



WHITE PAPER

**The State of Medical Error and System Efficiency:
A Solution**

The Challenge; The Charge

A progression of technologies and economies of scale have directed our medical systems into the current state they are in today. This state provides incredible capabilities for care and once impossible cures. But, this state has a cost. Much of what is needed for great care across the board has been left behind; the human has been pushed back. Now with baby boomers bringing retirement rates to record highs, retirements that include many of our best doctors and nurses, we face more serious problems in healthcare than ever before: problems involving errors and inefficiencies of gigantic and nearly unbelievable proportions. The state of the challenge has led to sweeping healthcare reforms never before experienced in the U.S. via new laws, oversight and policy. Although, everyone seems to know the meat is missing. President Obama addressed this in a national speech where he stated invention would solve the problem.

Medical Error

Medical error accounts for up to \$1 trillion in costs to the U.S. annually - *Journal of Healthcare Finance*. Study authors took calculations on measures from multiple previous reports, including the 1998 benchmark figure from the Institute of Medicine of 98,000 deaths caused annually from medical errors. Race, economic status, gender and education play significantly in the outcomes of victims. This, even if not under universal healthcare, is a moral tragedy; if not predictably a human tragedy.

System Efficiency

In the next two years, healthcare costs in the U.S. are estimated to reach 20 percent of GDP or nearly \$2.7 trillion and up to 30 percent of that total could be eliminated without reducing health care quality by adding efficiency - *New England Healthcare Institute*. ICD-10, stronger oversight, increasing diversity and more demanding patients create additional challenges to practices and individual caregivers.

Solution

Phrazer earned the global Edison Award as the best new medical device in 2011. This honor exemplified Phrazer's unique combination of incredible technology and the validated sciences of Communication and Information Theory. In this short outline, the following will be illustrated:

Phrazer's Return On Investment (ROI): A Solution for Efficiency

Legal Requirements: Ensuring Legal Compliance

The Science of Phrazer: Communication and Information Theory Empowered (CITE)

Medical Grade Hardware: End Consumer Device Intrusion

Phrazer's Future Path: Enduring Roadmap for Your Practice and Medicine

Phrazer's Return On Investment (ROI): A Solution for Efficiency

Charting

Charting is an area of challenge, filled with inefficiencies, errors and subjective data. Clinical documentation is critical to quality care while exponentially growing in importance with the implementation of ICD-10, new laws, oversights and other policies.

Nurses spend an average of 35.3 percent of their time on documentation. In a 12-hour shift, an Emergency Department physician spends 365 minutes on the computer.^[1]

Here is a breakdown:

- Charting/entering orders and labs to be done: 219 minutes/8 minutes per patient
- Looking up old medical records: 42 minutes/1.5 minutes per patient
- Entering discharge instructions/prescriptions: 41 minutes/1.5 minutes per patient
- Entering admission orders/completing transfer forms: 63 minutes/2.3 minutes per patient

In an Emergency Room the documentation ratio is typically 1-1, one hour of patient care to one hour of documentation/paperwork.^[2] When calculating the wages of physicians, triage nurses and registration clerks, the necessary resources and subsequent overhead becomes apparent.

With Phrazer, most charting time is handled: interviewing the patient, triaging, obtaining history, education, informed consent and more. Phrazer takes data directly from the patient, beginning with the first point of contact (not 50 minutes later when the first staff member is available). Phrazer can then help caregivers prioritize and organize their patient load based on acuities and where each patient is in his or her encounter. Phrazer automatically uploads the patient's information to your Electronic Medical Record (EMR) system and populates the appropriate fields. If you have not implemented an EMR, Phrazer is capable of linking to several online EMRs. Phrazer also has the ability to act as a stand-alone EMR.

Claim: Phrazer will decrease the amount of time spent on charting and paperwork while increasing the accuracy of patient records.

Example on Phrazer: Using Phrazer, patients enter the majority of their own information. After the data has been gathered and validated, it can be wirelessly transferred to the EMR system eliminating time spent typing in endless fields of information.

Trial Validation: Using the Phrazer system to gather and maintain medical records saves approximately 30 percent of a caregiver's time spent on documentation.

Increased Throughput

According to recent surveys, patients admitted to hospitals wait an average of six hours in emergency rooms. Some wait 24 hours or more to get treatment.^[3] The combination of overcrowding and understaffing wreaks havoc on any healthcare system. The emergency department is only the start. Backups that begin in one area create ripples felt by subsequent departments; they have cascading effects throughout the system. Unfortunately, focusing on short-term, department-specific solutions do little to improve the entire system's efficiency.

Ineffective communication can create bottlenecks in patient flow, whether it occurs during admission, discharge or anywhere during a patient's encounter. Gathering relevant, timely data throughout a patient's entire visit reduces bottlenecks by increasing efficiency. Phrazer provides effective patient education by offering detailed, elementary information and explanations. After providing the educational information, Phrazer validates the patient's understanding of the content provided. This ensures patients understand procedures they will undergo and improves patient compliance with discharge instructions. Phrazer doesn't stop there; it is also capable of emailing links to further detailed information to the patient for later viewing. In the process of providing validated discharge instructions, Phrazer records them as part of the audit trail.

When experiencing a sudden surge of patients due to catastrophe or outbreak, Phrazer will flag the repeat symptoms or complaints so it can be used to fast-track patients, speeding up triage and throughput.

Patient Satisfaction

Phrazer gives equal treatment in spite of gender, language, level of literacy, race, faith, culture and issue at hand. Its patented multi-stream audio pathways keep caregivers informed at all times of their patients' whereabouts while interacting with Phrazer. Patients stay engaged with real caregivers, stay abreast of the process and remain empowered. Patients are not left alone, they move through treatment faster. Phrazer's great bedside manner offers the patient a sense of inclusion. This strengthens the relationship between patient and caregiver.

Claim: Increase your efficiency; Phrazer gets patients successful treatment faster than using traditional registration and triage methods. Phrazer will help your hospital reduce bottlenecks and treat patients more efficiently and effectively.

Example on Phrazer: Using validated, replicable protocols, patented multi-stream audio and other efficiency methods to identify patient needs or reasons for visit allows time to be focused where needed most. Phrazer can provide all the needed admission/discharge instruction while monitoring patient comprehension.

Trial Validation: Using Phrazer to triage, gather symptoms/complaints and maintain medical records saves approximately 30 percent of a caregiver's time. Having a complete medical history before the caregiver sees the patient saves 20 percent alone.

Reduce Medical Error

The number three killer in our hospital systems is medical error preceded only by heart disease or the spectrum of cancers. The Institute of Medicine stated that avoidable medical errors in the U.S. kill up to 100,000 people every year. Recent studies predict that this number is much higher. The Journal of Patient Safety estimates that between 210,000 and 400,000 patients die prematurely due to preventable errors. The number of people “merely injured” every year by medical errors is about a half of a million.

There is no question that medical errors are an issue when we waste \$750 billion on healthcare that does not improve patient outcomes every year. The cost of medical errors is also felt in other ways: loss of patient trust in the healthcare systems, decreased patient and caregiver satisfaction, patient frustration and ultimately the loss of life. Medical errors can be looked at in different ways with each one shedding light on causes and potential solutions.

Based on the data available, poor practice and inadequate system design led to a majority of the medical errors. Meanwhile, many errors go undocumented. Humans are imperfect thus they make mistakes. Both competent and incompetent healthcare professionals make medical errors, but most commonly, faulty systems, current processes and work conditions cause errors.

Categories of Error

1. Technical medical error
2. Failure to use indicated tests
3. Avoidable delay in treatment
4. Failure to take precautions
5. Failure to act on test results
6. Inadequate monitoring after a procedure
7. Inadequate patient preparation before a procedure
8. Inadequate followup after treatment
9. Avoidable delay in diagnosis
10. Medication errors (wrong patient, wrong medication, wrong dose or wrong route)

Claim: Medical error can be controlled and minimized by using methods that do not allow for variables or inconsistencies. Phrazer provides accurate, timely information every time.

Example on Phrazer: By using Phrazer all biases are removed and error-causing variables are limited. All protocols and questions are asked and documented correctly every time, providing you with an audit trail that protects your caregivers from litigation.

Trial Validation: Phrazer has proven to be 99.8 percent accurate when gathering and disseminating patient information.

Increased Patient Compliance

Phrazer automatically adjusts to your patient's literacy and background which increases understanding and compliance. Phrazer improves a patient's ability to understand discharge instructions, including how to take their medications and the risks/side effects to consider. If you should choose, Phrazer will ask the patient about their satisfaction with your facility's performance or any other survey you would like captured.

At discharge, Phrazer confirms services provided with the patient then tactfully and consistently requests payment when needed. This relieves your staff of this awkward burden and increases payment compliance which is critical to your bottom line.

Claim: Phrazer will increase medical literacy and patient compliance working with all races, cultures and literacy levels.

Example on Phrazer: Incorporating culturally sensitive caregivers who will explain even the simplest of medical terms at a tap of a button increases medical literacy, increases understanding, builds trust and increases patient compliance.

Trial Validation: Phrazer has had an amazing 100 percent patient compliance thus far. Each time patients have been presented with the device, they have all used Phrazer in its entirety.

Infection Control

It's currently estimated that one in every 20 hospitalized patients will get an infection associated with their care.^[4] The financial toll is enormous, adding \$28-\$33 billion a year in cost to the U.S. healthcare system.^[5,6] Healthcare Acquired Infection (HAI) rates are largely dependent on the persistence of some bacteria and viruses on inanimate objects and surfaces. Nationwide, nearly two million people contract infections in hospitals every year and roughly 100,000 die from them. MRSA, an increasingly common infection, has become a particular focus for healthcare officials because it is so tenacious, making it difficult to treat.

The antimicrobial nature of Phrazer assists in protecting patients from the spread of pathogens. Phrazer utilizes many techniques for safety and reduced disease transmission such as incorporated antimicrobials, alcohol submersion resistance, intrinsically safe design and more (you can submerge Phrazer in cleaning solution).

Claim: Phrazer will not be a vector for diseases.

Example on Phrazer: Phrazer incorporates antimicrobial particles into its plastics, a powerful UV burst from the backlight, has intrinsically safe design and can be submerged in alcohol to clean if needed.

Trial Validation: Phrazer's antimicrobial properties don't allow it to be a vector.

Reduce Readmissions

Re-hospitalizations account for nearly one third of the total \$2.5 trillion spent on healthcare in the United States, according to the Institute for Healthcare Improvement. These re-hospitalizations can be costly, harmful and are often avoidable. The reasons for avoidable re-hospitalizations can be credited to many things; however, errors in the healthcare delivery system, poor communication among caregivers and lack of patient engagement all play significant roles.

Since October 1, 2012 hospitals receive lower payment rates for Medicare discharges if they experience higher than average readmission rates for three medical conditions. The Center for Medicare & Medicaid Services (CMS) defines readmission as admission to a hospital within 30 days of discharge from the same diagnosis. Sending a patient home with full understanding about his or her issue, including “When to call your doctor” may reduce the likelihood of unnecessary readmission. Phrazer can further reduce readmission rates by going home with the patient, providing the patient valid pathways to check the value of returning to the hospital while allowing a caregiver remote face-to-face communication with them.

Phrazer improves the quality of care patients receive by increasing their level of health literacy. Phrazer allows patients to watch an onscreen caregiver explain confusing medical terminology or procedures in ways that are easy to understand. The QuickTaps® function allows caregivers to select protocols that explain procedures, diagnoses and treatment instructions in the patient’s native language. Phrazer also provides caregivers with a source of patient education that is relevant to their patients’ conditions and concerns.

Claim: Phrazer can reduce your readmission rates and help you increase and expedite your reimbursement rates.

Example on Phrazer: Phrazer can provide elementary descriptions for both admission and discharge instructions using multiple methods to confirm that the patient understands instructions for care. Video conferencing allows you to check in with your patient after they have left the system.

Trial Validation: Better patient understanding and increased medical literacy allows for a better transfer of information. While the video conferencing allows you to have a constant connection with your patient even after discharge.

Summary

The new healthcare reform is forcing many healthcare systems to adapt new policies to help provide affordable, consistent, quality care. Phrazer provides numerous value-added features that can help you provide the best services to those you serve. The value packed Phrazer allows for a quick ROI and then expands to save you more. The more you use it, the more it saves you.

Legal Requirements: Ensuring Legal Compliance

Is Your Practice Compliant?

More than 50 percent of U.S. hospitals are not compliant with current civil rights, Americans with Disabilities Act and medical legal requirements. Under the unique pressures highlighted earlier and the new healthcare laws, there will be an increase in enforcement. Here is a short highlight of challenging areas to consider.

Assurance of Legal Compliance

Any facility accepting federal funds needs to show compliance with Title VI of the Civil Rights Act, requiring your facility to treat patients equally despite literacy, race, language, culture, gender or religion. Phrazer provides a compliance pathway that will lower your risks while also decreasing your cost burden associated with Title VI needs patients. Based off the Health Insurance Portability and Accountability Act (HIPAA) of 1996, Phrazer is fully HIPAA compliant to keep health information protected. Additionally, all interactions with the device are documented, including the patient's agreement to work with Phrazer and to receive specific treatments and procedures. This reduces malpractice exposure and helps facilities avoid litigation over errors in treatment.

The Transaction Compliance Administrator of HIPAA stated in a webinar about starting the HIPAA 5010 migration last year that a CMS unit could conduct "random audits to make sure you're compliant." Even though CMS has not outlined specifics of potential fines, "there's every indication they're headed that way."^[7] Although no official word has been handed down regarding exactly what fines our federal government may levy against healthcare organizations, failure to comply with HIPAA 5010 or ICD-10 will almost certainly lead to sizable fines.

Fines are not the only problem facing health entities that fail to comply; actual payment or reimbursement will inevitably prove problematic without submitting claims in the proper formats.

Affordable Care Act of 2010 Compliance

Phrazer can reduce your penalties for hospital readmissions and reportable "never" events. CMS hopes that penalizing hospitals for readmissions will force them to: improve discharge instructions and reconcile medications.^[8] Phrazer's ability to help with these two components will significantly improve the quality of care you deliver thus increasing the likelihood you'll receive 100 percent of your reimbursement.

In addition to the quality of care improvements that are inherent in other Phrazer value propositions (increased accuracy, increased efficiency, etc.), Phrazer offers additional elements to improve the quality of patient-centered care, resulting in improved patient retention and satisfaction.

The Hospital Value Based Purchasing Program established as part of the Affordable Care Act of 2010 is an attempt by Medicare and Medicaid to change how hospitals are paid. The focus is away from sheer volume. Instead, payment is based on quality and how well they enhance the patient experience, rating hospitals on:

- Nurse communication
- Doctor communication
- Pain management
- Communication about medications
- Communication about discharge information
- Responsiveness of hospital staff
- Overall satisfaction
- Positive recommendation

Guidance Memorandum: Title VI Prohibition Against National Origin

Section 601 of Title VI of the Civil Rights Act of 1964 states that: “no person in the United States shall on the ground of race, color or national origin, be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.” Regulations implementing Title VI which are published at 45 C.F.R. Part 80, specifically provide that a recipient may not discriminate and may not, directly or through contractual or other arrangements, use criteria or methods of administration which have the effect of subjecting individuals to discrimination because of their race, color or national origin, or have the effect of defeating or substantially impairing the accomplishment of the objectives of the program with respect to individuals of a particular, race, color or national origin.

“LEP persons are often excluded from programs or experience delays or denials of services from recipients of Federal assistance. Such exclusions, delays or denials may constitute discrimination on the basis of national origin, in violation of Title VI.”

Department of Justice 1976 “Coordination and Enforcement of Nondiscrimination in Federally Assisted Programs” 28 C.F.R. Subpart F. The DOJ regulation addresses the circumstances in which recipients must provide language assistance.

CRS Report of Congress - Order Code 97-826 A American with Disabilities Act (ADA) Requirements Concerning the Provisions of Interpreters by Hospitals and Doctors

The Office of Civil Rights’ position has been that recipients may be required to provide oral language assistance in languages other than English.

Title III of the ADA, section 302, 42 U.S.C. 12182 specifically requires the “professional office of a health care provider” and hospitals to provide language services under federal law.

Many examples of summary judgements being awarded include:

Aikins v. St. Helena Hospital

Mojocha v. Turner

Mayberry v. Van Valtier

The ADA says *Undue Burden* and *Deliberate Indifference* is a clause that plays somewhat contradicting roles in enforcement of the law. If a care facility can show that providing extensive language services would effectively disable its ability to provide its general services due to financial, access or other interruptions then they may be able to avoid the summary judgements that tend to occur. However, if a care facility does not have a clear policy or claims they didn’t

consider the possibility of certain languages coming to their facility then they can be guilty of deliberate indifference. With Phrazer being available and capable of more language assistance, and with the care facility being aware of its availability, it becomes likely undue burden can no longer be claimed, thus deliberate indifference may be substantiated.

New York Law Journal - February 15, 2005

There are 28 million Deaf people in the US. "VRI is an insufficient mode of communication" that "Basically, doesn't work well for people who are really sick, can't focus well enough, or can't get positioned correctly." - Elaine Gardner, Director of Disability Rights Project of the Washington Lawyers' Committee for Civil Rights and Urban Affairs

New England Journal of Medicine - July 2006

In 2005, 49.6 million Americans (18.5 percent of U.S. residents) speak a language other than English at home.

According to one study, no interpreter was used in 46 percent of emergency department cases.

Risk to You: If you receive federal funds, by law you are required to provide a set of services. If you do not comply, lawsuits, malpractice fines and other penalties will be enforced.

Phrazer Eliminates Risk: Phrazer is HIPAA compliant, and due to robust functionality Phrazer will reduce the legal burden upon your system.

The Science of Phrazer: Communication and Information Theory Empowered (CITE™)

CITE™ Technology is Key to Better Outcomes

Phrazer is the first fully-integrated CITE™ device designed specifically to leverage the full scientific understandings specific to medical communication in critical interactions to ensure significantly more accurate, timely and meaningful outcomes. Through the use of CITE, Phrazer yields dramatically improved conveyance of meaning, tight lines of attention, concise plug-ins to comprehension, leveraged trust, the shortest and clearest route to vital understanding and ultimately positive results that can be measured in reduced error, reduced cost and improved outcomes.

Phrazer features a myriad of key patented capabilities that leverage undeniable advances in efficacy for patients. For example, our patented catered multi-stream messaging sends specific, meaningful information to the patient while sending summary detailed information to the caregiver. The caregiver only hears what he or she needs to know and is able to multitask by obtaining vital signs or even working with other patients while Phrazer keeps him or her keyed in and interactive as needed with the patient at all times. This represents a more than 95 percent reduction in junk data for the caregiver.

We can easily demonstrate how this results in a significant three times efficiency increase for the caregiver while Phrazer also provides both accuracy and efficiency increases with the patient. For the patient we utilize understandings of visual focal length/brain connection, techniques of distraction mitigation, pattern recognition, authority establishment and additional extensive scientifically supported techniques that lead to greater trust, compliance, comprehension and positive outcomes.

Information Theory: The Shorter More Accurate Path

The use of information science and theory on Phrazer limits the number of possible understandings, meanings and options to only intended meanings by catering the messages and limiting the possible statistical meaning via mutual information (trans-information). Catered messages that are presented and designed with statistical validation of limited meaning in mind allow for not only more accurate and concise communication, but also for dramatic reductions in time needed to acquire meaningful information.

Mutual information measures the amount of information that can be obtained about one variable by observing another. It is important in communication where it can be used to maximize the amount of information shared between the patient, caregiver and EMR with the least amount of junk data. The mutual information of X relative to Y is given by:

$$I(X; Y) = \mathbf{E}_{X,Y}[SI(x, y)] = \sum_{x,y} p(x, y) \log \frac{p(x, y)}{p(x)p(y)}$$

where SI (Specific mutual Information) is the *pointwise mutual information*.

A basic property of the mutual information is that: $I(X; Y) = H(X) - H(X|Y)$.

With algorithm based protocols we can know key variables that inform and shorten the path to vital information.

Mutual information is symmetric: $I(X; Y) = I(Y; X) = H(X) + H(Y) - H(X, Y)$.

Mutual information can be expressed as the average Kullback–Leibler divergence (information gain) between the posterior probability distribution of X given the value of Y and the prior distribution on X : $I(X; Y) = \mathbb{E}_{p(y)}[D_{\text{KL}}(p(X|Y = y) || p(X))]$.

Mutual information is closely related to the log-likelihood ratio test in the context of contingency tables and the multinomial distribution and to Pearson's χ^2 test: mutual information can be considered a statistic for assessing independence between a pair of variables, and has a well-specified, asymptotic distribution. For example, to assess whether paired observations on two variables, expressed in a contingency table, are independent of each other (e.g. polling responses from people of different nationalities to see if one's nationality is related to the response). Phrazer incorporates consideration of these statistical variants to further focus accuracy.

Claim: Phrazer's use of information science and theory via multi-audio catered communication, mutual information enhanced protocols and EMR integration will dramatically speed time to treat, significantly improve accuracy and improve outcomes.

Example on Phrazer: Phrazer uses medically validated Physician's Desk Reference protocols upon which trans-information methodology is applied. Then catered versions of the protocol data are generated for both the patient and caregiver. Additionally, further catered versions for language, literacy, stress and other factors are added for dynamic application inline with use. The result is highly sophisticated interactions that have extremely improved accuracy, time and effectiveness in spite of situation at hand.

Trial Validation: In a diabetes hypertension clinic where Hmong, English, Spanish and Somali patients are seen, Phrazer achieved these results:

Language	Throughput without Phrazer	Throughput with Phrazer	Accuracy Improvement
English	45 minutes	7 minutes	94% to 99.9%
Spanish	105 minutes	7 minutes	76% to 99.9%
Somali	120 minutes	9 minutes	68% to 99.9%
Hmong	3+ hours	12 minutes	<65% to 99.9%

Knowledge Representation (KR) is an area of artificial intelligence used to represent knowledge in symbols, facilitating inferencing from those knowledge elements and creating new elements of knowledge. Phrazer utilizes analysis of how to best use sets of symbols to represent a set of facts within a knowledge domain. A symbol vocabulary and a system of logic are combined to enable inferences about elements in the knowledge representation to create new interfaces with knowledge representation that naturally make sense to users. Logic is also used to define how operators can process and reshape knowledge. Examples of operators and operations include: negation, conjunction, adverbs, adjectives, quantifiers and modal operators. The logic is interpretation theory. These elements—symbols, operators, and interpretation theory—are what give sequences of symbols meaning on Phrazer in spite of language, literacy, culture and background.

Claim: Phrazer dynamically generates knowledge representation in graphics, interfaces and onscreen representations that result in patient interactions that don't require training, that are faster and improve as the device is used. This will result in fast adoption, increased acceptance of Phrazer, reduced need for staff assistance and overall improved interactions with patients.

Example on Phrazer: Phrazer's simple booleans and interactive body are strong examples of knowledge representation in use.

Trial Validation: In recent private trials, Phrazer had a nearly unprecedented 100 percent patient acceptance rate. That is to say, every ER patient provided a Phrazer accepted Phrazer, used Phrazer easily without assistance, was able to run multiple protocols, provided full and deep information and felt it was valuable to their experience. They were provided with dynamically generated new interfaces and, via knowledge representation, they were able to naturally understand them.

Information Theory Summary

Simply put, the use of multi-channel catered messages, information theory empowered patient interactions and statistical variant control creates the shortest route questions that yield the most accurate outcomes. Deeply sophisticated application of information theory and science are seamlessly integrated into the most advanced and elegant medical communication system in the world.

Communication Theory

Trust is a fundamentally important aspect of medical treatment...Studies have established that patient trust predicts instrumental variables such as use of preventive services, adherence, and continued enrollment. - David H. Thom, Mark A. Hall and Gregory Pawlson *Measuring Patients' Trust In Physicians When Assessing Quality of Care*

The most complex environment that humans have adapted for is each other. This is the origin of our complex social cognitions. Humans have an incredibly complex and sophisticated non-oral system of communication designed to promote our survival. We read meaning from tone, expression, pacing and much more. When we communicate in medical situations we leverage these pathways more heavily. For example, we can discern 212 complex emotional states from the brow line alone. Phrazer leverages human interfacing (communication theory) to reinforce the messages presented and further aligns them through incorporating tactile interfacing and supportive visual interfacing. This results in an increase of efficiency and conveyance of meaning that is extremely powerful, accurate and meaningful during each interaction.

Coupling information science and theory with brain science and communication theory on Phrazer creates measurably higher levels of trust, understanding and accuracy as proven by neuroimaging results of cognitive and neural foundations from the National Institute of Health. Communication theory application on Phrazer is focused on evolutionary biology and brain research specific to individuals facing the unique and compelling communication challenges presented in medical situations.

Via communication theory incorporation (in video interfaces, graphics and locations on screen, invocation of culture and authority, hard to fake messages of intent, supportive tone and body language) Phrazer is able to positively leverage agency detection, precautionary reasoning, hyperactive agency detection, intuitive reasoning, casual determinism, empathy, intentionality and theory of mind among other key areas.

The caregiver on Phrazer provides highly calculated interactions that send messages to:

- Enable and elicit scrutiny of hard to fake signals of commitment
- Communicate caregiver/patient intentions
- Inculcate doctrines and forge critical caregiver/patient alliances
- Create hope, solace and excitement appropriately
- Provide attention arresting experiences that get patients past shocking news
- Convey sincere commitment

Focus, trust and relevance have key inroads that can be exploited to the benefit of the patient and caregiver via communication theory science that is accurate, vetted and proven.

Claim: Phrazer has a consistent, high quality bedside manner that provides the patient with a highly effective set of interactions that are comforting, meaningful and positive. Human caregivers alone cannot achieve this level of bedside manner, with the calculated and full implementation of communication theory for improved comprehension and trust. Phrazer will provide this quality without prejudice, frustration or deviation as part of the caregiver's patient interaction. This improves patient satisfaction, compliance and outcomes.

Example on Phrazer: Phrazer's caregivers are matched to the patient's gender, race, culture, language and medical expectations. Phrazer caregivers are there for the patient from the moment they enter your care and stay with them through their entire interaction, providing help, education, care and comfortable communication with their onsite doctors.

Trial Validation: In recent private trials, Phrazer worked with patients from diverse backgrounds, races, literacy and culture. These patients used Phrazer and experienced improved throughput speeds, acceptance rates and accuracy levels.

Distraction Mitigation Interfacing

Distractions can occur in the form of noise. In one study of the effects background noise and interruption on learning health information, the group of students watching a videotape with no distraction learned significantly more than a group watching the videotape with noise and with interruption, suggesting that distraction during health teaching adversely affects the ability to learn health information. (McDonald et al, 2004)

A focused patient is an efficient, accurate and effective patient. Phrazer utilizes methods for reducing visual, audio and touch distraction. The noise canceling patient medical headset eliminates all audio distraction for the patient during interactions which significantly improves comprehension and attention. Breaking protocols into short sub interactions through multi-sequencing further improves comprehension and focus when dealing with users experiencing stress, pain and deep concerns by allowing them short bursts of full attention followed by brief interludes for addressing these concerns.

Claim: Phrazer dramatically reduces distraction during patient interactions resulting in greater focus, comprehension and health benefits.

Example on Phrazer: Phrazer's noise canceling headset, heads-up positioning, color breakup and calculated multi-sequencing features are designed for unparalleled distraction mitigation.

Trial Validation: In recent private trials Phrazer achieved dramatically faster speed to treat, higher patient comprehension and more accurate information.

Science of Interpersonal Touch and Tactile Response

According to researchers, people are able to more accurately discern a wider range of feelings and emotion from touch than from gestures, expressions and sometimes even words. That's because touch is the first language we learn. Tiffany Field, PhD of the Touch Research Institute in Miami has found that benefits of touch seem to stem largely from its ability to reduce levels of cortisol, a stress hormone manufactured by the body.

Reinforcing trust, focus and validation techniques through multiple human input pathways, especially during interactions with vulnerable patients, will further improve outcomes. For example, when a patient is working with the Interactive Body on Phrazer, they are seeing a mirror image. When the patient touches the body to indicate the location of an issue, Phrazer clearly states and confirms the side of the body that matches the patient's intended indication. There can still be some confusion or missed meaning, so Phrazer asks the patient to firmly grasp the handles and confirm that the handle that is vibrating matches the affected side of the body; while doing this Phrazer provides visual input by lighting the corresponding LED. Together these indicators provide visual, audio and tactile confirmation in seconds. Then to further this level of accuracy, Phrazer confirms with the caregiver, as well, through a private audio channel.

Phrazer is designed with two handles that help strategically leverage touch. When handing a patient Phrazer, the caregiver presents it in "handhold" mode where the warmed, soft handles mimic a handhold between the caregiver and patient creating a physical connection. This causes endorphins to be released which enables the opening of pathways in the minds of both patient and caregiver. This small but powerful interaction plays a significant role in the interaction. From there, the patient holds the Phrazer with both hands which is a security position. A stressed or concerned patient will typically stay in security mode where a comfortable, relaxed patient will then place Phrazer in a third position known as heads-up mode where they rest it either on their laps or a table top. These three positions are key communication pathways that also give clear and important indications to the caregiver about the state of mind of the patient.

Claim: Nothing matches the speed, accuracy and capability of Phrazer to confirm patient issues, gain patient trust and provide caregiver validation.

Example on Phrazer: Phrazer's handhold design, Phrazer's security position, Phrazer's inline vibrators and Phrazer's prompting caregivers for physical touch confirmation are all features used to leverage tactile responses for the benefit of the interaction.

Trial Validation: In recent private trials Phrazer experienced zero errors on location of patient complaint. Phrazer provided this data to the caregiver and EMR with 100 percent accuracy.

Cultural Relevance

Cultural authority is the collective programming of a given society in regards to their norms and expectations. To achieve comfortable and confident disclosure and to gain physical access to a patient authority must be established. For authority to be established quickly enough for effective care, culture must be leveraged. - *Mat MKJ Phrazer Inventor*

Caregivers will work with diverse cultures on a daily basis. The diversity isn't just geographically and language based but also based on faith, race, education, gender and other factors. Common programming of authority varies enough in any group that it can be challenging to leverage. Consider these simple daily challenges:

- Why can't I get the patient to accept a transfusion?
- Why won't the female patient speak with me but her husband or son will?
- How come the patient won't allow an examination?
- Why is the patient visibly scared despite my best effort to calm them?
- Why won't the patient remove their jewelry?

There are unlimited examples of cultural challenges that we face but now, as never before, we have access to a cultural expert/advocate in the hands of the patient that works with us to speed and improve outcomes.

Claim: Phrazer will improve patient compliance with your facility by leveraging culturally relevant interfacing that carries authority with your patients.

Example on Phrazer: Phrazer matches the onscreen caregiver to the patient's culture, gender, race, faith and expectation. Phrazer provides cultural cues to the caregiver to improve their understanding of the patient, to enhance their authority with the patient and to improve outcomes.

Trial Validation: In recent private trials Phrazer experienced zero errors on location of patient complaint. Phrazer provided this data to the caregiver and EMR with 100 percent accuracy.

Communication Theory Summary

Phrazer artfully blends the real and virtual, enhanced by tactile communication, mimic learning, visual learning, cultural communication and meaning to create attention arresting, sticky, efficient and valid communication. Phrazer will prove this with your patients, your caregivers, your bottom line and efficacy.

It Just Works; Lives Are Saved

“Phrazer is a game changer, because right now there is this enormous need to have interaction with these people that struggle with English. There is nothing else out there that’s like this and that’s a very rare thing to have a truly game changing technology.” - *Tim Stivland, Clinical Communications, Boston Scientific*

“Phrazer provides the opportunity to build rapport and trust by effectively enhancing our bedside manner, which is so very important to the outcome of our patients.” - *Dr. Brian Konowalchuck Medical Director, Occupational Health, Essentia Health*

“I see Phrazer as having the capacity to improve the quality of care, the efficiency of care and improve outcomes. Phrazer also applies to the patient well beyond the need for translation across language barriers, but also in English-to-English interactions because Phrazer can help us be more precise in our language.” - *Dr. Macaran A. Baird, Head, Dept. of Family Medicine & Community Health, University of Minnesota*

“The consensus is that it’s easy to use. It will save time. You won’t have to wait for an interpreter, you won’t have to wait in line. I like it. Even if I speak English I would use it. It’s brilliant.” - *Abdi Ali, Founder and Executive Director of Center for Multicultural Mediation and Restorative Justice*

“I was very impressed with the concept behind Phrazer. It’s very easy to envision this working well in a number of different kinds of medical settings. The software is very user friendly and I’m certain patients will find it easy to use.” - *Mayo Clinic Doctor (on video)*

Feature	Speed	Accuracy & Quality	Satisfaction Value
Information Theory Protocols	X	X	X
Knowledge Representation Interfacing	X	X	X
Tactile (handhold, security, rest)	X	X	X
Cultural and Literacy Relevance	X	X	X
Communication Theory Techniques	X	X	X
Mimic Movements	X	X	X
Caregiver Summary	X	X	X
Direct To and From EMR	X	X	X

Medical Grade Hardware: End Consumer Device Intrusion

Consumer Devices in the Wrong Place

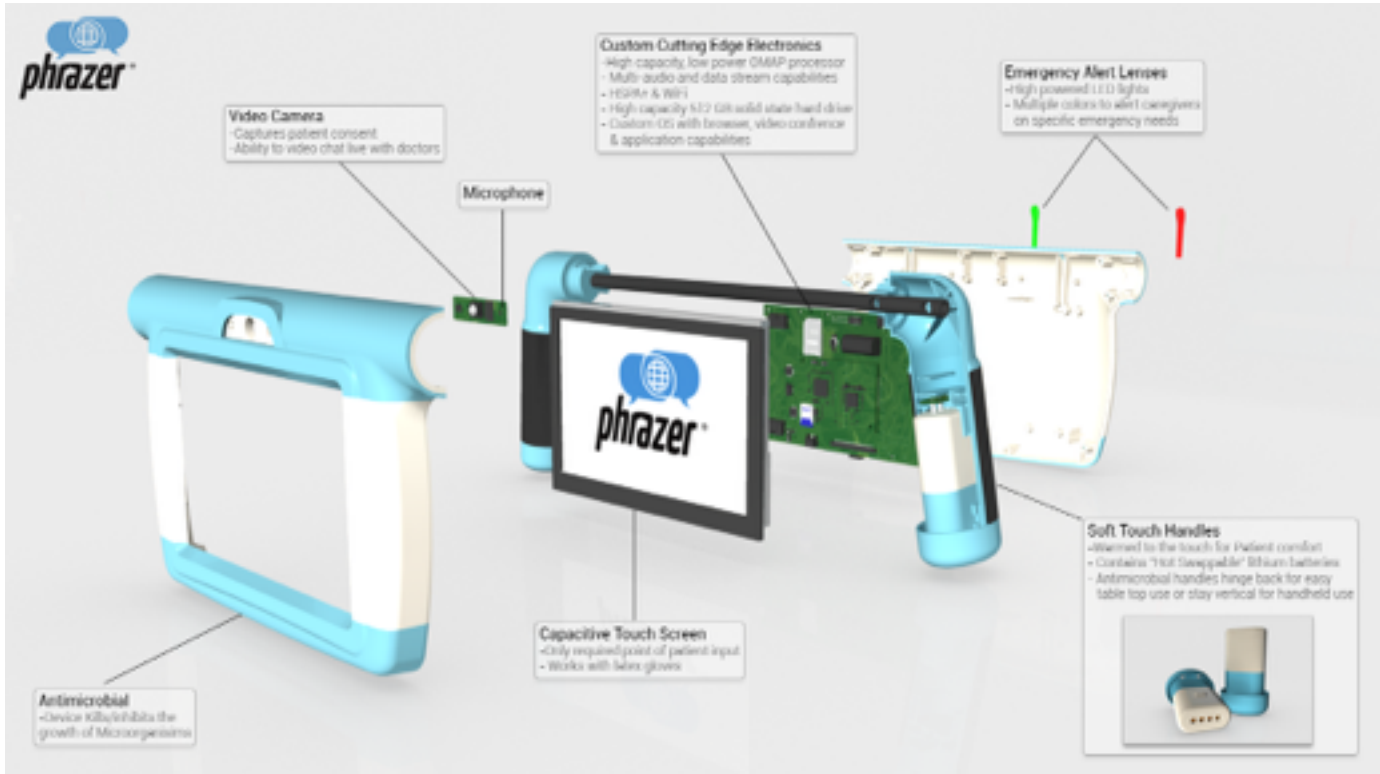
The rapid ramp of smart phone, tablet and web technologies coupled with the legislative pressures, demographic and market failure pressures in medicine has led to a consumer product invasion. With over \$700 billion in wasted cost and nearly 200,000 error based deaths annually there is a call for a solution (Medical error accounts for up to \$1 trillion in costs to the U.S. annually - *Journal of Healthcare Finance*). The inappropriate consumer product influx is like a gold rush in that it comes with snake oil sales claims such as “It’s Magic,” “Insanely Great,” “Completely Secure,” “There’s an app for that” and “Global Access” and vastly less value than claimed. That’s because, like the snake oil market, they lack oversight and the ethics required for the medical market space. To try to legitimize the effort for financial gain, the myriad of companies trying to leverage consumer products for medical use tap physicians to jump in and add their title, experience and credibility to apps and products with little benefit. The market is now a muddled mess infused with unqualified, untrustworthy products with no longterm future viability.

Consumer devices have no justifiable reason for inclusion in the medical market space. We don’t use our home scissors in a surgery or paper clips as clamps nor would we be willing to have knock off stethoscope, heart monitor, X-ray or MRI. The obvious significance of a medical interaction should naturally keep consumer products at bay but when that fails we look to our governing bodies for our protection. There has been a failure and the FDA is going to crack down on inappropriate use of consumer systems which will further disrupt a strained industry.

Healthcare must provide direction with FDA guidance for medical device hardware. The consumer market can’t, due to controls that are price restrictive, feature wasteful and primarily irrelevant to medicine. The revision rate of consumer products also disallows time for FDA and full medical certifications. There will be a body count associated with the practice of using consumer systems as they are measured against true, validated and highly focused medical systems. The need to discontinue the use of consumer goods in medical environments is urgent for the efficacy, economy and ethical needs of medicine.

Medically Qualified and Designed Devices

There are only a few medically qualified hardware communication devices in the market space. There is only one U.S. designed, engineered, manufactured, medically qualified, CITE enabled, inclusive solution on the market which is Phrazer by GeaCom. As such, it sets the standard for the market space and defines what is a truly qualified, medically designed solution. The following presents some details on this definition followed by a market product matrix.



Medically Engineered Design

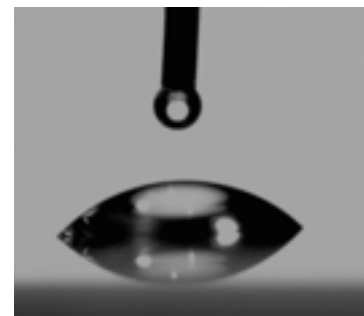
To meet very specific medical needs, Phrazer incorporates huge hard drives, one full week of battery life with hot-swappable power, human factor design, a high bright P-Cap touch screen/display that works with surgical gloves, extensive antimicrobial properties, Crypto-Magnetic Key access, multi-path audio, GSM/CDMA/WiFi/military/private channel network, high capacity processors, high resolution camera, multi-color coded alert LEDs, inline handle vibrators, pulse oximetry ready handles, heart rhythm ready handles, and much more. Phrazer is designed to work with people, technology, electronic medical records and more in a secure, accurate, efficient and safe manner. Here are some details on some of the medically specific hardware features only found on Phrazer:

Intrinsically Safe

Because Phrazer operates around oxygen and other explosive gases and liquids, it is designed to be intrinsically safe. With no moving parts, low voltage lines and a closed system, Phrazer will not spark or ignite dangerous gases found in medical environments.

Vector Mitigation and Disease Control

Phrazer's case is fully impregnated with nano-silver which has strong antimicrobial properties. Phrazer is also designed to have no purchase for liquids and disease with smooth surfaces that have high surface free energy and tension that prevents collection of liquids such as blood, mucus and saliva. Phrazer is also chemically resistant, can withstand strong solvents and alcohols and can be fully submerged or autoclaved, allowing for quick and thorough cleaning between patients.



Power Management



Phrazer is a high efficiency, high capacity system that uses incredible power management systems that allow for as much as a full week of functional use on one charge. The battery system is also hot-swappable allowing for continual, unlimited use. This allows for always on, always ready status for critical systems and easy inclusion into medical work flows. A low battery doesn't mean interrupting a critical patient interaction on Phrazer.

Connectivity

From clinic to clinic, hospital to hospital, during ambulance rides and from patient home to patient home, available networks vary. A truly universal medical communication device needs to be able to effectively communicate with any available, secure network at the time of need and only Phrazer has this capability. Phrazer has a unique communication module that supports CDMA, WiFi, private network, GSM, military band and more allowing for a truly interoperable medical device.

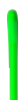


Further, Phrazer can communicate with remote blood pressure cuffs, pulse oximeters, remote ultrasound, pill trackers, digital scales, printers and more. Phrazer has its own proprietary OS it quickly adapts to fit your facilities needs in a more secure fashion than consumer market OS solutions.

High Definition Camera/Microphone

Phrazer's front facing camera tracks your patient, watches their reactions and adjusts systems automatically based on what is observed. If your patient gets up and walks away without closing out a session, Phrazer sees this and secures their record automatically. The AV also acts as a record when a patient provides video recorded informed consent to treat; fortifying medical systems against litigation and cost. Finally, this same AV system allows for patient wound recording, video interactions with specialists and more.

Multi-Code LEDs



Two high bright inline LEDs have five color states (red, blue, green, white, clear) for use with patient verification and caregiver interfaces. All of your staff can see and react to critical patient needs based on visual coded LED indicators. Phrazer lets you know when a patient is in critical need, in general care, nearing completion on a protocol or something as simple as which patient to take back to examination.

These same LEDs work as an additional visual verification for patients when selecting which side of the body is being referred to or when confirming answers to location questions. This further limits error and misrepresentation.

Inline Handle Vibrators

Independently located in each handle are high speed, variable vibrator motors. These motors are used for CITE tactile response, alert systems and as a tactile confirmation of patient selections for verification purposes to further limit error.

Multi-Path Audio

Phrazer includes patented capability to share unique audio exchanges simultaneously with the patient and caregivers. While Phrazer is sharing extensive, detailed information with the patient it will cue the caregivers with limited and vital information only. Phrazer's unique and powerful chipset, coupled with a powerful antenna system delivers this patented and critical capability reliably and in high quality.

Accelerometer and 3D Compass

Phrazer can guide your patients down hallways, through the maze of your clinic and hospital system with the use of the onboard 3D compass and accelerometer. These same components help with tremor measure, patient positioning and more. The ability to track and locate a patient with Phrazer is possible at any time. This also helps you track Phrazers to know where they are, how best to apply them and even to track to prevent theft.

Compliance, Information Safety and Hardware Encryption

Phrazer has no buttons for your caregivers or patients to inadvertently press. Nor can Phrazer be inadvertently powered on by a patient as it requires a unique crypto magnetic key to control which uniquely and powerfully secures Phrazer from unauthorized use. Phrazer limits patients to CITE based interactions limiting distractions and lowering error. The fact that Phrazer is a non-consumer product prevents patient familiarity leading to misuse and error.

Phrazer's hard drives and storage systems have multiple levels of encryption incorporated that exceed HIPAA compliance requirements. Should wireless communication not be appropriate, Phrazer has a unique, hidden and secured non-wireless, unique connectivity option.

Phrazer's onboard EMR capabilities and patient information gathering is locked away in the military grade DB40 database system that can not be accessed without full security and user validation. Phrazer allows you to know where it is, what it is doing and who is using it. No other medical product has this level of record security.

Remote Control and Tracking

Phrazer's onboard GPS tracking security system allows you to know where your Phrazers are at all time giving you the ability to set proximity alarms and geographically based business security rules. Tracking also allows opportunity for strategic application of medical resources and staff.

Phrazers can also be controlled remotely from a secured work station allowing for a multitude of opportunities for support, training, service and more.

Casing and Physical Characteristics

Phrazer's case is made of antimicrobial, chemically resistant, drop resistant, hardened polymers. Non-fade coloring, scratch resistance and easy cleaning keeps Phrazer looking, feeling and working like new.

Phrazer's handles, shape and colors are designed with CITE in mind for patient connection, security and comfort. The same design makes for easy transport, storage and incorporation into workflow for your staff.

Longevity and Upgrades

Consumer products are designed for one year use. Phrazer is designed for a ten-year life span. We offer an advance replacement program and complete hardware upgrades. During the span of use of your Phrazer you'll not see dimming displays, dying batteries, broken cases and other intentional obsolescence seen in consumer devices. Operating systems and user interfaces will provide critical continuity, maintaining experience based value.

Additional Value Points Supporting Hardware

Having medically specific hardware is required for proper service in the market space but what you fortify that hardware with in terms of software, production, quality, service and support ultimately can play as big a role in product value.

U.S. Engineered

Ownership of design is critical for meeting the sobering needs of the medical market space. When you own the design, critical features don't unexpectedly go away because the designer doesn't need them in their key target markets and new design additions don't get ignored because they don't cross into other market spaces. When you own the design, your product can react, grow and improve specific to your market's needs. Phrazer's designers and engineers work toward medical market space excellence without trying to blend with other markets that will water down value and disable key capabilities.

U.S. Production, U.S. Support

The highest quality medical products are made in the U.S. Craftsmanship, quality and ability to stand behind a product are hallmarks of U.S. manufacturing. Phrazer is designed, built, supported and created in the U.S. GeaCom is headquartered in Minnesota with production in Texas and Minnesota. GeaCom's support staff is in Duluth and Minneapolis, Minnesota and offers 24/7/365 on call readiness. GeaCom can support Phrazer for customers at the highest levels in the market.

Medical, Custom Operating System and User Interfacing

Like hardware, in software you don't want irrelevant consumer companies controlling and modifying your available functionality on consumer whim. For long term value, a medical device system must own not only its user interfaces but also fully own its operating system that controls all critical features. GeaCom has developed a proprietary, robust and powerful OS specific to Phrazer. We control our features, capabilities and future path in partnership with our customers.

To be trouble free and robust we've created a unique and powerful technique of updating the OS, remotely and trouble free, in the field. Our operating system and operating system management systems mean fully controlled, updatable and trouble free application in your facility. No consumer products can make this claim. In addition, its unique OS acts as a security measure unavailable in widely used consumer software.

GeaCom also maintains and develops user interfaces and medical media for you without the need of third parties. Updating protocols, languages, adding interfaces and features is quick and easy due to simple to implement updating.

Independent Network

Healthcare has become portable, not only within the confines of the hospital walls but also out into the patient's home, workplace and beyond. Having a network capability to run on CDMA, GSM, Private, WiFi and more is key to reaching all of these locations with quality and efficiency. Phrazer allows you to choose your connection type, a carrier or independent network method and gets your caregivers, ERM and treatments to the patient when and where needed.

Owned Quality

Your phone freezes up, your tablet has software hangs. Off the shelf consumer systems have a high tolerance for failure but this tolerance isn't shared by the medical market. Phrazer quality is set to a much higher standard, meets FDA and all major governing bodies requirements. Phrazer quality systems are among the best in the world, include extensive, daily self diagnosis, finite controls and the detailed reporting that is required for a true, quality medical device.

Longevity for Medical Application

Consumer devices are made to be used a few hours a day at most and have a typical lifespan of one year. In a year's time consumer device screens lose over 50 percent of their brightness, batteries lose over 80 percent of their capacity and other features may just fail outright. Phrazer is designed for continuous, all day service for up to ten years without losing screen, batteries or any functionality. This reduces your annual cost of ownership and provides a stable and reliable source of continual service.

Video Conferencing

Phrazer has high quality, anywhere video conference capabilities allowing for a myriad of support, patient facing and interviewing capabilities. When coupled with our secure remote control features this becomes a powerful combination in medical applications.

Patents

Phrazer has more than 78 patents and trade secrets incorporated into its feature set. It is the only system in the world allowed by law to have the vital, unique and critical features that it offers which result in unmatched patient efficacy, system efficiency and the interaction accuracy that it provides. In a market space where a 0.5 percent increase in accuracy is a default buy due to economies of scale and the critical nature of the application, Phrazer is the only viable option available on the market today.

Summary

GeaCom has committed to providing the best hardware, software and support into its vital solution for the medical market space. In doing so it has set a standard that is unmatched in the market and staked claim to a leadership position that it won't give up. Phrazer is, and will remain, the most powerful medical communication system in the market.

Phrazer's Future Path: Enduring Roadmap for Your Practice and Medicine

There are 78 powerful patents and trade secrets coupled with GeaCom's unwavering commitment to improving medical efficacy. This unique arsenal of value-added pieces strongly positions Phrazer as the one-of-a-kind, disruptive solution for long-term value to you, your system and the patients you serve. World leaders in innovation and technology have joined with GeaCom to assist in development and deployment of the first ever CITE product to reach its full potential and to meet the moral imperative potential for medicine (Texas Instruments, Micron, T-Mobile, Sierra Wireless, U.S. Government and more).

Phrazer has been in development for over five years, has been used around the globe with diverse caregiver and patient groups and has seen extremes from disaster relief to military theatre action, as well as, use in conventional medical systems. Following an FDA path, Phrazer has developed into a highly stable, reliable medical device that is providing greater accuracy, efficiency and positive outcomes than ever before possible.

The future path for Phrazer is strong and mapped out. Medical systems that join the Phrazer roadmap now will receive unique benefits of a first mover in a medical revolution. GeaCom will work with you to react and innovate in response to demanding and sophisticated experiences you share and will involve you in powerful marketing and ROI opportunities that arise.

New products like the award winning Kitsune medical, wearable headset/computer and the Gichi tracking tablet are coming online to add even more capability to Phrazer. Protocols, languages and cultural pathways are being added to the growing capabilities of Phrazer daily. Additional incorporated compliance and efficiency pathways are being included. Phrazer is already positioned as the strong leader in this space and we will continue to forge the high value path to improved healthcare.