

Use of Interactive Voice Response Technology in Health Care

Dr Ida Androwich, PhD, RN-BC, FAAN

Dr Margaret Ross Kraft, PhD, RN

Loyola University Chicago

Objectives

- Define interactive voice response technology (IVR)
- Discuss recent research using IVR systems
- Describe opportunities to leverage advances in technology to improve patient care

Poll Question 1

- Audience Composition
 - MD
 - RN/APN
 - Researcher
 - Administrator
 - Other

Poll Question 2

- Are you currently using IVR technology?
 - Yes
 - No

From Industrial Age to Information Age.....

Old Way (Industrial Age of Healthcare)

- Care episodic – provided in traditional settings
- Provider centric
- Clinical data interpretation limited by memory, intuition, pattern recall
- Knowledge development is produced in research settings
- Mass production

New Way (Information Age)

- Care is ongoing –patient is the point-of-care
- Patient centric
- Clinical data is (often) supported by CDSS, alerts, reminders, evidence
- Knowledge development is by-product of patient care
- Mass customization

Adapted from J. Perlin (2009)

Goal

- **New Knowledge as a Transparent By-Product of Care:**
 - *From “TRIP” (Translating Research into Practice)*
 - to**
 - *“TPIR” (Translating Practice into Research (and evidence of value and quality))*

(Perlin, 2009)

Definition: Interactive Voice Response (IVR)

- Can also be Interactive Voice Response Systems (IVRS)
- A technology that automates interactions with telephone callers and communication systems.
- Allows for an efficient exchange of information to or from a database.
- A method of patient communication and data collection that has increasing utility with advances in HIT

IVR 101 – How Does it Work?

- This technology initially used automated interactions with telephones using pre-recorded voice prompts and menus and the touch-tone keypad. (DTMF)
- Advances in the technology using voice recognition now allow for input/responses gathered from the spoken word.

A Little History...

- Pre-dates advent of digital computer
- 1939 Worlds Fair – Bell Labs “The Voder”
- Linked to mathematics
- Parallels history of speech recognition
- 1990s – Computer Telephony Integration
- 2000s -Increasingly commoner and cheaper to implement

Special Populations & Problems of Interest to VA

- Vulnerable and Underserved
- Chronically Ill
- Cardiac, Diabetic
- Mentally Ill
- Obese and Immobile
- Tobacco and Substance Users (Abusers)
- Elders
- Physically and Mentally Handicapped
- Individuals with Health Literacy Issues

Available Research on IVR Uses: Congruence with VA Populations of Interest

- Chronic Disease Management (CDM)
 - Diabetics: Low income, ethnically diverse
 - Hypertension, mental health, heart failure, support for smoking cessation
- Medication Management (MM)
 - Oral Anti-coagulation
 - Medication support & refill compliance
- Special Populations (SP)
 - Nicotine and ETOH usage issues
 - Cervical Ca Screenings
 - Depression Self-Help

Available Research on IVR Uses: Congruence with VA Populations of Interest

- General Uses (GU)
 - Pre-Rx questionnaires and surveys
 - Satisfaction with treatment
 - Post discharge patient safety and follow-up
 - Outcomes monitoring
 - Collection of race and ethnicity data
 - Care coordination & home monitoring
 - Assessments

Sample IVR Applications

- Tracking Patient Information
 - Patient or Provider entry
- Developing Decision Support Systems
 - Sending automated alerts and reminders
 - Offering resources and information
- Combining with personal health records
- Using in care transitions
- Linking to educational material

Chronic Disease Management

- A literature review in 2000 shows IVR has been used in the treatment of patients with chronic health problems such as heart failure, diabetes, hypertension and mental health disorders. Patient reported information was seen as reliable as that obtained in a clinical interview or medical record review.

Piette, J. (2000) Interactive voice response systems in the diagnosis and management of chronic disease. *The American journal of Managed Care*. Vol 6: 817-827

An Automated Speech-Recognition Telephone Intervention for Diabetics

- This project studied patient opinions about the use of IVR technology as a means of improving diabetes care.

Goldman, R., Sanchez-Hernandez, M., Ross-Degnan, D., Piette, J., Trinacty, C., & Simon, S.(2008) Developing an automated speech-recognition telephone diabetes intervention. *International Journal for Quality in Health Care*, V 20, No 4. 264-270.

Peer Support for Diabetes

- A reciprocal peer-support program using a telephone platform.

Heisler, Vijan, Malcki & Piette (2010) Diabetes control with reciprocal peer support vs nurse care management: a randomized trial. *Ann Intern Med* 153(8):507-15

Diabetes Management for Low-Income Patients

- Characteristics of diabetic patients who completed a disease assessment consistently over a year, using a call to report self-monitored glucose were studied. Responses were consistent and allowed for identification of those with poor glycemic control and other health problems.

Piette, J., McPhee, S., Weinberger, M., Mah, C., & Kraemer, F. (1999) Use of automated telephone disease management calls in an ethnically diverse sample of low-income patients with diabetes. *Diabetes Care* V 22, No 8, August: 1302-1309

Telephone Nurse Follow-up

- Another phase of the previously discussed study using the automated disease management call system with a telephone follow-up by a diabetes nurse educator. Patients reported greater satisfaction with overall health care , providers, and health outcomes.

Piette, J., Weinberger, M., & McPhee, S. (2000) The effect of automated calls with telephone nurse follow-up on patient-centered outcomes of diabetes care. *Medical Care*, V 38, No 2, 218-230

Monitoring and Counseling Hypertension Patients

- An evaluation of the effect of IVR on patient monitoring and counseling on adherence to medications and BP control.

Friedman, R., Kazis, L., Jette, A., Smith, M. Stollerman, J., Torgerson, J., & Carey, K. (1996), A telecommunications system for monitoring and counseling patients with hypertension: Impact on medication adherence and BP control. *American Journal of Hypertension*. 9:235-292.

Anticoagulant Management

- Use of IVR to communicate to patients the result of their INR tests and dosage schedules for anticoagulation therapy. Also provided reminders about appointments for blood tests.

Oake, N., van Walraven, C., Rodger, M., Forster, AI (2009) Effect of an interactive voice response system on oral anticoagulant management. *Canadian Medical Association Journal*. 180(9): 927-933. April.

Medication Refill Compliance

- Adherence to prescribed medications is often sub-optimal. 291 patients taking chronic disease-related drugs were given refill reminders using IVR technology. Some technical difficulties occurred and participants were not receptive to speaking to an automated voice.

Reidel, K., Tamblyn, R., Patel, V., & Huang, A. (2008) Pilot study of an interactive voice response system to improve medication refill compliance. *BCM Medical Informatics and Decision making*. 8:46i

Nicotine Dependence Treatment

- IVR was used to implement and evaluate use in the identification of tobacco users and provide smoking cessation intervention for a population of medically indigent managed care patients.

McDaniel, A., Benson, P., Roesener, G. & Martindale, J. (2005) An integrated computer-based system to support nicotine dependence treatment in primary care. *Nicotine & Tobacco Research*, V 7, Supp 1 (April) S57-S66

IVR and Alcohol Use Disorders

- 26 adolescents enrolled in an adolescent treatment program agreed to phone calls for 14 successive evenings to answer questions related to daily alcohol and other drug use. The use of IVR for daily reports was seen as a way to predict relapse.

Kaminer, Y., Litt, M., Burke, R., & Burleson, J. (2006) An interactive voice response (IVR) system for adolescents with alcohol use disorders: A pilot study. *The American Journal on Addictions* 15, 122-125.

Cervical Screening

- IVR was used to obtain information on cervical cancer screening and identification of high risk behaviors in an area with consistently low cervical screening rates.

Gorkrey, R., Parkinson, L., Bates, L., Green, S., & Aye, T. (2005) Pilot of a novel cervical screening intervention: Interactive voice response. *Australian and New Zealand journal of Public Health*. V 29 No 3 261-264

Depression Self-Help

- COPE: A telephone-based eight week self-help program for those with mild to moderate depressions. Available to employers for their employee assistance programs as well as to managed care organizations
- Uses cognitive-behavior therapy (constructive thinking); assertive communication; pleasant activities
- 24 hour availability (most contacts are after 5PM and before 9AM)

Geist, J., Baer, L., Marks, I., & Osgood-Hynes, D. (1999) *COPE program for depression*. HealthCare Technology Systems.

Validation of the Use of IVR for Administration of a Questionnaire

- An IVR system designed with prerecorded questions was used to collect data from the Short Inflammatory Bowel Disease Questionnaire (SBIDQ)

Lam, M., Lee, H., Bright, R., Korzenik, J. & Sands, B. (2009) Validation of interactive voice response system administration of the Short Inflammatory Bowel Disease Questionnaire. *Inflammatory Bowel Disease* V 15, No 4. 599-607

Patient Safety After Discharge

- IVR was used to improve post-discharge monitoring to decrease complications in the hospital to home transition period. The system used an automated call 48 hours after discharge to identify any patients with new health problems. If found, a nurse did a follow-up call.

Forster, A., & van Walraven, C. (2007) Using an interactive voice response system to improve patient safety following hospital discharge. *Journal of Evaluation in Clinical Practice*, 13, 346-351.

Post-Discharge Follow-up

- Patients from general med/surg services were followed with an IVR call 2 days and 30 days after discharge to determine the status of an adverse event and patient perceptions of the IVR.

Forster, A., Boyle, L., Shojania, K., Feasby, T., & Van Walraven, C. (2009) *Journal of General Internal Medicine*. 24(4) 520-525

Outcomes Monitoring

- IVR is seen as a useful and acceptable method for nursing assessment and intervention at a relatively low cost allowing a clinical nurse specialist to “do more with less”.

McDaniel, A. (2004) Interactive voice response technology for outcomes monitoring. *Clinical Specialist*. 16(7) 7-8

Collection of Race & Ethnicity Data

- Harvard Pilgrim Healthcare has used IVR since 2007 to collect race and ethnicity data in the context of outreach to encourage screening for colorectal cancer. They were able to call 22,000 members.

HPHC: Pilot test of IVR Outreach calls as a mechanism for collecting REL data.

(2008) National Health Plan Collaborative, September.

Importance of Care Coordination – Home Monitoring

- National rate of rehospitalization is 19.6%
- Monitored patients 6.5%
- Atul Gawande. “Hot Spotters” , *The New Yorker*, January 24, 2011, pp40-51.

Assessments via IVR Currently Available

- Rating Scales
- Patient Monitoring and Longitudinal Evaluation
- Quality of Life, Work Productivity, and Functional Assessments
- Screeners
- Self-Help Programs

IVR Benefits Summary

- Educate as well as probe on self-management behaviors.
- Use of a toll-free number allows free information at convenient times.
- Spoken messages may be more effective when dealing with individuals with low literacy.
- Calls may be enabled in Spanish or other languages.
- Computer-generated messages may be perceived as less threatening than a personal discussion.

IVR: Lessons and Pitfalls

- IVR has not been described in sufficient detail to evaluate or replicate use....it does have advantages and pitfalls. Understanding of the technology can enable optimized usage in clinical research.

Abu-Hasaballah, K., James, A., & Aseltine, R. (2007) Lessons and pitfalls of interactive voice response in medical research. *Contemporary Clinical Trials*. 28: 593-602

IVR Pros

- Easy access to and familiarity with telephone technology
- Consistency of interviewing
- Independent of literacy skills
- Real time data collection and storage
- Increased perceived anonymity
- Automated reminders

IVR Cons

- Many instruments have not been validated in IVR format.
- Participants can't seek clarification during a survey.
- Requires script validation and piloting.
- May need dedicated staff to program and maintain the system.

Do Providers Really Want Empowered Consumers?

- IVR is an enabling technology
- IVR use is likely to transform the provider-patient relationship
- Technopoly: The Surrender of Culture to Technology (Postman, 1992)
- Stethoscope had a profound impact on care; limited the value of the subjective (what the patient says)
- PHR has the power to create a more “balanced” view of the patient.

Completed Research: Things We Know

- Consumer acceptance
- Provider acceptance
- Desired functionality
- Many vendors and providers already have tools available

Research Gaps: Things We Need to Better Understand

How to best move from concept to practical application?

- Function evaluation – collection, sharing, exchange and self-management of information
- Adoption and attitudes – focus on specific populations, trends, associated factors
- Privacy and security – data control, balance between access and security,
- Architecture – data, infrastructure and applications
- Cost and the business case for PHR

Increased Value Requires IT

Economic pressures will accelerate value-based healthcare

Value-based healthcare creates accountability for measured performance

Value will increasingly be measured longitudinally across sites and episodes-of-care, and reinforced through payment reforms like “bundling”

Longitudinal accountability for health and care spans traditional silos & requires “system-ness”

Information is the key to system-ness, producing value, and proving it

One Step at a Time

Goal is transformation, not merely automation of a “broken” system

- Consequently we can't just spend more and ignore current ineffective and inefficient system

Considerations:

- Technology must be used to transform system – a means, not an end
- Consider incremental change (one bite at a time)
- Seek common priorities and values
- Shift incentive strategies toward meaningful patient outcomes
- Emphasize ongoing research, including comparative effectiveness

(adapted from Mark Frisse, 2009)

Questions for You :

- What is a “value added” application that you could begin to develop in your setting?
- What strategies hold the most promise in your setting?

Contact Information

- Dr Ida Androwich, PhD, RN-BC, FAAN
– iandrow@luc.edu
- Dr Margaret Ross Kraft, PhD, RN
– mkraft@luc.edu