# A speech-based and intelligent personal emergency response system

*V.W. YOUNG, E. ROCHON, A. MIHAILIDIS.* **Towards the development of a speech-based and intelligent personal emergency response system: Identification of key conversational features in personal emergency response calls.** *Gerontechnology 2014;13(2):315;* doi: 10.4017/gt.2014.13.02.198.00 **Purpose** The traditional push-button, Personal Emergency Response System (PERS) provides immediate access to emergency response services 24 hours a day and has successfully enabled older adult subscribers to remain living longer in their homes and communities[3]. However, since its inception nearly forty years ago, personal emergency response technology has evolved slowly. False alarm events are common[3] and the success of the system depends completely on the user's compliance with wearing the button as well as his/her physical ability and desire to push the button[1,2,4]. With recent and increasing concern over a rapidly aging population, there has been a growing need to further develop the traditional push-button PERS[1,4]. Our lab is currently developing an automatic, speech-based, and intelligent PERS by incorporating automatic speech recognition and artificial intelligence techniques. This paper examines how PERS users communicate their needs in a Personal Emergency Response Call (PERC) during an emergency event. By identifying key conversational features in real PERCs, our goal is to establish design guidelines to help develop the automated communication module between the PERS user and PERS computer. *Figure 1* shows how the user would communicate to the PERS mounted on the ceiling. **Method** Conversational analysis was conducted on 71 real, personal emergency response calls. Verbal ability, general discourse, communication style, and time were the main areas examined. Features included the speakers' rate of speech, intelligibility, disfluency, total number of utterances, number of speaker turns, number of questions and answers, number of statements, number of one word utterances, and call speed before emergency response initiation. **Results & Discussion** Research results reveal that emergency risk level and the individual calling both affect the emergency response time, with low and high emergency risk level calls and care provider callers receiving a significantly faster response than medium risk calls and older adult callers. Older adult callers' speech was significantly less intelligible and used fewer words per minute than care provider callers' speech. PERS callers were also found to use both linear and circular type speech patterns when responding. In conclusion, several important conversational features were identified, and will be used for developing additional guidelines for the new PERS.

### References
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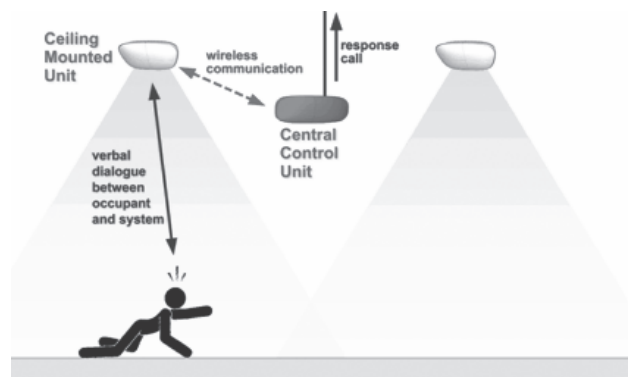4. Porter EJ. Wearing and using personal emergency response systems. Journal of Gerontological Nursing 2005;31(10):26-33

*Figure 1. Example speech-based, intelligent PERS set-up*