

" DO YOU ISABEL YOUR PATIENTS ? "



isabel

To make the right clinical decision,
You need the right support.

WWW.ISABELHEALTHCARE.COM

Isabel is a validated, web-based diagnosis decision support and knowledge mobilizing system designed to help improve diagnosis reliability and reduce clinical risk at the point of care.

First conceived eight years ago, Isabel is a direct response to the near-fatal misdiagnosis of three-year-old Isabel Maude, who developed necrotizing fasciitis, a well described complication of chicken pox. Isabel was seen by both the family physician and the local hospital's providers, all of whom failed to recognize the clinical features of necrotizing fasciitis and sent the child home.

Isabel's life-threatening ordeal highlighted the need for an advanced diagnosis reminder and knowledge system, one that would be easy to use in the clinical workflow. The Isabel system was created by physicians to offer providers diagnosis decision support at the point of care, reducing the incidence of missed or delayed diagnosis and leading to an improvement in the quality of patient care.

Isabel : The Award-Winning Diagnosis Reminder System

Diagnosis is at the heart of clinical work and is the foundation on which all other actions are predicated.

Isabel provides clinicians with an instant, patient specific check list of diagnoses to help them make the diagnosis as fast as possible, ensure that important other possible diagnoses are not missed and request the most appropriate tests.

Diagnosis error - a compelling patient-safety issue

Medical diagnoses that are wrong, missed, or delayed make up a large fraction of all medical errors and cause substantial suffering and injury. A 3-year project by the Cook County Rush Developmental Center for Research in Patient Safety, funded by the Agency for Healthcare Research and Quality (AHRQ) and published in 2005, found that 10 - 30 % of errors are errors in diagnosis and that diagnosis errors far outnumber medication errors as a cause of claims lodged. A review of 53 autopsy studies found an average rate of 24 % missed diagnoses.

Failure to consider reasonable alternatives - single most common cause of misdiagnosis

A 2005 Veterans Administration study funded by the National Patient Safety Foundation analyzed cases of diagnostic error involving internists and found that cognitive factors contributed to diagnostic error in 74% of cases. Premature closure, i.e. the failure to continue considering reasonable alternatives after an initial diagnosis was reached; was the single most common cause. Isabel addresses the very issue of premature closure and has been proven in clinical studies to minimize diagnosis error by reminding physicians to consider important diagnoses.

Constructing a complete differential diagnosis - reinforcing basic medical training

Professor Arthur Elstein, Phd at the Department of Medical Education and the School of Public Health at the University of Illinois at Chicago, and expert on diagnostic reasoning in clinical medicine, spent a lifetime's work on answering questions such as : How do physicians make decisions ? How can we help them make better ones? Elstein has suggested the value of compiling a complete differential diagnosis to combat the tendency to premature closure, the most common cognitive factor identified to contribute to diagnosis error. Medical students and residents are trained to construct a complete differential diagnosis for each patient.

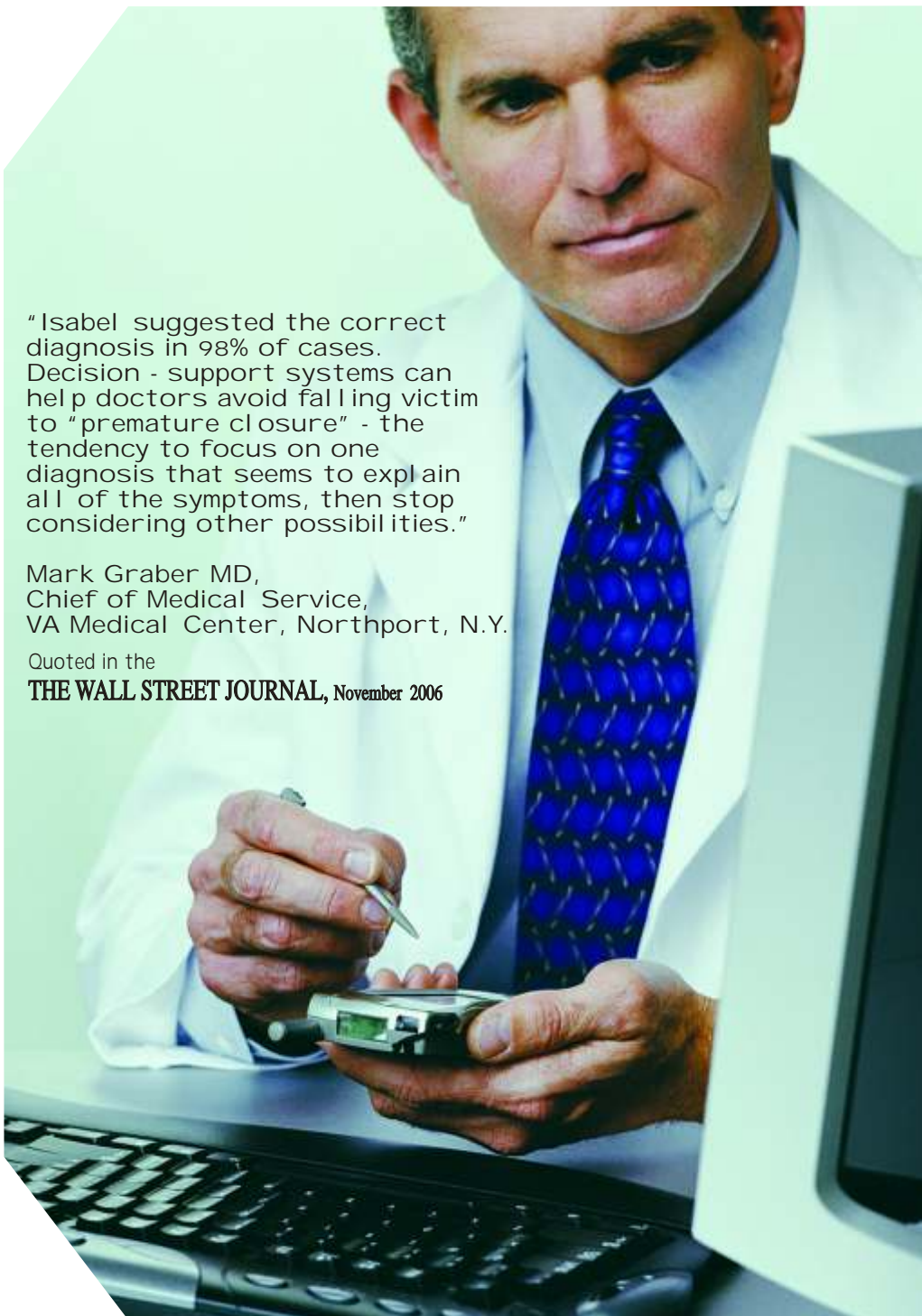
Medical Error and Misdiagnosis: The facts are clear

In a retrospective review of 636 cases investigated by an emergency department physician review committee at an urban public teaching hospital over a 15-year period the diagnostic process was the leading phase of work in which problems were observed (71%).¹

"38% of patients reported experiencing at least one specific error-related concern, most commonly misdiagnosis (22% of all patients)."²

" A 2006 study of Closed Malpractice claims showed that the leading factors contributing to diagnosis errors included failures in judgement (79%), vigilance or memory (59%), knowledge (48%).³

"Failure to diagnose and treat in time contributed to almost 75 percent of all mortality attributable to patient safety incidents."⁴



"Isabel suggested the correct diagnosis in 98% of cases. Decision - support systems can help doctors avoid falling victim to "premature closure" - the tendency to focus on one diagnosis that seems to explain all of the symptoms, then stop considering other possibilities."

Mark Graber MD,
Chief of Medical Service,
VA Medical Center, Northport, N.Y.

Quoted in the
THE WALL STREET JOURNAL, November 2006

A 2006 Medical Liability Insurance study found that errors in diagnosis were the leading allegations of closed claims. In Family Medicine, Internal Medicine, Pediatrics and Radiology more than 50% of lawsuits alleged a failure to diagnose.⁵

1. "Characteristics of Patient Care Management Problems Identified in Emergency Department Morbidity and Mortality Investigations During 15 Years". Karen S. Cosby MD et al from the Department of Emergency Medicine, Cook County Hospital, Rush Medical School, Chicago, IL. .
2. Burroughs TE, Waterman AD, Gallagher TH et al. "Patient Concerns About Medical Errors in Emergency Departments." Acad. Emerg. Med., Jan 2005.
3. Gandhi TK, Kachalia A, Thomas EJ et al. "Missed and delayed diagnoses in the ambulatory setting: a study of closed malpractice claims." Ann Intern Med. 2006 Oct 3;145(7):488-96.
4. HealthGrades Quality Study. "Patient Safety in American Hospitals," July 2004.
5. ProMutual Group study reported in the American Medical Association Newsletter, March 2006.

Isabel benefits more than patients, providers, and institutions.

Isabel also gives EMR vendors and insurance providers a way to successfully address the priority of patient safety with their health care clients—a top priority in hospitals across the United States and around the globe.

Who does Isabel benefit ?

Providers

- Fast and validated diagnosis support that saves considerable time compared to using traditional methods
- Increased patient satisfaction
- Immediate access to diagnosis and drug specific knowledge in near-patient settings
- Reduced insurance premiums
- Reinforced decision-making backed by up to date knowledge

Institutions

- Valuable continuing education for medical staff
- Increased competitive advantage
- Preferred image as a quality-oriented and high-tech health care provider
- Reduced insurance premiums and costs associated with misdiagnosis
- Enhanced referral network

EMR vendors

- Enhance product offering to current and future customers
- Provide single-click diagnosis support direct from the EMR interface
- Value addition to a static EMR by interactive diagnosis support
- Assist clients in reducing medical error, specifically misdiagnosis.

Insurance providers

- Provide proactive participation with clients to reduce claims
- Assist clients to increase patient safety
- Be seen to be a driver of improved quality of care
- Provide greater value to current and future clients

Isabel differs from other decision support and knowledge systems by starting at the same point that a patient's journey frequently begins—with symptoms, signs and results of tests.

Most decision support systems require that the provider know the diagnosis or condition being dealt with. Isabel is able to assist providers to arrive at a diagnosis or determine the causative drug.

Isabel's user-friendly interface enables instant processing of a patient's key signs and symptoms in free text. Isabel uses statistical natural language processing (SNLP) to search and display medical textbooks and journals. SNLP enables Isabel to go beyond 'finding' to 'understanding' using the context and meaning of the clinical terms entered, rather than by keywords alone.

Corroboration is provided by clicking on each suggested diagnosis or drug. Providers can obtain diagnosis-specific knowledge on investigations and treatment from textbooks, lessons learned and recent advances from journals, and up to date clinical information through seamless links to external web based resources such as Medline Plus, UpToDate, CDC etc. Once a diagnosis has been determined or a drug implicated, providers can follow their own institution's treatment guidelines and formulary.

Patient's clinical features - symptoms, signs, results of tests entered and populated from EMR files

each diagnosis, based on diagnosis, related to or causative drug, providing the ability to update and comprehensive package of textbooks, journal articles, and annotated images to corroborate decisions

Diagnosis Reminder System

Isabel, either as a standalone system or interfaced with your EMR system gives providers dynamic clinical decision support, enabling them to:

- Quickly obtain a list of likely diagnoses including bioterrorism diagnoses and causative drugs for a given set of clinical features
- Learn more on investigations and treatment for each diagnosis, either through a cursory quick-read or a more detailed read or clinical information on bioterrorism from the CDC, USA
- Access the clinical lessons learned and errors that have been reported in relation to the diagnosis being considered
- View diagnosis specific annotated images or helpful list of investigations that can be performed to confirm or rule out a diagnosis
- Link seamlessly though to popular web based resources such as Medline Plus, UpToDate, Google etc.

How does Isabel Work ?

Isabel's clinical decision support system has 2 sophisticated components

Isabel Diagnosis Reminder System (IDRS)

The IDRS applies cutting-edge pattern recognition software (statistical natural language processing) to a huge proprietary database of medical knowledge and algorithms. This allows the system to provide a clinically validated list of likely diagnoses and causative drugs. From entering an initial query to receiving a list differential diagnoses, bioterrorism diagnoses and drugs, the process takes, on average, less than one minute.

Isabel Knowledge Management (IKMS)

Integrating an institution's treatment guidelines and management algorithms within the framework of Isabel's own knowledge package, the IKMS delivers a total diagnosis support and knowledge solution that is unsurpassed. Isabel offers an integrated, comprehensive knowledge package that compiles information from sources such as respected medical textbooks and journal abstracts, and makes available annotated images, treatment algorithms and more. Isabel's knowledge package includes : "Lessons Learned" a section that showcases the lessons learned and pitfalls to be avoided as reported in medical journals, "What's New?" a feature that highlights the most recent advancements in the diagnosis and management of disease. Providers also have the option of linking seamlessly through to popular web based resources such as Medline Plus, UpToDate, Google etc.



When making rounds with residents of children with tricky symptoms - "Did you guys Isabel this? Are you comfortable you thought of everything?"

Richard Chinnock MD, Chairman of Pediatrics, Loma Linda Children's Hospital, Loma Linda, CA.

"The times that you need Isabel are the times that are important," says Knight. "The times that you need it are the times that you don't know. And the times that you don't know are the times that you are probably at the highest risk in terms of making an error, coming to the wrong diagnosis, or coming to premature closure."

Napoleon Knight MD, Vice President of Medical Affairs and Quality Improvement at Carle Foundation Hospital in Urbana, IL in "Medicine on the Net" Jan 2008.

"The Isabel system prevented a serious error in diagnosis and is likely to have saved this patient's life. I am aware of three other instances in which Isabel made a positive difference to patient care."

John Bergsagel, MD, Leukemia/Lymphoma Service, Children's Healthcare of Atlanta & Emory University School of Medicine, Georgia, USA. May 2005

Using advanced statistical language processing and real-time data processing, Isabel asks the provider to consider a list of likely diagnoses and causative drugs.



Advanced clinical decision support

Components that support providers at the point of care:

Isabel and electronic medical records

Although Isabel is used as a stand-alone system, it is web-based and designed to interface seamlessly with and be embedded into EMR systems. Isabel's Application Program Interface is customizable and has been interfaced with leading primary care, ambulatory and hospital-based EMR vendors' systems. Embedded in a patient's EMR, Isabel can use clinical features and results of investigations to provide diagnosis support 24 hours a day 365 days a year. Current EMR systems that lack dynamic and interactive diagnosis reminder systems will be enhanced through offering Isabel as a value-added tool to their current and future customers. Institutions could also opt for an Isabel audit function, meaning that an audit trail of whatever Isabel components each provider accessed (differential diagnoses, treatment guideline, knowledge package etc.) could be recorded to demonstrate clinical diligence.

Isabel and CME Capture

In the process of achieving objectives of reducing diagnosis error and providing knowledge in the work flow, Isabel is able to give something back to users by way of capturing session details for CME submission. Isabel offers both individual subscribers and users at institutions the ability to capture all Isabel session details for submission to CME accrediting bodies. Session details can be saved, printed or emailed for collation and submission.

awards & recognition


Isabel was highlighted by Maureen Bisognano, COO of the Institute of Healthcare Improvement, as one of the innovative tools to help mitigate cognitive diagnosis error at the 2007 Institute of Healthcare Improvement Annual Forum

isabel has been extensively featured in USA Today (Sept 2007), Fox News (Dec 2006), Wall Street Journal (May 2005 & Nov 2006), CBS (May 2006), New York Times (Feb 2006), Forbes (Aug 2005) and CNN (Oct 2004).

isabel was featured (2007) in the best selling book "Super Crunchers" by Ian Ayres along with the Institute of Healthcare Improvement and Don Berwick.

Peer reviewed articles and results of clinical studies have been published in Archives of Disease in Childhood, Journal of the American Medical Informatics Association, Medinfo 2004, Journal of Intensive Care Medicine, Health Management Technology, BMC Medical Informatics and Decision Making and the BMJ Emergency Journal.

- Winner of the 2005 Frost & Sullivan Healthcare Information Technology Product Innovation of the Year Award
- Awarded the "best example of technological innovation" at the 2003 Healthcare IT Effectiveness Awards
- Recognized as one of the "outstanding and innovative developments within the IT sector" at the 2002 British Computer Society IT Professional Awards



"Isabel is a powerful and wonderful tool that is useful for both advanced clinicians and learners. For the experienced, it can serve as a reminder of the 'zebras' that we sometimes overlook. For learners, it can be used as a tool to help build their differential diagnoses skills. It truly is a gift in caring for patients."

Joseph H. Schneider, MD.
Chief Medical Information Officer, Children's Medical Center Dallas, Texas.

Return On Investment

Clinical Trial Evidence

"In the traditional medical environment, people expect you to know everything. It can be difficult sometimes to keep all that knowledge right at the top of your brain so you can pull it out when you really need it."

Napoleon Knight, MD.
ER Physician & VP Safety & Quality, Carle Hospital, Champaign-Urbana, IL

RETURN ON INVESTMENT

ISABEL - SYSTEM ACCURACY, IMPACT,

In addition to its proven capabilities, Isabel is also extremely cost-effective and offers a high return on investment—saving institutions millions of dollars per year by arming providers with an expert opinion 24 hours a day, 365 days a year.

And since Isabel is a ready-made application that is centrally managed and updated by Isabel Healthcare Inc, the total cost of ownership for subscribers is kept to an absolute minimum.

Studies have shown that, for the average 200-bed hospital (with an emergency room and outpatient care), Isabel can save over \$3 million per year. These savings result from not only the reduction of diagnosis errors and the time spent reaching the correct diagnosis, but also from fewer wasted patient bed days and the potential savings from decreased insurance and litigation costs, staff efficiencies, and continuing education.

However, this number doesn't even include the additional revenue generated from producing a higher quality of care and enhanced patient safety.

Since 2000, Isabel has undergone a robust validation process worldwide in live clinical settings. No diagnosis decision su

INDEPENDENT MEDICAL VALIDATION

How well does Isabel perform for diagnostically challenging NEJM CPC cases when whole text data entry is used?

Using whole text entry, the correct diagnoses was suggested in 74% cases. Using key findings entered manually, the correct diagnosis was suggested in 98% cases.

VA Medical Center, Northport, NY and the Department of Medicine, SUNY at Stony Brook, NY. Nov 2005

What is the impact of Isabel on diagnostic errors in a simulated environment?

In 10% of cases, Isabel caused the user to include a major diagnosis they had not considered and should have.

Department of Pediatrics, University of Virginia, Charlottesville, VA and Dept of Health Evaluation Sciences, University of Virginia, Charlottesville, VA. Nov 2006

Does Isabel have an educational impact on the differential diagnosis generated by medical students?

80% students found Isabel to be more useful than standard resources; 67% students reported that Isabel often or always provided an additional diagnosis not initially considered. All students interviewed agreed that the use of such web-based tools should be incorporated into medical education.

Golisano Children's Hospital at Strong, Rochester, NY. Oct 2004

"I put all his symptoms into Isabel and it came up with a number of ideas," he says. "One of them was gallbladder disease, which I probably should have thought of, but I didn't." An ultrasound was ordered, and gallbladder disease was indeed the problem.

Stephen Borowitz, pediatric gastroenterologist
at University of Virginia Children's Hospital
in USA Today Sept 2007

"THE ISABEL PROGRAM IS USED TO GET RESIDENTS TO BROADEN THEIR THINKING AND TO CONSIDER SUCH ISSUES AS WHETHER A CHILD WITH FEVER AND RASH SHOULD BE EVALUATED NOT ONLY FOR INFECTIONS BUT ALSO FOR JUVENILE RHEUMATOID ARTHRITIS OR LUPUS."

"I FIND ISABEL EXTREMELY USEFUL IN TEACHING THE ART OF DIFFERENTIAL DIAGNOSIS TO HOUSE OFFICERS AND MEDICAL STUDENTS. ISABEL IS WORTH ITS WEIGHT IN GOLD."

DR. MARGARET K. HOSTETTER, MD.
PROFESSOR AND CHAIR OF THE DEPARTMENT OF PEDIATRICS & PHYSICIAN-IN-CHIEF
YALE-NEW HAVEN CHILDREN'S HOSPITAL YALE UNIVERSITY SCHOOL OF MEDICINE

OUTCOMES AND CLINICAL TRIALS

THE ISABEL CLIENT PROCESS

...ess, having been tried and tested by over 35,000 providers
...port system has been validated to such an extent.

MULTI-CENTER MEDICAL VALIDATION BY
DEVELOPERS AND ACADEMIC COLLABORATORS

*Does Isabel suggest 'clinically relevant' diagnoses in an adult
emergency medicine setting?*

Overall, the diagnostic system displayed the final discharge diagnosis in 95% of inpatients and 90% of 'must-not-miss' diagnoses suggested by the expert panel.

Validation of a diagnostic reminder system in emergency medicine: a multi-centre study. Emergency Medicine Journal Sept 2007.

*How does Isabel influence clinicians' decision-making in a
controlled environment?*

In 13% cases at least one 'gold standard' diagnosis was considered by the user only after Isabel advice. No adverse diagnoses were considered due to Isabel advice. Only 7 unnecessary tests were performed post-Isabel.

Assessment Of The Potential Impact Of A Reminder System On The Reduction Of Diagnostic Errors. BMC Medical Informatics And Decision Making. May 2006.

Does Isabel improve diagnostic decision-making?

Isabel produced a meaningful change in the quality of diagnostic decision making in 14% cases. Isabel advice prompted doctors to perform 6 'important' tests. Median extra time taken by the doctors to process Isabel advice was 1 min 38 sec.

Diagnostic Omission Errors In Acute Pediatric Practice: Impact Of A Reminder System On Decision-making. BMC Medical Informatics And Decision Making. Nov 2006.

Isabel is a web-based system:

- Access from any device with an Internet connection
- No additional capital expenditure
- Automatic upgrades
- No software installation or ongoing maintenance

Isabel access options:

- User name and password (for Individuals)
- Through an icon with password embedded
- IP authentication (for Institutions)

Isabel client service support program

- Initial on site training
- Help with initial and crucial ongoing internal awareness
- Ongoing telephone support
- Follow-up visits
- Specialist advice and support on programs to measure and mitigate diagnosis error

Empower providers and help give patients greater peace of mind.

Contact Isabel Sales and Marketing
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