Second Annual Informatics Conference:

Business Intelligence in the Health Care Age:
“The Meaningful Use of Meaningful Use Data”

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Meeting summary written by Patricia A. French, **Left Lane Communications**

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The conference focused on the expanding use of business intelligence in healthcare and other arenas, the implementation of Meaningful Use provisions, and the business strategies required to advance market innovations efficiently and productively while simultaneously increasing healthcare quality and reducing costs. The goals of the conference were to explore pathways to using the nation’s health information technology investment to improve systems performance, so that business intelligence can fulfill its role as a valued asset in healthcare as in other industries.

Health information technology applied to business strategy can aid in several critical activities:
1. Providing descriptive assessments of care delivery, including variability
2. Generating performance metrics for both providers and patients
3. Providing evidence in support of process and quality improvements
4. Providing useful data at the point of care
5. Aiding in decision support
7. Supporting efforts to improve productivity (de-skilling, automation)
8. Providing metrics to streamline supply-chain management
9. Facilitating organizational innovation, to transform healthcare

Healthcare can learn from retail, finance, and other industries that have long used analytics and informatics to generate critical business intelligence.

**Keynote Addresses**

**Topic:** Healthcare Informatics and Analytics: Looking from the Business Lens  
**Speaker:** Asif Ahmad, MBA, Executive Vice President, Clinical & Technology Services, US Oncology/McKesson Specialty

**Topic:** Bridging the Gap: Leveraging Technology in Support of a Research, Quality, and Rapidly Learning Healthcare System  
**Speaker:** Jeffrey M. Ferranti, MD, MS, Associate Chief Information Officer, DUHS; Associate Director, DCHI; Assistant Professor, Newborn Critical Care, DUMC

**Presentations and Panel Discussions**

**Topic:** Panel Discussion: Market Opportunities: Business Intelligence in Health Care Markets  
**Moderator:** Jeffrey L. Moe, PhD, Senior Director, Development, Executive in Residence, Duke University Fuqua School of Business  
**Panelists:** Sean M. Hogan, MBA, Vice President, Healthcare Delivery Systems, IBM Global Healthcare & Life Sciences  
Dean Torres, MHSA, Senior Industry Specialist, Healthcare, Teradata Corp.
The Fuqua School of Business
Business Intelligence in the Healthcare Age

Steve Savas, MBA, Principal, Business Technology Office, McKinsey & Company
James Spalding, PharmD, MS, Director, Global Health Economics, GE Healthcare

**Topic:** Panel Discussion: Accelerating Adoption After Meaningful Use
**Moderator:** Jeff Miller, Director, North Carolina Health Information Exchange
**Panelists:**
- Anna Ramanathan, Chief Information Officer, Washington County Regional Medical Center
- Vijay B. Venkatesan, Vice President, Management Information & Analysis, Kaiser Foundation Health Plan, Inc.
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- David W. Zaas, MD, MBA, Vice-Chair for Clinical Practice, Department of Medicine, Medical Director of Lung Transplantation, DUMC

**Topic:** Panel Discussion: Market Opportunities: Business Intelligence in Non-Healthcare Markets
**Moderator:** Richard Staelin, PhD, Edward and Rose Donnell Professor of Business Administration, Duke University Fuqua School of Business
**Panelists:**
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- Victoria Neidigh, Vice President, Health & Wellness, NBC Universal

**Topic:** Presentations and Discussion: Business Strategy: Moving the Market Forward
**Moderator:** Kevin A. Schulman, MD, MBA, Professor of Medicine, DUMC; Gregory Mario and Jeffrey Mario Professor of Business Administration and Director, Health Sector Management Program, Duke University Fuqua School of Business; Associate Director, DCRI
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- Peter Preziosi, PhD, RN, Healthcare Innovation Strategist, Verizon Innovation Group

**Topic:** Panel Discussion: Moving Forward: Next Steps
**Moderators:** Kevin A. Schulman, MD, MBA, Professor of Medicine, DUMC; Gregory Mario and Jeremy Mario Professor of Business Administration and Director, Health Sector Management Program, Duke University Fuqua School of Business; Associate Director, DCRI
Jeffrey M. Ferranti, MD, MS, Associate Chief Information Officer, DUHS; Associate Director, DCHI
William (Ed) Hammond, PhD, Director, DCHI
Keynote I: Healthcare Informatics and Analytics: Looking from the Business Lens

Speaker: Asif Ahmad, MBA, Executive Vice President, Clinical & Technology Services, US Oncology/McKesson Specialty

As healthcare information technology (HIT) continues to evolve through the stages of the Meaningful Use provisions, its clinical and business value rises accordingly:

- **Stage 1**: Metrics—Deployment of electronic health records (EHR) and collection of data measures.
- **Stage 2**: Optimizing performance—Generating data for informatics and analytics (business intelligence) providing decision support.
- **Stage 3**: Transforming care—Data reintegration and the use of predictive modeling leading to truly individualized medicine.

Relevant Trends and Implications

Several market trends are driving the development of HIT products and services, including an increasing demand for personalized medicine, the fact that patients are paying a larger share of their healthcare costs, increasing demands for medications in emerging markets, and patients becoming more informed and seeking treatments.

However, personalized medicine remains mostly misunderstood. Further, although patients expect coordinated, high-quality care based on what they see on the Web and in social media, the healthcare market is not ready for it—disincentives exist against innovation and change.

In the U.S., the burden of chronic disease continues to increase. Policymakers and payers are exerting more influence on what physicians prescribe. The federal government is focusing on prevention, but it is not investing in proactive approaches. At the same time, regulators are becoming more risk averse.

As a result of these trends, not only will the pharmaceutical industry’s need to produce outcomes data greatly increase, the industry also must expand its skill set and models to a multidisciplinary approach. It will need to collaborate with regulators and payers to be successful, and products must show value.

The two main trends in technology are the virtualization of research and development (R&D) with shifts in R&D to emerging markets, and the development of remote-monitoring technologies. Although the pharmaceutical industry is expanding rapidly in Asia, care models there differ from those in the U.S. Industry must continue to work with vendors to virtualize R&D and develop patient-compliance tools.

Examining Marketplace Demands

Only five of the top pharmaceutical companies generate >10% of their revenues from products launched within the past 5 years. Among the drug patents expiring within the next 5 years, oncology drugs alone will represent a major loss in sales, with substantial implications for R&D. Despite soaring R&D expenditures over the last decade, the numbers of new molecular entities (NMEs) and biologics submitted and approved have decreased.

The pharmaceutical industry is facing a projected $157 billion loss from the introduction of generic versions of its products. The E7 countries—China, India, Russia, Brazil, Mexico, Indonesia, and Turkey—are expected to be key in ameliorating this loss, given their anticipated doubled rate of growth compared with G7 countries. The impact of biosimilar and generic drugs in these “pharmerging markets” has not been deeply studied. However, no framework currently exists to support common information synthesis and analytics.

In the U.S., a second attempt is being made at creating a national IT roadmap, but the ability to
gather and store electronic health information has outpaced the ability to analyze and use such data. Although new technologies exist that can be leveraged for cost reduction and care standardization, these have not been studied systematically. Patient empowerment and education also remain controversial topics. But perhaps most important, data still are not considered an enterprise asset and intellectual treasure.

Integrated data are the foundation of commercial informatics activities, which includes healthcare. The various customer segments within the healthcare industry—pharmaceutical and device manufacturers, providers, academic research groups, data aggregators, contract research organizations (CROs), payors, state and federal governments, financial markets—each have different informational needs, and businesses have an opportunity to develop tailored products and services to meet these needs, along with novel delivery mechanisms and sales models.

Companies in other industries can link data across their units to identify value propositions, unlike the “silo mentality” that exists in many areas of healthcare. Healthcare informatics will need to evolve to contain diverse data assets. Initial efforts might provide a comprehensive view of a specific landscape, such as oncology. However, to remain competitive, new data fields and capabilities must be added continuously. The future could see the addition of genomic information, real-time alerts, death index data, patient-reported data, and new health-related knowledge.

There are three key models by which the pharmaceutical industry purchases and manages data. Some have a shared services model; some, an autonomous brand model; and some, a hybrid of these. Depending on the model, businesses can sell the same data to same company multiple times.

The pharmaceutical industry also has traditionally pursued an “end-to-end” innovation strategy. To compete with biotechnology companies, the pharmaceutical companies must adopt a focused portfolio strategy that relies on a value chain: from pharmaceuticals to diagnostics/devices to generic drugs to consumer health to health management. Having common information architecture is a key factor in achieving this goal. IT can also inform and facilitate the life cycle for traditional drug development, from discovery to maturity.

The demand for HIT is likely to grow, especially for aggregating data types that straddle functional areas. Account-level sales transactions, share, and volume data will need to be linked with provider and patient claims and reimbursement data, which in turn will require linkage with resource utilization and outcomes data at multiple levels of detail (e.g., country, state, community, hospital, practice, physician, patient). These and other innovations will bring us closer to achieving the goal of transforming healthcare through the use of HIT.
Keynote II: Bridging the Gap: Leveraging Technology in Support of a Research, Quality, and Rapidly Learning Healthcare System

Speaker: Jeffrey M. Ferranti, MD, MS, Associate Chief Information Officer, DUHS; Associate Director, DCHI; Assistant Professor, Newborn Critical Care, DUMC

As technology continues to evolve, the goals for using data to improve quality should embrace not only metrics and performance tracking but also predictive analytics, bioprofiling of global health, pharmacogenomics, and financial effectiveness. However, our ability to gather and store electronic health information is outpacing our ability to analyze and use these data.

The Meaningful Use provisions of the Health Information Technology for Economic and Clinical Health (HITECH) Act are being enacted in three stages. Stage 1 calls for creation of systems for data capture and sharing. Stage 2 calls for the advanced use of data in the clinical setting, and Stage 3 calls for the use of data to improve outcomes. Each stage requires that data be presented in meaningful ways.

Traditional enterprise assets for healthcare have included human resources, finance, facilities, intellectual property, and other assets. To this list must now be added HIT. Systems must evolve to collect and analyze data not only to improve outcomes but also to remain competitive.

Duke’s Decision Support Repository (DSR) has collected financial, clinical, operations, and research data since 1996. It contains 3.82 million patient records (24 million encounters), representing information on 79% of all residents of Durham county residents. It also incorporates data from the Social Security Death Index, tumor registries, and other sources of longitudinal data.

The Learning Healthcare System
Data from the warehouse, the patient and family, and other sources can be combined to apply to institutional initiatives, which can include clinical research, public health research, or scientific discovery, as shown in the use cases described below.

1. Translational Medicine
The Duke Enterprise Data Unified Content Explorer (DEDUCE) began development in 2008 with support from Duke’s Clinical and Translational Science Award. This business-intelligence tool has a user-friendly interface with enterprise data stores, making data available for decision-making.

A major feature of this tool is the ability to generate cohorts for research based on a specific set of clinical, demographic, and even financial variables. Whereas traditional recruitment can take months or years, DEDUCE can generate a candidate cohort in seconds, greatly reducing the time required for clinical research projects.

One limitation of DEDUCE is the fact that it looks at data retrospectively. This spurred development of its partner application, the Duke Integrated Subject Cohort Enrollment Research Network (DISCERN). This system notifies research staff of potential subjects, according to the variables defined in DEDUCE, in real time. These systems continue to speed enrollment for many studies at Duke. In one vaccine study, enrollment increased from 9.6% to 14.7% (53%), and recruitment hours/month fell from 40 to 16.

These systems also can be used to prioritize scarce resources, as with the recent shortage of H1N1 vaccine. Other applications include detecting protocol violations within existing trials, tracking readmissions, and identifying healthy volunteers for Phase I research.

2. Redesigning Healthcare Delivery
To be considered business intelligence, raw data must first be turned into actionable information. After an analysis of computerized physician order entry (CPOE) at a hospital in Pittsburgh showed unexpectedly increased mortality after its
implementation, DUMC began investigating safety issues at their centers, which have long used CPOE.

The Duke Safety Data Warehouse allows monitoring, tracking, and even predicting drug-related adverse events, overall and in specific hospital populations. It turned out that in the pediatric population, errors involving fluid-replacement products were the most common; whereas in adults, it was errors involving narcotics. The data warehouse was later used to assess the effectiveness of interventions designed to reduce these errors.

Another new system, SEBASTIAN, is an online, evidence-based “rules engine” for management of chronic disease. The system is tied to the other Duke EHR systems to provide clinical decision support data and tools (checklists, trends over time) in real time. A feasibility study in Argentina has recently validated this concept, and the system’s interface is now the basis of the Health Level Seven (HL7) Decision Support Service functional model.

3. Revenue Generation
Databases can be queried to identify lost opportunities, prevent billing problems and inconsistencies, and understand variations in cost based on historical data. In one example at Duke, modeling of expected payments for the pediatric intensive care unit revealed incorrect billing of charges for critical care nursing. This process-level correction changed a projected $2.1 million deficit into a $400,000 profit in 4 months, allowing funding for creation of the Neonatal-Perinatal Research Institute. Such modeling is now performed every month.

4. Knowledge Synthesis/Analysis to Improve Quality
It is difficult to analyze findings among relatively small populations. Because all facilities in the Duke system are interconnected, practices and their implications can be compared across centers. For example, the incidence of *Clostridium difficile* infection was found to be much higher at one Duke center. Additional analysis revealed that the practice at this center of using antiseptic wipes was insufficient to control infection. When standard handwashing procedures were instituted at the center, the incidence of infection fell to that noted at other Duke facilities.

5. Patient Ownership of Health
Giving people an opportunity to be involved in their care can not only help them engage but also improve outcomes. The DukeHealth.org portal allows people to find a doctor, check their appointments, request refills on their prescriptions, and even view diagnostic test results. In a recent study, only 4% of patients who use the portal fail to keep their appointments, compared with an incidence of 10% among those who do not.

Current approaches to HIT have not kept pace with those used in other industries. The healthcare industry must start using analytics as business intelligence to remain competitive and continue to improve outcomes.
Panel Discussion: Market Opportunities: Business Intelligence in Health Care Markets

Moderator: Jeffrey L. Moe, PhD, Senior Director, Development, Executive in Residence, Duke University Fuqua School of Business

Panelists: Sean M. Hogan, MBA, Vice President, Healthcare Delivery Systems, IBM Global Healthcare & Life Sciences
Steve Savas, MBA, Principal, Business Technology Office, McKinsey & Company
James Spalding, PharmD, MS, Director, Global Health Economics, GE Healthcare
Dean Torres, MHSA, Senior Industry Specialist, Healthcare, Teradata Corp.

Overview
Both the ability to gather data and its application to business decisions are critical for success. In a recent study of 179 large companies, those that adopted “data-driven decision making” (DDDM) were 5% to 6% more productive than companies not using data to make decisions. The increase in productivity was not explained by other factors, such as the amount invested in IT. How the healthcare industry can harness DDDM to make strategic and tactical decisions remains unclear, but the increasingly competitive market demands such effort. The following examples demonstrate the use of DDDM in the healthcare arena.

Discussion topics

- Pharmaceutical companies often wish to price drugs according to perceived value against placebo, not against comparable products. This might be unrealistic in the era of managed care, especially given the push toward using generic agents. However, one company used data from an EHR to show a health system that admissions were reduced with use of their branded product versus a generic version. The branded product stayed in the formulary and generated $50 million of revenue in the first year alone.

- Health systems can use DDDM for better population management and resource use. A medical director might combine demographic, clinical, pharmacy, and genetic data to form specific cohorts for analyses. If such data can be correlated with high or low healthcare utilization/consumption, then outliers can be identified and profiled. The low-utilization group could be profiled for healthful behaviors or preventive activities. These, together with other data, might be used for proactive interventions in the high-utilization group. Such data can also be used to assess the effectiveness and productivity of specific healthcare teams, with resulting improvements in business models and value propositions.

- From the IT vendor side, data collected for one client can be used to develop predictors for validation in other client systems. Peer-reviewed publications, with appropriate disclosure, also can be used for purposes of transparency and for customers to use for their own benefit; i.e., let them use their own data to answer questions relevant to them. For example, in addition to tracking the initial sales of imaging technologies to provider (market uptake), data should be collected about actual use and correlated with patient- or provider-level variables, to assess local value for care and/or productivity.

- Sophisticated supply-chain management has now expanded to include clinical data. For example, when the H1N1 virus broke out, some health systems could assess drug utilization among their various facilities, track it, and then anticipate when and where drug supplies would be needed. These same systems could send epidemiological data to the Centers for Disease Control and Prevention (CDC) daily, rather than just weekly or monthly.

- Areas for growth in clinical informatics include post-drug approval analytics to expand indications, assess important secondary endpoints, refine dosing, and identify/prioritize unmet needs; improved predictive modeling for targeted interventions in at-risk patients; incorporation of additional data sources, such as from social media applications; and change management in the healthcare culture.
Panel Discussion: Accelerating Adoption After Meaningful Use

Moderator: Jeff Miller, Director, North Carolina Health Information Exchange
Panelists: Anna Ramanathan, Chief Information Officer, Washington County Regional Medical Center
Vijay B. Venkatesan, Vice President, Management Information & Analysis, Kaiser Foundation Health Plan, Inc.
Victoria Weaver, Assistant Vice President, Clinical Services Group, Hospital Corporation of America
David W. Zaas, MD, MBA, Vice-Chair for Clinical Practice, Department of Medicine, Medical Director of Lung Transplantation, DUMC

Overview
The initial types of analytics specified by the Meaningful Use provisions are primarily descriptive. In the future, analytics might be expanded to include predictive modeling and other types of informatics. Incorporating data collection and analytics into the healthcare industry has been delayed, however, and both cultural and IT evolutions will be required to accelerate this process.

Discussion topics
- Although EHRs have proven benefits in terms of productivity and processes, some systems and practitioners have been resistant to the transition from paper-based records. However, providers have only until June 30 to meet EHR certification criteria for Meaningful Use and obtain 2011 incentives.
- One key issue affecting uptake is how implementation of interoperable HIT systems can add value and differentiate providers. An integrated system must capture the entire episode of care to be able to analyze utilization, outcomes, demographics, epidemiology, and other types of information, but current systems do not reliably reflect data from home care, out-of-network care, and even office-based care.
- Another key issue is the cultural change that is required. Physicians have traditionally considered themselves as individual practitioners who have all of the data needed to make decisions. Their perception is that current IT systems impair productivity. One way to use HIT to engage individuals is to give them their own metrics on quality, outcomes, length of stay, etc. Information in general must be delivered in timely, accessible, meaningful formats; providing the right technology at the right time in the right way will spur uptake.
- Leadership, including CEOs and boards of directors, also must present the value proposition to staff members in ways that speak to their needs. They also must provide incentives that are aligned with implementation goals, and be prepared to tolerate some variation among providers/departments.
- Many health systems are attempting to implement core production systems (EHRs) and generate analytics simultaneously, whereas other industries have decades of data from production control systems to inform their analyses. At the same time, margins are smaller, every IT system added worsens the situation, and deadlines are looming. But without standardized, integrated, managed data, analytics are not possible. Many systems will necessarily be imperfect during Stage 1 of Meaningful Use implementations, but they likely can “catch up” in Stages 2 and 3.
- Accountable care organizations (ACOs) must identify how best to manage broad populations of people in health systems built from multiple enterprises, such that the right care is provided at the right time by the right team member(s). Quality data are needed to identify propensities, optimal care modes, and other information for proactive use, but analytics alone are insufficient—the system’s administrative structure must support meaningful use.
- Current analytics tools assess population-based metrics. Whether these tools will remain relevant when applied to individualized healthcare remains uncertain.
Panel Discussion: Market Opportunities: Business Intelligence in Non-Healthcare Markets

Moderator: Richard Staelin, PhD, Edward and Rose Donnell Professor of Business Administration, Duke University Fuqua School of Business

Panelists: Wade Baker, PhD, Director, Research & Intelligence, Verizon Business
Cathy F. Burrows, MBA, Director, Enterprise Information and Customer Management Support, RBC Centura
Victoria Neidigh, Vice President, Health & Wellness, NBC Universal

Overview
Healthcare might have much to learn from best practices for business intelligence in other industries. Lessons learned include risk management strategies for data, use of customer relationship systems (CRMs), and findings from the data security community.

Discussion topics

- **Financial sector**: Consumer and business intelligence, combined with application of this information, represents business knowledge. In the financial sector, integrated analytics and predictive modeling have long been used to assess portfolios, predict when clients will be in decision-making modes (anticipate “life advice events”), and proactively deliver specific value propositions for their needs.

- **Data Security**: According to the 2011 Data Breach Investigations Report, which includes 900 million compromised records from 1700+ breaches over 7 years, 92% of all data breaches are caused by external agents. These overwhelmingly reflect unsophisticated attack techniques, such as taking advantage of unchanged passwords, that can be overcome through relatively simple methods (box). Security systems that are automatic, transparent (such as encryption), and built into the workflow are the strongest.

- **CRM Techniques**: American families are becoming older, smaller, and more ethnically diverse. Healthcare companies are challenged to identify and segment consumers according to their needs, given that current delivery options may not work. Successful CRM techniques and tools might be adapted from those used in other industries.

- **Mobile Applications**: Up to 70% of all Internet traffic now moves over mobile devices. Healthcare needs to leverage this major cultural shift to effect behavior change. More than 600 consumer health applications now exist; social networking, in particular, might represent an opportunity for loyal customers and others with influence to communicate with potential new customers. Gaming dynamics might also be harnessed to reward desired behaviors. But society in general is currently moving faster than the healthcare sector with regard to online capability, and the value proposition will need to be compelling to customers.

- **Mortgage Collapse**: The foreclosure crisis was brought on in part by the use of incorrect data. For patient-reported information, various levels of online authentication/verification will be required to reduce the likelihood of erroneous data entry and analysis, as will operational risk management. Although implementation of EHRs has reduced the incidence of fatal, preventable medical errors in hospitals alone from up to 98,000 yearly as of 1999, any error in health records still can be fatal.

Simple Ways to Minimize the Risk of Data Breaches
- Eliminate unneeded data; monitor the rest
- Ensure that essential controls are met
- Check remote access services
- Test, review Web applications
- Audit user accounts and monitor privileged activity
- Track and analyze event logs
Presentations: Business Strategy: Moving the Market Forward

Moderator: Kevin A. Schulman, MD, MBA, Professor of Medicine, DUMC; Gregory Mario and Jeremy Mario Professor of Business Administration and Director, Health Sector Management Program, Duke University Fuqua School of Business; Associate Director, DCRI

Speakers:
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- David A. Watson, Chief Operating Officer, MedeAnalytics International
- Peter Preziosi, PhD, RN, Healthcare Innovation Strategist, Verizon Innovation Group

Overview

Health systems that can break through the “silo mentality” to adapt to changing requirements and anticipate trends in healthcare will be in the best position to succeed in this competitive environment.

Discussion topics

- Administrative and clinical systems are disconnected in healthcare, precluding efficient, effective data collection and analysis. Barriers to effective health analytics span three categories. First is ownership/sponsorship, which includes embracing data as an enterprise asset and focusing on its management relative to business improvement across divisions. Second is data governance. This requires overcoming “silo models” of data management to establish roles and policies for enterprise-wide governance, decoupling data from specific systems, and basing processes and integration on data quality. Third is technology adoption/execution—a phased approach to solving business issues via analytics.
- The silo mentality for clinical data collection also hampers the ability to conduct clinical research within, between, and across systems. If research variables of interest can be integrated into a comprehensive clinical EHR, not only will research efforts be facilitated but the safety, efficiency, and quality of care also might be enhanced. Such efforts will require methods for mapping to a common data dictionary, deidentifying and aggregating data, setting up standard queries, and ensuring data access, integrity, and security across participating systems, sponsors, and third parties such as the government. At first, only retrospective analyses would be possible, but prospective research would eventually be possible.
- The Partnership to Advance Clinical electronic Research (PACeR) might serve as a model for breaking down silos to facilitate integrated, EHR-based clinical research. It includes academic research centers, hospitals, HIT companies, physician groups, and patients across New York. The project has required participants to re-engineer their systems to collect data within their own workflows. The eventual goal is to use PACeR to conduct evidenced-based basic, observational, and prospective research in an iterative and efficient mode. Stakeholders also might identify successful business models and track product safety, among other applications.
- At the most basic level, breaking down silos requires fostering relationships, both between and within organizations. As with any other relationship, those affecting healthcare flourish only in an atmosphere of shared goals, trust, and transparency. For stakeholders in healthcare, including insurers, ACOs, and the government, the overarching goals are to keep people well and to provide cost-effective, high-quality care as efficiently as possible when they become ill. Integrated systems offer the best chance of collecting data that will aid all segments in collective decision-making, but without trust and transparency, relationships become dysfunctional and antagonistic. This can have harmful, and potentially fatal, implications for patients.
- Unstructured data (dictated notes, reports, etc.) have long been perceived as a barrier to fully interoperable HIT systems. However, although such data cannot be used to automate decision support or validate compliance, they do support human decision-making, can be supplemented by multiple
coded entries, and retain the current workflow. HIT initiatives, working under HL7’s Clinical Document Architecture, have developed standards and methods for creation of structured, digitally useful forms of paper records and their secure transmission to the center’s EHR, other providers, and the patient.
Panel Discussion: Moving Forward: Next Steps

Moderator: Kevin A. Schulman, MD, MBA, Professor of Medicine, DUMC; Gregory Mario and Jeremy Mario Professor of Business Administration and Director, Health Sector Management Program, Duke University Fuqua School of Business; Associate Director, DCRI

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William (Ed) Hammond, PhD, Director, DCHI

Overview
Suggestions given for how to advance the fields of healthcare informatics and analytics include specific educational and training initiatives, seeking additional viewpoints, and exploring options for data ownership.

Discussion topics
• The first class of Masters of Management in Clinical Informatics will be graduating in May 2011. They can serve as the vanguard for informing future curricula.
• An estimated 50,000 workers will be required to address HIT needs within the next 5 years. Also needed will be academic mathematicians and change managers. None of these specialties has developed standards or best practices to address the implementation of Meaningful Use provisions. As standards evolve, findings should be fed back into formal academic programs for optimal effectiveness and relevance.
• For degree programs, the healthcare marketplace requires strong project managers who understand EHR implementation. Persons in this role will need either expertise in systems architecture with an appreciation of clinical information, or clinical experience with a grasp of information management. Similarly, current clinical or IT professionals should be encouraged to receive cross-training in the other discipline. Nonclinical staff, in particular, should be exposed to the actual work processes, in the form of shadowing providers or other clinical experiences.
• For future conferences, it would be helpful to gain the perspectives of consumers, payers, and social media developers with regard to healthcare informatics.
• Determination of the ultimate ownership of healthcare data has not kept pace with the technology. It might be that the patient is the best point of reference for information. Varied options for data ownership must be explored for maximal effectiveness, portability, transparency, and security.
• Only limited applications exist to effect truly individualized health management. It is difficult to imagine that genomic data can be incorporated into current clinical workflows, given the slow pace of adoption even of rudimentary EHRs.