

**NATIONAL COMMITTEE ON VITAL AND
HEALTH STATISTICS**

Workgroup on National Health Information Infrastructure,

and the

Workgroup on Health Statistics for the 21st Century

October 30, 2000

**English Room of the Canterbury Hotel,
750 Sutter Street, San Francisco, CA 94109**

Invited Testimony by:

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Introduction

My Background

<first slide>

It is a great pleasure and an honor for me and to present once again to working groups of the National Committee on Vital And Health Statistics. I am particularly honored to be asked to testify before you -- members of the Workgroup On The National Health Information Infrastructure, and the Workgroup On Health Statistics for the 21st Century. The intersection of these two areas lies at the heart of my own professional interests. I am a practicing academic internist, a user of electronic medical records, and sometimes a patient of physicians using our technology from Medscape. I received additional graduate training in chronic disease epidemiology, and health services research focusing in medical informatics. My work now focuses on improving the abilities of healthcare providers to manage individual patients as well as populations of patients, linking knowledge to practice at the point of care with electronic health records, and empowering healthcare consumers to play a greater role in their own disease management and wellness through the shared online electronic health record. Prior to joining Medscape, my academic research focused on clinical decision support, and expert systems. At Medscape, I am Chief Medical Officer, and responsible for providing guidance and oversight for all clinical issues in our software products, and services.

Medscape

Medscape is a vendor of clinical information management tools for physicians and patients, a provider of premium healthcare information for professionals and patients, and a provider of a wide variety of online services including next day medical conference summaries, peer reviewed clinical content, accredited continuing medical education, and online health records. Medscape is devoted to improving the healthcare experience for providers and patients through the use of Digital Health Record technology at the point of care. After 15 years of work, Medscape now has in excess of 30,000 clinician users of our Digital Health Record technologies, including electronic medical records, Medscape Mobile, and transcription services. These clinicians have created in excess of 15 million online health records, and we have several thousand users of aboutmyhealth.net -- the first online electronic health record shared by patient and provider alike. Medscape as we know it now resulted from the integration of four companies: MedicaLogic, Medscape, Total eMed, and anywhereMD.

Objectives

<second slide>

My objectives for my brief comments before you today are to first provide commendations for a job well done in producing the two reports. The Interim Report Toward a National Health Information Infrastructure, and the Interim Report Shaping a Vision for 21st Century Health Statistics provide an excellent vision into critically important areas of the U.S. healthcare delivery system. I will first share with you my reactions to the reports, describe our work at Medscape which pertains to aspects of the NHII, and then describe to you barriers and unresolved issues as I see them which must be overcome before the reports may be translated into reality. Possible tactics to support or drive development of the National Health Information Infrastructure will also be highlighted briefly at the end of my remarks.

Reactions to the Interim Reports

Toward a National Health Information Infrastructure

The vision outlined in the interim report toward a National Health Information Infrastructure is very consistent with our work at Medscape. We agree that critical issues remain to be solved in protecting the privacy of personally identifiable healthcare information. Critical standards need yet to be developed to enable secure interoperability between healthcare information management systems. The recognition of information as both a private resource and public good lies at the center of critical issues surrounding the use of healthcare information for care delivery, health maintenance, healthcare operations, medical research, and maintenance of the public health. The report correctly identifies challenges yet to overcome with respect to overcoming the costs associated with building out the National Health Information Infrastructure, and correctly characterizes the NHII as a necessarily heterogeneous system of systems to support clinical information management broadly.

In our work at Medscape, we also agree there are three different “dimensions” to clinical information management. Our product aboutmyhealth.net is analogous to the personal health dimensions as described in the interim report. With this tool, patients can perform many of the functions outlined in the reports in terms of accessing and managing personal healthcare information, as well as communicating to their healthcare providers.

The healthcare provider dimension maps well to our notion of an electronic medical record. The EMR, or Digital Health Record, whether it is delivered via client/server technology within a healthcare enterprise, or through new Internet enabled electronic medical record technology, gives the provider a means to capture clinical documentation, access tools for medication administration, formulary compliance, outcomes reporting, clinical communications, as well as integration with a variety of knowledge-based tools at the point of care. Our electronic health records contain a great deal of structured and coded clinical information which can support clinical decision support needs, as well as outcome reporting needs for population management.

The community health dimension is analogous to our online reporting environment although as it is described in the interim report it goes far beyond what we have been able to accomplish to date. So far, we allow users the ability to report upon their own patient

populations, and to assess their compliance with national standard guidelines of care. Soon, we will provide the end user the ability to contrast their own experience against experience of similar, or referent populations. We have not yet integrated data from sources beyond the systems typically interfaced to the EMR: hospitals, laboratories, and transcription systems. I look forward to the day when the core content in the community health dimension as described in the interim report is available to users of electronic health records at the point of care. Such population statistics and insights would be very valuable to each and every clinician. For example, access to community-wide microbial sensitivity information at the point of care could be extremely helpful.

Shaping a Vision for 21st Century Health Statistics

The Interim Report *Shaping A Vision For 21st Century Health Statistics* does an excellent job in highlighting the need for improved data sources and analysis of healthcare information to support both individual clinical decision-making and population management. The knowledge gaps outlined in the report accurately reflect the divide between what is currently available in only the most sophisticated healthcare information management systems, and those data that reside in other systems typically not accessible in the course of routine healthcare delivery. Indeed, other data from non-clinical environments may not yet be in any information management system whatsoever, yet it may be relevant to individual patient management, or population health management.

In addition, the need to better understand healthcare business trends toward capitation, consolidation, and other market effects requires a meta-level view of the healthcare delivery system and the data it produces. A meta-level view would look at aggregated data from multiple provider and healthcare enterprise environments, as well as socio-cultural, demographic, geographic, and environmental data. Some of the research objectives described in this interim report, I believe are approachable with a robust electronic health record. With a rich clinical data repository created from electronic health record used at the point of care many questions on technology assessment, clinical efficacy, and other types of epidemiological questions may be readily addressed. Yet, sadly the penetration of electronic medical record technology in the marketplace remains low.

The Current Reality

Why is the penetration of electronic to record technology low in the marketplace? The lack of sufficient technology standards are usually identified as the culprit. However, even with today's basic interoperability standards, as I defined them in my testimony to the Workgroup on Computer-based Patient Records, basic information exchange between systems is feasible. More sophisticated interoperability may require additional syntactic and semantic messaging standards but a huge amount of information may be exchanged between systems today because a lot of information, such as laboratory results and other quantifiable data, does not require very sophisticated modeling.

By and large, the reason penetration is low is that while physicians are often called upon to make healthcare information technology investments, they are capital poor in the

current healthcare environment. Certain hospitals and integrated delivery systems have capital for such investments and clearly they are investing in healthcare information management technology. New models for delivering healthcare information technology (which will be described below) markedly change the investment dynamic from one of a capital intensive outlay to a subscription software model. This change is positively impacting technology adoption rates.

The second major reason that healthcare information management technology is only slowly being adopted is that the market forces that would benefit from such technology are not aligned in most cases. In organizations where the providers, the payers, the hospitals, and occasionally the employers, are aligned significant technology investment has occurred with dramatic results. For example, in the Kaiser Permanente and Veterans Administration Healthcare Systems, clinical information management technology has been the focus of large-scale capital investment. In the private healthcare marketplace, however, such alignment rarely occurs. The tactics presented at the close of these remarks aim to align market forces which will drive technology investment in the NHII.

New Models for Healthcare Information Technology

<slide three>

While the two interim reports provide an outstanding vision of what might be with respect to a National Health Information Infrastructure, and 21st Century Statistics, the current reality, regrettably, is far different. It should be noted that less than 5 percent of outpatient clinics, and somewhere between 10 and 20 percent of hospitals, have anything even remotely resembling a computer-based patient record, or systems for physician order entry. Most hospital environments have well-established departmental clinical systems – such as clinical laboratory, and radiology, and legacy systems for patient accounting, but rarely is there a true integrated clinical information management system designed for the clinician, not to mention the health consumer.

In the outpatient setting, most clinical practices have some form of practice management system, but this rarely serves the needs of clinical information management for the physician and care providers. Recently, we have seen the emergence of the so-called application service provider, or ASP, model of technology delivery where systems may be hosted remotely, potentially by a third party, outside of the healthcare enterprise. As depicted in the third slide, the Internet provides the backbone for serving up a wide variety of clinical functionality now using secure technologies over the public Internet, or over private networks.

A Systems Perspective

<slide four>

In the next slide, we see a wonderful depiction of the "simple" dataflow arising from a simple clinical encounter as represented by the California healthcare foundation. In this wonderful presentation, the Foundation details all the clinical data arising from a simple patient care visits for sore throat. When one considers the clinical encounter, the documentation, the physician's orders, all of the attendant implications around the clinical encounter for labs, prescriptions, results, -- even the immediate transaction set is

considerable. The secondary and tertiary waves of transactions to the third party administrators, the pharmacy benefit managers, the HMO, the claims clearinghouse, the state and federal health authorities, potentially research institutions, clearinghouses, public health institutions, and etc., amplify the problem. It's easy to see how in this country alone there are approximately 30 billion transactions per year for Healthcare, or potentially almost 60 transactions total for every clinical encounter!

The objectives then for the NHII must be to allow the efficient communication of clinical information between people and between systems to promote health, support healthcare delivery, research, and maintenance of the public health. As previously stated, given the heterogeneous nature of not only healthcare delivery systems, but healthcare information management systems as well, achieving this vision is a tall order indeed.

The Medscape Experience

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At Medscape, we recognize that the National Health Information Infrastructure represents a complex system of systems in which our technologies play only a part. We are committed, however, to open standards and interoperability between healthcare systems. As a "best of breed" solution for only one part of the puzzle -- electronic health record -- we must excel at interfacing to ancillary information systems. Our technology is built around digital health record tools designed for physicians. These may include Internet enabled dictation systems; full featured electronic medical record systems, or the new ASP model electronic health record tools. These tools are used by physicians and other healthcare providers that the point of care to create digital health records.

If the patient and provider agree, a secure abstract of the physician's records is created for an individual patient and delivered through a secure consumer channel to the online health record known as aboutmyhealth.net. In this manner, with the shared online health record, the patient and their providers or their proxies may both contribute to the shared digital health record and use it as a communications vehicle for routine clinical tasks such as appointments and prescriptions, and use it for a tailored information retrieval tool.

<slide six>

One of the most powerful features resulting from the use of online health records for the provider is the "Practice Profiles" environment. Here a user of Medscape Charts may perform simple population analyses across all their patients in a secure Web environment. Simple queries such as distribution of all patient's problems, distribution of all medications, distribution of medications used for individual problems, various productivity and utilization reports are all readily available. In addition, the user may analyze their practice patterns for compliance in a particular disease given the national guideline. Here in slide 6 we show a Practice Profiles report for a physician to analyze their compliance with a coronary artery disease guideline for all of their CAD patients.

<slide seven>

In slide seven, we see the opening screen for me aboutmyhealth.net environment for patient named Sarah J. Taylor. Here Sarah may review the status of all for messages with

all physicians caring for her, review her individual doctors charts, access health news information services, and search online knowledge-based tools in a secure environment.

<slide eight>

For example of the next slide Sarah may review her progress with respect to hyperlipidemia management over time.

Barriers to the NHII

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With the emergence of mature clinical information management technologies such as those briefly described, one may ask why have we not yet achieved consensus around the pursuit of a National Health Information Infrastructure? In their outstanding paper "Will Disruptive Innovation Cure Healthcare?" Christensen and colleagues review the many factors that have impeded technology adoption in healthcare historically. The authors describe a "disruptive technology" as that which allows those who were previously unable to do something which historically required the skill of professionals." The authors point out that the various stakeholders in healthcare often suppress innovative technologies which may threaten their status quo.

<slide ten>

Certainly, it is easy to identify a wide variety of issues that provide barriers to change in U.S. Healthcare today. First, among physicians in practice, there is fear of change given that so much change has occurred already and so much of which has occurred adversely impacted their ability to practice medicine and derive value for their services. For physicians now: "losses loom larger than gains". In addition, there is organizational resistance from the entrenched stakeholders. Hospitals are striving to maintain their inpatient census, physician organizations are striving to maintain their economy, health maintenance organizations are striving to reduce the hospitals inpatient census and physician autonomy... it's no wonder the consumer and the provider are frustrated beyond belief.

Christensen and colleagues describe certain patterns of regulatory resistance, which may also inhibit technology adoption. For example, they describe how nurse practitioners and other non-physician allied health professionals may perform as well or better than physicians in certain situations. For example, in the cold and flu season, studies have found that nurse practitioners may do just as well as physicians when caring for simple problems, and patient satisfaction may go up when more time is spent with them. Yet, in this country many states have regulations that prohibit or restrict nurse practitioners' practices in inefficient ways. One may posit that if nurse practitioners were empowered to practice more independently, they might choose to maintain their relationships with physician colleagues via the NHII. The same might apply for community and regional physicians with their regional academic medical centers. Need for such 'connectedness' is a driver for NHII. So long as there are regulatory impediments to allied health practitioners, or telemedicine across state lines, there is a barrier to the NHII.

I believe another form of resistance may be described as structural resistance where due to the episodic nature of care and the information imbalance between physicians and patients, we have not yet seen consumer demand for service and convenience similar to the consumer demand for service and convenience in other industries. As selected patient populations became very well informed, however, for example patients with HIV disease, in some cases they became as well informed as their providers. Online discussion and chat rooms arose to provide peer group support when it wasn't available from the traditional providers. The demands of HIV care also prompted certain physicians to provide special services for these patients. The same pressures don't apply to most routine care issues.

Lastly, it may be said that the simple fact the U.S. Healthcare system is in such chaos that this alone prevents significant new technology adoption for healthcare information management. Many physician practices, and many hospitals, are struggling simply to survive amidst organizational upheaval, reimbursement restructuring, cost containment, and managed care. In this environment, investments in technologies that do not have an immediate benefit, or at least are not perceived to have an immediate benefit, may be difficult to justify. In addition, given the intrinsic flux within the system with rapidly changing organizational affiliations, mergers and de-mergers, it is difficult to make investments in technologies that may serve to better interface one healthcare setting to another. In this scenario, the 'politics of information' would hold that each entity has its own copy of any and all healthcare data it needs to run its business, and it doesn't trust any other entity to share or hold any part of its data as it may be used against them.

Unresolved Issues for the NHII

While there are numerous technology issues, which remain unresolved for the National Health Information Infrastructure, I believe that even if they are completely resolved we will not see widespread consensus to pursue the NHII. That is because the socio-cultural issues are equally if not more important.

<slide eleven>

I think the principal issues that remain unresolved for the National Health Information Infrastructure are not related to technology issues but rather related to societal issues, perception, Privacy rights, data ownership, and property issues around healthcare data. We have yet to adopt in this country a national Patient's Bill of rights, or other legislation, which may serve to define healthcare data ownership and property rights. In the Medscape white paper on this subject (included in the handout), we take the position that the patient is the owner of his or her healthcare information. The physician who creates a chart has limited property rights to their records but is not the owner of the information contained within it. The complexity of this issue alone impacts not only data privacy, security, and protection issues, but also derivative uses of the data as will be discussed below.

A related data ownership issue arises in the "boundary -- less" condition that exists when healthcare payer is also a patient's employer. In this setting, there are no walls between the entity reimbursing for healthcare services and the patients employer, as they are one

and the same. A clear delineation is needed in such settings to give patients reassurance that healthcare information won't be used to adversely influence workplace decisions on hiring, promotion, projects, etc. Providers a level of comfort that healthcare information won't be misused by the employer, or that patient's may not be forthcoming given the privacy compromise and thus conceal critical healthcare information from their providers.

Yet another related issue to data ownership is data "monetization". Given that we not yet have of robust property model applied to data, it is difficult to "monetize" the data in a coherent way. What are reasonable expectations for patients who contribute their anonymous data in aggregate form for healthcare research? What are reasonable expectations for the providers who may have been involved in recording and gathering healthcare information from patients as well? Finally, what is a reasonable expectation for data that is used in secondary analyses? In each case, either the patient, the provider, and the healthcare enterprise or data custodian may have reasonable expectations to participate in the healthcare data 'value chain'. Answers to such questions are difficult in the absence of a national policy on patient's rights and privileges with respect to personally identifiable healthcare information, and a model for applying property constructs to data. There's hope that we are in the midst of a transition where such questions may be at least partially answered with the final regulations from the Health Insurance Portability and Accountability Act (HIPAA), and hopefully a patient's Bill of Rights.

Lastly, I believe the average physician and patient do not yet recognize the benefits, which will arise with development of a National Health Information Infrastructure. Physicians have yet to see any indication of an absolute need for adoption of any of the components of the National Health Information Infrastructure. The Health Insurance Portability and Accountability Act is looming large now in the clinical consciousness and may force some clinicians to adopt clinical information management technology to address HIPAA requirements. However many physicians are simply taking a "wait-and-see attitude" before making even the smallest of steps despite the carefully documented benefits which may accrue to the quality of care, and reimbursement when using electronic medical records. I believe additional research is necessary to assess broadly the impact of components of the NHII, for example electronic health records, on healthcare service, quality, costs, and healthcare outcomes. Particularly difficult research questions must address the impact of 'network effects', and other systems effects within and between healthcare enterprises, on individual, and population health.

In addition, the healthcare consumer is largely unaware of the state of clinical information management in the U.S. today. All the consumer is aware of his their frustration with accessing care, healthcare and pharmaceutical costs, difficulties with healthcare reimbursement, and for 44 million Americans the absence of adequate healthcare insurance. I believe that the average healthcare consumer is now focusing on the privacy and confidentiality perceived risks rather than the potential for significant improvement in healthcare service delivery and convenience. When the average consumer perceives that having an online health record is a "good thing" which can make

them feel better about their healthcare, or may save their life, only then will it become a fixture in their expectations for healthcare delivery.

Possible Approaches to Solutions Toward the NHII

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To begin to make way for a National Health Information Infrastructure I believe we first must begin to make evolutionary changes in the healthcare delivery framework itself. Implementing new technology for technology's sake alone is not likely to be successful. If, on other hand, new technology is being implemented in response to requirements expressed by an evolving healthcare delivery system, it is much more likely to be successful. For example, if we have the need to triage cognitive services of clinicians to appropriately match the clinician's skill level to the difficulty of the patient's medical problem being seen this will have implications for communications and data sharing networks across the healthcare environment. This has been the goal of telemedicine research for decades. Early experiments in telemedicine have looked at these issues in a variety of ways, typically as a point-to-point extension of a single healthcare delivery enterprise, rather than building upon the concept of an NHII. Training average clinicians to use communications and data sharing networks would naturally evolve the local practice of medicine to a NHII-based model of medical care where cases could be matched to the appropriate clinician for cognitive services whether across town or across the country.

The success of the Internet in other industries has been to 'disintermediate' people or processes that separated consumers from the sources of products or services they desired. The same might occur in healthcare. We already see patients going online in record numbers to access healthcare information on the Internet themselves to inform their own thinking about their healthcare conditions, medications, lifestyle, and other issues. In certain situations, patients may not need to visit the doctor -- a simple clinical dialogue over the NHII may suffice.

From a technology point of view, however, the NHII may best be achieved by investing less money in high-end complex technologies and more in technologies that simplify complex problems. In their paper on disruptive technology, Christensen and colleagues describe the need for changing the distribution of the provider mix to allow for the vast majority of patients with simple problems to be seen by allied health professionals rather than physicians. TCP/IP is a relatively simple technology that was disruptive. HL-7 was a disruptive technology for healthcare information systems. For the NHII, we should focus research on simplifying complex problems like clinical information management: methods for basic secure interoperability, simple document and data representation, and ease of use for provider and patient alike.

Potential Tactics to Support the NHII

In addition to the technology and policy initiatives outlined in the Interim reports, the following may serve also as motivation for a National Health Information Infrastructure. These four areas may serve to simulate development of the NHII.

Defined Contribution Health Insurance

As employee benefits in healthcare defaults from defined benefit to defined contribution health plans, it may reasonably be expected that employees will have increased demands for healthcare quality information, satisfaction information, and other metrics pertaining to their choice of healthcare providers and plans, and their purchases of healthcare services. When patients are managing their own healthcare dollar, they will be increasingly sensitive to healthcare delivery service and convenience issues as well. Enabling the National Health Information Infrastructure in ways that have been described above will theoretically allow patients access to performance data on physicians, hospitals, and plans.

Value-based Healthcare Purchasing

Similarly, employers, who are facing escalating healthcare costs particularly in the area of prescription drug benefits, will also look for means by which to judge their healthcare expenditures. Healthcare purchasing cooperatives and other business coalitions have already formed around the country to seek to rationalize and control their healthcare expenditures. To do so they will have need for healthcare service satisfaction, quality, and outcomes data with which to make healthcare purchasing decisions. If the buyer is demanding such performance data from the healthcare delivery system, the system itself will need to adopt tools for gathering and managing clinical information to meet this need.

Patient Safety Requirements

Only recently it has become widely recognized, thanks to the Institute of Medicine report To Err is Human, that medical error is one of the leading causes of death in this country. Most pundits agree that medical error is not due to gross physician negligence in most cases, rather it is due to the absence of a safety net, or systems infrastructure that can support the decision-making at the point of care. Physicians all too often are operating without a complete state of knowledge regarding the patient at hand, nor the most relevant and applicable best practices or current clinical cure guidelines. Both healthcare consumers, and healthcare payers, have now recognized that medical error may be leading contributor to healthcare costs and thus demand for improved patient safety will necessitate implementing components of the National Health Information Infrastructure - particularly tools for improved clinical information management and decision support.

Computerized Prescription Management and Physician Order Entry

Perhaps the best way to apply scarce resources in technology investments in healthcare is to apply them to the process of physician order entry and computerized prescription management. It is recognized that 85 percent of all healthcare costs result from physician decisions at or near the point of care. Clinical decision support systems can positively

impact physician behavior at the time of order entry. Standard order sets, or clinical cure guidelines, may be provided to the physician in a helpful manner that makes it easy for them to be followed. A specific example is in the area of computerized prescription management. In this case, physicians may benefit from automatic medication interaction assessment at the point of care to avoid untoward adverse drug events. The technology for this type of clinical decision support is widely available and robust.

Evidence-based Practice

As healthcare consumers and healthcare payers become increasingly data driven the need for detailed evidence regarding clinical practice will only increase. With the use of electronic medical records tools, a rich repository of clinical data is accumulated. I believe this will enable new forms of evidence-based medicine, or evidence based practice to arise where real-time comparative analyses may be performed for individual clinical decisions against reference populations drawn from the clinical data repository. The clinical data repository may be used to create tailored clinical prediction rules, which may give an individual patient a risk assessment or prediction given the population model.

Collaborative Disease Management

Perhaps the strongest pressure for a National Health Information Infrastructure will come from the consumer whose expectations for healthcare service and convenience will necessitate information technology investments among all healthcare stakeholders. The consumer now has expectation of round-the-clock access to online banking, information resources on Internet, travel services, and a variety of retail services on Internet. I believe the new model of chronic disease management will soon emerge when patients and providers are connected continuously over the online health record. This will allow the patient to record symptoms and certain physiologic parameters remotely and have them securely sent to the physician's electronic medical records. By the same token, the physician will now have a continuous view of the patient's progress and care management rather than the episodic view, which arises from clinical encounters in the office environment alone.

Reimbursement Reform

Two areas of reimbursement reform may provide a profound stimulus on development of the National Health Information Infrastructure.

Quality Benefit Programs

As physicians and healthcare delivery systems become increasingly judged on their performance with respect to various measures of patient satisfaction, quality, and outcomes, physicians will be incented by progressive healthcare delivery systems to perform on these measures. In my clinical practice environment, for example, full-time physicians use the electronic medical record to record key clinical data for all appropriate patients. At year's end, the practitioner's compliance with standard preventive services guidelines and other enterprise healthcare protocols is assessed. If the physician is over the target threshold, they get extra income. The physician is incented to use electronic to record as the recording tool because the data from the electronic record is used to

benchmark the physician against target thresholds. This sort of buy in has been very successful.

Differential Reimbursement for Automated Clinical Information Management

While we have now seen several of our customers experience a malpractice premium discount due to their use of electronic medical records, we have yet to see payers recognize the benefits of using electronic medical records and provide a differential reimbursement for physicians using them. Because the quality of the data arising from a well-designed electronic medical record may drastically simplify the reimbursement process for the payer this is recognized as having value to the payer which may be shared with the physician. Historically, payers and provider incentives have not been aligned for making information technology investments.

Thank you!

Thank you for the opportunity to share with you my reactions on the two-term reports and the barriers and unresolved issues I see for the National Health Information Infrastructure.

In summary, I agree with the Committees that pursuit of standards development remains a critical issue, but I would suggest that we need to prioritize our standards development work in a cost-effective way, and in a way that parallels the business drivers today in healthcare. The effort to create an essential minimal data set is noteworthy, but it must be complemented by the requisite informatics work to be sure those data are representable to computer systems, and sufficient secure interoperability standards exist to allow them to be communicated between information systems.

The NHII will not result, however, from technology innovations alone. We need ‘forcing functions’ which will create the business imperatives, or operational requirements, that will stimulate adoption of NHII technology. We need to define healthcare data attributes dealing with privacy rights, confidentiality, and security in a meaningful and practical way, as well as data attributes dealing with property rights for healthcare data.

Finally, we need to equitably distribute the costs of investments in the NHII to all participants by allowing self-interested parties to pursue the NHII – mostly through incentive programs and reimbursement mechanisms as I have described above – in a manner consistent with existing and evolving healthcare business models. And leadership is key: the government through the NCVHS must continue to drive the agenda but is only one player at the table of stakeholders in US Healthcare. All stakeholders must come together to pursue the common vision in a self-interested way.

Thanks again. As time allows, I'd be happy to answer questions.

Toward a National Healthcare Information Infrastructure

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NATIONAL COMMITTEE ON VITAL AND HEALTH STATISTICS

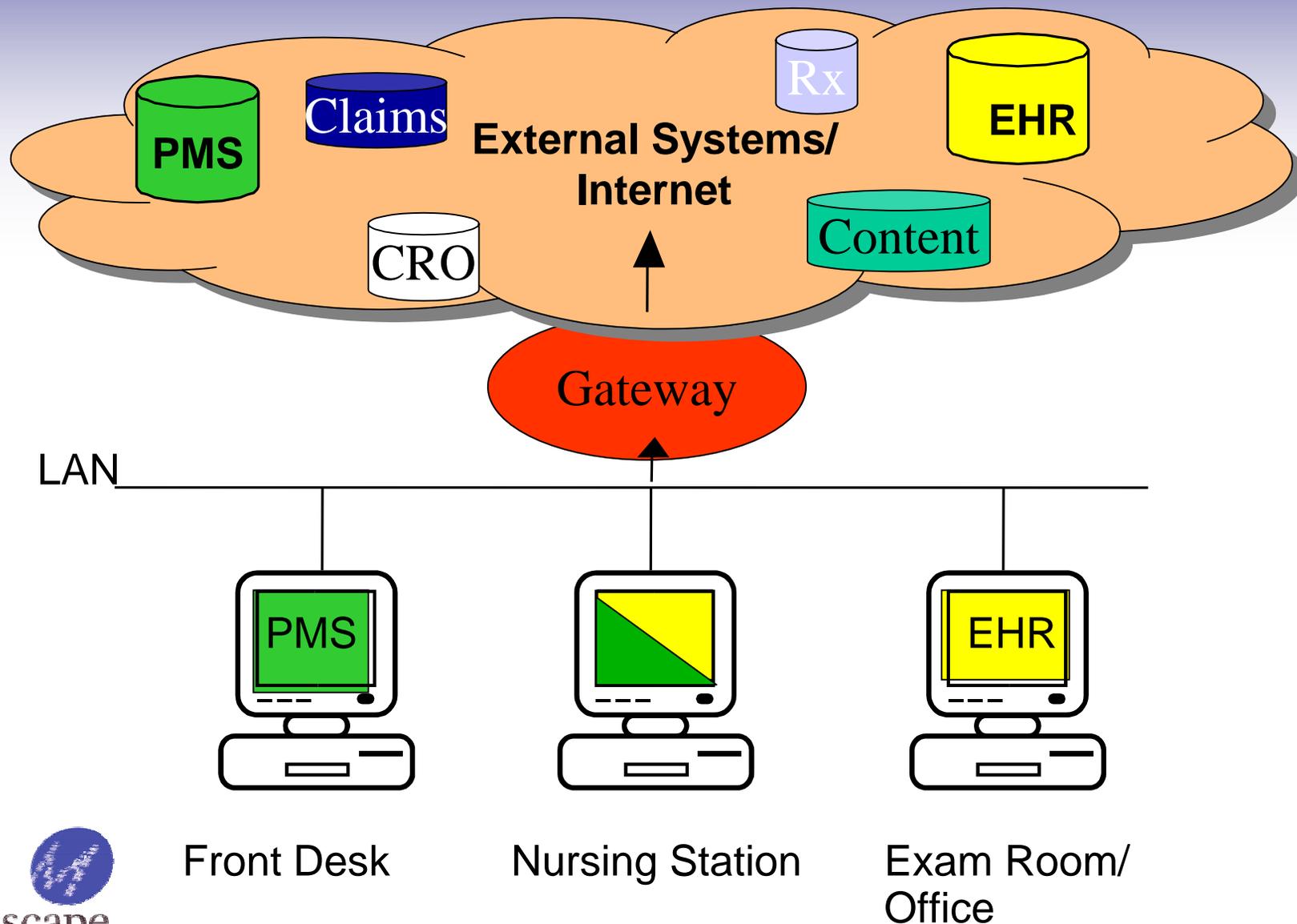
Workgroup on National Health Information Infrastructure, &
Workgroup on Health Statistics for the 21st Century

San Francisco, CA, October 30th, 2000

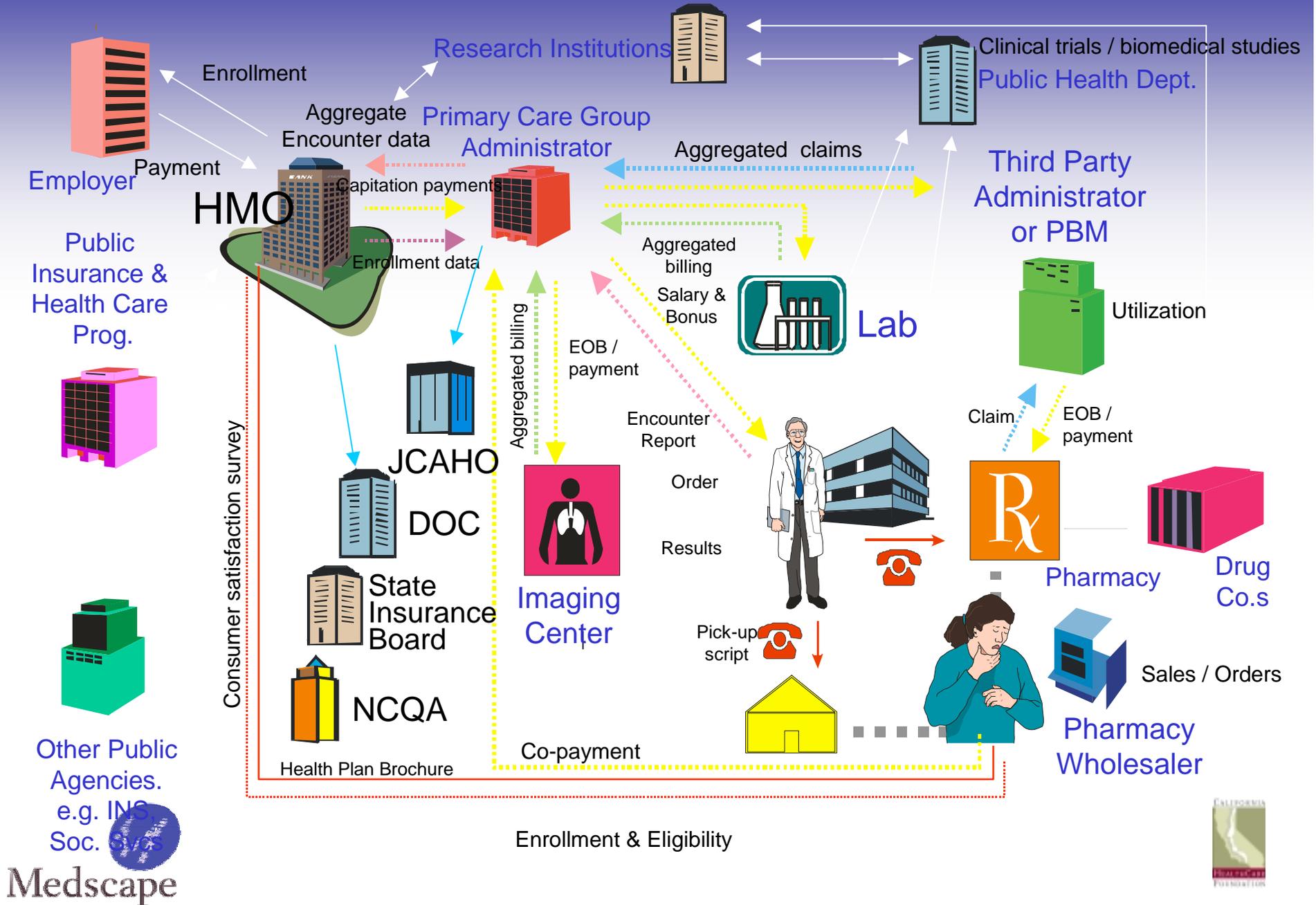
Objectives

- Commendations for two outstanding reports
- The NHII Vision and 21st Century Statistics
 - Reactions
 - Our experience at Medscape
- Barriers & Unresolved Issues
 - Data Issues
 - Incentives
 - Structural Issues
 - Breaking the 'log jam'

Healthcare Information Systems



"Simple" Data Flow



Comprehensive eHealthcare Solution

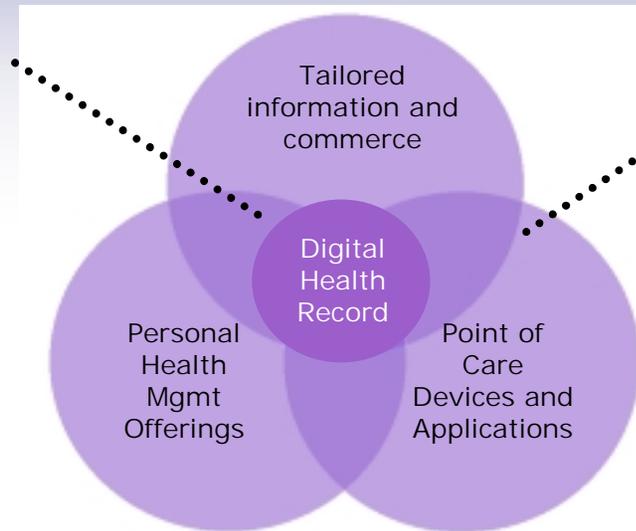
CBS HealthWatch

- Top-rated consumer site
- CBS integration and promotion



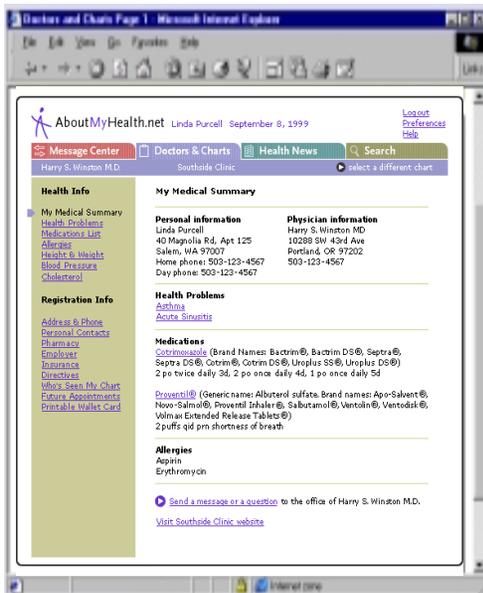
MedScape

- #1 rated physician site
- 350,000 registered physician members worldwide



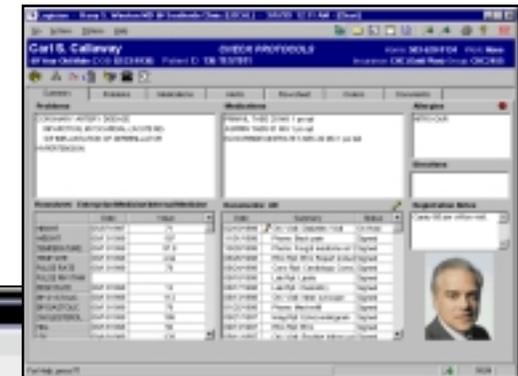
AboutMyHealth.net

- Access to online record
- Pt-phys communication



MedicaLogic

- Logician Enterprise
- Logician Internet



TOTAL MED



Practice Profiles

Set Options

[Select State, Specialty or Date range](#)

Disease Management

[Problems by Description](#)

Utilization

[Medication by Product Name](#)
[Orders by Description](#)

Productivity

[Diagnoses by ICD-9 Code](#)
[Orders by CPT Code](#)
[Visit Types by Service Code](#)
[Notes by Month](#)

Demographics

[Patients by Sex](#)
[Patients by Age](#)

Unrecognized

[Unrecognized items](#)

Includes all charts checked in as of 10:40 pm, PST 08/03/2000.

Version 1.1 (Build 1)

[Debug Info](#)

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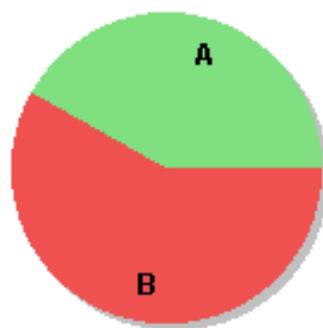
G Guidelines for coronary artery disease

All patients with coronary artery disease should be on beta blockers unless otherwise contraindicated.

Of your 1786 patients with coronary artery disease, 1049 (58%) are not recognized as following the guideline.

Reference: [Stable coronary artery disease](#)

Patients Meeting the Guideline



A On Guidelines (42%)

B Off Guidelines (58%)

Message Center - Microsoft Internet Explorer

File Edit View Favorites Tools Help Links Customize Links InSite Liquid Music Network

Address /messagecenter.asp?view1=on&view2=on&view3=on Go


AboutMyHealth.net Sarah J. Taylor Thursday, September 16, 1999
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Incoming Messages

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Request an appointment with:

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Harry Winston MD	Demo Clinic	Request an appointment

Request a refill for:

▲ Close this list		
HUMULIN R INJ U-100	Dr. Winston MD, Demo Clinic	Request refill
REGLAN TAB 10MG	Dr. Winston MD, Demo Clinic	Request refill
PRENATAL 1 TAB + IRON	Dr. Winston MD, Demo Clinic	Request refill

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Patient Empowerment and Self-management



What is Disruptive Technology?

That which allows those who were previously unable to do something which historically required the skill of professionals.

Christensen CM, Bohmer R, Kenagy J.
"Will Disruptive Innovations Cure Health Care?"
Harvard Business Review, 2000

Barriers to Change

- Fear of Change
 - “Losses Loom Larger than Gains”
- Organizational Resistance
 - Entrenched stakeholders
 - David vs. the Goliaths
- Regulatory Resistance
 - E.g.: State regulations and Nurse Practitioners
- Structural Resistance
 - Episodic Care
 - Information Imbalance
- Chaos
 - Turmoil, upheaval, lack of leadership prevents ‘traction’

What are the unresolved issues?

- Data Ownership
 - Copyright, use and re-use, anonymous/aggregate
- “Boundary-less” Conditions: Employer is Payer
 - Need separation of church and state
- Data Monetization
 - A ‘value chain’ for data?
- Privacy, Security, and Confidentiality
 - Patient’s Bill of Rights
 - HIPAA Final Rule on Privacy... Enforcement
 - Private right of action
- Healthcare Benefits
 - To the individual, To society

Possible Approaches to Solutions

- Create a system where the clinician's skill level is matched to the difficulty of the medical problem.
 - Triage...
 - Intelligent resource allocation
 - Eliminate artificial boundaries in time, place, and knowledge
- Invest less money in high-end, complex technologies and more in technologies that simplify complex problems
 - Marry public health and primary care
 - Change the distribution of the provider mix
 - Provide for competent upward migration
 - And allow for the entrance of new disruptors
- Create new organizations to do the disrupting
 - Cannibalize the old
- Overcome the inertia of regulation
 - Beware protection of the entrenched

Potential Tactics to Solve the Crisis

- Defined Contribution Health Insurance
- Value-based purchasing
- Patient Safety
 - Computerized Prescription Management
 - Physician Order Entry
 - Evidence-based Practice
 - Collaborative Disease Management
- Differential Reimbursement for Automated Clinical Information Management

Thank You!

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