman & Miranda, 2013).

Providing AAC Training

Once an AAC station is created, an SLP should provide in-service training sessions for members of the AAC team. Physicians and SLPs should meet to discuss the importance of providing AAC to non-verbal ICU patients. SLPs provide explanations regarding their role in assessing and treating communication difficulties using AAC, as other professionals are often unaware of SLPs' expertise in AAC. The SLP can provide specific examples of how AAC intervention can improve communication with ICU patients who present with decreased or absent oral speech. Physicians and SLPs may also consider creating a systematic referral process for mechanically ventilated patients and other patients who are likely to have limited oral speech during their stay in the ICU (Garrett et al, 2007).

Nurses should also receive AAC training. As stated previously, nurses spend a considerable amount of time at the patient's bedside compared to many other professionals on the care team and frequently communicate with the patient. Therefore, in order to accurately interpret patient's communication attempts, nurses must understand how the AAC systems are used. Training should cover the importance of AAC in the ICU, assumptions to avoid, and explanations of the AAC materials available in the AAC station and their use. These topics can be introduced and discussed using role-playing activities, storytelling exercises and discussions. Consider assigning a case-study or two at the end of the trainings to encourage application of the information discussed in the training (Happ et al., 2014).

Framework for an AAC Service Delivery Model in the ICU

Obtain a Physician's Referral

Before an SLP can assess a patient's communication needs, a physician's referral is needed. While developing the AAC service delivery model, the physicians and SLPs should have agreed

on a referral method that is accessible and allows for easy communication between both professions.

Assessment of Patient Communication Needs

Prior to selecting AAC tools for a patient, it is important to consider any sensory or motor needs they may have as these needs will be considered when selecting appropriate AAC. During a brief assessment, make observations about the patient's vision, hearing, motor abilities, oral motor functions, level of literacy and the primary language (Beukelman & Mirenda, 2013; Garrett et al., 2007). Below is a description of how to assess these functions.

- **Vision:** Note if patients wear glasses. However, do not assume that the absence of glasses means the absence of a visual impairment. Their glasses might be lost or left at home. Ask patients who are not wearing glasses about their vision or look in their charts for any visual impairments.
- **Hearing:** Note any hearing impairments present or reported. Notice if patients wear hearing aids, but again, do not assume the absence of hearing aids means hearing is within normal limits. Hearing aids might be lost or left at home or a hearing loss may be undiagnosed. Also notice if patients need others to repeat themselves multiple times before they understand them.
- **Motor Ability:** Note any motor limitation patients may have. Note if patients have limited range of motion in their arms, legs, neck or head and note the extent of the limitations. Also note any fatigue that happens during the use of the extremities, both upper and lower. It is also important to note their ability to isolate one or two fingers to point at objects, as the use of many AAC boards requires pointing.

- Oral Motor Function: If patients are not ventilated through an oral endotracheal tube, consider their ability to accurately move their lips, tongue and jaw to produce speech. Note any weakness or discoordination in these oral structures.
- Literacy: Ask patients, or their family members, about their reading skills. Note if they are able to read single words, short phrases or full-length texts.
- Primary Language: Consider patients' primary spoken language. Patients who are not proficient in English will need AAC materials adapted to their primary language.

Sensory and motor assessments do not have to be time consuming and can be completed by the SLP during a brief observation. Below (Figure 2) is a sheet that can be kept at the AAC station and used to document patient's sensory or motor needs.

Figure 2: Sensory and Motor Assessment

Patient's Name: _____

Vision	1. Is the patient currently wearing glasses? 2. If no, does the patient report normally wearing glasses? 3. Other notes about vision:	Yes	No
Hearing	1. Is the patient currently wearing hearing aids? 2. If no, does the patient report normally wearing hearing aids? 3. Does the patient need information repeated multiple times before he/she appears to understand? 4. Other notes about hearing:	Yes	No
Motor Ability	1. Is there noticeable weakness in the patient's arms legs or neck? 2. If yes, where? (circle all that apply) R. Arm L. Arm R. Leg L. Leg Neck 3. Does the patient have decreased range of motion in his/her arms, legs, or neck? 4. If yes, where? (circle all that apply) R. Arm L. Arm R. Leg L. Leg Neck 3. Can the patient isolate one or two fingers to point? 4. Does the patient's arms, legs or neck fatigue with extended use? 5. Other notes about motor ability:	Yes	No
Oral Motor	1. Is there noticeable weakness in the patient's lips, tongue or jaw? 2. If yes, where? (circle all that apply) Lips Tongue Jaw 3. Does the patient have limited range of motion of lips, tongue or jaw? 4. If yes, where? (circle all that apply) Lips Tongue Jaw 5. Is the movement of the oral structures coordinated? 6. Other notes about oral motor functions:	Yes	No
Literacy	1. Can the patient read single words? 2. Can the patient read phrases? 3. Can the patient read full text?	Yes	No
Primary Language	1. Is patient proficient in English? 2. If no, what is his/her primary language?	Yes	No

Selecting AAC Tools for the Patient

Using the information from the sensory and motor needs assessments, appropriate AAC systems can be selected or designed to meet patients' individual needs. When appropriate, select multiple AAC tools to introduce to patients and their family. Patients may find that particular AAC tools work well together and allow them to communicate a larger variety of messages or that one system is easier for them to use than the others (Garrett et al., 2007). Multi-modal AAC systems are recommended as they are often more effective than relying on a single method. After giving patients and their families a brief explanation and demonstration of the tools, leave all of them in the room and allow patients to select the ones they find easiest to use and understand.

Communicating Important Patient Communication Information

ICU patients are cared for by several different healthcare professionals during their admittance. Healthcare professionals on a patient's care team need to be aware of the AAC supports the patient is using so they can clearly communicate with the patient. One method of sharing communication information is to write the patient's communication information on a sheet of paper and place it outside the room or above the patient's bed. This document should include (but is not limited to) the method of AAC being used, the meanings of communication signals unique to the patient and strategies for successfully gaining the patients attention. During their hospital stay, patients may develop their own communication signals which are not universally known, such as tightening their hand in a fist to convey pain or turning their head aside to reject or disagree. These communication signals should be recorded on the document as well so that each member on the patient's care team can accurately interpret them. The communication information sheet should also include strategies that are helpful for gaining the

patient's attention to initiate communication. This information can also be shared in the patient's chart or during shift change reports (Garrett et al., 2007).

Providing Feedback on the Usability of the Service Delivery Model

Once the AAC service delivery model is implemented, it is important to assess its effectiveness in an ongoing and systematic way. Feedback should be collected from patients, family members, and hospital staff to evaluate the delivery model's strengths and weaknesses. Consider providing patients and their family members with discharge surveys about their experience using AAC during their admittance (Costello, 2000). To encourage feedback from hospital staff members, consider placing an anonymous suggestion box at the AAC station. The SLP designated to oversee the AAC station should review the feedback frequently and the AAC team should make the appropriate changes to the delivery model as soon as possible. Implementing feedback ensures that the service delivery model is effective and meets the communication needs of patients and their family members.

Special Considerations for Planned ICU Admittance

Preoperative AAC Consultations

Admittance to the ICU is not always unplanned or sudden. Some patients have a pre-scheduled admittance due to a planned medical procedure or surgery. These procedures may include head and neck surgeries, organ transplants, reconstructive surgeries or any other procedure that requires long-term intubation (Garrett et al., 2007). It is typical for patients to participate in a pre-operative consultation session to prepare them for their procedure. However, patients and their family members are frequently surprised by the communication difficulties that occur when a patient is ventilated after a planned surgery. Preoperative counseling, while thorough on many other details related to the procedure, often overlooks temporary

communication difficulties (Boyles et al., 2012). Patients with pre-scheduled ICU admittance are in a unique position as they can be better prepared for their anticipated communication difficulties. During a preoperative AAC consultation, an SLP should assist patients in preparing for their expected communication difficulties. The SLP can inform patients of the communication difficulties that may be expected and can assist them in selecting appropriate AAC strategies. Preoperative consultations also allow patients to practice using the AAC system before their hospital admittance. (Costello, 2000; Garrett et al., 2007).

Informing Patients of Expected Communication Difficulties

Preoperative consultation should begin with an explanation of the expected communication difficulties. Explain, in simple, easily understood terms, why verbal communication will be difficult during the patient's recovery in the ICU. Patients who have not previously experienced a loss of verbal communication may have more questions and require longer explanations than patients who have previously experienced a loss of communication during a hospital stay. The SLP should ensure that all of the patient's questions or concerns are addressed and, when necessary, make referrals to other professionals for questions outside the SLP's scope of practice (Costello, 2000).

Selecting AAC Tools for the Patient

Once patients have been informed about the expected communication difficulties, the SLP should provide them with a brief introduction to a variety of AAC systems. Patients should be encouraged to select multiple AAC systems, as one tool or strategy is likely not enough to meet all of their communicative needs. If sensory and/or motor impairments (see Assessment of Patient Communication Needs above) are present or expected to result from the medical procedure, the SLP should introduce AAC tools that accommodate those impairments. Access

methods, such as switches or partner assisted scanning, that accommodate the sensory and/or motor impairments should also be introduced during this time (Costello, 2000).

Next, the SLP should assist patients in modifying the selected AAC tools to ensure that patients have access to vocabulary that is important to them and meets their unique communication needs (Costello, 2000; Garrett et al., 2007). For patients using static picture communication boards, the SLP may add or remove pictures so that the boards become personalized for each patient. For patients using a high-tech SGD, the SLP can assist them in recording additional words or phrases that are important to them (Costello, 2000). Below (Figure 3) is an informational pamphlet that can be shared with patients at or before their preoperative consultation. Consider providing examples of printed communication boards with the pamphlet. If the pamphlet is given to patients before their consultation, they can come to the meeting prepared with questions and ideas of how they would like to communicate during their ICU admittance.

Postoperative Bedside Evaluation

Once patients are admitted to the ICU and are alert and responsive, the SLP should reintroduce the AAC system. The SLP should ask patients a few questions and instruct them to respond using the AAC tool. If unexpected sensory or motor impairments resulted from the procedure, the SLP should alter the selected AAC or select another AAC strategy that accommodates the impairments. Before completing the bedside evaluation, the SLP should provide any additional patient, family or staff instruction needed and answer any questions patients have about the AAC system (Costello, 2000).

Figure 3: Preoperative Informational Pamphlet

Post-operative Communication Difficulties: What to Expect



During your post-surgical admittance to the intensive care unit (ICU), you will receive mechanical ventilation and/or a tracheal tube. Mechanical ventilation equipment and tracheal tubes are both obstructive to the larynx (the voice box) and temporarily hinder verbal speech during their use. Therefore, you should expect to have limited verbal communication during your recovery time at the hospital.

Limited verbal communication does not mean you will be unable to communicate with hospital staff or your family and friends. Preparing and practicing alternative forms of communication can allow you to communicate with those around you, despite your temporary inability to speak. You can write messages in a notebook or point to letters on an alphabet board to spell out your message. View and consider the possible strategies in the list to the right. If one strategy works well for you, consider practicing before your procedure so that you can effectively and efficiently use it during your recovery.

The list to the right is not an exhaustive list of alternative communication strategies. If you do not find them to be useful for you, contact SLP's name at SLP's Phone number to discuss other communication possibilities.

References

- Able net. (2018). Sounding board. Retrieved from <https://www.ablenetinc.com/soundingboard>
- Boeri, M. (2017, August 31). Smalltalk app spotlight: Intensive care [Blog post]. Retrieved from <https://blog.aphasia.com/smalltalk-intensive-care>
- JabstoneLLC (2018). Jabtalk. Retrieved from https://play.google.com/store/apps/details?id=com.jabstone.jabtalk.ba&hl=en_US

Consider these alternative forms of communication...

- Written messages: consider writing messages in a notebook.
- Alphabet boards: Point to printed letters on a sheet of paper to spell messages to communication partners.
- Communication picture boards: Point to pictures on a picture board to communicate with those around you. You may also consider using Lingraphica's Small Talk Intensive Care app for iOS devices, which provides pictures of words and phrases commonly used in ICU settings.
- Prerecorded Messages: Consider using an app for your phone or tablet device that allows you to prerecord your own messages. Consider using JABstone LLC's JABtalk for Android devices or Ablenet's Sounding Board for iOS devices
- Yes/no Questioning: If you expect to have limited use of your hands or arms, consider creating a consistent and reliable way to communicate yes and no with your communication partner. Possible signals include a quick blink for "yes" and long blink for "no".
- Partner assisted scanning: If you would like to use a communication picture board but are expected to have limited strength or mobility, consider a partner assisted scanning approach in which you signal to your communication partner when they approach the column of your desired picture and then signal again when they reach the picture as they read down the column.
- Above are just a few ways to communicate while ventilated during your hospital stay. Any strategy you develop that helps you communicate your wants and needs with ease is right for you.

Ethical Considerations

As mentioned before, SLPs are trained to assess and treat communication disorders and have specialized training in AAC practices (ASHA, 2016). Therefore, SLPs are the most appropriate professional to provide assessments and consultations within an AAC service delivery model. However, acute care SLPs many times have very full caseloads and report that a small percentage of their caseload is spent completing AAC assessments and interventions (ASHA, 2017). In order to fully implement the proposed AAC service delivery model, hospitals will likely be required to hire additional acute care SLPs. Additional hiring is not always possible due to funding and applicant shortages. If a hospital does not have enough SLPs to complete AAC services in the ICU and is unable to hire additional SLPs, an AAC service delivery model should still be implemented. At the very least, hospitals should place AAC materials in the ICU and provide staff with AAC training, as nursing research has found these supports to increase patient communication and satisfaction (Handberg & Voss, 2017; Happ et al., 2014; Rodriguez, Rowe, Thomas, Shuster, Koeppl & Cairns, 2016). A simplified service delivery model is better than no AAC supports in the ICU, however, a simplified model should only be used as a temporary solution to staffing and funding issues. Hospitals should make it a primary goal to implement a complete AAC service delivery model as the simplified model will not sufficiently meet all of the communication needs of ICU patients.

AAC Materials and Explanations of Their Use

Written Communication as AAC

Using written communication as AAC is just as it sounds; patients write their messages and share them with their communication partners. Writing may not be as easy for patients as it was before their ICU admittance, however, supports and adaptations can help some patients

effectively use written communication. To determine if written communication is appropriate for a patient, use the criteria listed below. If a patient would benefit from using written communication as AAC, consider using one of the three examples provided further in this section.

Why use written communication as AAC

One of the biggest benefits of using written communication as AAC is that it allows patients to communicate and share novel messages spontaneously. Written communication does not limit patients' communication to a set of predefined words and phrases, as picture communication boards often do. Additionally, writing is a familiar form of communication for most patients and using it as AAC does not require them to learn a new communication system or a complicated piece of technology.

Who is a candidate for written communication?

- Patients who have adequate literacy and spelling skills
- Patients who have the fine motor skills and range of motion necessary to write or type

Who is not a candidate for written communication?

- Patients with inadequate literacy and spelling skills
- Patients with illegible handwriting and who cannot type
- Patients who have decreased fine motor skills, rapid fatigue, motor incoordination or decreased range of motion for which adaptive equipment cannot compensate.

This includes some individuals with ALS, spinal cord injury, Guillain-Barre syndrome and limb apraxia.

Materials needed.

- Spiral bound notebooks
- Writing utensils: felt tip pens, thick black markers
- Boogie Boards or Magic Slates
- Tobii Dynavox LightWriter SL40 Connect or iPad with Speak for Me app
- Adaptive equipment: Universal cuffs and pencil grips

Written communication option 1: paper and pen***Who is a candidate for this method?***

- Patients who meet the above criteria for written communication
- Patients who would like to save their written messages for future use

How does it work?

Patients are given a spiral bound notebook and a dark felt tip pen, which can easily be read in a dimly lit room. Patients write their message in the notebook and show it to their communication partner. The message is then left in the notebook so that it does not have to be rewritten if they need to communicate it again later (Beukelman & Mirenda, 2013).

How can it be adapted and modified?

- Provide pencil grips or thick, light weight markers: Patients who have difficulty holding a pen may find that a pencil grip improves their ability to hold the writing utensil. Others may find that the larger diameter of a marker is easier to hold (see Figure 4 for examples) (Garrett et al., 2007).
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that holds the writing utensil in place. It allows patients with

decreased strength and fine motor skills to hold the writing utensil (see Figure 4 for example).

- Consult an occupational therapist: If you are unsure about the orthotic supports a patient needs to successfully write, consult an OT, as they are familiar with a wider variety of writing supports.

Figure 4: Adaptive Writing Equipment

See links below for examples of adaptive equipment

[Pencil grips]. Retrieved from
<https://www.schoolspecialty.com/pencil-grip-pack-017675>

[Black marker] Retrieved from
<https://www.movingstore.com/products/black?variant=774258003>

[ADL universal cuff utensil holder]. Retrieved from
https://www.especialneeds.com/adl-universal-cuff-utensil-holder.html?m=Configurable_Scp&135=607&aid=136508&ne_ppc_id=824858605&gclid=CjwKCAiAiarfBRASEiwAw1tYv2qcTvKaEYd7khoXCdcsA2Vrhxl4Cq63bem7sxdJOyk4RWTwvRVO3xoCBlwQAvD_BwE

Written communication option 2: boogie boards and magic slates

Who is a candidate for this method?

- Patients who meet the criteria for written communication
- Patients who prefer that their messages are not saved, for privacy/confidentiality reasons (Beukelman & Mirenda, 2013)

How does it work?

Patients use the stylus provided with the Boogie Board or Magic Slate to write their message on the board. After the message has been read by their communication partner it can be erased and a new message can be written.

Figure 5: Boogie Board & Magic Slate Examples

See links below for examples of Boogie Boards and Magic Slates

[Boogie board]. Retrieved from <https://www.michaels.com/boogie-board-ewriter-lcd-writing-tablet/M10372110.html>

[Magic slate]. Retrieved from <https://www.amazon.com/5038728038413-Magic-Slate-by-Tobar/dp/B000H6W69U>

[Pink magic slate]. Retrieved from <https://qne.com.pk/plain-magic-slate-pack-of-1-9543.html>

How can it be adapted and modified?

- Provide pencil grips: Patients who have difficulty holding the stylus may find a pencil grip to improve their ability to hold it (see Figure 4 for examples).
However, sizes of the stylus vary and pencil grips may fit on some but not others.
- Attach the stylus to the board: The specialized stylus is needed to use the board and if it is attached to the board, it cannot roll off the bed or get lost. Attaching the stylus to the board ensures that it is always available when the patient needs it.
- Increase the size of the board: Both Boogie Boards and Magic Slates come in various sizes. Provide patients with decreased visual acuity or larger handwriting with larger boards.
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can help patients with decreased strength and fine motor skills hold the stylus (see Figure 4 for example).
- Consult an occupational therapist: If you are unsure about the orthotic supports a patient needs to successfully write, consult an OT, as they are familiar with a wider variety of supports (Garrett et al., 2007).

Written communication option 3: type-to-speech keyboards***Who is a candidate for this method?***

- Patients who meet the criteria for written communication
- Patients who know how to type on a standard keyboard and have the strength and motor coordination to do so

How does it work?

Text-to-speech keyboards are simple to use. Patients type their message and then select the key that speaks the message. The Tobii Dynavox LightWriter SL40 Connect is a compact text-to-speech keyboard with built-in speakers and display screens. It can store premade messages and comes with three sizes of keyguards (Tobii Dynavox, n.d.). Mobil Touch Tech's Talk for Me text-to-speech app was created by an individual who is an AAC user and has many features that make it user friendly. The app is an iOS compatible program that allows users to type messages using an iPad compatible wireless keyboard. Once the message is typed and the user selects "Say it!" the app speaks the message. The app also includes many other features such as increasing or decreasing the speaking rate, pausing the message, an undo button, word prediction and storing messages that assist the user in communicating (Mobile Touch Tech, n.d.). Video links are provided below to provide a demonstration of both typing methods (Abilia International, 2017; Mobile Touch Tech, n.d.).

Figure 6: Type-to-speech Devices

See links below for examples of type-to-speech devices

[LightWriter SL40 connect]. Retrieved from
<https://www.tobii-dynavox.com/en-us/devices/multi-access-devices/lightwriter-sl40-connect-variant/>

[Talk for me icon]. Retrieved from
<https://itunes.apple.com/us/app/talk-for-me-text-to-speech/id975096888?mt=8>

LightWriter: <https://www.youtube.com/watch?v=Fb6orYmM1GQ>

Talk for Me: <http://www.mobiletouchtech.com/talk-for-me/>

How can it be adapted and modified?

- Key guards: The LightWriter SL40 Connect comes with three different size keyguards. The keyguard elevates the area around the keys and helps patients guide their fingers to the correct keys. Keyguards would be an appropriate adaptation for individuals with mild hand tremors or mildly decreased fine motor skills who may accidentally press keys surrounding the target key on the standard keyboard.
- Key arrangement: The letter keys on the LightWriter SL40 Connect are removable and can be placed in alphabetical order if patients find that configuration easier to navigate.
- Enlarge the text: The text in the Talk for Me app can be enlarged for patients with visual impairments.
- Speech output modifications: For patients who are fast typers, the Talk for Me app has an option for producing speech as it is typed. Patients who are slower typers can have the text read after the message is completed. The app also allows the speaking rate to be modified. Patients can use a sliding scale on the homepage of the app to increase or decrease the rate at which their message is read.

- Stylus: Patients using the Speak for Me app may find it easier to make selection on the iPad screen using a stylus, rather than their finger (see Figure 10 for examples).
- Brightness and Volume: Both Text-to-speech keyboards allow patients to increase or decrease the brightness of the screen and to increase or decrease the volume of the device. Additionally, both provide a list of voices that patients can choose from and select one close to their own voice.

Electrolarynx as AAC

In order to produce speech, an individual's vocal folds must vibrate. The vibrations of the vocal folds move up through the vocal tract and are shaped into speech. When the vocal folds are not present (e.g. after a laryngectomy) or functional (e.g. paralysis, intubation) an electrolarynx can be used to create the vibrations needed to produce speech. An electrolarynx is a hand-held, battery operated device that is placed on the soft tissue of the neck, cheeks or under the chin. The electrolarynx produces vibration through the soft tissue, which can then be shaped by the vocal tract into speech. Speech from an electrolarynx is often described as mechanical or robotic, but the speech is understandable and users can clearly convey their messages (Doyle, 2017).

Figure 7: Electrolarynx

See links below for examples of electrolarynxes and how they work

[How to use an electrolarynx]. Retrieved from <https://headandneckcancerguide.org/adults/cancer-diagnosis-treatments/surgery-and-rehabilitation/cancer-removal-surgeries/laryngectomy/>

[Truetone electrolarynx]. Retrieved from <https://www.amazon.com/DSI-Truetone-Electrolarynx/dp/B003E6LNTE>

Why use an electrolarynx?

Using an electrolarynx as an augmentative form of communication, allows patients to continue using speech as their primary form of communication. Patients can communicate any

message they want to communicate without the vocabulary limitations presented by other AAC options. Additionally, because the electrolarynx preserves patients' ability to speak, messages can be communicated quickly and with little support from communication partners.

Who is a candidate for an electrolarynx?

- Laryngectomy patients: A laryngectomy completely or partially removes the vocal folds; therefore, laryngectomy patients can no longer produce natural speech. An electrolarynx can replace the functions of the vocal folds needed for speech.
- Patients with vocal fold paralysis: If the vocal folds cannot move to meet at midline, producing speech will be effortful and the voice will sound weak and breathy. Using the electrolarynx may help the individual achieve clearer speech with less effort.
- Cuffed tracheostomy patients: Cuffed tracheostomy tubes do not allow air to pass between the vocal folds and as a result they cannot vibrate to produce speech. An electrolarynx can replace the speech functions of the larynx while the tracheal tube is cuffed.
- Patients who are intubated using a nasal endotracheal tube: When the endotracheal tube is placed through the nasal cavity and into the trachea, it passes between the vocal folds. This obstructs the vocal folds and prevents them from producing speech. However, because the nasal endotracheal tube does not obstruct the oral and pharyngeal articulators, the vibrations from an electrolarynx can be shaped into speech.

Who is not a candidate for an electrolarynx?

- Patients who are intubated using an oral endotracheal tube: When an oral endotracheal tube is placed through the oral cavity and into the trachea, it not only obstructs the vocal

folds, but also the oral and pharyngeal articulators. Therefore, vibrations from an electrolarynx cannot be shaped into speech.

- Patients who fatigue too quickly or have diminished motor coordination and as a result cannot effectively shape the vibrations from the electrolarynx into speech. This includes patients with Guillain-Barre syndrome, myasthenia gravis and apraxia of speech.

Figure 8: Intubation and Tracheostomy

See links below for examples of endotracheal and tracheostomy tubes

Nasoendotracheal Intubation

[Nasoendotracheal intubation]. Retrieved from https://www2.aofoundation.org/wps/portal/surgerymobile?showPage=redfix&bone=CMF&segment=Midface&classification=92-Special%20considerations&treatment=&method=Special%20considerations&implantstype=hidden&approach=&redfix_url=1285234140798

Oral Endotracheal Intubation

[Oral endotracheal intubation]. Retrieved from https://en.wikipedia.org/wiki/Tracheal_tube

Tracheostomy

[Tracheostomy]. Retrieved from <https://www.aic.cuhk.edu.hk/web8/Tracheostomy%20tube.htm>

Materials needed.

- Electrolarynx
- Oral adaptors

How does it work?

The first step in using an electrolarynx is to find the placement that produces the clearest sound. As mentioned above, the electrolarynx works by sending vibrations through soft tissues into the pharyngeal and oral cavities. The soft tissues of the neck, cheeks and below the chin are typical placements for the electrolarynx. Try all three placements to determine which is best for the patient. For recent laryngectomy patients, placement on the cheek might be more effective due to possible swelling in the neck. Ventilated patients may require placement on the cheek or below the chin due to the narrowing of the pharynx from the endotracheal tube. Once the most appropriate placement is determined, patients are instructed to hold down the button on the

electrolarynx (turning it on) while they articulate as they would during typical speech (Doyle, 2017). Below is a link of an electrolarynx being used with an ICU patient (Sunnybrook Hospital, 2015).

Electrolarynx use with an intubated patient: <https://www.youtube.com/watch?v=C4HOu78tSTw>

How can it be adapted and modified?

- Oral adaptors: For some patients, the placements discussed above may not work due to swelling or scarring of the soft tissues. An oral adaptor is an option to consider for these patients (see figure 9 for example). An oral adaptor is a straw-like attachment that is placed on the head of the electrolarynx. The adaptor is then placed in the oral cavity at the corner of the mouth. Instead of sending vibrations through the soft tissue, the oral adaptor vibrates the air in the oral cavity directly. Patients can then shape the vibrations into speech.
- Patients with weakness, reduced range of motion, or poor motor skills of the hands and arms might need their communication partner to hold the electrolarynx in place and to turn it on and off in between speaking turns.

Figure 9: Electrolarynx with Oral Adaptor

See link below for examples of an electrolarynx with an oral adaptor

[Oral adaptor]. Retrieved from <https://headandneckcancerguide.org/adults/cancer-diagnosis-treatments/surgery-and-rehabilitation/cancer-removal-surgeries/laryngectomy/>

Alphabet Boards as AAC

An alphabet board is a sheet of paper with the printed alphabet on it. Patients select individual letters to spell their message as the communication partner watches the selections. Five examples of alphabet boards are described below. Use the sensory and motor assessment as well as the criteria below to determine if a patient can effectively use an alphabet board. If an

alphabet board is determined to be appropriate, use the criteria below each board to determine which one best fits the sensory and motor needs of the patient. While the alphabet boards below may work for many patients, it is important to note that they are not appropriate for every patient. Some patients may have unique needs that require the creation of a highly personalized alphabet board. If this is the case, an alphabet board can easily be made using text document software programs (such as Microsoft Word).

Once the appropriate alphabet board is selected, place it in a plastic page protector so that the board is less susceptible to damage and can be easily cleaned. Also consider providing communication partners with paper and writing utensils so they can write down the patient's message as it is spelled. (Garrett et al., 2007).

Why use an alphabet board?

Alphabet boards allow patients who are unable to write due to physical limitations to have some of the same benefits of written communication. Patients who use an alphabet board have the ability to produce and communicate spontaneous, novel messages. The alphabet board does not limit them to predetermined words or phrases, as other communication boards do. Unlike written communication, the process of using an alphabet board requires more participation and support from communication partners and it often requires increased time and effort for patients to create their messages. However, if communication partners are willing to utilize an alphabet board with a patient, it can greatly improve the patient's communicative ability.

Who is a candidate for use of an alphabet board?

- Patients with adequate literacy and spelling skills

- Patients with the ability to isolate fingers to point, who can use adaptive equipment to adequately point or who can participate in partner assisted scanning

Who is not a candidate for use of an alphabet board?

- Patients who do not have adequate literacy and spelling skills
- Patients with decreased visual and auditory acuity that prevents them from directly selecting letters and participating in partner assisted auditory scanning
- Patients with family members and/or communication partners who do not have adequate literacy skills, attention or visual acuity to follow the patient's selections

Materials needed.

- An alphabet board appropriate for the patient's sensory and motor needs
- Plastic page protectors
- Spiral bound notebooks and writing utensils
- Adaptive equipment: Adaptive stylus, head or glasses mounted laser pointer, BIGmack switches

Alphabet board option 1: keyboard type.***Who is a candidate for this board?***

- Patients who meet the above criteria for an alphabet board
- Patients who find it quicker to locate letters when they are organized as they are on a keyboard rather than in an alphabetical list

How does it work?

Using an alphabet board to communicate is easy; patients simply point to the letters on the board to spell their message. The space bar below the letter icons is used to clearly mark the end of a word and the beginning of the next. The standard board also includes small, frequently

used words that patients can select, rather than being burdened with spelling them. While patients are creating their messages, their communication partners watch their selections and identify the words being spelled. If needed, communication partners can write down the words that are being spelled so that earlier spelled words are not forgotten by the end of the message.

How can it be adapted and modified?

- Adaptive stylus: Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. If patients cannot isolate their fingers to point to letters on the board, they might be able to grasp the stylus and use it to select the letters (see Figure 10 for examples).
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).
- Head or glasses mounted laser pointers: For patients who are unable to point to their selections on the board due to decreased range of motion or strength in their arms, a head or glasses mounted laser pointer can be used. Patients can use the laser pointer to make selections on the board and only have to move their head and neck (See Figure 10 for examples).
- Larger icons: Consider using the alphabet board with larger icons for patients who have trouble clearly selecting letters due to a visual impairment. There is less room on the board for frequently used words, however, patients might be able to more accurately select letters and communicate their message due to the larger icon size.

- Use sticky notes to create novel icons: If a patient has additional words or phrases that are frequently used, consider writing them on sticky notes and placing them on the bottom of the board or over an existing icon that is not used by the patient.

Figure 10: Adaptive Pointers

See links below for examples of adaptive pointers

[Adaptive stylus]. Retrieved from <http://atmac.org/stylus-ipad-iphone-easy-grip>

[Ball grip stylus]. Retrieved from <https://www.amazon.com/ShapeDad-acstyball1-Balltop-Stylus/dp/B00GZHY8SM>

[Limitless stylus]. Retrieved from <https://www.eastersealstech.com/2015/05/06/5-styluses-for-those-with-mobility-impairments/>

[Glasses mounted laser pointer]. Retrieved from <http://store.lowtechsolutions.org/laser-pointer-head-mounted/>

[Laser pointer on head band]. Retrieved from http://www.zyteq.com.au/products/legacy_products/laser_pointers

Figure 11: Standard Keyboard Style Alphabet Board

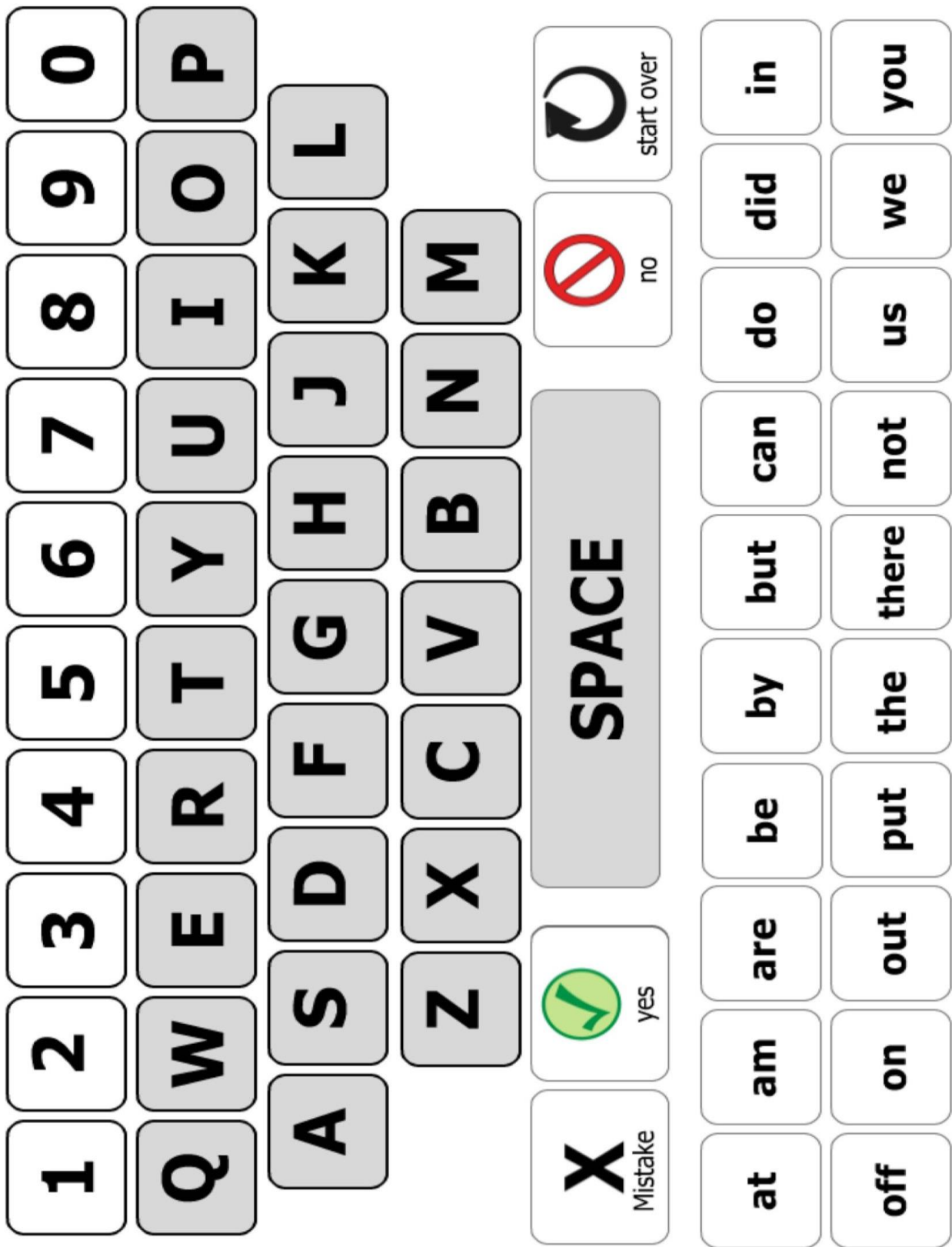


Figure 12: Enlarged Keyboard Style Alphabet Board



Alphabet board option 2: alphabetical icons.***Who is a candidate for this board?***

- Patients who meet the above criteria for an alphabet board
- Patients who find it quicker to locate letter icons when they are in alphabetical order

How does it work?

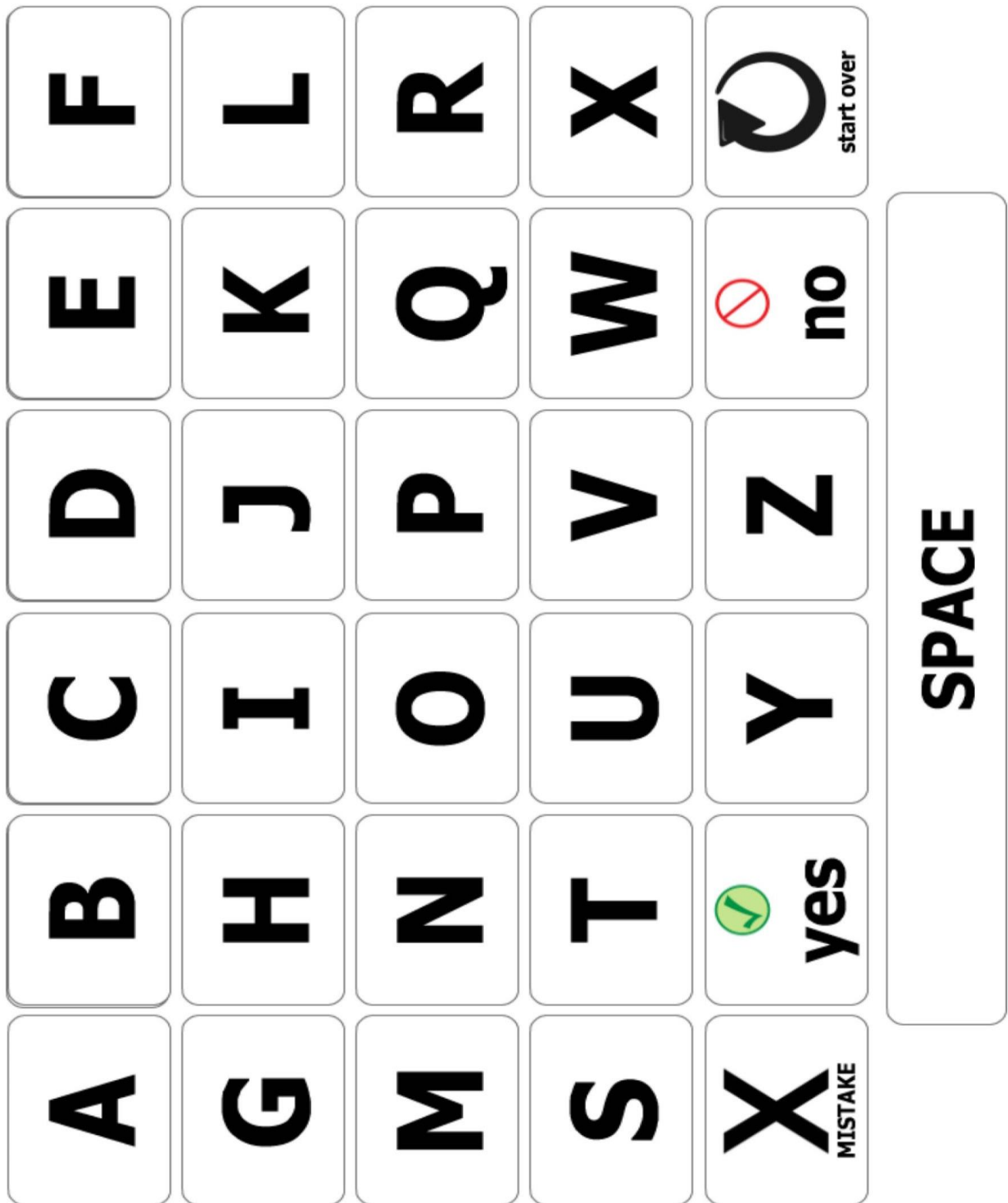
Patients point to the letters on the board to spell their messages. The space bar below the letter icons is used to clearly mark the end of a word and the beginning of the next. The standard board also includes small, frequently used words that patients can select, rather than being burdened with spelling them. While patients are creating their message, the communication partners watch their selections and identify the words being spelled. If needed, communication partners can write down the words being spelled so that earlier spelled words are not forgotten by the end of the message.

How can it be adapted and modified?

- Adaptive stylus: Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. If patients cannot isolate their fingers to point to letters on the board, they might be able to grasp the stylus and use it to select the letters (see Figure 10 for examples).
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).

- Head or glasses mounted laser pointers: For patients who are unable to point to their selections on the board due to decreased range of motion or strength in their arms, a head or glasses mounted laser pointer can be used. Patients can use the laser pointer to make selections on the board and only have to move their head and neck (See Figure 10 for examples).
- Larger icons: Consider using the alphabet board with larger icons for patients who have trouble clearly selecting letters due to a visual impairment. There is less room on the board for frequently used words, however, patients might be able to more accurately select letters and communicate their message due to the larger icon size.
- Use sticky notes to create novel icons: If a patient has additional words or phrases that are frequently used, consider writing them on sticky notes and placing them on the bottom of the board or over an existing icon that is not used by the patient.

Figure 14: Enlarged Alphabetical Board



Alphabet board option 3: partner assisted scanning board.***Who is a candidate for this board?***

- Patients who meet the above criteria for use of an alphabet board
- Patients who are unable to point to the icons independently or with the use of adaptive pointers

How does it work?

To use partner assisted scanning, patients and their communication partners first create a confirmatory signal (e.g. eye blinks, gestures, hand squeezes). Communication partners name the first letter in the row (the vowels and the number 1) at a steady pace that is not too fast or too slow. When communication partners reach the row with the desired icon, patients give the confirmatory signal. Communication partners then read the letters in the row from left to right. When the desired letter or want/need is reached, patients provide the confirmatory signal again. Due to the time intensity of this process, it is best for communication partners to write down the letters as they are identified.

How can it be adapted and modified?

- Use a switch with a recorded confirmatory signal: If patients are unable to create a confirmatory signal that is consistently and easily recognized, a switch such as the BIGmack switch should be considered (see Figure 15). This single button switch stores pre-recorded messages and plays them aloud when the switch is activated (Ablenet, 2018a). The word “yes” can be pre-recorded on the switch and can serve as a confirmatory signal. Patients can activate the switch with their hand, foot, elbow or head. Consult an OT and PT to assist with the patient’s posturing and placement of the switch.

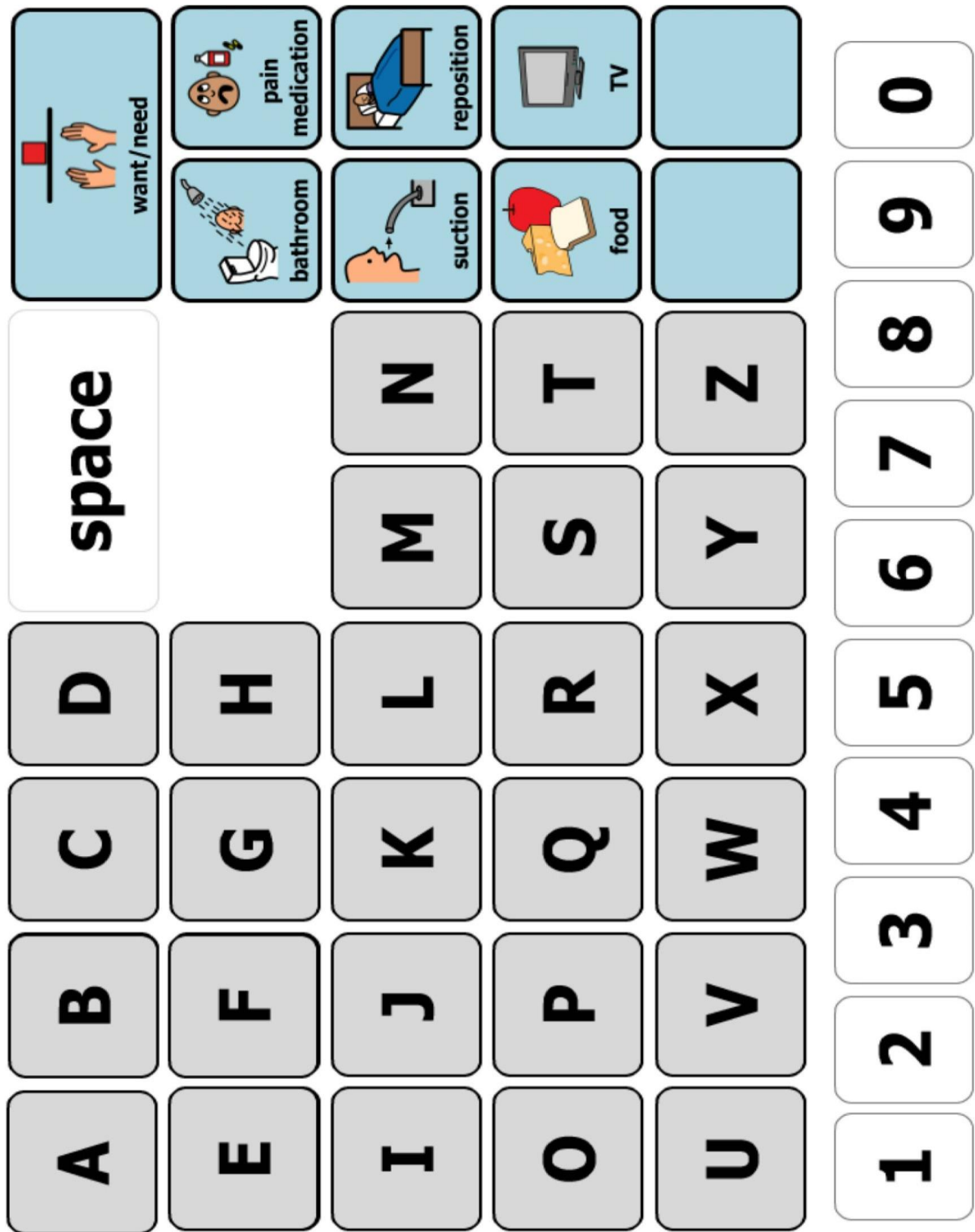
- Create personal wants/needs icons: The bottom two wants/needs icons are left blank so caregivers can write in wants and needs that are unique to the patient using the board. Perhaps the patient wants a particular family member (e.g. parent, spouse) or frequently needs a particular personal care item (e.g. lotion, Chapstick).

Figure 15: BIGmack

See link below for an example of a BIGmack adaptive switch

[BIGmack]. Retrieved from
<https://www.ablenetinc.com/bigmack>

Figure 16: Partner Assisted Alphabet Board



Picture Boards as AAC

Picture boards contain a variety of picture symbols that represent words and phrases. Patients point to the pictures to communicate their wants, needs and thoughts while the communication partner watches their selections. Below are five examples of picture boards, each one containing vocabulary related to a specific communication topic (e.g. wants and needs, pain information). Patients will likely need all five to meet their communication needs. It is best to place the picture boards in plastic page protectors and then place the page protectors into a three-ring binder to create a communication book. This allows patients to quickly and easily find the picture board they need.

Why use picture boards?

The messages that can be created with a picture board are limited to the vocabulary included on the board. However, picture boards are a great alternative for patients who do not meet the criteria to use the writing approaches or alphabet boards discussed above. Picture boards provide the written word or phrase below the picture but patients are not required to have advanced literacy skills because the picture can be used to understand the symbol's meaning. Additionally, picture boards do not require the fine motor skills necessary for writing and typing and can convey messages quicker than an alphabet board for patients who fatigue quickly.

Who is a candidate for use of a picture board?

- Patients with the cognitive abilities needed to understand the symbols and their meanings
- Patients with the ability to isolate fingers to point, who can use adaptive equipment to adequately point or who can participate in partner assisted scanning
- Patients who did not meet the criteria for written communication due to inadequate motor skills

- Patients who did not meet the criteria for written communication or alphabet boards due to poor literacy skills
- Patients who did not meet the criteria for written communication or alphabet boards due to rapid fatigue

Who is not a candidate for picture boards?

- Patients with cognitive impairments that limit their understanding of the picture symbols
- Patients with both impaired vision and hearing that prevent them from using direct selection of symbols or partner assisted scanning

Materials needed.

- Quick words picture board
- Wants/needs picture board
- Pain information picture board
- Family communication picture board
- Feelings picture board
- Plastic page protectors
- Three-ring binders
- Adaptive equipment: Adaptive styluses, universal cuffs, head or glasses mounted laser pointers, BIGmack switches

Picture board option 1: direct selection picture boards.***Who is a candidate for these boards?***

- Patients who meet the above criteria for use of picture boards
- Patients with the ability to isolate fingers or use adaptive equipment to accurately point

How does it work?

Direct selection communication boards are simple and easy to use. Patients turn in the communication book to the desired picture board. Then they select the desired picture symbol while the communication partner watches the selection.

How can it be adapted and modified?

- **Adaptive stylus:** Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. If patients cannot isolate their fingers to point to pictures on the board, they might be able to grasp the stylus and use it to select the pictures (see Figure 10 for examples).
- **Provide a Universal Cuff:** This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).
- **Head or glasses mounted laser pointers:** For patients who are unable to point to their selections on the board due to decreased range of motion or strength in their arms, a head or glasses mounted laser pointer can be used. Patients can use the laser pointer to make selections on the board and only have to move their head and neck (See Figure 10 for examples).
- **Create personal icons:** On the Family Communication picture board, the top row of boxes is intentionally left blank to encourage family members to write in phrases and questions that are unique to the patient.

- Use sticky notes to create novel icons: If a patient has additional words or phrases that are frequently used, consider writing them on sticky notes and placing them on the bottom of the board or over an existing icon that is not used by the patient.

Picture board option 2: partner assisted picture boards

Who is a candidate for these boards?

- Patients who cannot isolate fingers or use adaptive equipment to make selections on the picture boards
- Patients who cannot make direct selections due to visual impairments
- Patients who have severely limited range of motion or who fatigue too quickly to use the direct selection picture boards discussed above

How does it work?

The picture boards for partner assisted scanning are the same picture boards used for direct selection. However, instead of patients turning to the page and pointing to the pictures, communication partners scan through the options for them. Patients using partner assisted scanning and their communication partners create a confirmatory signal to indicate when the desired page or picture is named. The confirmatory signal can be a hand squeeze, an eye blink or any other signal that can be consistently produced by the patient and is easily recognizable to the communication partner. Communication partners begin the scanning process by naming the titles of the picture boards one at a time (e.g. Quick Words, Wants/Needs). When patients give the confirmatory signal, communication partners point to and number the rows one at a time (e.g. row one, row two...) until the confirmatory signal is given again. Once the row is identified, communication partners name each picture symbol in the row until the confirmatory signal is given a final time and a selection is made. Communication partners should ensure that they scan

the pages, rows and symbols at an appropriate rate. Scanning too fast does not provide patients with adequate time to provide the confirmatory signal. Scanning too slowly makes the process more time consuming and effortful.

How can it be adapted and modified?

- Provide fewer symbols per picture board: Consider using picture boards with fewer symbols per board or by “removing” infrequently used words by placing a sticky note over them.
- Auditory Scan: Patients with poor visual acuity may not be able to participate in the partner assisted scanning approach described above. Patients with poor visual acuity but adequate hearing acuity, can participate in a full auditory scan.

Communication partners begin the scan by reading the titles of the picture boards.

When patients select a picture board, the communication partners then read through all of the options on the board until a selection is made with the confirmatory signal.

- Use a switch with a recorded confirmatory signal: If patients are unable to create a confirmatory signal that is consistently and easily recognized, a switch such as the BIGmack switch should be considered (see Figure 15). This single button switch stores pre-recorded messages and plays them aloud when the switch is activated (Ablenet, 2018a). The word “yes” can be pre-recorded on the switch and can serve as a confirmatory signal. Patients can activate the switch with their hand, foot, elbow or head. Consult an OT and PT to assist with the patient’s posturing and placement of the switch.

Figure 17: Quick Words Picture Board

Quick Words

 hello	 My name is _____	 How are you?	 stop	 bye
 I want to go home	 more	 I like that	 can you talk slower	 I don't like that
 Can you repeat that?	 can you speak louder	 can you talk slower	 I don't understand	 Ask me yes/no questions
 yes	 come back later	 I don't know	 help	 no

Figure 18: Wants & Needs Picture Board

Wants & Needs

 watch TV	 change channel	 music	 book	 glasses	 hearing aid
 food	 drink	 open/shut curtains	 light on	 light off	 blanket
 bathroom	 lip balm	 lotion	 change clothes	 wash/bathe	 brush hair
 suction	 sleep	 Reposition	 adjust bed up	 adjust bed down	 Fix pillow

Figure 19: Pain Information Picture Board

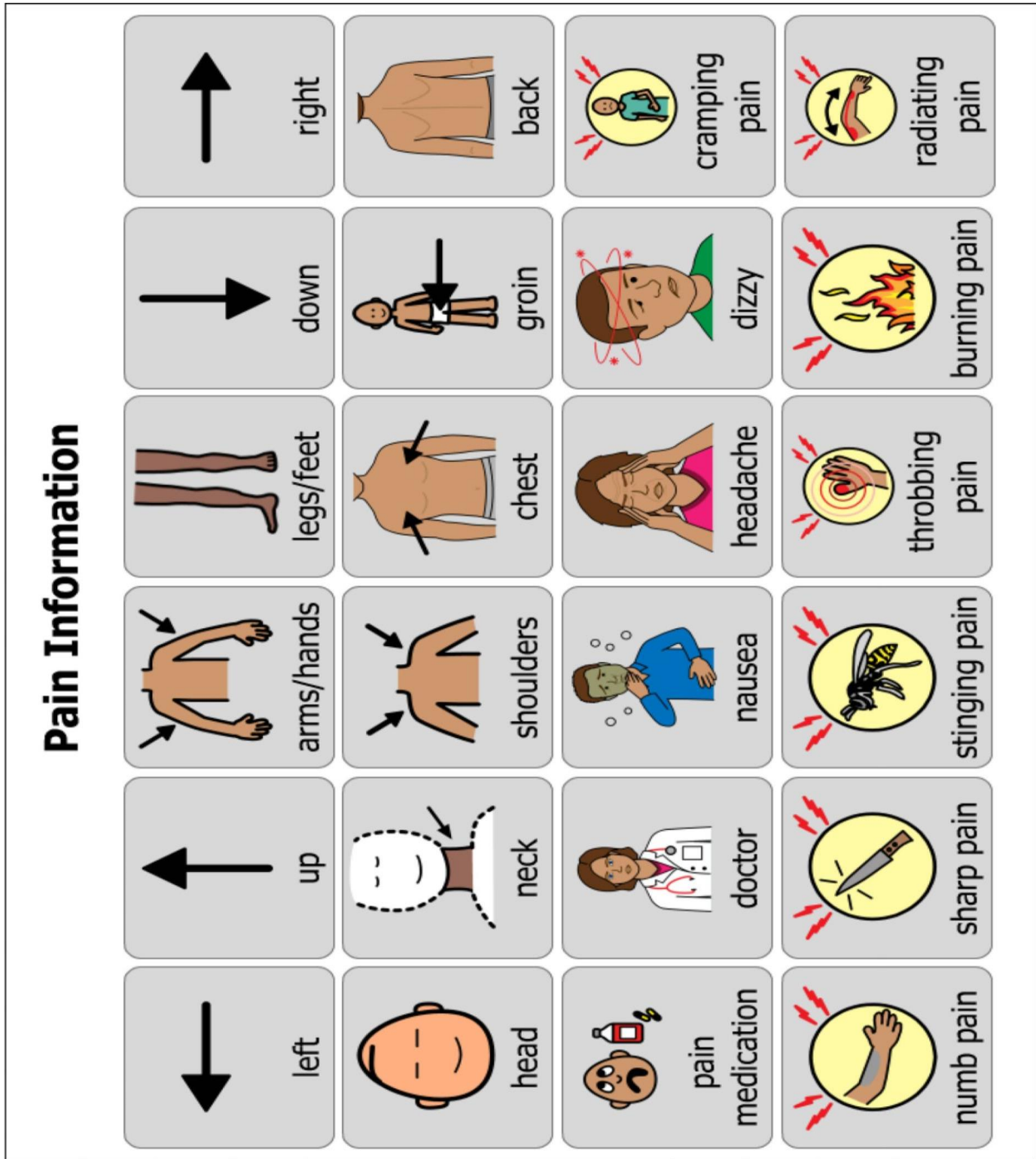


Figure 20: Family Communication Picture Board

Family Communication







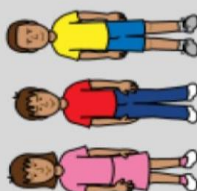




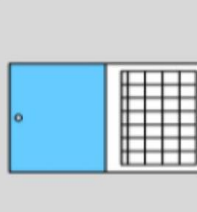





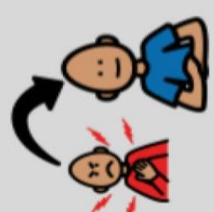

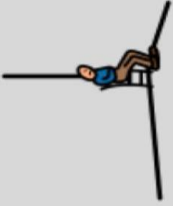







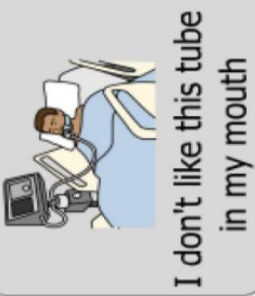










 <p>How are you?</p>	 <p>tell me about your day</p>	 <p>tell me more</p>	 <p>Please let me rest</p>	 <p>read aloud</p>	 <p>thank you</p>
 <p>how are the kids?</p>	 <p>How are the pets?</p>	 <p>When can I go home?</p>	 <p>Did you pay the bills?</p>	 <p>Why am I here?</p>	 <p>What day is it?</p>
 <p>I love you</p>	 <p>stay with me</p>	 <p>hold my hand</p>	 <p>comfort me</p>	 <p>tell me a happy story</p>	 <p>Will I get better?</p>

Figure 21: Feeling Communication Board

Feelings

 hot	 lonely	 happy/excited	 confused
 thirsty	 at peace	 content	 scared/worried
 comfortable	 I don't like this tube in my mouth	 so-so	 frustrated
 hungry	 loved	 uncomfortable	 angry
 cold	 relieved	 tired	 sad

Asking Yes/No Questions as AAC

Using yes/no questions is an easy and effective AAC strategy. Communication partners ask patients a series of yes/no questions about various topics and patients answer using a yes/no communication board (Figure 23) or other signals representing yes and no to answer the questions.

Why use yes/no questions as AAC?

When answering yes/no questions, patients are limited to the questions the communication partner asks. When compared to the writing strategies, alphabet board, electrolarynx and picture communication boards, the yes/no question strategy seems limiting. Patients using yes/no questions as AAC do not have access to varied vocabulary and cannot create novel messages. However, this strategy can be useful for patients who do not have the attention or understanding to use the previously discussed AAC strategies due to cognitive impairments or increased delirium. The directions for using this AAC strategy are simple and easily taught, as patients can generalize the skill after a few models of the task (Lasker, Garrett, & Fox, 2007). Additionally, yes/no boards can be useful for patients who rapidly fatigue or have severely reduced range of motion as the board requires only a small amount of movement to move from the 'yes' icon to the 'no' icon. The simplicity and ease of use for this strategy allows patients with increased delirium, cognitive impairments, rapid fatigue or limited range of motion to communicate their wants and needs when other AAC options are not appropriate.

Who is a candidate for use of yes/no questions?

- Patients who can make a clear yes/no selection: Selections can be made using a finger, hand, foot or adaptive equipment to point to the yes/no communication board. Additionally, yes/no selections can be made using gestural cues (eye blinks, hand squeezes).

- Patients with increased delirium or cognitive impairments who require simple, straight forward directions
- Patients with rapid fatigue and/or reduced range of motion
- Patients with adequate auditory or literacy skills: Patients must be able to either hear or read the questions asked by their conversation partners

Who is not a candidate for use of yes/no questions?

- Patients who cannot provide a selection on the yes/no boards, a gestural signal for ‘yes’ and ‘no’ or access pre-recorded yes/no switches
- Patients whose delirium or cognitive impairments prevents them from understanding even simple yes/no questions

Materials needed.

- Yes/no communication boards
- Adaptive equipment: adaptive styluses, head or glasses mounted laser pointers, Talking Brix switches

How does it work?

When patients appear uncomfortable or in need of something, their communication partners ask them a series of yes/no questions to determine their wants or needs. Patients use the yes/no board to indicate their answers to the questions until their message is communicated. For example, a communication partner may notice that the patient appears to be in pain. The communication partner can ask the patient “Are you in pain?” If the patient responds with a “yes” then the communication partner can ask “Is it in your arm?...leg?...chest?, etc....” until the source of pain is located.

How can it be adapted and modified?

- Place the ‘yes’ and ‘no’ icons on opposite sides of the body: If a patient is unable to move one hand or foot between the ‘yes’ and ‘no’ icons on the same board, consider cutting the icons apart placing one icon on the left side of the body and the other on the right side of the body.
- Create ‘yes’ and ‘no’ gestures: If a patient cannot make a clear selection using the yes/no board, consider creating gestures for ‘yes’ and ‘no’. The gestures should be distinctly different from one another so that they are distinguishable and the patient should be able to consistently produce them.
- Use a switch with recorded ‘yes’ and ‘no’ responses: For patients who are unable to use the yes/no board or create consistent and easily recognizable gestures, Talking Brix switches should be considered (see Figure 22). Each Talking Brix switch holds one pre-recorded message and the switches can be connected to one another to create a low-tech communication device (Ablenet, 2018i). The word “yes” can be pre-recorded on one switch and the word “no” on another. Patients then select the switch that provides the appropriate response to the question. Patients can access the switches with their hands or feet.
- Eye gaze selection: Patients who cannot make selections using their hands, feet or gestures, may benefit from eye gaze selection. The ‘yes’ and ‘no’ icons can be cut apart and taped to the opposite corners at the end of the bed, or anyplace else where they are visible to the patient and placed far enough apart for the patient’s selection to be clearly interpreted. To answer ‘yes’ or ‘no’ to the communication partner’s question, the patient looks at the appropriate icon.

- Head or glasses mounted laser pointers: For patients who are unable to point to their selections on the board due to decreased range of motion or strength in their arms, a head or glasses mounted laser pointer can be used. Patients can use the laser pointer to make selections on the board and only have to move their head and neck (See Figure 10 for examples).
- ‘Yes’ only responses: If it is difficult for a patient to alternate between the ‘yes’ and ‘no’ icons or gestures, consider providing only a ‘yes’ icon or gesture. When the patient does not point to the ‘yes’ icon or give the ‘yes’ gesture, the answer is presumed to be ‘no’. This adaptation requires less effort from the patient as it does not require a response to every question.

Figure 22: Talking Brix

See link below for an example of the Talking Brix adaptive switch

[Talking brix]. Retrieved from
<https://www.ablenetinc.com/talkingbrix>

Figure 23: Yes/No Communication Board



Eye Gaze Boards as AAC

For patients with severe motor impairments or fatigue, the previously discussed communication boards are too motorically taxing, even with adaptations. Alphabet boards and picture communication boards can be easily adapted into eye gaze communication boards for these patients. Eye gaze communication boards are placed on rectangular pieces of plexiglass with a rectangle cut-out in the middle. This allows communication partners to track patients' eye gaze as they make selections. The icons are visible from both sides of the board so that communication partners can observe patients' selections from behind the plexiglass. Eye gaze boards allow communication partners to easily track patients' gaze and identify the icons being selected.

Why use an eye gaze board?

Eye gaze boards allow patients with severe motor impairments to have access to the communication boards discussed above without the motoric demands. In order to use the previously discussed communication boards, a patient is required to have the motor skills necessary to select icons with a finger, hand, foot or adaptive equipment or to provide a signal during partner assisted scanning. For patients with severely diminished or absent motor functions, these selection options are not possible. Eye gaze boards eliminate motor barriers, as patients only need motor control of their eyes in order to make a selection.

Who is a candidate for eye gaze boards?

- Patients with adequate ocular motor function in at least one eye
- Patients with severely impaired motor functions, that prevent them from using other AAC strategies
- Patients with the visual acuity needed to accurately identify the icons

Who is not a candidate for eye gaze boards?

- Patients with bilateral damage to cranial nerve III or other impairments that limit their ocular motor function, such as ocular motor apraxia
- Patients with poor visual acuity who cannot accurately identify the icons

Materials needed.

- Plexiglass eye gaze boards
- Alphabet board overlays
- Quick words overlays
- Wants/needs overlays
- Pain information overlays
- Family communication overlays
- Feelings overlays
- Dry erase markers
- Metal binder rings to store overlays
- Notebooks and pens

Eye gaze board option 1: alphabet board.***Who is a candidate for this board?***

- Patients who met the above criteria for an eye gaze board
- Patients with adequate literacy skills
- Patients with the cognitive ability to understand how the board is used

How does it work?

The eye gaze alphabet board contains six boxes and each box has a different colored dot above it. Each box contains six letters or numbers. Each letter or number within a box is outlined

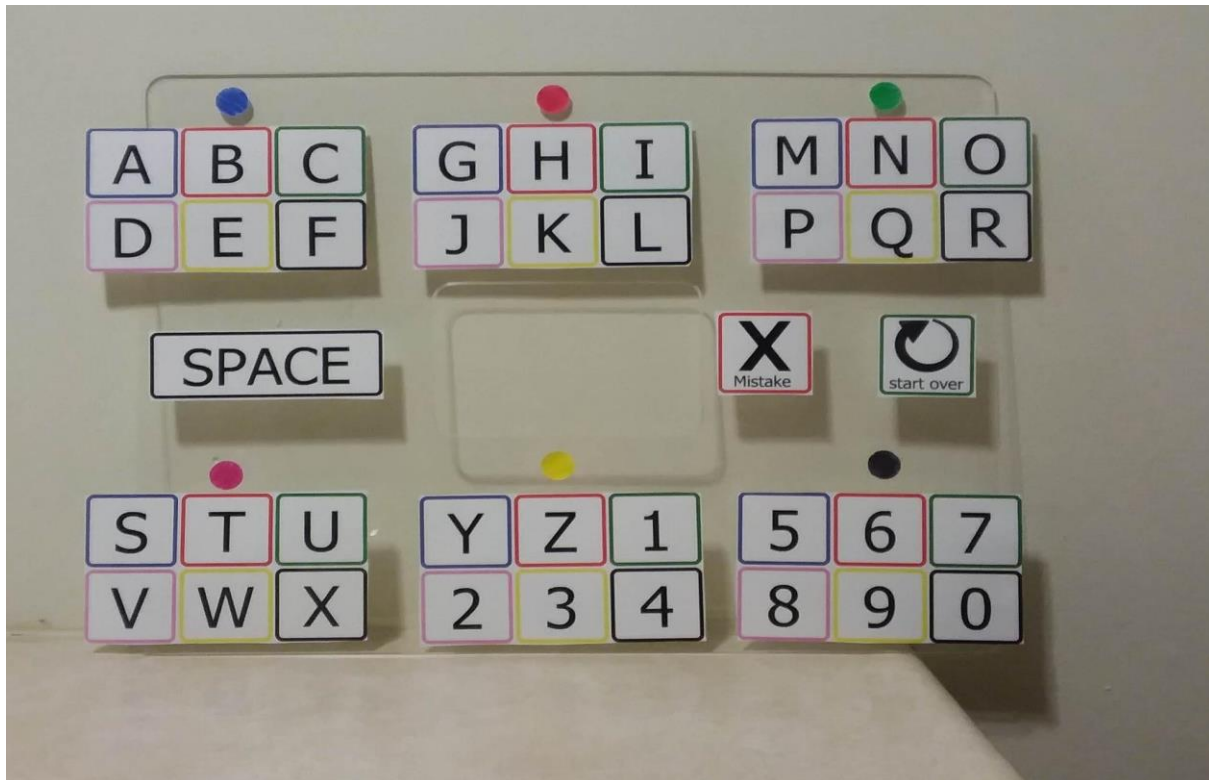
in a different colored border that corresponds to one of the colored dots above the boxes (see Figure 24). To select a letter, patients first look at the box that contains the letter and communication partners call out the color of the dot located above the box to confirm the selection. Then patients look at the colored dot that matches the colored border of the desired letter or number and communication partners name the color aloud and then name the letter or number in the originally selected box that matches the selected color. To confirm that communication partners have selected the correct letter, a confirmatory signal should be created. Patients may look directly at their communication partner if their response is correct and look away if the response is incorrect. Any two signals can be used as long as the patient can reliably and consistently produce them and the communication partner can accurately distinguish them. The eye gaze alphabet board also contains a space icon that patients glance directly at when a word is completed. The board also includes icons for communicating when a mistake is made or when patients need to restart a word. These icons are also selected with a direct eye gaze. This process can be time consuming, so consider providing communication partners with paper and writing utensils so they can write down the message as it is created. The icons needed to create an eye gaze alphabet board are located in Appendix B.

How can it be adapted and modified?

- Larger icons: If a patient cannot locate the letters and numbers on the board due to poor visual acuity, consider using a larger eye gaze board with larger letters and numbers.
- As the eye gaze alphabet board is already an adaptation of the direct selection picture boards, there are few adaptations that can be made to it. If a patient cannot use an eye gaze alphabet board, even when the icons are enlarged, it is best to

consider other AAC strategies such as an eye gaze picture board or an alphabet board or picture board with partner assisted scanning.

Figure 24: Eye Gaze Alphabet Board



Eye gaze board option 2: picture boards

Who is a candidate for an eye gaze picture board?

- Patients who meet the above qualifications for use of an eye gaze communication board
- Patients with the cognitive ability to understand the meanings of the picture symbols and how the board is used

How does it work?

Eye gaze AAC boards allow patients with severe motor impairments to access picture communication boards. The eye gaze picture board contains five clear, plastic overlays that can

be interchangeably placed on the board. Changing the overlay allows patients to access different symbols to communicate different messages. Patients who use eye gaze picture boards are provided a *Quick Words, Wants & Needs, Pain Information, Family Communication* and *Feelings* overlay. Each board contains five boxes and each box has a different colored dot above it. Within each box is a maximum of six pictures, each of which has a different colored border that corresponds to one of the colored dots above the boxes. Four of the boxes contain pictures related to the board's communication topic, while the other box serves as a navigation menu. The navigation menu contains symbols representing the other four overlays so patients can tell their communication partners when they want to communicate something located on another overlay (see Figure 24). To use the eye gaze picture board, patients and their communication partners are first instructed to create confirmatory signals. One signal should confirm that the communication partner has correctly interpreted the patient's gaze while the other signal should indicate the gaze was misinterpreted. These signals must be consistent and easily distinguished from one another. Confirmatory signals can include a blink for a correct interpretation and a side glance for an incorrect interpretation of the gaze. Any signal that the patient can consistently and reliably produce can be a confirmatory signal. To select a picture from the board, patients first look at the box containing the picture. Communication partners then name the color of the dot above the box. Once patients confirm that their gaze was interpreted correctly, they then look at the colored dot that corresponds to the colored border of the picture and the communication partners name the color aloud. The communication partners then name the picture with that colored border from the originally selected box and patients confirm or deny that their selection was accurately identified. The icons needed to create these boards are located in Appendix C.

Figure 25: Eye Gaze Picture Board



How can it be adapted and modified?

- Place fewer pictures on each board: The method described above might be too difficult for some patients or communication partners to use. For these patients, consider placing fewer pictures on the board (see Figure 26 for example). Place ten larger icons around the board and instruct patients to gaze directly at the picture they want to select. This adaptation would be appropriate for patients with cognitive impairments, increased levels of delirium or poor visual acuity.
- Add personalized vocabulary: Some of the overlays have blank spaces where personal vocabulary words can be written for patients to choose. Dry erase markers can also be used to add vocabulary to the board.

Figure 26: Modified Eye Gaze Picture Board with Larger Icons



Speech Generating Devices as AAC

Speech generating devices (SGD) are high-tech, electronic AAC devices installed with speech output software. This software can be installed on dedicated communication devices or on tablet devices, such as iPads. Dedicated communication devices generally require specific training and practice, as they are meant to serve as long-term communication aids. Due to the increased fatigue and delirium experienced in the ICU, dedicated SGDs are not typically recommended as the primary mode of AAC. Instead, three iPad applications that can serve as SGDs are recommended. These applications are easy to learn and simple to use but still meet patients' communication needs.

Why use an SGD?

For patients who have lost their ability to communicate orally, the SGD can be a powerful tool. Unlike printed communication boards, SGDs speak the messages aloud. This

makes communication easier for patients and their communication partners. The speech output allows patients to more easily gain the attention of their communication partners. Additionally, communication partners are not required to stand next to patients as they make their selections and can attend to other tasks while messages are created. SGDs also offer more adaptation and modification options when compared to printed communication boards. Patients with motor impairments or poor visual acuity can access scanning options that do not require outside support and assistance from the communication partner. The SGD can highlight or read aloud the icons as patients watch or listen. A variety of switches are also available to assist patients in accessing the device. Similar to printed communication boards, SGDs have options for patients to spell messages or select words and phrases represented by picture symbols. Speech generating devices also allow the communication boards to be customized and personal for patients. Words, phrases and recorded messages can quickly and easily be added to a patient's device.

Who is a candidate for an SGD?

- Patients who can isolate a finger, use adaptive equipment to select icons or who have the visual and/or auditory acuity and motor function to use scanning options

Who is not a candidate for an SGD?

- Patients with severely impaired motor functions who cannot access the device through direct selection, even with the use of adaptive switches

Materials needed.

- iPads installed with AAC apps such as Sounding Board, GoTalk Now or Lingraphica:
Intensive Care applications
- Adaptive equipment: Adaptive styluses, universal cuffs, adaptive switches

SGD option 1: Sounding Board by Ablenet***Who is a candidate for this SGD?***

- Patients who meet the above criteria for use of an SGD
- Patients with the cognitive ability to understand picture symbols and their representations

How does it work?

Ablenet's iPad application Sounding Board is versatile and easy to use. The application has the option to use premade picture communication boards or to create a completely customized page(s). When creating a communication page within the app, the user chooses the number of icons available on the page (up to 20), selects the pictures used to represent the icon (stock photos or photos from the camera) and records the message that is spoken when the icon is selected. This process is simple and intuitive. Using this process, an SLP can quickly and easily turn the picture communication boards described above into communication pages within the app. These pages can be saved within the app so that they are ready to use when patients need them. Sounding Board can also be used to create communication pages to meet patients' personal communication needs. For patients who wish to talk about their family, a family communication page can be created with pictures of the family members and recordings of their names that will be spoken when the picture is selected. Another benefit of using the Sounding Board application is that patients can easily navigate between communication pages. The communication pages appear on the main menu screen and patients select the communication board that contains the messages needed to communicate their specific want or need. Below is a link to a video that demonstrates how to create and modify boards using the Sounding Board app (Ablenet, 2018g).

Figure 27: Sounding Board

See links below for examples of Sounding Board's features

[Sounding board icon]. Retrieved from
<https://www.ablenetinc.com/soundingboard>

[Sounding board]. Retrieved from
<https://itunes.apple.com/us/app/soundingboard/id390532167?mt=8>

Video instructions to create/modify boards: <https://www.ablenetinc.com/soundingboard>

How can it be adapted or modified?

- Adaptive stylus: Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. Patients who cannot isolate their fingers to make selections within the application, might be able to grasp the stylus and use it to make selections. Additionally, some patients may find it easier to make selections on the touch screen using a stylus rather than their finger. Provide styluses for patients who have to tap the screen several times before their selection is recognized (see Figure 10 for examples).
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).
- Enlarge icons: Since Sounding Board is customizable, the number and size of icons on a page can be modified. For patients with decreased visual acuity and motor impairments, larger icons can be easier to recognize and select.
- Adaptive switches: see descriptions below

SGD option 2: GoTalk Now

Who is a candidate for this SGD?

- Patients who meet the above criteria for use of an SGD
- Patients who will benefit from using a combination of picture communication pages and keyboard spelling options
- Patients who find picture scenes easier to navigate and locate vocabulary

How does it work?

Attainment Company's application GoTalk Now allows the user to create fully customizable boards. Like Sounding Board, GoTalk Now offers customizable picture communication pages. When creating a standard picture communication page, the user selects how many icons appear on the page (up to 32), chooses the pictures to represent the icons and records the message that is spoken when the icon is selected. An SLP could use these features to turn the above picture communication boards into speech generating communication pages. Unlike Sounding Board, GoTalk Now offers a keyboard page and visual scene pages. The keyboard page allows patients to type their message, much like they would with an alphabet board, which is read aloud when completed. The keyboard page has word prediction to assist patients in creating their messages. The visual scene pages appear on the screen as a picture of a particular environment. The picture includes "hot spots" that bring up related vocabulary when selected. For example, a visual scene of a standard ICU room can be created. When patients need to communicate with the nurse, they can select the nurse in the visual scene and words and phrases related to nurse-patient communication will appear. The visual scene can also include information about pain when patients select the pain scale on the patient information board or they can request a position change when they select the bed. The visual scenes need to be created and customized, however, once they are created they can be saved to the application and reused (Attainment Company, 2018).

Figure 28: GoTalk Now

See links below for examples of Go Talk Now's features

[GoTalk now icon]. Retrieved from
<https://itunes.apple.com/us/app/gotalk-now/id454176457?mt=8>

[GoTalk keyboard]. Retrieved from
<https://www.attainmentcompany.com/gotalk-now>

[GoTalk picture board]. Retrieved from
<https://appsliced.co/app?n=gotalk-now-plus>

[Visual scene]. Retrieved from
<https://www.attainmentcompany.com/gotalk-now>

How can it be adapted and modified?

- Adaptive stylus: Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. Patients who cannot isolate their fingers to make selections within the application, might be able to grasp the stylus and use it to make selections. Additionally, some patients may find it easier to make selections on the touch screen using a stylus rather than their finger. Provide styluses for patients who have to tap the screen several times before their selection is recognized (see Figure 10 for examples).
- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).
- Enlarge icons: Since GoTalk Now is customizable, the number and size of icons on a page can be modified. For patients with decreased visual acuity and motor impairments, larger icons can be easier to recognize and select.
- Adaptive switches: see descriptions below

SGD option 3: Lingraphica: Small Talk Intensive Care.

Who is a candidate for this SGD?

- Patients who meet the above criteria for use of an SGD
- Patients with increased fatigue or cognitive impairments who benefit from simple, easy to understand instructions.

How does it work?

Lingraphica created its application Small Talk Intensive Care for acute care patients to communicate pain, medical information and feelings with medical staff. The application contains a single list with 84 phrases illustrated with picture symbols. The icons are organized within the list by category (pain scale, body parts, feelings etc.) and when an icon is selected, the phrase is read aloud. The Small Talk Intensive Care application is not customizable, as words and phrases cannot be added to the list. Additionally, the application only allows patients to communicate medically related information. However, it is a simple and straightforward design which makes it easy to use for patients who find other SGDs to be too complicated or difficult to navigate (Boeri, 2017).

Figure 29: Lingraphica Intensive Care

See links below for examples of Lingraphica: Intensive Care's features

[Lingraphica]. Retrieved from
<https://appadvice.com/app/smalltalk-intensive-care/403057381>

[Lingraphica page]. Retrieved from
<https://itunes.apple.com/us/app/smalltalk-intensive-care/id403057381?mt=8>

How can it be adapted and modified?

- Adaptive stylus: Adaptive styluses come in different shapes and sizes that are easier for patients with decreased fine motor skills to grasp. Patients who cannot isolate their fingers to make selections within the application, might be able to grasp the stylus and use it to make selections. Additionally, some patients may find it easier to make selections on the touch screen using a stylus rather than their

finger. Provide styluses for patients who have to tap the screen several times before their selection is recognized (see Figure 10 for examples).

- Provide a Universal Cuff: This elastic band is worn around the patient's hand and has a pocket that can hold the stylus. If a patient does not have the ability to grasp an adaptive stylus, a universal cuff can be used to hold the stylus in the patient's hand (see Figure 4 for example).
- Adaptive switches: See descriptions below

Mounting Equipment and Adaptive Switches

AAC boards and SGD are only useful if they are accessible to the patient. Mounting equipment and adaptive switches allow patients to access their communication supports with greater ease. When selecting switches, consider the size of the switch and the amount of force needed to activate it. Larger switches might be easier for patients with limited motor functions or poor visual acuity to use, while patients with decreased strength may require a more sensitive switch that does not require increased pressure to be activated. Below are descriptions of mounting equipment and adaptive switches that are appropriate for the AAC boards and SGDs described above.

Typing stands.

Communication boards, such as alphabet and picture boards, may be difficult for patients to view when they are placed flat on the bed tray. Typing stands, which can be purchased at office supply stores, can be used to display communication boards so they are visible to patients, even while they are reclined in bed (Hurtig & Downey, 2009).

Figure 30: Typing Stand

See link below for an example of a typing stand

[Typing stand]. Retrieved from
<https://www.amazon.com/slp/typing-stand/y59r2jwyte8x6uh>

Gooseneck pipe and spring clamp.

Patients may not have a bed tray in their room due to the space needed for medical equipment (Hurtig & Downey, 2009). For patients who do not have a bed tray in their room, a typing stand would not be an appropriate mounting option. When a bed tray is not available, patients' communication boards can be mounted on the bed rail or a nearby IV pole with a simple mounting arm made of gooseneck pipe and a spring clamp, both of which are available at most hardware stores. The spring clamp is used to attach the gooseneck pipe to the bed rail or IV pole. Communication boards can then be attached to the other end of the pipe with tape or adhesive Velcro. The flexibility of the gooseneck pipe allows the arm to be adjusted so that communication boards can remain in patients' line of vision, even when their position changes. This clamp can be made using the instructions provided in the link below (Schlepic, n.d.).

Figure 31: Gooseneck Mount with Spring Clamp

See link below for an example of a gooseneck spring clamp

[Gooseneck spring clamp]. Retrieved from
<https://www.instructables.com/id/Flexible-GoPro-Clamp-Mount/>

Directions for building gooseneck clamp:<https://www.instructables.com/id/Flexible-GoPro-Clamp-Mount/>

Gooseneck with Super Clamp from AbleNet.

The gooseneck mounting arm described above is an inexpensive and easy way to mount printed communication boards. However, a stronger, more durable mounting arm is required for most SGDs as the above gooseneck mounting arm could not sustain the weight of a tablet device. For the SGDs discussed above, the Gooseneck with Super Clamp mounting arm from AbleNet is recommended. The clamp allows the SGD to be mounted to a bed tray, bed rail or an IV pole and the flexibility of the gooseneck pipe allows the device to be optimally positioned. SGDs are attached to the mounting arms with universal mounting plates (AbleNet, 2018b).

Figure 32: Gooseneck with Super Clamp

See link below for an example of a Gooseneck with Super Clamp mount

[Gooseneck with super clamp]. Retrieved from
<https://www.ablenetinc.com/gooseneck-with-super-clamp-1>

Universal mounting plates.

Due to their increased weight, SGDs require sturdier mounting options. Universal mounting plates allow devices to be securely attached to mounting arms. Universal mounting plates consist of two pieces, the mounting plate and the mount. The mounting plate is placed on the back of the SGD and the complimentary mount is placed on the mounting arm. The mount on the arm then attaches to the mounting plate on the back of the SGD. The universal mounting plate can be placed on most SGD options; therefore, different SGDs do not require different mounting solutions (AbleNet, 2018).

Figure 33: Universal Mounting Plate

See link below for an example of a universal mounting plate

[Universal mounting plate]. Retrieved from
<https://www.ablenetinc.com/technology/mounting/universal-mounting-plate-1>

Jelly Bean switch from Ablenet.

The Jelly Bean is a standard, round switch with a 2.5-inch diameter. Patients can use their hand, foot, elbow or head to activate the switch (Ablenet, 2018e).

Figure 34: Jelly Bean

See link below for an example of a Jelly Bean switch

[Jelly bean]. Retrieved from
<https://www.ablenetinc.com/jelly-bean>

Specs Switch from Ablenet.

The Specs Switch is a smaller round switch with a 1.4-inch diameter. Patients can activate this switch using their hands or head. The switch is small enough that it can be placed in a patient's hand with the support of a universal cuff or it can be placed on the pillow beside the head (Ablenet, 2018h).

Figure 35: Specs Switch

See link below for an example of a Specs Switch

[Specs switch]. Retrieved from
<https://www.ablenetinc.com/specs-switch>

Grasp Switch from Ablenet.

The Grasp Switch is an option for patients who are unable to activate button switches, such as the Jelly Bean and the Specs Switch, due to decreased range of motion. The Grasp switch is a tube-shaped switch that patients hold in their hand. Patients squeeze or pinch the switch when they want to make a selection. Patients must be able to reliably squeeze or pinch the switch and release their grasp within 2 seconds to accurately use the switch (Ablenet, 2018c).

Figure 36: Grasp Switch

See link below for an example of a Grasp Switch

[Grasp switch]. Retrieved from
<https://www.ablenetinc.com/grasp-switch>

Micro light switch from Ablenet.

The Micro Light switch is a small, but sensitive switch. Patients can activate this switch with their hands, feet or head. The increased sensitivity of this switch provides patients with limited strength to access SGDs with a switch (Ablenet, 2018f).

Figure 37: Micro Light Switch

See link below for an example of a Micro Light Switch

[Microlight]. Retrieved from
<https://www.ablenetinc.com/micro-light-switch>

Imperium sip and puff from Ablenet.

The Imperium Sip and Puff switch can be used by patients who have severely decreased motor functions in their arms, legs or neck and as a result, cannot utilize any of the above switches. This switch is placed at the corner of the patient's mouth and is activated with a sip or a puff of air on the mouth piece. The switch includes a clamp and mount to secure it near the patient's mouth. This switch would not be appropriate for ventilated patients as they cannot produce the sip or puff necessary to activate the switch (Ablenet, 2018d).

Figure 38: Imperium Sip and Puff

See links below for an example of an Imperium Sip and Puff switch

[Sip and puff]. Retrieved from
<https://www.ablenetinc.com/catalogsearch/result/?cat=0&q=sip+and+puff>

[Sip and puff use]. Retrieved from
https://www.researchgate.net/figure/Sip-and-Puff-System-4_fig2_312590854

Options for securing switches.

Some patients may find the Jelly Bean, Specs Switch and Micro Light switches to be more easily accessible when they are propped up with an angle bracket. Angle brackets can be made from thermoplastic splinting material and stored in the AAC station (Hurtig & Downey, 2009). Attach the switches to the bracket with adhesive Velcro to ensure that the switch does not fall out of the patient's reach.

The Jelly Bean switch, as well as the BIGmack recording switch suggested for adaptations, can also be mounted on the Gooseneck with Super Clamp mounting arm described above with a universal mounting plate. The flexibility of this mounting arm allows the switch to be placed at various distances and angles that may assist some patients in more accurately activating the switch.

Additionally, badge clips can be used to keep switches in place. The switch's cord can be placed through the plastic loop and the metal clip can be attached to the bed sheets or the patient's gown. The clip prevents the switch from moving out of the patients reach and ensures that the communication device is always readily available to the patient.

Figure 39: ID Badge Clip

See link below for an example of an ID badge clip

[ID badges]. Retrieved from
https://www.staples.com/badge+clips/directory_badge+clips

Benefits of Implementing an AAC Service Delivery Model in the ICU

The AAC service delivery model and the AAC materials provided in this manual were carefully created and designed to meet the unique communication needs of ICU patients. This service delivery model is a compilation and application of various research studies examining the frustrations of acute care patients and the successful use of AAC in the ICU. Additionally, the

AAC materials were thoughtfully created to meet the various and diverse needs of ICU patients while remaining simple and easy to use to accommodate the fatigue and delirium often experienced by patients. Implementation of this service delivery model not only benefits the patients using the AAC but also the medical providers serving them.

Health care staff can also benefit from the implementation of this AAC service delivery model within the ICU. When patients can easily and accurately communicate their wants and needs, nurses, doctors and other staff members can more easily meet their needs. Staff members do not have to spend increased amounts of time trying to interpret vague and ambiguous gestures and signals when patients attempt to communicate. Many nurses have reported that the increased efficiency and ease of communication between them and their patients saves them time (Happ et al., 2014). The AAC materials and their explanations provided in this manual were not only created to be easy for patients to use, but also for nurses and other staff members to easily understand. After completing the AAC training and familiarizing themselves with the AAC tools, health care staff should find it simple and easy to communicate with patients using the AAC systems.

While the hospital health care staff benefit from the implementation of this AAC service delivery model, patients gain the most benefit. Admittance to the ICU can be a frightening experience and the inability to communicate only adds to the anxiety and frustrations patients report feeling (Fink et al., 2015). Providing patients with AAC and access to communication tools and strategies can ease their anxiety and provide them with more control during a time of uncertainty. Not only does access to communication decrease anxiety and frustration, but it also increases the patients access to quality health care as they can express their satisfaction or dissatisfaction with their care. AAC allows patients to accurately communicate specific pain

information and as a result the medical care team can better treat the pain, which may have gone unnoticed if patients were not able to communicate. Patients benefit from this service delivery model and the use of the provided AAC materials because they are given the opportunity to be active participants in their treatment with the supports of AAC tools that are easy to use and understand.

The benefits of an ICU AAC service delivery model greatly outweigh the challenges of creating and implementing it. The gains received from its implementation extend far beyond patients as hospital staff members experience its benefits as well. The service delivery model outlined above and the accompanying AAC materials were created to be systematic and comprehensive while remaining realistic and simple for ICU staff and administrators to implement. When provided the service delivery model and AAC materials above, hospitals are without excuse when they fail to honor the communication rights of ICU patients.

Appendix A

The NJC Communication Bill of Rights



**National Joint Committee for the
Communication Needs of Persons
With Severe Disabilities (NJC)**

COMMUNICATION BILL OF RIGHTS

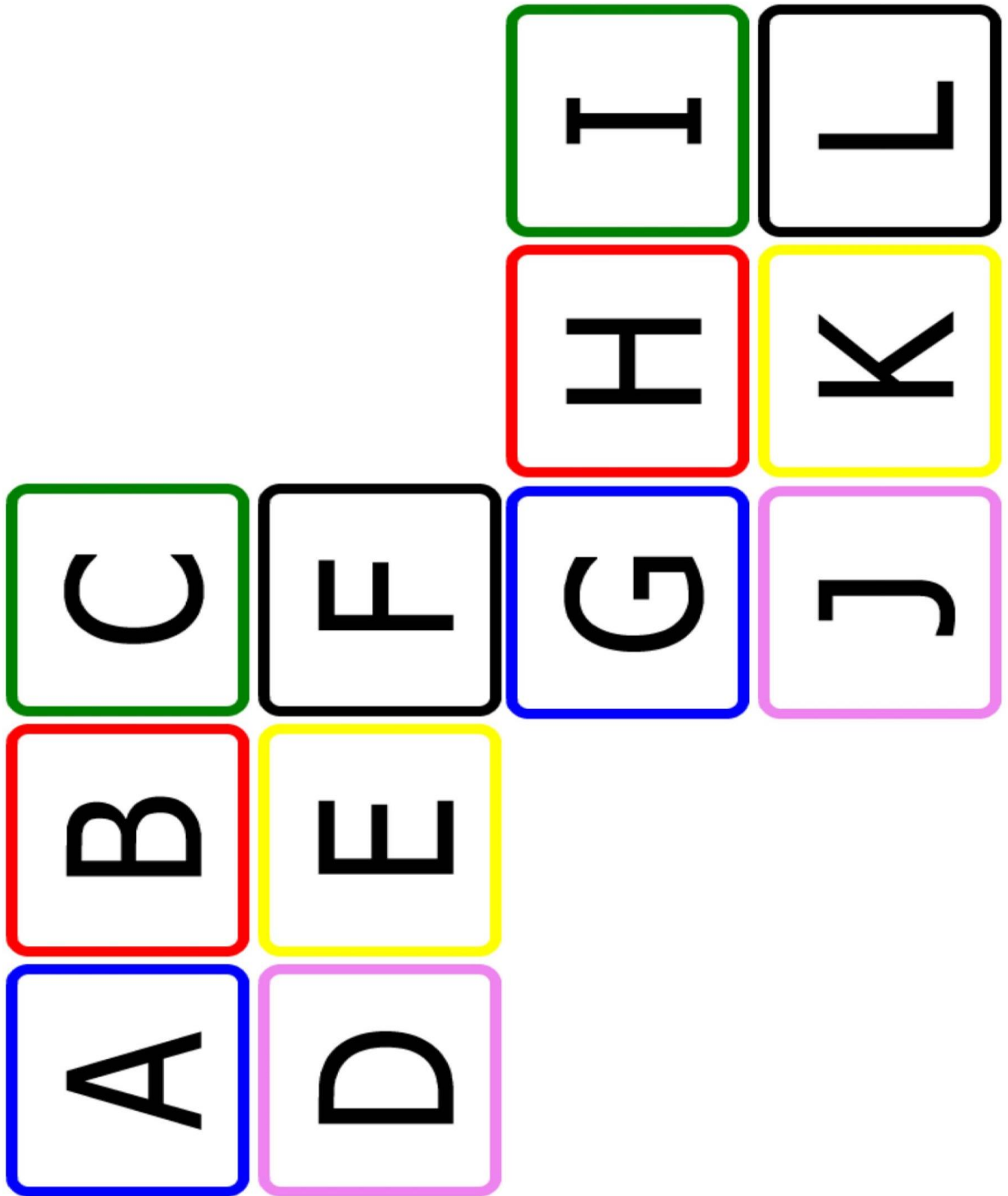
All people with a disability of any extent or severity have a basic right to affect, through communication, the conditions of their existence. Beyond this general right, a number of specific communication rights should be ensured in all daily interactions and interventions involving persons who have severe disabilities. To participate fully in communication interactions, each person has these fundamental communication rights:

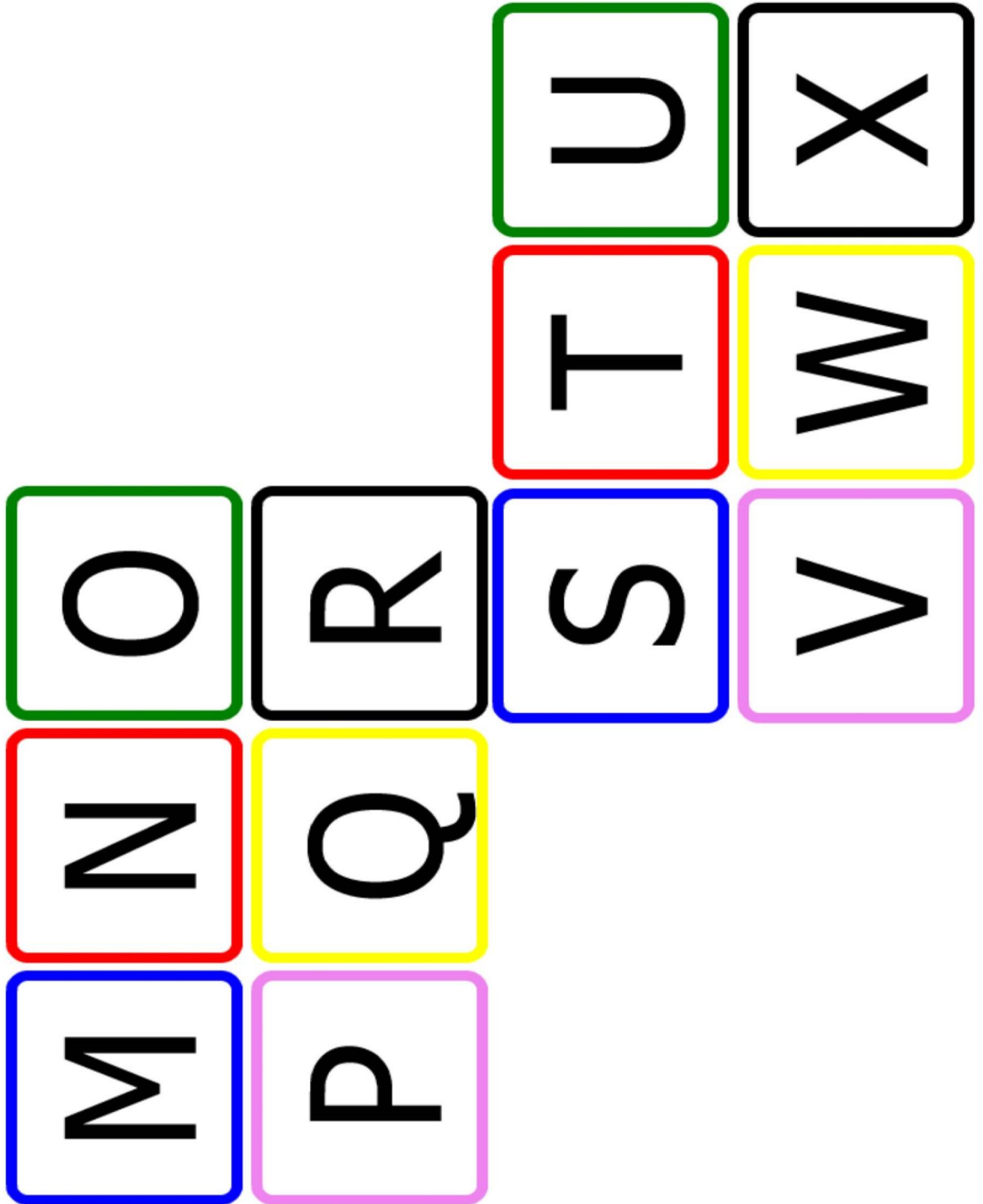
1. The right to interact socially, maintain social closeness, and build relationships
2. The right to request desired objects, actions, events, and people
3. The right to refuse or reject undesired objects, actions, events, or choices
4. The right to express personal preferences and feelings
5. The right to make choices from meaningful alternatives
6. The right to make comments and share opinions
7. The right to ask for and give information, including information about changes in routine and environment
8. The right to be informed about people and events in one's life
9. The right to access interventions and supports that improve communication
10. The right to have communication acts acknowledged and responded to even when the desired outcome cannot be realized
11. The right to have access to functioning AAC (augmentative and alternative communication) and other AT (assistive technology) services and devices at all times
12. The right to access environmental contexts, interactions, and opportunities that promote participation as full communication partners with other people, including peers
13. The right to be treated with dignity and addressed with respect and courtesy
14. The right to be addressed directly and not be spoken for or talked about in the third person while present
15. The right to have clear, meaningful, and culturally and linguistically appropriate communications

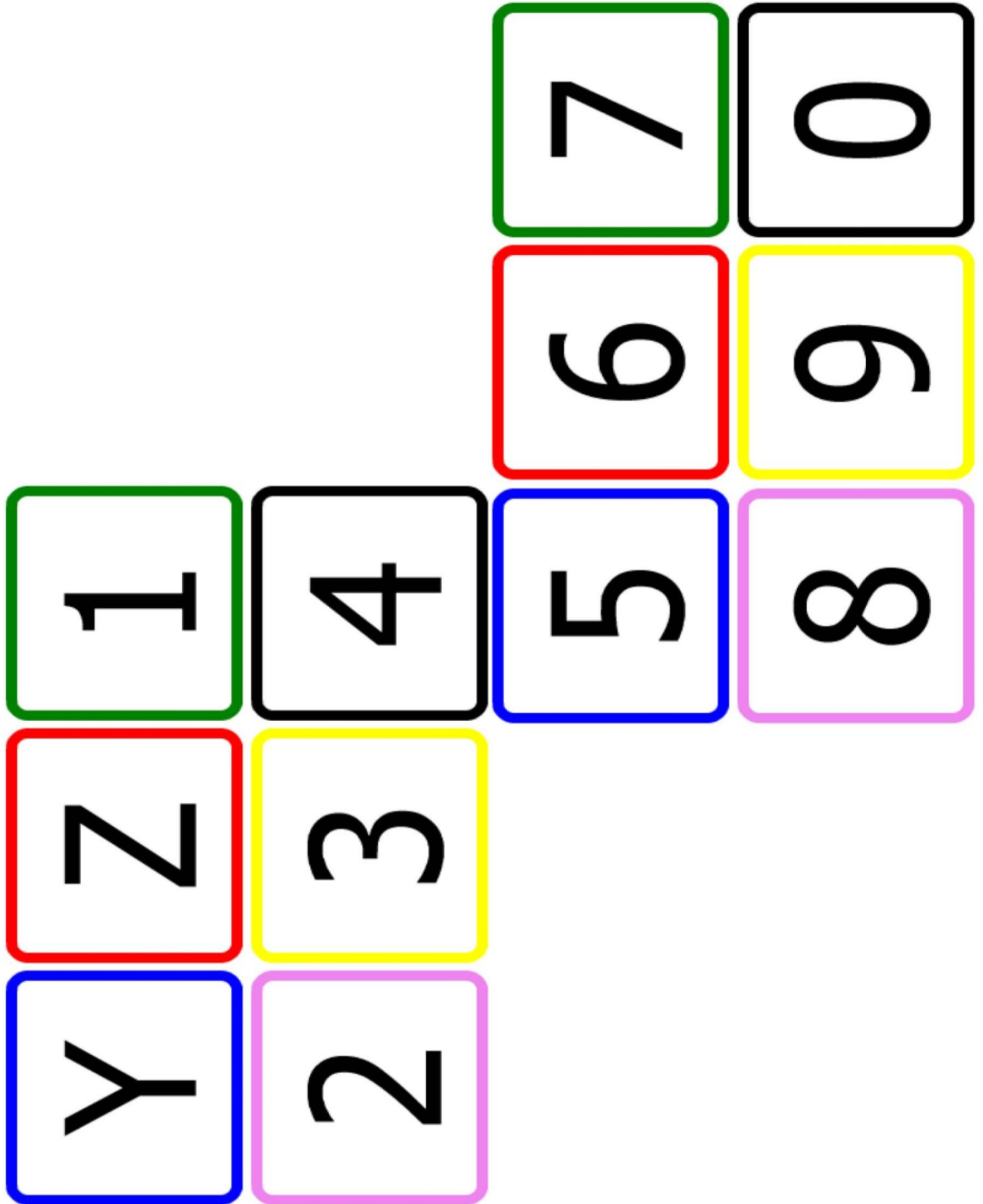
For more information, go to the NJC website at: www.asha.org/njc

Brady, N. C., Bruce, S., Goldman, A., Erickson, K., Mineo, B., Ogletree, B. T., Paul, D., Ronski, M., Sevcik, R., Siegel, E., Schoonover, J., Snell, M., Sylvester, L., & Wilkinson, K. (2016). Communication services and supports for individuals with severe disabilities: Guidance for assessment and intervention. *American Journal on Intellectual and Developmental Disabilities, 121*(2), 121-138.

Appendix B
Alphabet Eye Gaze Materials



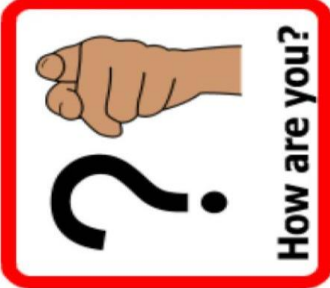

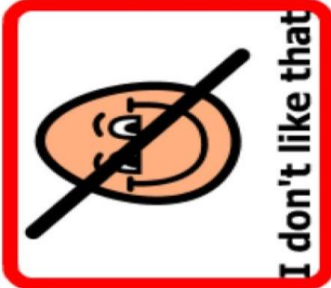
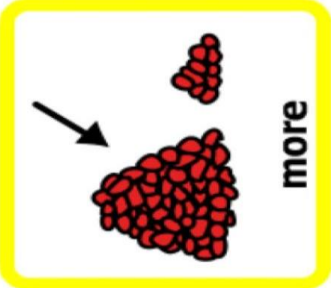


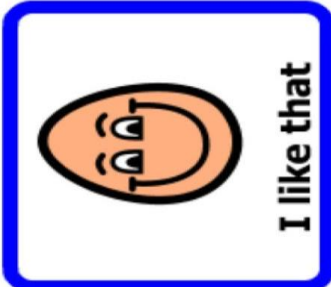









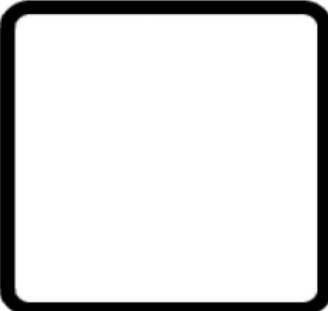







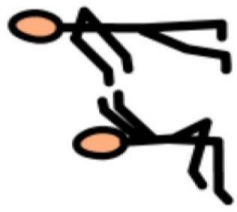




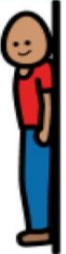




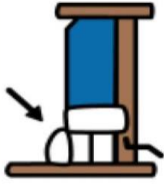


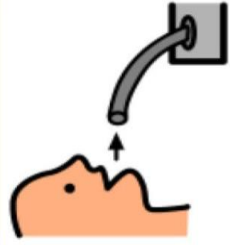
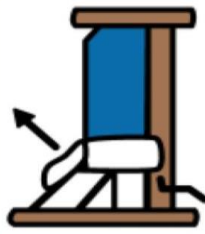


Appendix C
Eye Gaze Picture Board Material

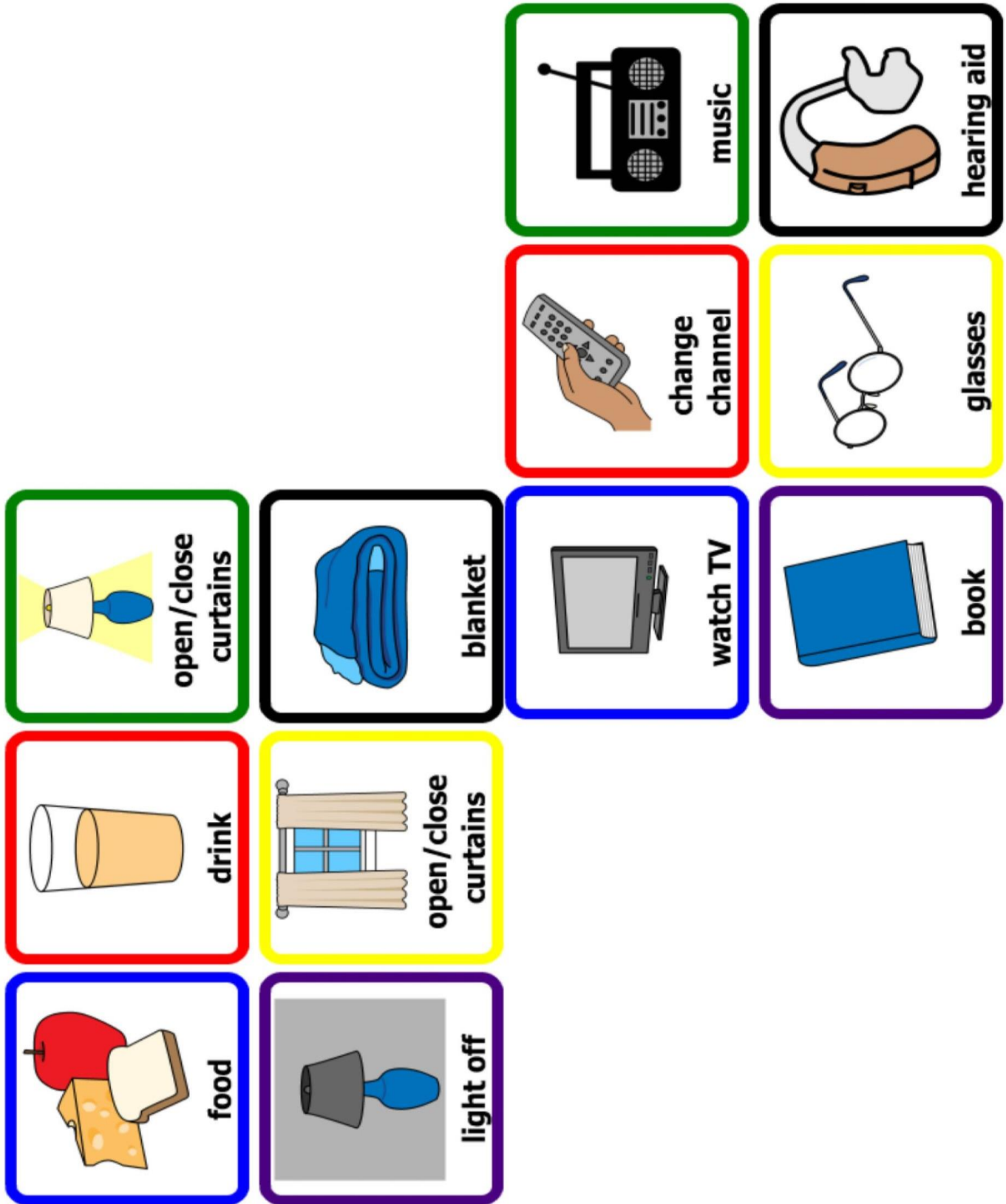
Quick Words Board

 <p>stop</p>		 <p>How are you?</p>	
 <p>I don't like that</p>	 <p>more</p>	 <p>hello</p>	 <p>bye</p>
 <p>I like that</p>	 <p>home</p>	 <p>thanks for visiting</p>	


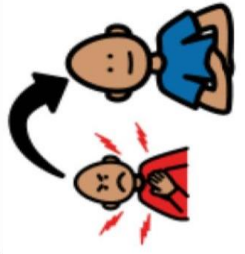




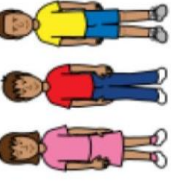


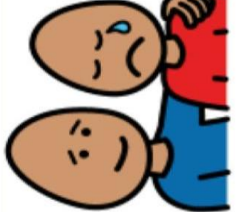


 <p>can you repeat that</p>	 <p>can you speak louder</p>	 <p>can you talk slower</p>	 <p>I don't know</p>	
 <p>yes / no ? Ask me a yes/no question</p>	 <p>come back later</p>	 <p>no</p>	 <p>yes</p>	 <p>no</p>
 <p>I don't understand</p>	 <p>yes</p>	 <p>help</p>		


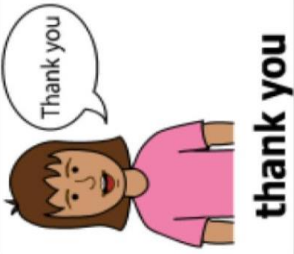
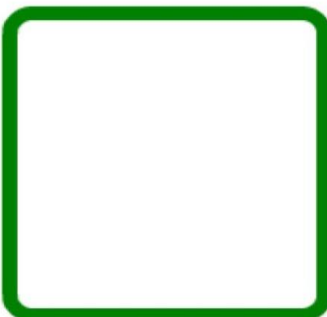
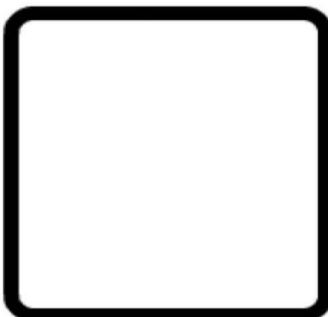

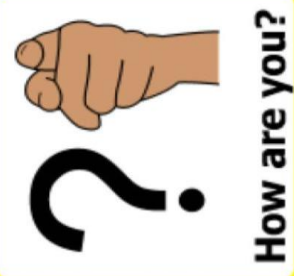
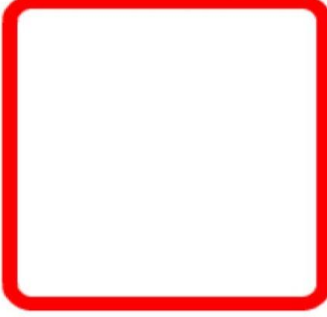
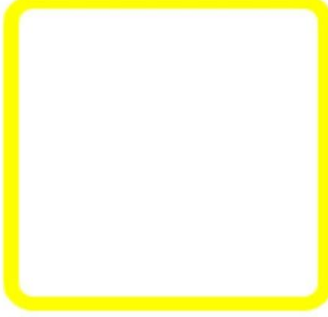


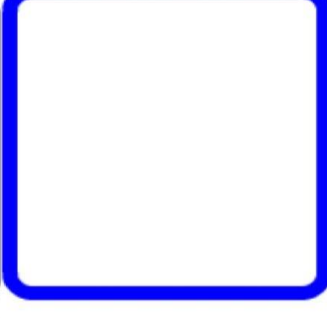
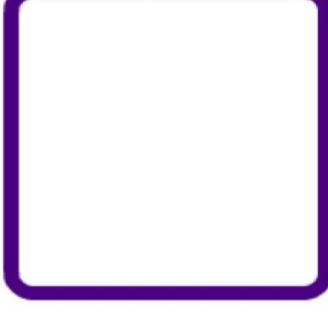
Wants/Needs Board

 <p>reposition</p>	 <p>fix pillow</p>	 <p>bathroom</p>	 <p>change clothes</p>
 <p>sleep</p>	 <p>adjust bed down</p>	 <p>lotion</p>	 <p>brush hair</p>
 <p>suction</p>	 <p>adjust bed up</p>	 <p>lip balm</p>	 <p>wash/bathe</p>



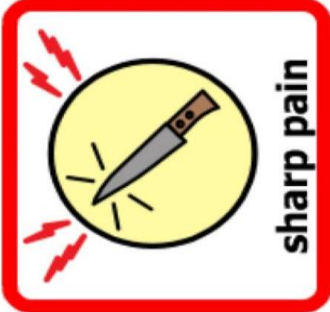








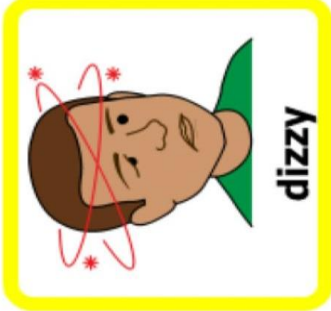


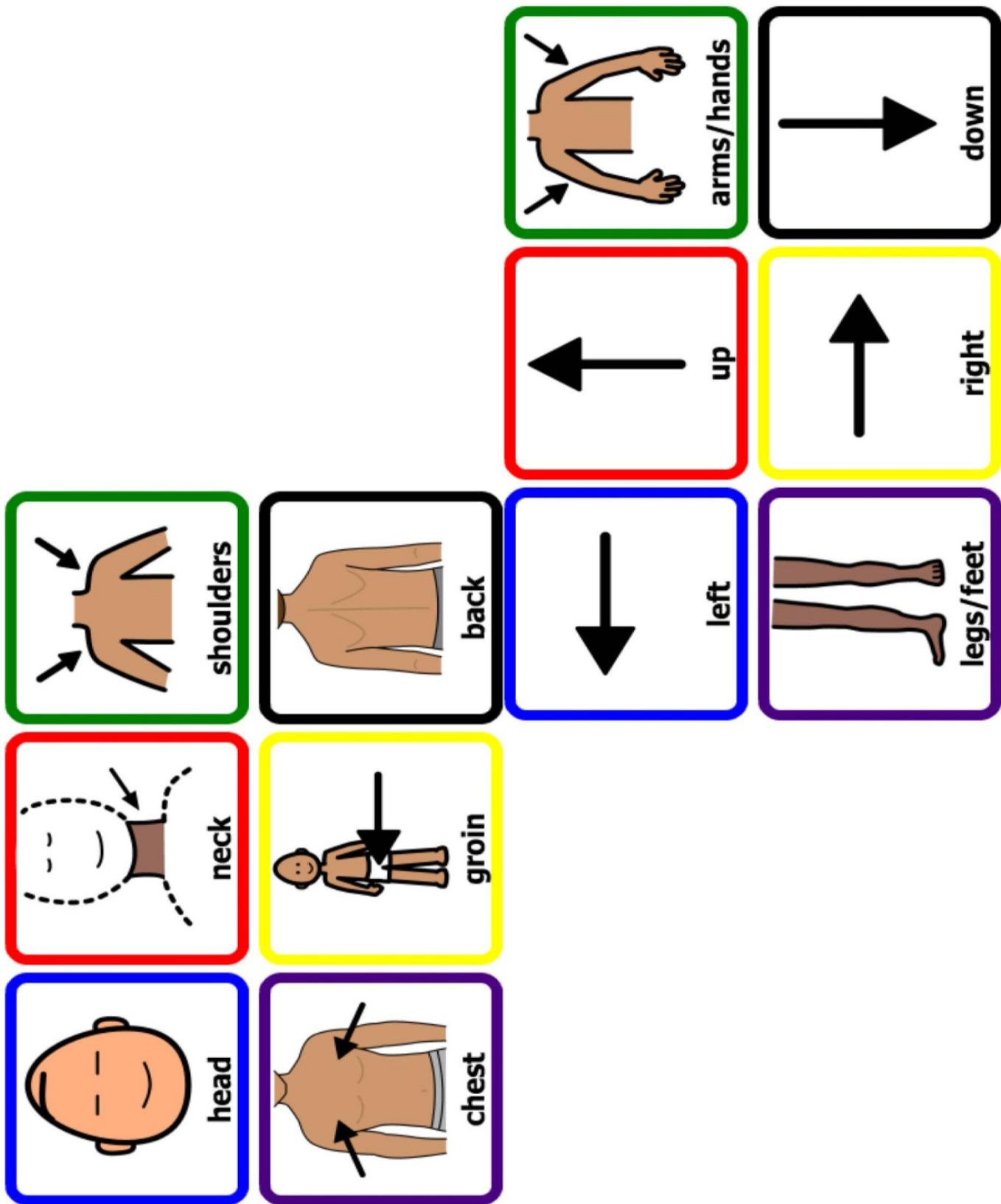
Family Communication Board

 <p>hold my hand</p>	 <p>will I get well</p>	 <p>When can I to go home</p>	 <p>did you pay the bills</p>
 <p>stay with me</p>	 <p>tell me a happy story</p>	 <p>how are the kids</p>	 <p>why am I here</p>
 <p>I love you</p>	 <p>comfort me</p>	 <p>how are the pets</p>	 <p>what day is it</p>

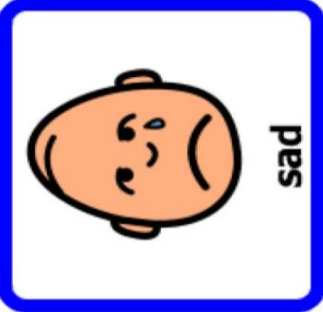
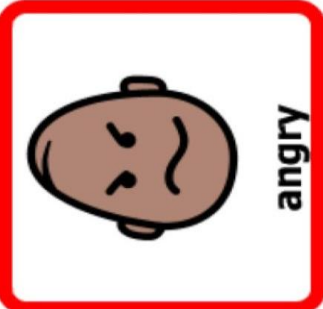




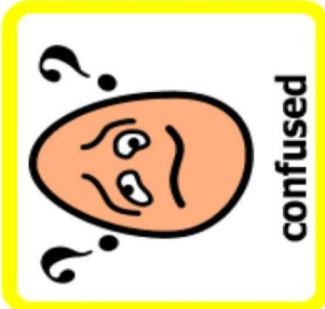
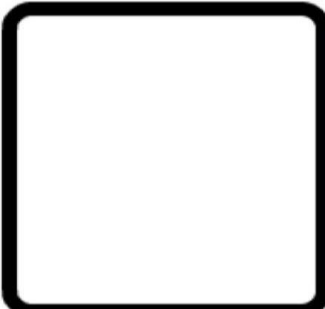




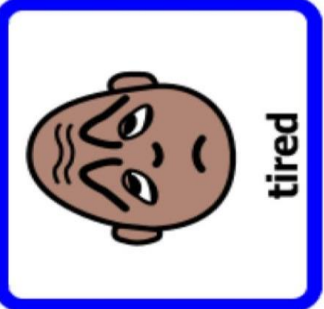


 <p>tell me about your day</p>	 <p>thank you</p>		
 <p>read aloud</p>	 <p>How are you?</p>		
 <p>please let me rest</p>	 <p>tell me more</p>		


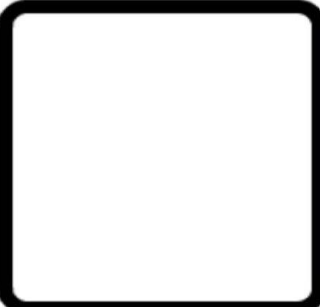

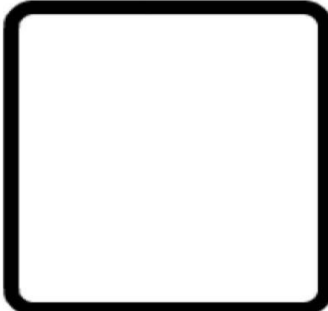


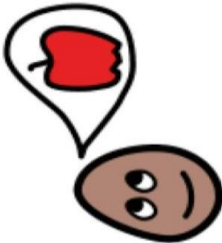





Pain Information Board




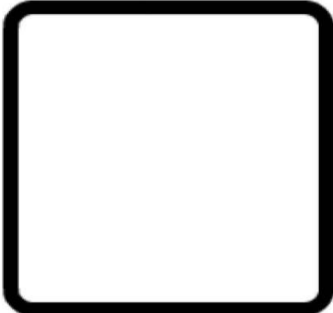

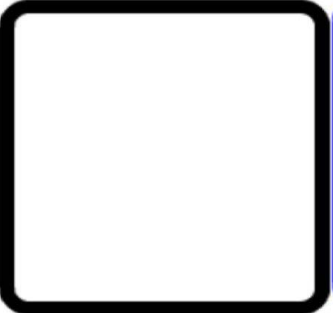
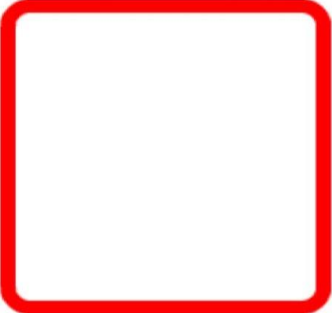

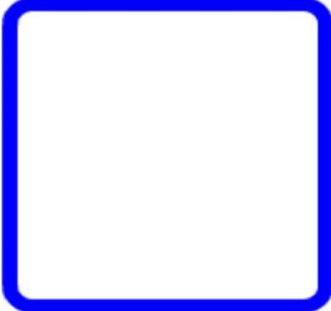



 <p>numb pain</p>	 <p>throbbing pain</p>	 <p>sharp pain</p>	 <p>burning pain</p>	 <p>stinging pain</p>	 <p>radiating pain</p>	 <p>nausea</p>	 <p>cramping pain</p>
		 <p>pain medication</p>	 <p>headache</p>	 <p>doctor</p>	 <p>dizzy</p>		


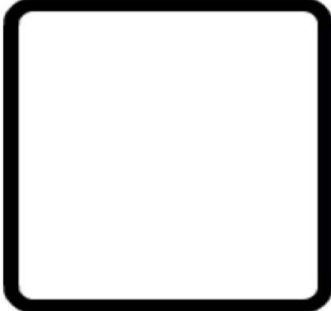
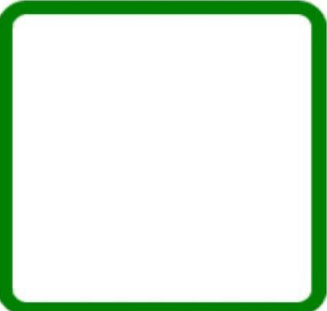
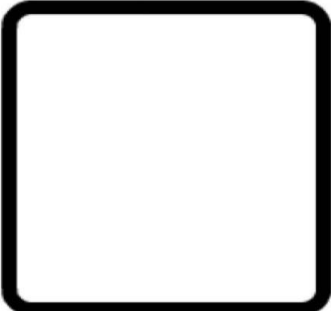

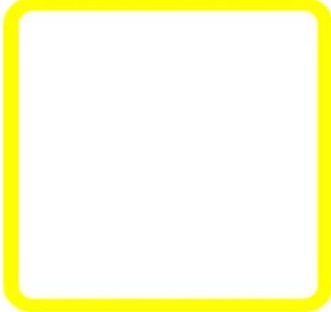

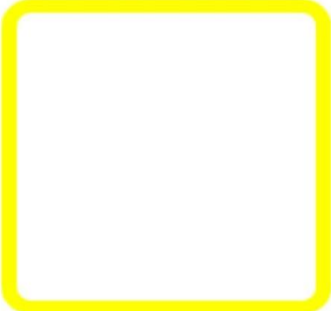


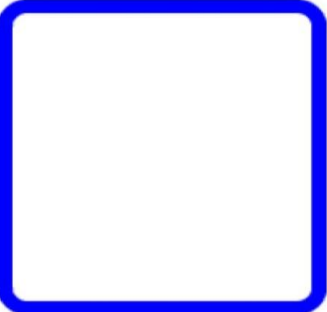




Feelings Board

 <p>sad</p>	 <p>happy/excited</p>	 <p>content</p>	 <p>so-so</p>	
 <p>scared/worried</p>	 <p>tired</p>	 <p>uncomfortable</p>	 <p>frustrated</p>	
 <p>angry</p>	 <p>confused</p>	 <p>so-so</p>	 <p>uncomfortable</p>	

 <p>I don't like this tube</p>		 <p>comfortable</p>	
 <p>love</p>	 <p>lonely</p>	 <p>hungry</p>	 <p>thirsty</p>
 <p>relieved</p>	 <p>at peace</p>	 <p>cold</p>	 <p>hot</p>

 <p>want/need</p>	 <p>pain</p>	 <p>pain</p>	
 <p>family</p>			 <p>feelings</p>
	 <p>family</p>	 <p>quick words</p>	 <p>family</p>

 <p>pain</p>			
 <p>want/need</p>			
 <p>quick words</p>			
 <p>family</p>			

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