Unless otherwise noted, the publisher, which is the American Speech-Language-Hearing Association (ASHA), holds the copyright on all materials published in Perspectives on Culturally and Linguistically Diverse Populations, both as a compilation and as individual articles. Please see Rights and Permissions for terms and conditions of use of Perspectives content: http://journals.asha.org/perspectives/terms.dtl

Converging Communication Vulnerabilities in Health Care: An Emerging Role for Speech-Language Pathologists and Audiologists

Sarah W. Blackstone

Augmentative Communication Inc Rehabilitation Engineering Research Center on Communication Enhancement Monterey, CA

Karin Ruschke

International Language Services, Inc. Chicago, IL

Amy Wilson-Stronks CulturaLink, Inc. Indianapolis, IN

Charles Lee
Polyglot Systems
Durham, NC

Abstract

The needs to improve health care outcomes and reduce health care costs in the United States are important national health policy goals. Research suggests that improving patient-provider communication is a critical step toward those goals. Speech-language pathologists (SLPs) and audiologists are uniquely educated and clinically prepared to lead in this effort. This article advocates for becoming involved in implementing new standards and regulations that address the need for "effective communication, cultural competence and patient- and family-centered care." Using three case examples, the article highlights the convergence of communication challenges faced by 4 groups with communication vulnerabilities: those with speech, language, hearing, vision and cognitive impairments; limited English proficiency; little knowledge about healthcare (poor health literacy); and/or cultural, sexual identity, or religious differences. Authors discuss the need for SLPs and audiologists to advocate for the use of key assistive technologies and strategies that help individuals who are communication-vulnerable interact more effectively with their health care providers. They also call for active and systematic collaborations among professions representing groups currently at high risk for health disparities. As Henry Ford said, "Coming together is a beginning. Keeping together is progress. Working together is success."

Regardless of practice setting or client population, clinicians need to improve how they and their colleagues communicate with patients and address cultural and linguistic differences. Besides being ethical and appropriate, patient-centered communication is also, or

soon will be, a requirement under new and pending laws, regulations, and standards (Blackstone, Garrett, & Hasselkus, 2011).

Nobody should be surprised at the persistent and extensive differences in the medical treatment people receive in the United States. Researchers have amply documented the significant disparities in access and quality of care, and the persistence of these disparities over time (Agency for Healthcare Research and Quality, 2006; Lambda Legal, 2010; Smedley, Stith, & Nelson, 2002; The Joint Commission, 2007). Adding to the many health disparities that occur due to race, ethnicity, gender, education, income, geographic location, disability status, and sexual orientation, other inequities result from a range of barriers that disproportionately affect patients with communication difficulties (Bartlett, Blais, Tamblyn, Clermont, & MacGibbon, 2008; Patak et al., 2009).

Current research documents causal relationships between poor patient-provider communication and serious medical missteps, increased healthcare utilization, and poor patient outcomes (Divi, Koss, Schmaltz, & Loeb, 2007; The Joint Commission, 2010a, b). Research also demonstrates that effective patient-provider communication increases the likelihood that: a patient's problems are diagnosed correctly, patients understand and adhere to recommended treatment regimens, and patients (and their families) are satisfied with the care they receive (Wolf, Lehman, Quinlin, Zullo, & Hoffman, 2008). As a result, effective communication between patients and providers is increasingly being viewed as an essential component of quality healthcare and patient safety (Ethical Force Program Oversight Body, 2006), as well as the basic right of every patient (The Joint Commission, 2010a, b).

As a consequence of these new insights and expectations, speech-language pathologists (SLPs) and audiologists are uniquely qualified to take on a more direct role in improving the quality of healthcare in the United States, as well as to create new opportunities for their professions while helping more people with communication vulnerabilities receive better quality care. As of January 2011, The Joint Commission, a nonprofit agency that accredits healthcare organizations, will be evaluating hospital compliance with new and revised standards to promote patient-provider communication. The Joint Commission defines effective communication as

the successful joint establishment of meaning wherein patients and healthcare providers exchange information, enabling patients to participate actively in their care from admission through discharge, and ensuring that the responsibilities of both patients and providers are understood (2010b, p. 91).

Successful communication is understood as a two-way process wherein messages are negotiated using a variety of common symbols, whether these be spoken words, manual signs, text, gestures, or graphics, until the information is correctly understood by both parties (Blackstone, Williams & Wilkins, 2007; Clark, 2004; Goodwin, 1980). With regard to healthcare, this means that providers must be able to understand and integrate the information garnered from patients, and that patients must comprehend accurate, timely, complete, and unambiguous messages from providers in a way that enables them to participate responsibly in their care (The Joint Commission, 2010b).

The Joint Commission's new and revised standards include a requirement that addresses the need to identify and address patient communication needs (Standard PC.02.01.21), while emphasizing the need to be aware of and responsive to the variety of sociocultural perspectives within an environment that does not tolerate discrimination. Specifically, the new standard refers to identifying and addressing the needs of patients with speech, language, hearing, vision, and cognitive impairments, as well as those who have limited English proficiency, limited literacy skills, little knowledge about healthcare, and/or cultural, sexual identity, or religious differences (The Joint Commission, 2010a). Using the best available statistics, these groups represent at least 168 million people in America, a significant

percentage of those likely to be admitted to hospitals, especially in areas where hospitals treat many patients who don't speak English (ASHA, 2008a, b, c; Berke, 2010; Diamond, Wilson-Stronks, & Jacobs, 2010; Hasnain-Wynia, Yonek, Pierce, Kang, & Greising, 2006; National Institute on Deafness and Other Communication Disorders, 2011; Pleis & Lethbridge-Cejku, 2006; U.S. Department of Education, 2006). Figure 1 helps to illustrate that many individuals within each group are likely to have multiple and overlapping communication challenges, depicted by the shaded areas.

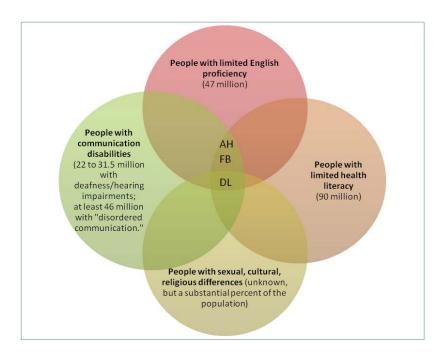


Figure 1. A visual model and estimate of patients who are "communication vulnerable" in health care settings.

AH is a young woman with cerebral palsy and severe dysarthria who is scheduled for surgery. Her speech is unintelligible to unfamiliar people, and she uses augmentative communication strategies and a speech generating device (SGD) to communicate with family and friends. She is relatively independent and employed part-time, but she never learned to read. Also, AH finds it difficult to negotiate the healthcare system. For example, she doesn't understand the purpose of the informed consent process, and since she cannot read, has difficulty comprehending the importance of the information that is being gathered through the hospital intake forms. Since instructions are usually provided in writing, she often leaves appointments not knowing what she is supposed to do. After her surgery, her doctor expects she will spend several days in the Intensive Care Unit (ICU), will require mechanical intubation, and may be unable to access her SGD.

DL is a man in his mid-20s who doesn't speak English and is a recent immigrant. He fell down a flight of stairs while helping a friend move, but initially didn't think his injuries were severe. He was brought to the Emergency Department by his friends 15 hours after the incident. At the time, he was unable to ambulate unassisted and, when questioned, seemed to be inventing new words as he spoke. A qualified hospital interpreter was summoned and arrived within 15 minutes. She found DL's speech to be unintelligible and provided this information to the physician. The physician communicated through the interpreter to determine that DL was disoriented times three (time, place, condition). The interpreter asked the hospital staff for permission to engage his friends so she could be certain DL was not speaking an unfamiliar dialect. DL's friends verified that his speech was nonsensical and said

he was acting out of character. As a result, the Emergency Department physician ordered an immediate CT scan, which showed intracranial hemorrhaging.

FB was admitted to the hospital through the Emergency Department for observation and tests after experiencing what appeared to be a stroke. His first language is Korean, and initially he did not seem to understand or speak English. His daughter reported that her dad wore hearing aids, but she didn't know where they were. The hospital offered interpreter services to assist with the admission process. The doctor referred FB to the Communication Disorders Department for a speech and language evaluation and audiological assessment.

The patients represent multiple issues that can negatively impact patient-provider communication during a hospitalization. As shown, they all have a communication disorder, limited English proficiency or ability to speak, and poor health literacy skills, albeit for different reasons. In addition, they bring with them their own individual expectations and understandings of their health and condition, which are shaped by their background, culture, and previous experiences with the healthcare system. Each individual creates unique challenges for hospital staff needing to communicate with them.

According to the new and revised Joint Commission standards, hospitals now must identify and document the communication needs of their patients at admission. The Joint Commission also emphasizes the need to identify and address communication needs as part of the ongoing healthcare process and then update this information throughout the hospitalization, since communication needs may change after a surgery, or as a result of scheduled or unforeseen medical events and treatments (Bartlett et al., 2008; The Joint Commission, 2010a). Other agencies have also introduced laws and regulations that address patient-provider communication issues. A more complete description of these standards and how they apply to communication disorders specialists is included in another article in this issue (see Hasselkus). Key examples include

- The new comprehensive health reform legislation (the Patient Protection and Affordable Care Act), that includes provisions regarding the use of plain language and culturally appropriate language in health-related information about insurance and other health issues (US Department of Health and Human Services (HHS), 2011a).
- The Agency for Healthcare Research and Quality (AHRQ; HHS, 2011b), that has established health literacy as a "universal precaution" in an effort to minimize risks to patients.
- The U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion(2010) recently issued a National Action Plan to Improve Health Literacy to engage "organizations, professionals, policymakers, communities, individuals, and families in a linked, multisector effort."
- Skilled nursing facilities now must use The Centers for Medicare and Medicaid Services (CMS) revised Minimum Data Set (MDS) 3.0 to assess residents (Wisely, 2010). This requires gathering intake information through patient interviews rather than observations and requires staff use strategies (e.g., using manual signs, graphics, etc.) to enable patients to communicate successfully.
- Title VI of the Civil Rights Act of 1964, which states that people cannot be discriminated against as a result of their "national origin," including their primary language (HHS, 2001). Any healthcare organization receiving federal funds (e.g., Medicare and Medicaid) must make reasonable efforts to provide services to their patients in the language in which the patient is most

comfortable receiving their healthcare information. The National Standards for Culturally and Linguistically Appropriate Services in Health Care (CLAS) standards provide guidance for healthcare organizations on compliance with Title VI.

Roles and Responsibilities

The scope of practice for SLPs emphasizes their role in human communication (ASHA, 2007). SLP services in hospitals need to focus far more attention on communication challenges patients face that can directly impact medical outcomes, healthcare costs and patient safety. Hospital practices and policies regarding patient-provider communication can positively affect the care quality that patient's receive, as illustrated below for AH, DL, and FB.

AH faced multiple communication challenges in the hospital because of her speech disability, her limited ability to read English, and her lack of awareness about the healthcare system. Anticipating problems, the surgeon referred her to the hospital's Communication Disorders Department as part of her pre-admission process, to make sure she had a way to communicate effectively throughout her hospitalization. During the appointment, an SLP worked with AH to devise ways for her to ask providers questions, indicate pain levels, and express basic needs. For example, the SLP gave her a low-tech communication board and helped her program pertinent vocabulary into her speech generating device (SGD). In addition, AH exercised her prerogative to designate a "support person" who was familiar with how she communicated. On the day of her admission, AH brought her SGD, several low-tech communication boards with hospital-specific vocabulary, and her designated support person to the hospital. The SLP who saw her as an outpatient monitored AH's communication status throughout her stay, regularly checking in with her and her nurses. In the ICU, the SLP set up a partner-assisted eye gaze system with simple messages and an adapted nurse's call button that AH could access easily. Back on the unit, AH preferred to use her SGD, as well as basic needs low-tech aids with symbols/pictures representing key vocabulary. She was able to use the adapted nurse's call button. At discharge, instructions were provided in a plain language format with pictures and diagrams to support her comprehension. For example, instructions said YOU (picture of AH) take each medication (picture of the medication) and a clock with the times a day she needs to take it. Then, nurses used a "teachback" strategy, asking her to demonstrate understanding of information to ensure she comprehended and could implement the home program (Weiss, 2007). AH reported her experience positively and complied with all discharge instructions. The nursing staff said they had experienced no difficulties communicating with her.

The presence of a qualified interpreter working with staff in the emergency room may have saved DL's life and probably reduced the residual effects of his traumatic brain injury. After surgery and a short stay in the ICU, DL was moved to a "step down unit" and referred to the Speech-Language Pathology Department for assessment and treatment. The SLP requested assistance from the same hospital interpreter during all sessions. Over the course of several days, these professionals worked together to document DL's daily progress. For example, the interpreter noted less slurring in DL's speech, which was not evident to the SLP. In addition, when the SLP was showing DL pictures and asking him to verbally identify depicted objects, the interpreter pointed out that some of the objects were not common in the patient's culture and suggested alternatives. Within a week, DL made rapid progress in his speech and language, although cognitive symptoms persisted. Because DL was being transferred to a rehabilitation facility, the interpreter and SLP devised bilingual communication displays for use in the new facility. They also alerted the facility staff about cultural and religious issues and made a communication display that enabled him to request prayer time. As his condition improved, DL wanted to return to his religious practices and pray five times each day.

FB had designated his daughter as a support person during the admission process, but it was obvious that he didn't want his daughter making decisions for him. He would become angry when staff spoke to her rather than to him. The audiologist provided him with a Pocket Talker, an assisted listening device distributed by several companies, which increased his ability to hear and respond to questions in both English and Korean. The hospital interpreter and SLP worked together to provide a simple language board so he could communicate more directly with nurses and other hospital staff. The interpreter participated in the speech and language testing and was able to confirm with the SLP that FB had trouble saying words in Korean as well as English and that he seemed to have forgotten some words and grammatical forms in both languages. As a result, the SLP felt comfortable making a diagnosis of "moderate expressive aphasia with apraxia." The audiological assessment revealed that FB had a moderate bilateral hearing loss secondary to presbycusis, and the audiologist adjusted his hearing aids accordingly. During his admission, the audiologist, SLP, and hospital interpreter were able to support FB's communication needs. At discharge, he was speaking both English and Korean with some difficulty. Discharge instructions were provided in both languages. Using culturally sensitive pictures, staff prepared his medication instructions and taught him (and his daughter) how to follow them (Chuang, Lin, Wang, & Cham, 2010; Zeng-Treitler, Kim, & Hunter, 2008).

Meeting the Communication Needs of Patients

Patients in today's health care system present with many different types of communication challenges such as pre-existing disabilities that affect hearing, speech, language and cognition (like AH and FB); conditions caused by a current medical situation (like FB's stroke and DL's traumatic brain injury); temporary communication difficulties caused by medical interventions (like AH's intubation post-surgery); and cultural, sexual preference, or religious differences that may be unfamiliar to hospital staff (like DL's ritualistic prayer sessions).

SLPs and audiologists, often in concert with other professionals, are uniquely positioned to support both typical and atypical communication processes across all age groups and settings. Working closely with doctors, nurses, interpreters, and other healthcare professionals (e.g., Admissions, Discharge, Emergency Departments) on a day-to-day basis to support patients who face communication challenges, SLPs and audiologists can have a positive effect on health outcomes, reduce costs and personal frustrations, and improve safety through the prevention of medical errors due to miscommunication. In our examples, all three patients faced speech and language barriers caused by disabling conditions (cerebral palsy, traumatic brain injury, stroke, and presbycusis). In addition, FB and DL had limited English proficiency and required access to qualified language interpreters. All of these patients benefited from print materials that were translated or adapted to increase their understanding, using plain language and graphics.

The Joint Commission has developed a how-to guide (Joint Commission, 2010b) to support improved practice and help hospitals and health care providers learn to communicate with all patients, regardless of cultural or linguistic differences, sensory impairments, or limitations on communication via natural speech. Although the Road Map was designed specifically for hospitals, professionals in all settings can benefit from the information. New accreditation standards are only one of many reminders that there is a need for clear, understandable information throughout the health care spectrum and that issues related to effective patient-provider communication and improved health literacy are increasingly prominent.

The Joint Commission's Road Map specifically notes that language and sign language interpreters, translators, speech-language pathologists, audiologists, and professional chaplains are critically needed in health care settings and that augmentative communication

strategies and assistive technologies are requisite tools for a significant number of hospitalized patients. The guide provides multiple resources in its Appendices to help health care providers, compliance officers, and administrators implement the new and revised standards, including ways to address the communication needs of patients with disabilities (e.g., speech, physical, or cognitive impairments, blindness/low vision, or hearing impairments); develop Language Access Plans to serve patients (or providers) who speak languages other than English (including sign language) or who have limited health literacy; translate forms and instructional materials into other languages; and respect, understand, and address different cultures, religions, and spiritual beliefs, including lesbian, gay, bisexual, and transgender patients.

Speech-language pathologists and audiologists who work in schools, universities, private practices, clinics, rehabilitation facilities and those who teach student clinicians and continuing education workshops should also accept responsibility for informing their clients and families about the new Joint Commission standards, as well as other regulations and laws that mandate attention to patient-provider communication across the health care continuum. In addition, hospital-based SLPs and audiologists need to step up to the plate and take a central role. The time is now to establish collaborative relationships with administrators, sign language and spoken language interpreters, translators, clergy, compliance officers, and other medical staff who are engaged in planning and preparing to implement the new standard in their facilities.

Summary

Improving patient-provider communication is a critical step to addressing health disparities, an important national health policy goal. Speech-language pathologists and audiologists are uniquely educated and clinically prepared to lead this effort. Will our professions recognize these new opportunities? Will SLPs and audiologists seize the day and become involved in helping to implement new standards and regulations that address the need for effective communication, cultural competence and patient- and family-centered care? Will our professions seek out collaborative relationships with other healthcare professionals and administrators? If we don't, we will have missed a rare opportunity to demonstrate the broader relevance of our skills and services, and make it less likely that all patients are well served in the future.

Steps toward working effectively with an interpreter include

- Planing session activities and consulting with the interpreter or a dictionary to learn core/target words,
- Having a pre-session with the interpreter,
- Making sure everybody is positioned appropriately during the session,
- Not raising your voice,
- Speaking directly to the patient, not the interpreter,
- Using the first person and active voice (i.e. "I will be asking you some questions")
- Asking the interpreter to interpret intended meanings, taking into account message content, register, conversational conventions, etc,
- Speaking at an even pace, and
- Avoid technical jargon and idiomatic expressions.

References

Agency for Healthcare Research and Quality. (2006). *National healthcare disparities report*. Rockville, MD. Retrieved from http://www.ahrq.gov/qual/nhdr06/nhdr06.htm

American Speech-Language-Hearing Association. (2007). Scope of Practice in Speech-Language Pathology. doi: 10.1044/policy.SP2004-00197

American Speech-Language-Hearing Association. (2008a). *Incidence and prevalence of communication disorders and hearing loss in children:2008 ed.* Retrieved from http://www.asha.org/research/reports/children.htm

American Speech-Language-Hearing Association. (2008b). *Incidence and prevalence of speech, voice, and language disorders in adults in the United States: 2008 ed.* Retrieved from http://www.asha.org/research/reports/speech voice language.htm

American Speech-Language-Hearing Association. (2008c). *Incidence and prevalence of hearing loss and hearing aid use in the United States:2008 ed.* Retrieved from http://www.asha.org/research/reports/hearing.htm

Bartlett, G., Blais, R., Tamblyn, R., Clermont, R. J., & MacGibbon, B. (2008). Impact of patient communication problems on the risk of preventable adverse events in acute care settings. *Canadian Medical Association Journal*, 178(12), 1555-1562.

Berke, J. (2010). Hearing loss-demographics-deafness statistics: Statistically, how many deaf or hard of hearing? About.com Guide. Retrieved from http://deafness.about.com/cs/earbasics/a/demographics.htm

Blackstone, S., Garrett, K., & Hasselkus, A. (2011). New hospital standards will improve communication: Accreditation guidelines address language, culture, vulnerability, health literacy. *The ASHA Leader, 16*(1), 24-25.

Blackstone, S. W., Williams, M. B., & Wilkins, D. P. (2007). Key principles underlying research and practice in AAC. *Augmentative and Alternative Communication*, 23(3), 191-203.

Chuang, M. H., Lin, C. L., Wang, Y. F., & Cham, T. M. (2010). Development of pictographs depicting medication use instructions for low-literacy medical clinic ambulatory patients. *Journal of Managed Care Pharmacy*, 16(5), 337-345.

Clark, H. H. (2004). Pragmatics of language performance. In L. R. Horn & G. Ward (Eds.), *Handbook of pragmatics* (pp.365-382). Oxford, UK: Blackwell.

Diamond, L., Wilson-Stronks, A., & Jacobs, E. A. (2010). Do hospitals measure up to the national culturally and linguistically appropriate services standards? *Medical Care*, 48(12), 1080-1087.

Divi, C., Koss, R. G., Schmaltz, S. P., & Loeb, J. M. (2007). Language proficiency and adverse events in U.S. hospitals: A pilot study. *International Journal of Quality Health Care*, 19(60), 67.

Ethical Force Program Oversight Body (2006). *Improving communication-improving care, how health care organizations can ensure effective, patient-centered communication with people from diverse populations.* Chicago, IL: American Medical Association.

Goodwin, C. (1980). Conversational organization: Interaction between speaker and hearer. New York, NY: Academic Press.

Hasnain-Wynia, R., Yonek, J., Pierce, D., Kang, R., & Greising, C. (2006). Hospital language services for patients with limited english proficiency: Results from a national survey. *Health Research and Educational Trust*. Retrieved from

 $\underline{www.onlineresources.wnylc.net/pb/orcdocs/LARC_Resources/LEPTopics/HC/2006_HospitalLanguageServices for LEPPatients.pdf$

Lambda Legal. (2010) When health care isn't caring: Lambda legal's survey on discrimination against LGBT people and people living with HIV. Retrieved from http://www.lambdalegal.org/health-care-report

National Council on Interpreting in Health Care (NCIHC).(2007). FAQS for health care professionals. Retrieved from http://www.ncihc.org/mc/page.do?sitePageId=101286&orgId=ncihc

National Healthcare Disparities Report. (2006). Agency for healthcare research and quality, Rockville, MD. Retrieved from http://www.ahrq.gov/qual/nhdr06/nhdr06.htm

National Institute on Deafness and Other Communication Disorders (NIDCD). (2010). *Mission statement*. Retrieved from http://www.nidcd.nih.gov/about/learn/mission.html

- Patak, L., Wilson-Stronks, A., Costello, J., Kleinpell, R., Henneman, E. A., Person, C., & Happ, M. B. (2009). Improving patient-provider communication: A call to action. *Journal of Nursing Administration*, 39(9), 372-376.
- Pleis, J. R., & Lethbridge-Cejku, M. (2006). Summary health statistics for U.S. adults. National Health Interview Survey, 2005. *National Center for Health Statistics, Vital Health Stat, 10*(232), table 11.
- Smedley, B. D., Stith, A. Y., & Nelson, A. R., Eds. (2002). *Unequal treatment: Confronting racial and ethnic disparities in healthcare*. Washington, DC: National Academy Press.
- The Joint Commission. (2007). Improving America's hospitals: The Joint Commission's annual report on quality and safety. Oakbrook Terrace, IL: Author.
- The Joint Commission. (2010a). Advancing effective communication, cultural competence, and patient- and family-centered care: A roadmap for hospitals. Oakbrook Terrace, IL: Author.
- The Joint Commission. (2010b). The Joint Commission standards for hospitals. Oakbrook Terrace, IL: Author.
- U.S. Department of Education. (2006). *ED performance and accountability*. Twenty-Sixth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act. Retrieved from http://www2.ed.gov/about/reports/annual/osep/2004/index.html
- U. S. Department of Health and Human Services (2001). National sstandards for culturally and linguistically appropriate services in health care executive summary. Retrieved from http://minorityhealth.hhs.gov/assets/pdf/checked/executive.pdf
- U.S. Department of Health and Human Services (2011a). *Health disparities and the affordable care act.* Retrieved from http://www.healthcare.gov/law/infocus/disparities/index.html
- U.S. Department of Health and Human Services (2011b). *The agency for healthcare research and quality*. Retrieved from http://www.ahrq.gov/qual/literacy/
- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2010). *National action plan to improve health literacy*. Washington, DC: Author.
- Weiss, B. D. (2007). *Health literacy and patient safety: Help patients understand* (2nd ed.). American Medical Association Foundation and American Medical Association. Retrieved from http://www.ama-assn.org/ama1/pub/upload/mm/367/healthlitclinicians.pdf
- Wisely, J. M. (2010, May 18). Skilled nursing facility assessment tool focuses on patient communication. *The ASHA Leader*.
- Wolf, D. M., Lehman L., Quinlin, R., Zullo, T., & Hoffman, L. (2008). Effect of patient-centered care on patient satisfaction and quality of care. *Journal of Nursing Care Quality*, 23, 316-321.
- Zeng-Treitler, Q., Kim, H., & Hunter, M. (November, 2008). Improving patient comprehension and recall of discharge instructions by supplementing free texts with pictographs. *American Medical Informatics Association Annual Symposium Proceedings*, 849-853.