

**Testimony of Luis Machuca**  
**CEO, Kryptiq Corporation**  
**Before Environment, Technology and Standards Subcommittee**  
**"Health Care Information Technology: What are the Opportunities for and**  
**Barriers to Interoperable Health Information Technology Systems?"**  
**February 23, 2006**

My name is Luis Machuca and I am the CEO of Kryptiq Corporation based in Hillsboro, Oregon. I am honored to offer my thoughts and perspectives on the opportunities and barriers for health information technology adoption. This testimony will illustrate that secure clinical messaging represents the single biggest opportunity to quickly and cost effectively modernize our healthcare system.

As residents in the Portland metropolitan area we have just witnessed the media frenzy regarding the theft of medical records. We have heard the raised voices of outrage that personal data may have been exposed due to this incident. An Oregonian editorial indicted the health system for its failure to manage health data appropriately.

But where are these voices of outrage regarding the errors in clinical judgment and decision-making that occur in every health system in every city, in every state, every day of the year, due to the lack of clinical information being available at the right time. Why is this not the target of our outrage and concern as a society?

To cite the Institute of Medicine (IOM) Report published in 2000 "To Err is Human," our US health system, which is capable of the most miraculous acts of life-saving, is frequently the source of patient harm. Between 44,000 and 98,000 patients die in hospitals each year from preventable medical error. Preventable, but un-prevented, medical errors are a greater risk to patient health than motor vehicle accidents, breast cancer, or AIDS. In terms of lives lost, patient safety is as important an issue as worker safety. Every year, over 6,000 Americans die from workplace injuries. Yet this number is exceeded by the 7,000 Americans who die annually from errors in medication prescription or administration.

In addition, our healthcare system is overwhelmingly expensive. Healthcare in the US is estimated to cost up to \$2 trillion per year, consuming 13 percent of the GDP. Centers for Medicare and Medicaid Services (CMS) estimates predict this will rise to \$3 trillion and close to 20 percent of GDP within the next 10 years, or an average of \$10,000 per American resident. Employers will not be able to afford health benefits approaching \$40,000 per year for a family of four, while remaining competitive in a global economy – nor can they continue to afford the staggering (yet unmeasured) productivity loss from subjecting workers to an inefficient healthcare system.

The decentralized and fragmented nature of the healthcare delivery system contributes to unsafe conditions for patients, and serves as an impediment to efforts to improve safety.

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Even within hospitals and large medical groups, there are rigidly-defined areas of specialization and influence. The average Medicare patient sees more than 6 physicians in the course of a single year, but their care is frequently “silo-ed”, and lacks coordination and communication. At the same time, the loose affiliation of most provider groups makes it difficult to implement improved clinical information systems capable of providing timely access to complete patient information across all providers. Unsafe care, high cost and productivity loss is the price we pay for not having data mobility in our healthcare system.

The IOM followed their 2000 report with a 2001 report that boldly stated that between the healthcare we have and the care we could have lies not just a gap, but a chasm.

A highly fragmented delivery system that largely lacks even rudimentary clinical data mobility results in poorly designed care processes characterized by unnecessary duplication of services and delays. There is substantial evidence documenting overuse of many services—services for which the risk of harm may outweigh the potential benefits.

Meanwhile we are stuck in a health system that pays for quantity not quality and is centered on a 400 year model of treating patients when they are acutely sick, rather than ensuring the services needed to maintain their health. For the last four decades, the needs of the American public have been shifting from predominantly acute, episodic care to care for chronic conditions. Chronic conditions are now the leading cause of illness, disability, and death; they affect almost half of the U.S. population and account for the majority of healthcare. Yet these conditions are seriously under managed when it comes to ensuring Americans get the most appropriate evidence-based care that they should expect.

For example, hypertension affects nearly one in three American adults. It is called “the silent killer” due to the strong link between unmanaged hypertension and later incidents of coronary vascular disease. Yet only 23 percent of diagnosed hypertensives have their blood pressure under control, despite readily available and cost-effective medications. Diabetes was referred to in a recent New York Times article as a disease of epidemic proportions, and yet more than 70 percent of diabetics have unmanaged cholesterol levels, despite readily available cholesterol management treatments. Diabetes is the leading cause of non-traumatic lower limb amputations in the US, but barely one in five patients with diabetes receive the recommended annual foot exams that can expose loss of sensation. Additionally, almost 70 percent of our children with severe asthma are not receiving appropriate medications.

A 737 stays grounded due to safety risks if a tray-table won't stay in it's locked and upright position, but the equivalent of a 737 load of people die every day from preventable medical errors.

Many of us would not dream of letting our cars go more than 7000 miles without an oil change, and in fact get regular notifications about servicing so they don't break down on

the side of the road. However, we may go years without a blood pressure or cholesterol check, and the first sign of coronary heart disease is when our bodies break down and we are rushed to hospital with a heart attack or stroke.

As a society, we are outraged about a single occurrence of data being stolen, but ignore the daily healthcare crisis when opportunities for continuous and appropriate care are missed due to the lack of basic information systems with data mobility.

The relevant technologies to address these problems are neither complex nor expensive. We don't need 4-D CAT scanning devices to ensure children receive immunizations and the elderly receive flu shots. We don't need to solve the genome code to notify patients in a timely and traceable manner when their lab results are normal or abnormal.

We created Kryptiq to solve these problems.

Today, more than 100 employees at Kryptiq Corporation are focused on enabling secure connectivity in healthcare. Last year alone our customer base grew 120 percent to over 700 healthcare organizations in 48 states. More significantly, the number of secure clinical messaging customers grew by more than 200 percent in that same time frame. Every one of these clinics who purchased Kryptiq connectivity software did so with the specific intent to collaborate with other clinics and in many cases also with their patients. The primary application of Kryptiq software is "provider-to-provider" communication for referrals, lab results, consultations, admissions, and prescriptions. These products also allow "provider-to-patient" communication to deliver secure online access to medical record summaries, lab results, and administrative data. They enable patients with chronic diseases to ask questions and provide home monitored data to their physician office, and support eVisits to provide necessary care without the patient coming into the practice. The growth and adoption of Kryptiq software tells us that connectivity is not just a "nice to have" capability – it is the best way to unlock the value that is trapped in the information silos of healthcare.

Much attention has been given to President Bush's goal to enable Electronic Health Records (EHR) for nearly all Americans by 2014. The creation of the Office of the National Coordinator for Health Information Technology (ONC) has advanced the cause and awareness of EHR. Among other tangible benefits, Dr. David Bralier's efforts have been a positive and significant step forward in moving us away from paper and establishing a foundation for data storage and management. EHRs are of great value in organizing and maintaining the accuracy of patient information, while eliminating the burdens inherent in a paper system. However, EHR adoption alone does not result in collaboration. In fact the evidence to date suggests most EHR implementations create islands of automation, no more capable of sharing information than the paper records they replace.

Efforts spearheaded by the ONC to create Regional Health Information Organizations (RHIOs) for information sharing have largely stalled. Yet Kryptiq customers are delivering significant and measurable gains by combining the EHR systems that already

exist with a readily available and affordable messaging infrastructure to share information across their communities. Secure clinical messaging represents the greatest opportunity to modernize and improve healthcare. Therefore, we believe that in order to truly lower costs and improve quality, we need to look at how we MOVE patient information, not just how we STORE patient information.

We all know about the growing cost of healthcare and the burden it is placing on our citizens, our businesses and our economy. Several studies have shown the tremendous potential for cost savings and qualitative improvements that can be realized through healthcare IT adoption. A recent study by the Center for Information Technology Leadership (CITL) at Partners HealthCare reported that if all information exchange between physician, hospitals, pharmacies, radiology centers, and public health facilities were fully automated in a standardized way, the U.S. healthcare system could save in excess of \$77 billion dollars each year. The study specifically, and in my opinion rightly, points out that 70 percent plus of the savings opportunities exist through inter-office collaboration as opposed to internal office automation.

The recent RHIO initiatives are an attempt by the government to address the data mobility issue. However, the “typical” RHIO (not unlike its predecessor, the CHIN) has a fatal flaw – it essentially requires that all infrastructure, governance, funding, and standards be agreed to and deployed BEFORE it can be of any use. This is analogous to building an entire road system before anyone can drive. In addition, questions about their sustainability have yet to be answered. This leads me to conclude that the current RHIO concept will require ever-increasing and ongoing financial support from the government.

**Comment [MC1]:** This comment is specific to the funding issue, which gets lost in this sentence. If you build this massive RHIO with new technologies you then need to consider who pays. If users pay, then it better deliver measurable value to those who utilize it -- but it doesn't, it benefits "the system". Things that benefit "the system" (roads, schools, power, mass transit) generally get funded by taxation where everyone, whether they use the utility or not, contribute to it -- but the RHIO model does not have an effective tax base.

There is a smarter approach. The concept of an “organic” or incremental RHIO fueled by secure messaging technology provides immediate data mobility in a self-sustaining model without the centralized high cost infrastructure and bureaucratic governance. Forrester Research, reflecting on the early and modest results from initial RHIO efforts, has coined this concept as Managed Connectivity and it is gathering support among industry leaders. Dr. Brailer illustrated this point in a recent article in Health Data Management, "Most [people] will want to make local decisions on how data will be shared...the less centralization there is, the more value people will see..." The Managed Connectivity concept is predicated on peer-to-peer workflow-based collaboration. The technology foundation is email and the Internet, which is already universally available at a minimal cost.

**Comment [LM12]:** Need Brailer's quote

By definition, this approach includes any clinic that has email access as opposed to only those that have EHR. At the same time, it will serve to stimulate EHR adoption because electronic records are a place to store and manage data that is sent and received. The big benefit however is that collaboration begins on day one – there are no multi-year implementation projects.

I know that this model will succeed. I spent 15 years at Intel at the critical time of Personal Computer adoption. As many of you may recall, the transition from early adopters to widespread business use occurred because of email. Collaboration drove PC

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adoption, which in turn drove richer applications, and created the industry that made every industry more competitive and productive. This was referred to as a “virtuous technology spiral.”

More importantly, I know that the “organic” approach works because I see our customers doing it every day.

Oregon has been the home to many healthcare breakthroughs, both in the private and public sector. The Oregon Health Plan, the early electronic medical record developed by Dr. Mark Leavitt, and the wide deployment of EHRs by both Providence Health System and Kaiser Northwest Permanente are examples of national leadership in healthcare.

Recently, in partnership with our customers, Kryptiq has established that connectivity solutions significantly improve care delivery and reduce costs. For example, by transitioning patient referrals from paper-based systems to secure electronic communications, Providence Health System and The Oregon Clinic were able to save an approximate combined \$10 per referral. Faxes and phone calls were replaced by electronic messaging in a matter of weeks. This was achieved without the need of external forces or government subsidies or multi-agency committees arguing about every last technical and business detail. In addition to reducing costs, moving to electronic referrals eliminated the time lag inherent in paper systems and ensured that relevant information was where it needed to be when it needed to be there.

Meanwhile Providence Medical Group recently released the results of a comprehensive one-year study of significant improvements in patient outcomes using Kryptiq’s CareManager Diabetes Module. Their ability to unleash the data stored in their EHR and use it to proactively communicate with chronic patients regarding their health status, instead of waiting for the next office visit, has led to remarkable improvements in treatment compliance. They have demonstrated a 58 percent increase in the number of patients with diabetes who achieved control of their cholesterol and blood pressure levels, significantly reducing the risk of disease complications. They also documented a 250 percent increase in foot screenings, helping to stem the rate of later amputations. All of this was achieved without any additional staff requirements, and the extra revenue from providing necessary and medically appropriate care in a timely manner allowed the medical group to pay for the necessary IT investment, while undoubtedly saving the economy many millions of dollars in hospital visits and other longer term care costs.

Similar examples exist throughout the country in physician offices adopting connectivity solutions at their own investment to improve their care services and generate additional revenue at a lower overall cost. Family Medical Specialists of Texas (FMS) believed that their busy patients would receive better care if they could have online consultations with their primary care physician to resolve medical questions and issues without an office visit. Rather than waiting on all the local health plans to support “eVisits”, FMS now charges individual patients \$40 per year for their eCare program. Patients believe it pays for itself by avoiding co-pays; employers and employees save time by avoiding unnecessary office visits; FMS generates additional revenue without increasing staff

costs; and the health plans save money by shifting office visits to more cost-effective and efficient forms of care.

Memorial Hermann Healthcare System (MHHS) in Houston, Texas has adopted messaging technology for similar reasons. Dr David Bauer, Residency Director for The Family Medicine Residency Program, cites a typical pre-messaging scenario of a patient calling in with a question regarding a medication she had been prescribed the previous day. “She left me a message to call her back. But when I called her back she was in a meeting so I got her voicemail. When she returned my call I was busy seeing patients. Over the next 24 hours she spoke to three of my nursing team without reaching me, having to re-explain her issue each time, and we left each other seven voicemail messages.” Dr Bauer’s scenario is a common one, happening all over the country every day, but for him it’s now a thing of the past. “Now we use secure messaging, which allows me to communicate with patients and other providers without our needing to be available at the same time.”

Examples such as these illustrate that the market is creating the standards for baseline interoperability. The next logical step in the evolution of such standards is a common interchange structure for patient medical records that is simple to deploy such as the ASTM Continuity of Care Record (CCR) or the HL7 Clinical Document Architecture (CDA). The standard should be accessible by patients and healthcare providers and work in both EHR and non-EHR environments. By contrast, emerging concepts, such as Cross Enterprise Document Sharing (XDS), promote collaboration but require significant infrastructure, are more complex to deploy and assume certain market outcomes that are still in question.

Because there are competing definitions of a common interchange structure for patient medical records, healthcare IT vendors are reluctant to develop interoperability solutions based on either standard. We believe that it is time for the government agencies such as NIST to help mediate between these competing approaches. We are also encouraged by NIST’s involvement in developing reference implementations for the XDS standards. These efforts help promote the validity of standards and their applications.

A common interchange structure for medical records will be a great leap forward for everyday collaboration. However, other standards will need to be developed to address more specialized healthcare-related homeland security needs such as the aggregation of emergency room data to identify pandemics.

We’ve made great progress in a short period of time and this has led us to a solid foundation for the critical work that remains to be done. Clearly, we want to continue to build on the successes that will drive collaboration and improve the quality and delivery of care, while achieving critical cost savings. To this end, we recommend that the Government’s continued and future funding for healthcare IT follow this direction:

1. Prioritize “organic” RHIO expansion while limiting any additional spending on centralized or federated models unless they demonstrate scalability and broad community participation.
2. Fund the implementation of electronic collaboration technologies in public health settings. Public health is largely funded by the government at a federal, state and local level. To preserve the viability of the public health clinics, they should be the recipients of targeted resources specifically for this purpose.
3. Mediate a definition of a common interchange structure for patient medical records to facilitate collaboration. Specifically, settle the debate between CDA and CCR. CMS could provide incentives for the adoption through its reimbursement processes.
4. Combine any contemplated changes in Stark laws with collaboration mandates that ensure that any recipient of technology can participate in a fully collaborative and open community-wide network.
5. Continue work towards differential reimbursement to physicians who can prove better outcomes of care for their patient population.

As we have shown, the benefits of secure electronic collaboration are undeniable. We are on the eve of a major breakthrough of technology adoption that will make the healthcare industry safer, more cost-effective and more competitive. We advocate a network of collaboration that maximizes provider and patient participation, and provides immediate and secure data mobility in a self-sustaining model without the high cost and complexity of a centralized system.

Thank you.

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Luis Machuca, President and CEO

Luis Machuca is the President and Chief Executive Officer of Kryptiq Corporation, the leading provider of interoperability and workflow connectivity solutions for healthcare. Mr. Machuca received his BSEE in 1980 and MSIE in 1981, both from Purdue University. In 1981, he joined Intel Corp., where over a 15-year career, held a variety of roles in management before becoming co-General Manager of the OEM Products & Services Division where he established Intel as the number one motherboard supplier in the world. In 1996, he became the Executive Vice President of the NEC Computer Services Division of PB-NEC Corp. In 1999, Mr. Machuca joined eFusion Corp. as President and COO and subsequently merged the company with ITXC. Mr. Machuca currently serves on the Oregon Health & Science University Foundation Board of Trustees, Lifeworks NW Board of Directors, the Boy Scouts of America Cascade Pacific Council Executive Board, Catholic Charities of Oregon and the Jesuit High School Board of Trustees. Mr. Machuca has also served on the Portland Metropolitan Family Services Board of Directors, and was a finals judge for the 2005 NewVenture Championship business plan competition sponsored by the University of Oregon’s Lundquist Center for Entrepreneurship. In 1999, Mr. Machuca received the Outstanding Industrial Engineering Award in from Purdue University.

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