

Reducing Medical Errors Applying Just-in-Time Knowledge

Smarter Health Innovator Series Seminar

University of Waterloo

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Agenda

- Who is Medicalis?
- Today's Healthcare Challenges
- Partnership with Brigham & Women's Hospital
- Embedding Medical Knowledge Into Clinical Workflows
- Bridging the Gap between the Primary Care Provider and Diagnostic Testing Facility
- Canadian Initiatives
- Demonstration
- Summary

Who is Medicalis ?



Company History

- Founded in June 1999
 - JV between Brigham and Women’s Hospital and Mitra
 - Based in Boston, MA
 - Providing knowledge management and workflow solution for radiology
 - Technology built by Mitra’s engineering group

- Spun off from Mitra into Medicalis in July 2002
 - Enables both corporations to focus on their core business and competencies
 - Relocated to Waterloo, ON
 - ~20 employees



Providing Knowledge for Life

- Medicalis provides physicians with on-line & real-time order placement, including evidence-based decision support for clinical appropriateness and reimbursement, multi-site scheduling, result viewing and follow-up tools
- Our solutions and services improve patient care and reduce medical error. They enhance the accuracy of prescribing/ordering, and optimize the utilization of test & therapy resources
- We are focused on Evidenced-Based Medicine and the integration that inserts decision support into clinical workflows
- Interventional radiology is a likely mechanism for the delivery of gene therapies to the targeted organs
- Genomics, laboratory testing, and medical imaging are an important combination for future clinical IT solutions



Today's Healthcare Challenges

Demands on the healthcare system...

- **Need to reduce medical errors**
 - Institute Of Medicine report estimates 44,000 to 98,000 deaths a year
 - Non-fatal errors increase US hospital costs from \$30B to \$120B annually

- **Need to continually educate**
 - “Physicians must keep track of 10,000 different diseases & syndromes, 3,000 medications, 1,100 lab tests and as many as 400,000 articles added to biomedical literature each year.” (Harvard Business Review, July 2002)
 - It takes 5 to 10 years for known best-practices to be actually used by physicians

- **Need for care is increasing**
 - Baby boomers
 - Consumers demand sophisticated tests to diagnose current ailments
 - Consumers demand greater preventative tests using Imaging, Labs, and Genetics

Technology Challenges

- Networks (lack of connectivity)
 - Lack of connectivity within and between institutions
- Wide variety of information systems in healthcare provider institutions
- Large number of legacy systems
 - Difficult to interface with
- Physician adoption
 - Need to demonstrate significant value to introduce new technologies
- Healthcare is a 24x7x365 activity
- IT is poorly funded

Partnership with Brigham and Women's Hospital



Brigham and Women's Hospital (BWH)

- Located in Boston, MA
- World leader in patient care, medical education, and research
- Consistently named to US News and World Report's Honor Roll of top hospitals.
- A major teaching hospital of Harvard Medical School
- World-renowned center for advanced patient care and for pioneering work in virtually every area of medicine.



- Home for one of the most powerful Biomedical Research Institutes in the world.
- Over 500 scientists
- \$240 million in research grants for medical care and basic science

Brigham and Women's Hospital (BWH)

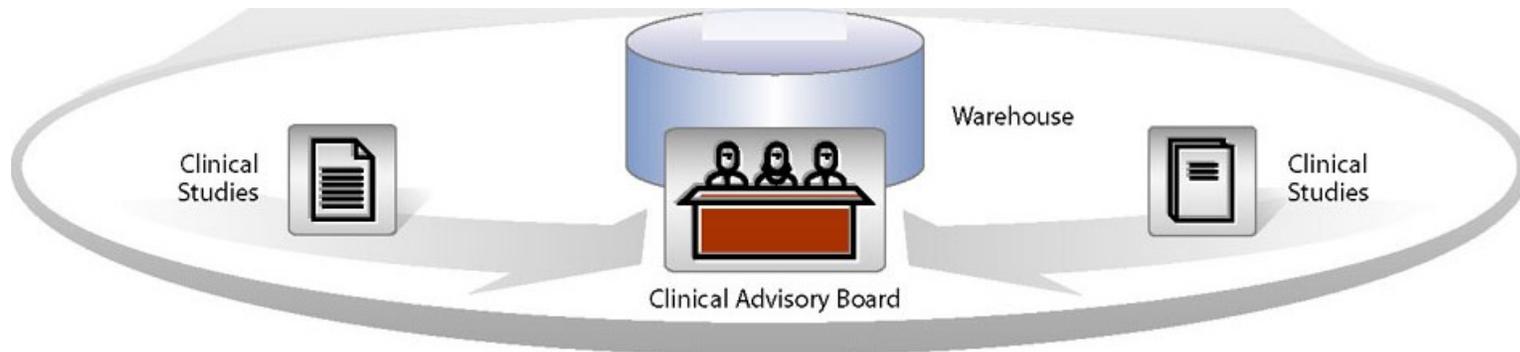
- BWH is a founding member of the Partners HealthCare IDN: a system of primary care and specialty physicians, community hospitals, the two founding academic medical centers (BWH, Mass. Gen.), specialty facilities, community health centers, and other health-related entities.
- Partner's Healthcare is a non-profit organization.



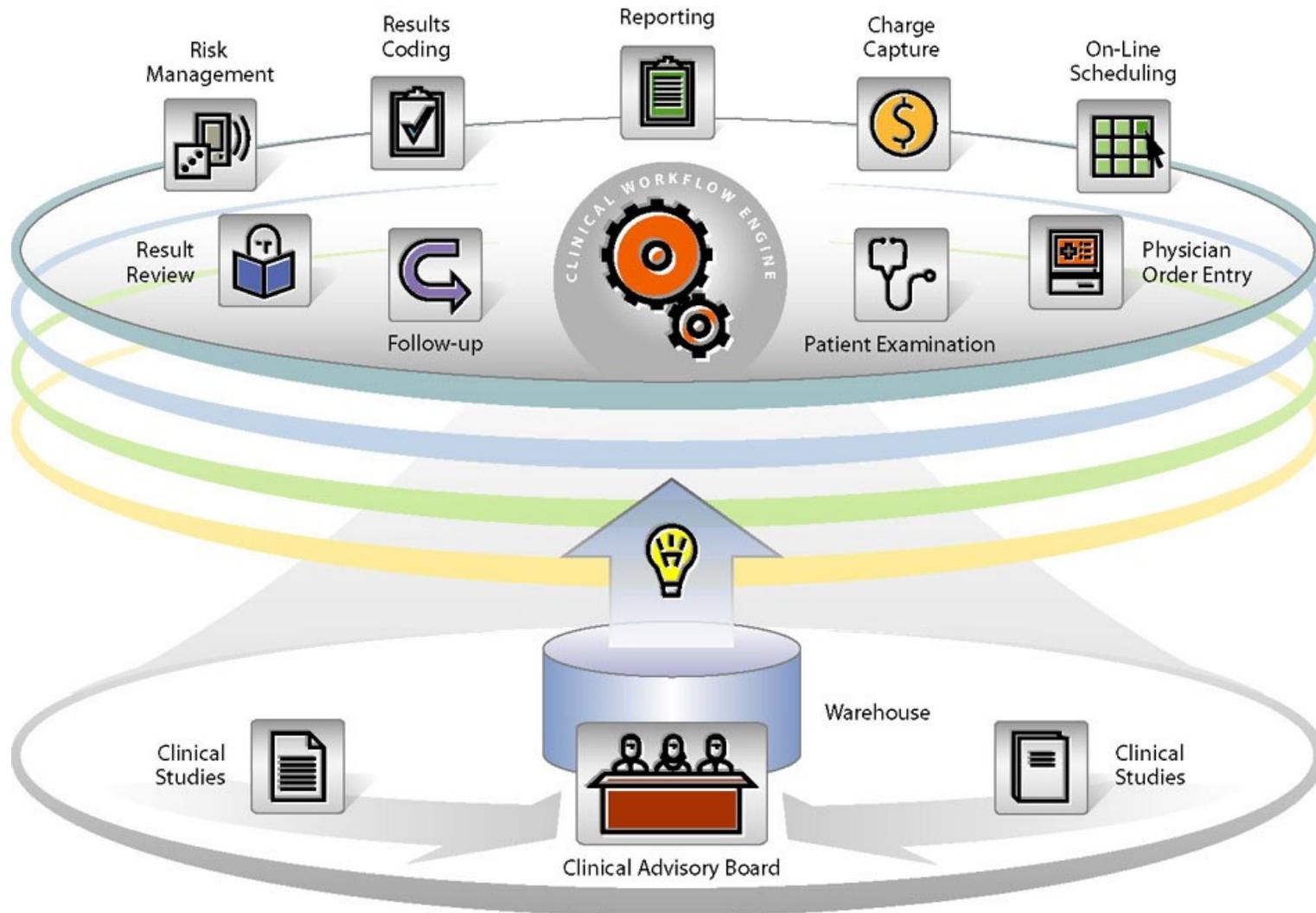
Embedding Medical Knowledge Into Clinical Workflows



Source of Knowledge

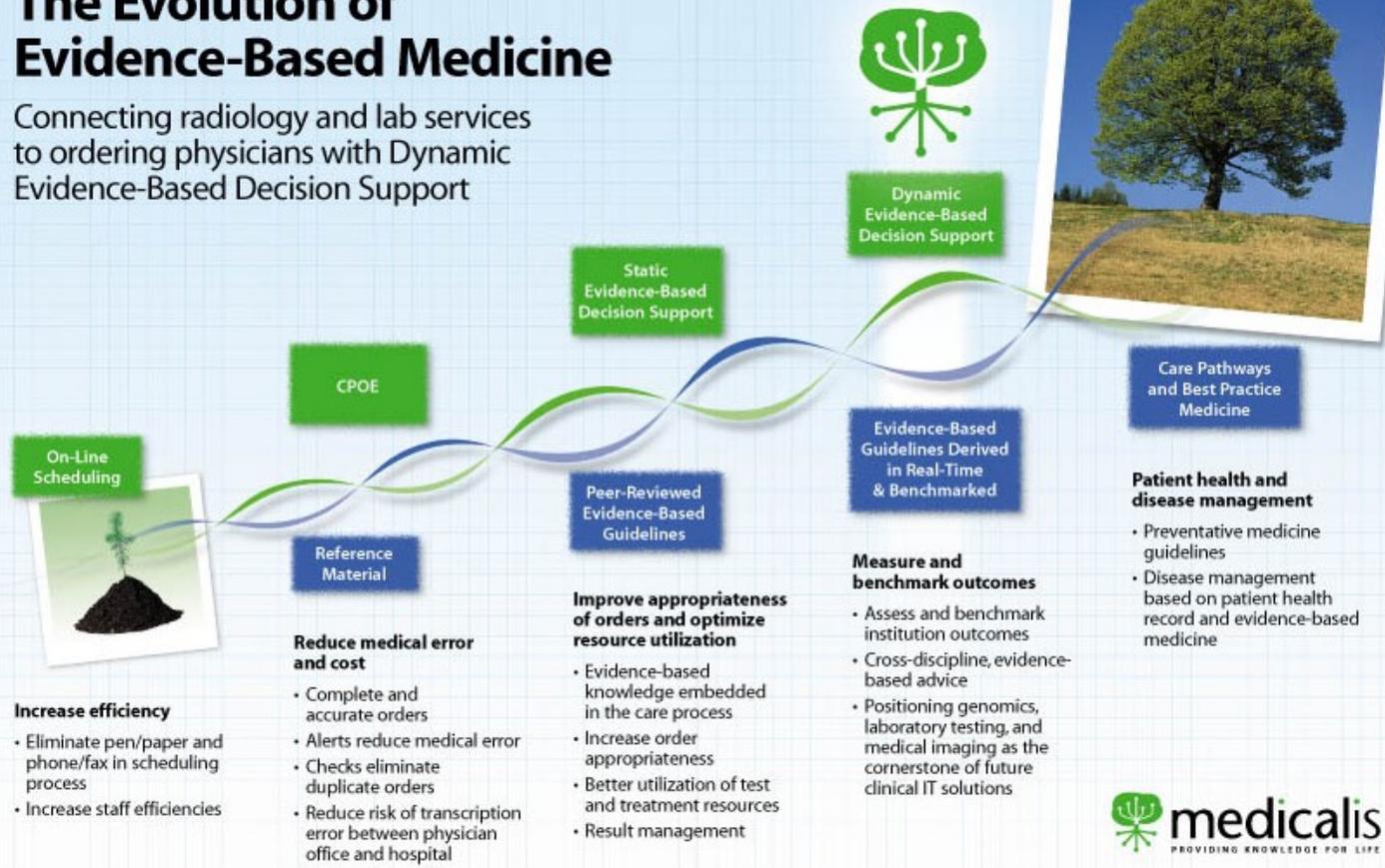


Source of Knowledge



The Evolution of Evidence-Based Medicine

Connecting radiology and lab services to ordering physicians with Dynamic Evidence-Based Decision Support



- Increase efficiency**
- Eliminate pen/paper and phone/fax in scheduling process
 - Increase staff efficiencies

- Reduce medical error and cost**
- Complete and accurate orders
 - Alerts reduce medical error
 - Checks eliminate duplicate orders
 - Reduce risk of transcription error between physician office and hospital

- Improve appropriateness of orders and optimize resource utilization**
- Evidence-based knowledge embedded in the care process
 - Increase order appropriateness
 - Better utilization of test and treatment resources
 - Result management

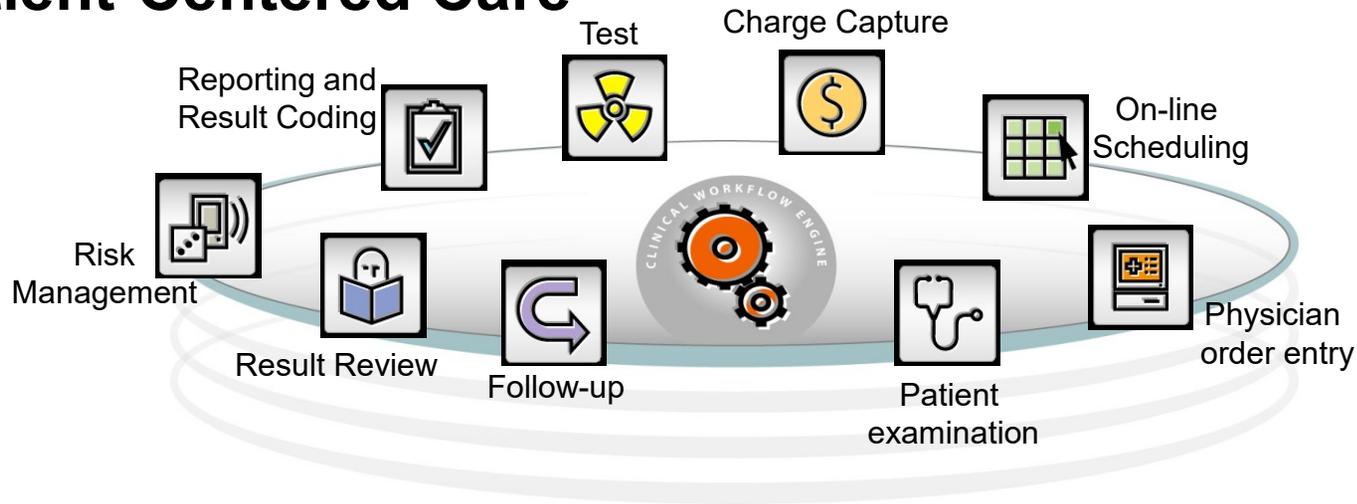
- Measure and benchmark outcomes**
- Assess and benchmark institution outcomes
 - Cross-discipline, evidence-based advice
 - Positioning genomics, laboratory testing, and medical imaging as the cornerstone of future clinical IT solutions

- Care Pathways and Best Practice Medicine**
- Patient health and disease management**
- Preventative medicine guidelines
 - Disease management based on patient health record and evidence-based medicine



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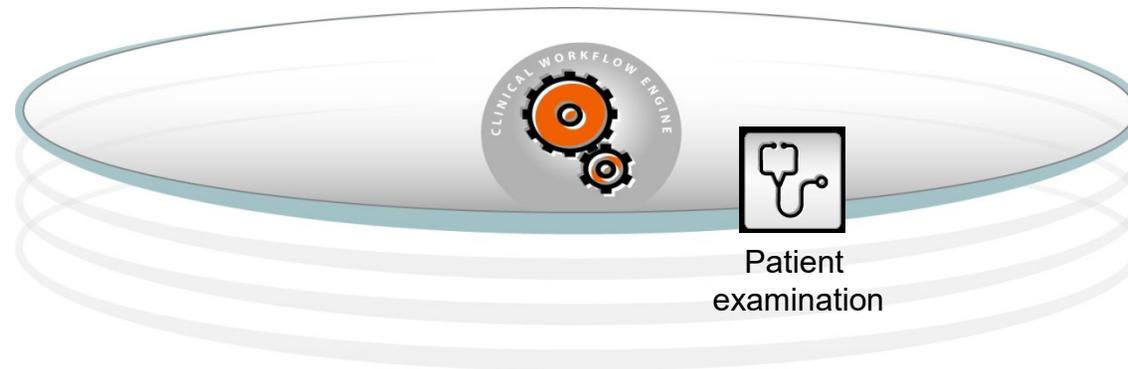
Patient-Centered Care



- Percipio, the Medicalis solution, promotes patient-centered care
- It benefits **all** stakeholders in the ordering of tests, performing of tests and follow-up procedures

Patient Examination

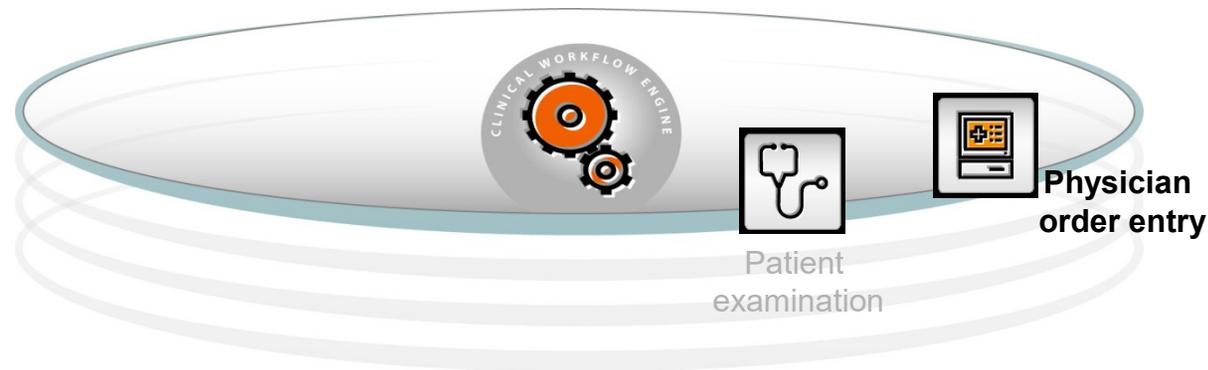
Embedding Knowledge...



- The physician examines the patient
- The physician decides to order a diagnostic test
- The physician uses Percipio to order the test, whether in his practice, in the patient's home, or at the hospital

Physician Order Entry

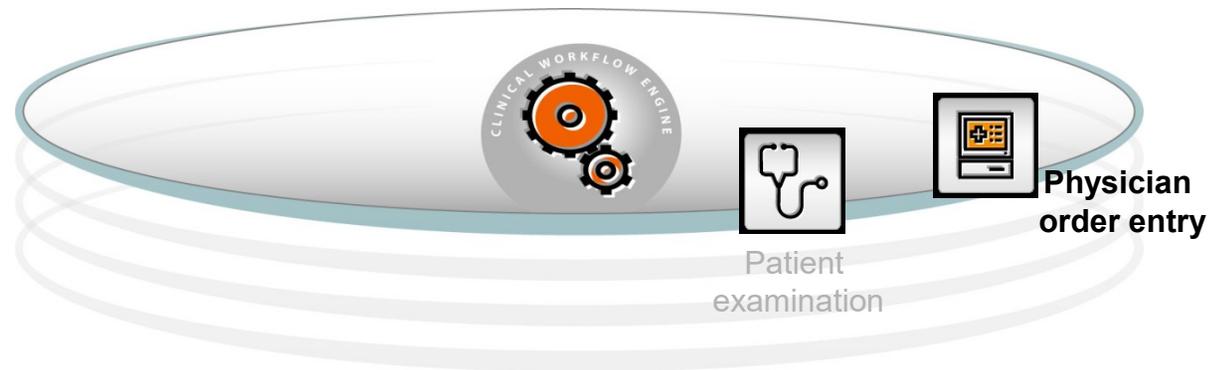
Embedding Knowledge...



- The physician uses Percipio to select the exam he wants to order
- The physician is prompted to enter history, signs & symptoms, and differential diagnosis
 - Percipio alerts the physician for safety issues (e.g. allergies)
 - ➔ Patient safety and medical error reduction
 - Percipio alerts the physician about duplicate orders
 - ➔ Optimization of resource utilization for the test-provider facility, cost savings
 - Percipio alerts the physician about non-reimbursable exams
 - ➔ Cost savings

Physician Order Entry (cont...)

Embedding Knowledge...

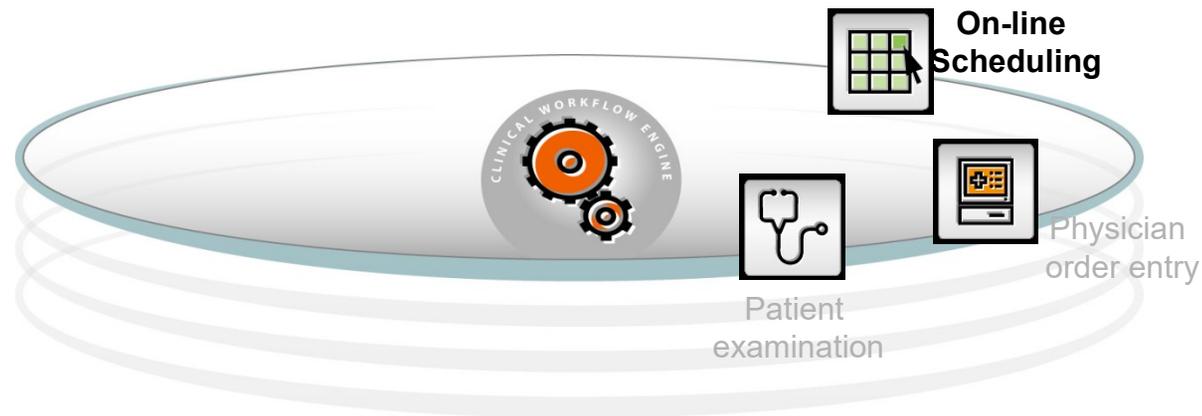


- Percipio provides feedback on the appropriateness of the order
 - The physician may be informed that the ordered test is not going to provide useful information or benefit the patient
 - The physician can review the literature behind the guideline
 - The physician can review the outcomes of similar prior tests from Percipio’s database (patent)
 - Brings knowledge into the practice of the physician
 - Ensures the physician follows best practices
 - Improves care by directing the patient to the right test, right away



Scheduling

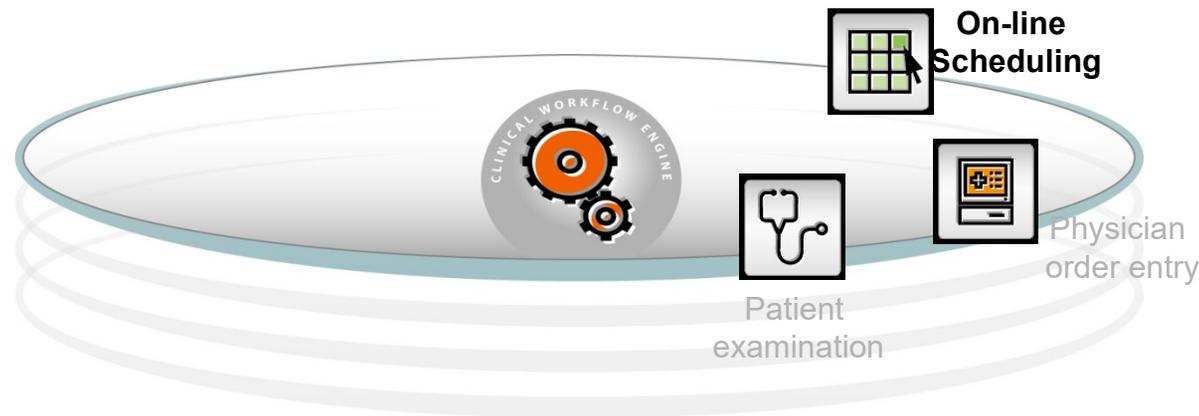
Embedding Knowledge...



- Once the order is electronically signed-off by the physician, staff schedules it
 - In the current practice, the staff member receives a paper order, and uses fax/phone to schedule the test. The patient is later informed of the appointment
- Percipio shows the next available time slot from multiple facilities that can perform such a test
 - e.g. facilities that are affiliated with this physician

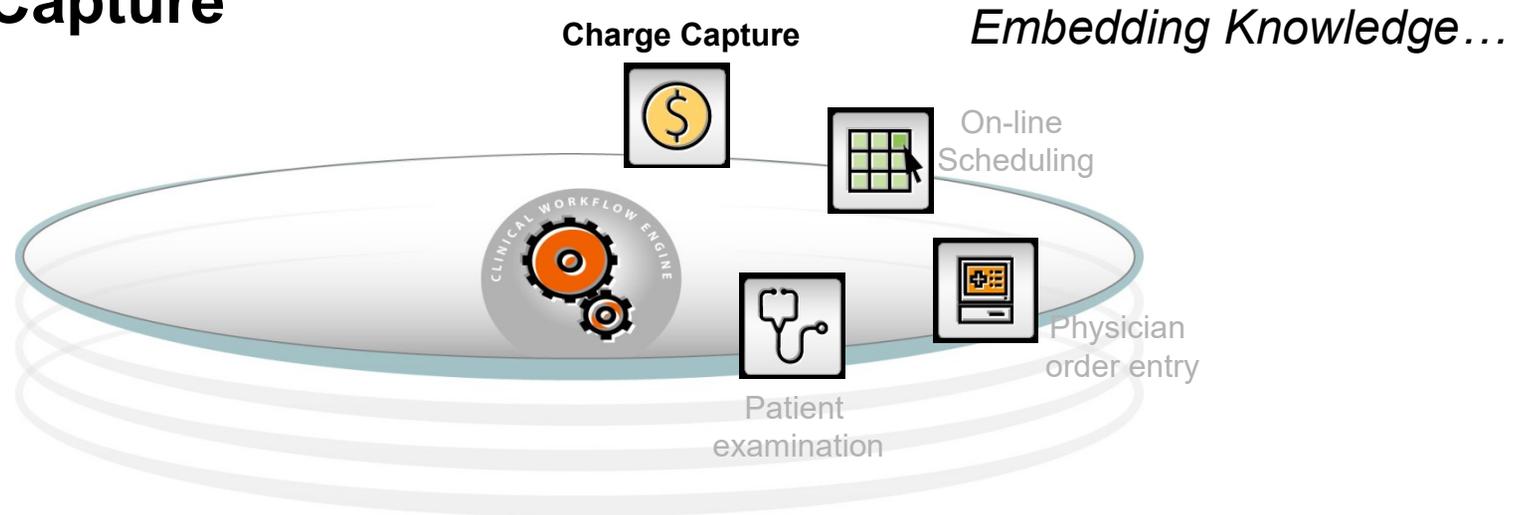
Scheduling (cont...)

Embedding Knowledge...



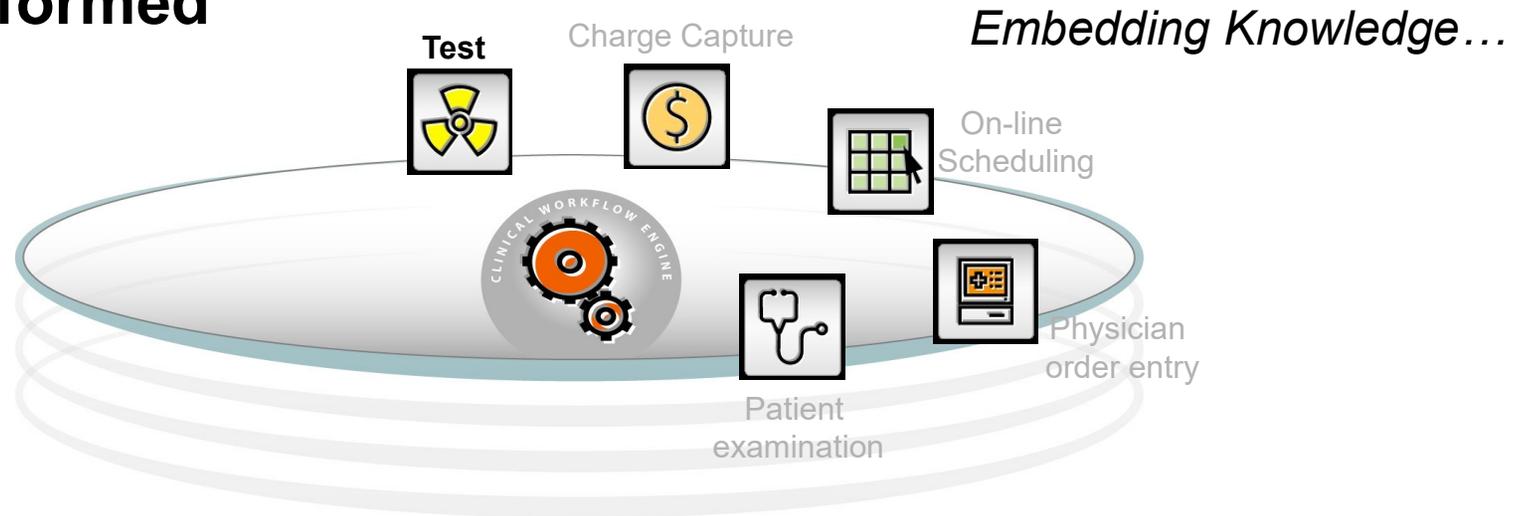
- The staff member can choose the most appropriate appointment
 - e.g. earliest appointment, or location most convenient to the patient, or facility offering the desired service
- The appointment is scheduled on-line and in real-time, while the patient is still in the practice
 - Saves considerable amount of time for staff
 - Ensures the patient leaves with appointment card (or email meeting invitation) and preparation instructions

Charge Capture



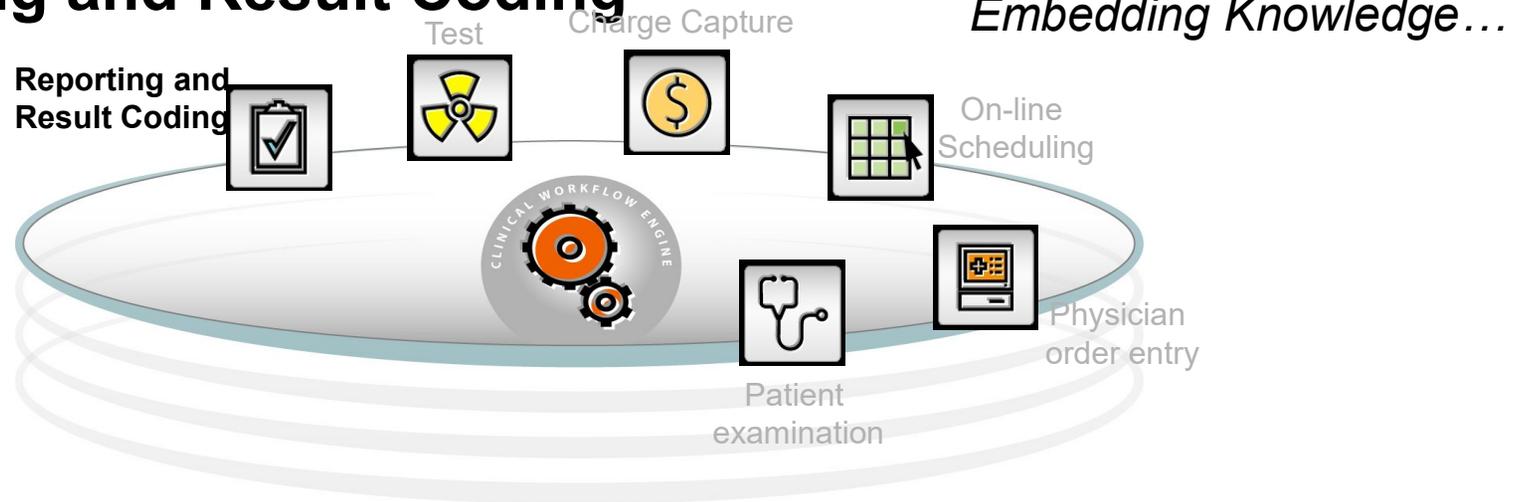
- While the physician completes his order, Percipio maps indications and differential diagnosis to the billing codes as defined by the payer
 - Today, an estimated 10 to 15% of radiology orders cannot be billed
 - ➔ Ensures all expected revenues are captured

Test Performed



- The patient comes to the test-provider facility at the date and time of the exam
 - ➔ Reduces number of no-shows
- The patient is properly prepared for the test
 - ➔ No delay or re-scheduling of the exam because pre-medication, or other instruction were not followed

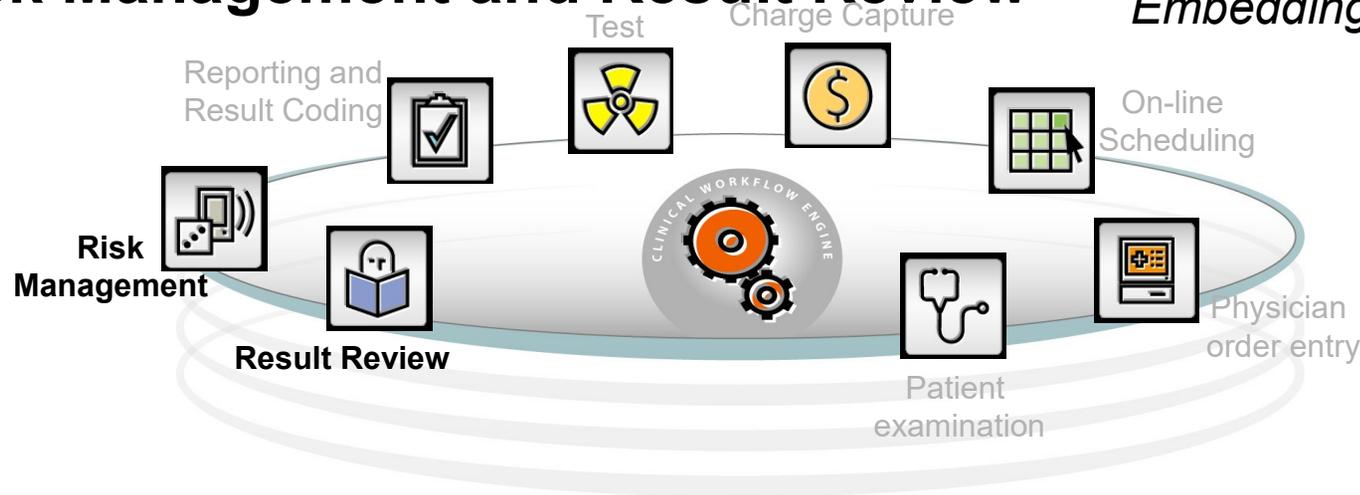
Reporting and Result Coding



- Report is completed by specialist (e.g. radiologist)
 - Percipio contains a unique result coder that captures significant information about the report in a structured way
 - Serves as a base for data mining and outcome analysis for discovery of new evidence of appropriateness
 - Incorporated into clinical data warehouse for inclusion in dynamic feedback about appropriateness

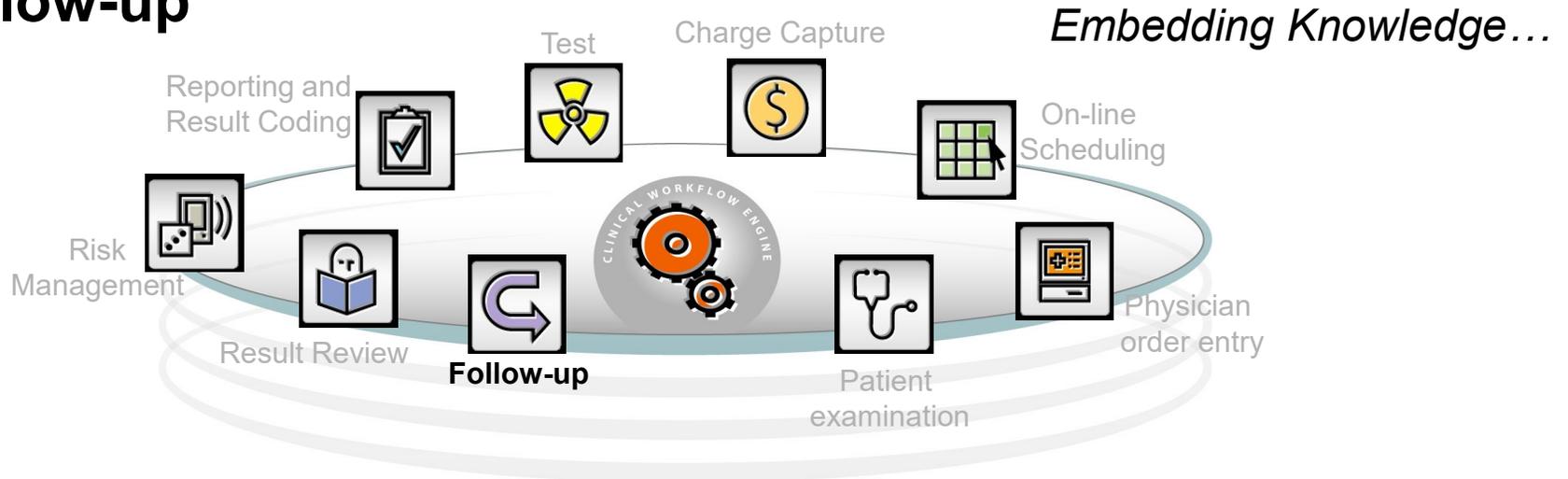
Risk Management and Result Review

Embedding Knowledge...



- Strengthen communication between specialist (e.g. radiologist) and physician
 - ➔ Physician alerted about abnormal results
- The physician reviews the result
 - Percipio ensures that the report from information system of the test-provider facility is digitally available
 - The physician can also review images from an integrated web viewer
 - ➔ Physician has immediate access to results online

Follow-up



- Percipio manages patient conditions requiring follow-up
 - e.g. Breast screening mammogram every other year if mammogram normal, or every 6 months if abnormalities observed on mammogram
 - The patient leaves with a letter to remind her when to come back for further checks
 - The physician can proactively manage the patient’s care and therapy over time, including preventative medicine, screening, genetic testing

Bridging the Gap between the Primary Care Provider and Diagnostic Testing

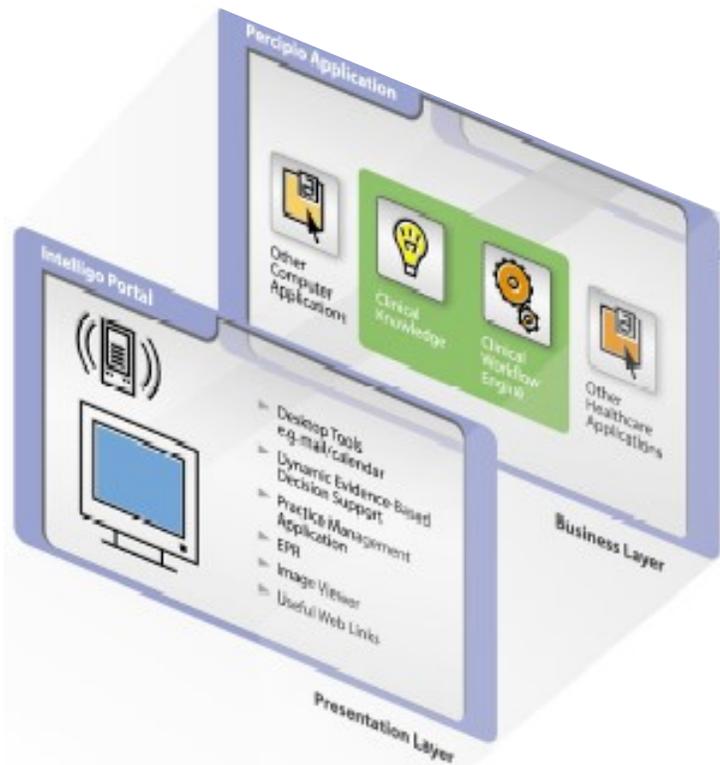


Intelligo

Intelligo



Intelligo



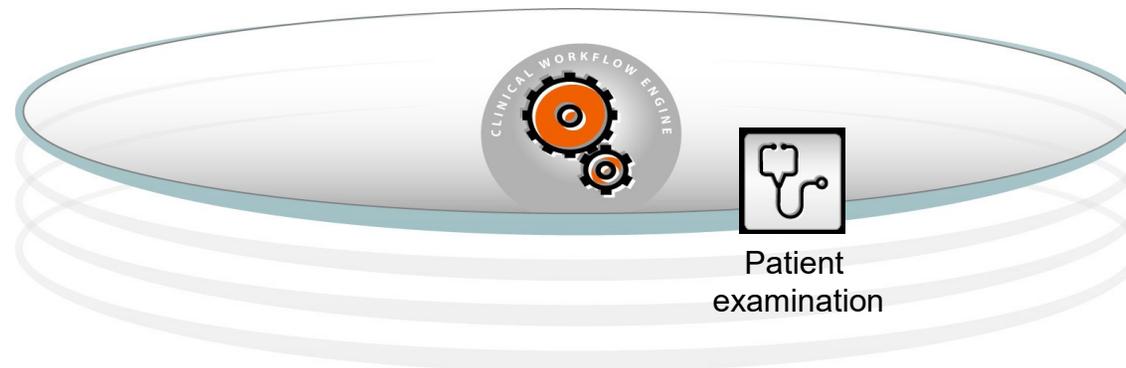
Intelligo



Intelligo



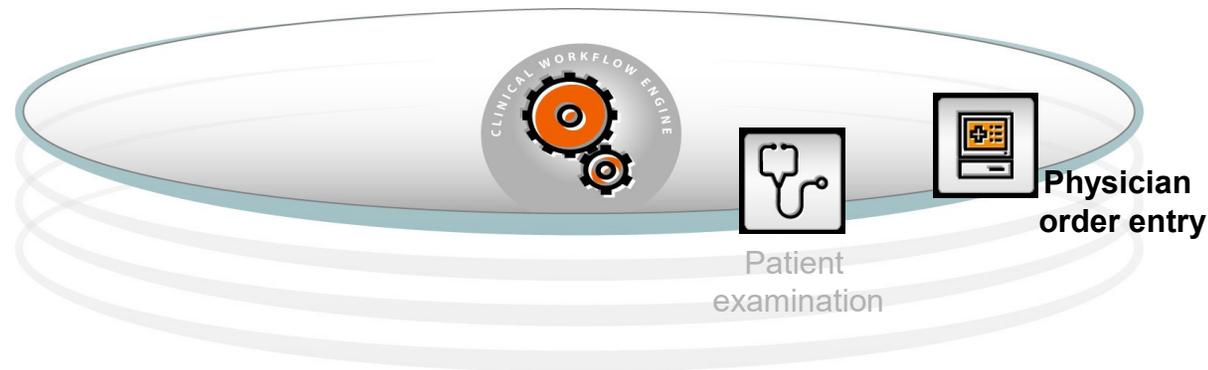
Bridging the Gap at BWH



- Percipio is available throughout the clinical episode
 - ➔ Only a network connection and a web browser are required
- Intelligo integrates Percipio with basic information systems
 - User authentication (e.g. BICS)
 - Patient demographics (e.g. EMPI)
 - Physician database (e.g. CPM)
 - Insurance information (e.g. NEHEN)

Physician Order Entry

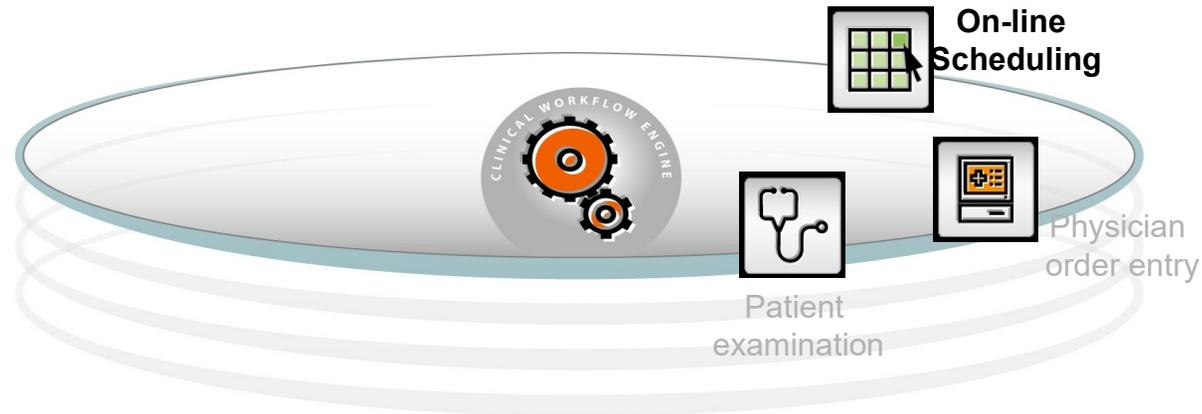
Bridging the Gap at BWH...



- Intelligo integrates Percipio with existing applications on the desktop
 - “launch and forget” with user and patient context (e.g. LMR)
 - “embedded function”, order created in Percipio, passed back to host application on desktop, where order is signed and completed (e.g. EDOE)

Scheduling

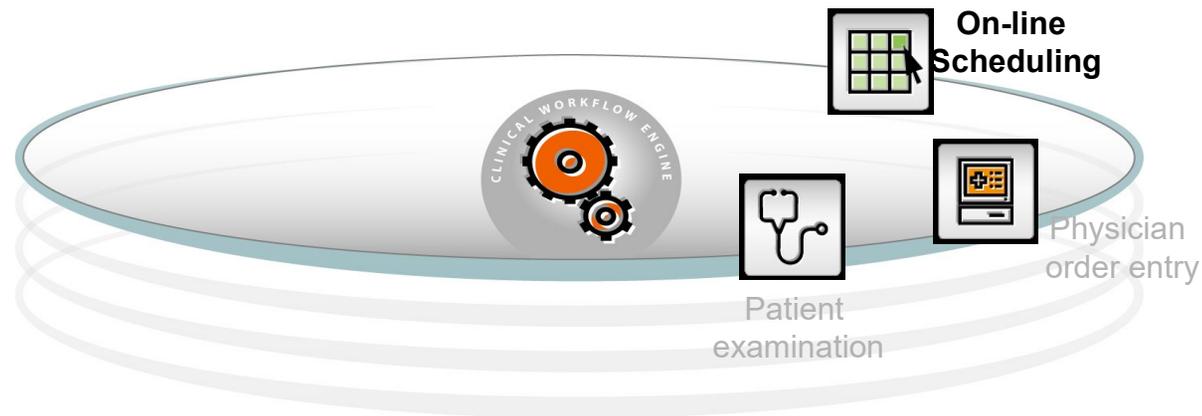
Bridging the Gap at BWH...



- With Percipio, the staff member takes the order from a list of open orders, and schedules it
 - Eliminates transcription errors
- Surrogate scheduling
 - Uniform view of all diagnostic test center resources

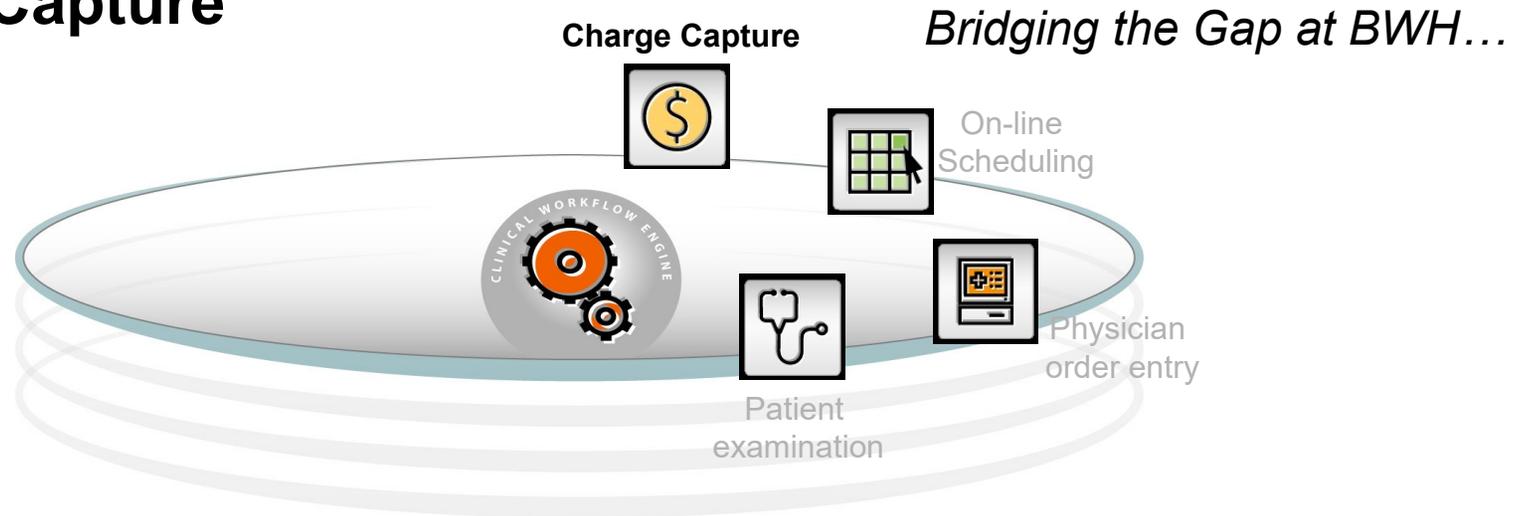
Scheduling (cont...)

Bridging the Gap at BWH...



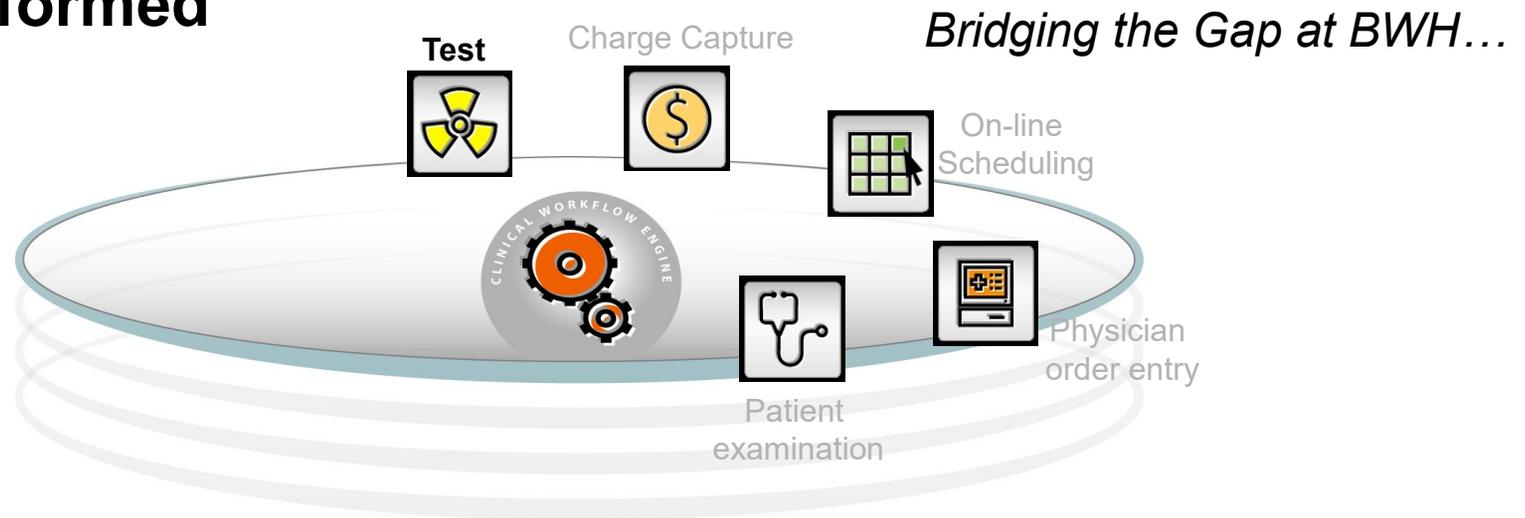
- Automated interface between Percipio and ancillary facility IS
 - Back office exchange of order and acknowledgement
- Manual interface
 - Web based worklist for department staff to transfer studies

Charge Capture



- Capturing indication in structured manner enables us to automatically map to ICD-9 and CPT-4 codes
 - Reduces the number of staff doing manual code mapping

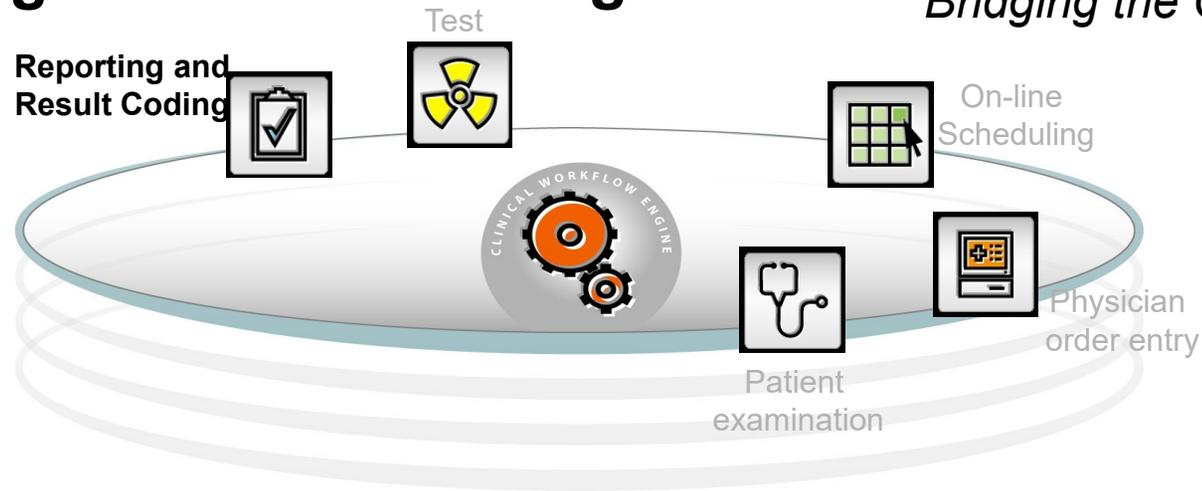
Test Performed



- Order transmitted electronically to facility
 - ➔ No transcription error, no lost fax etc
- Provides access to patient history and demographics at point of test
 - Indications and allergies available
- Provides access to physician contact information
 - Tech can contact physician for clarification

Reporting and Result Coding

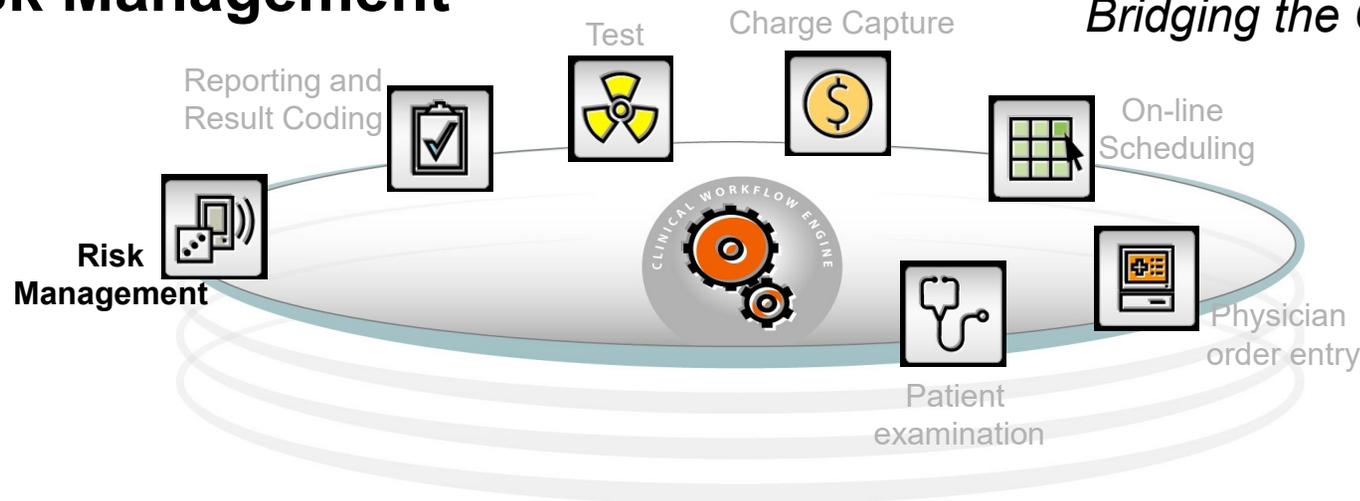
Bridging the Gap at BWH...



- Radiologists and Transcriptionist portal in progress, to seamlessly integrate reporting, results coding, signing of reports

Risk Management

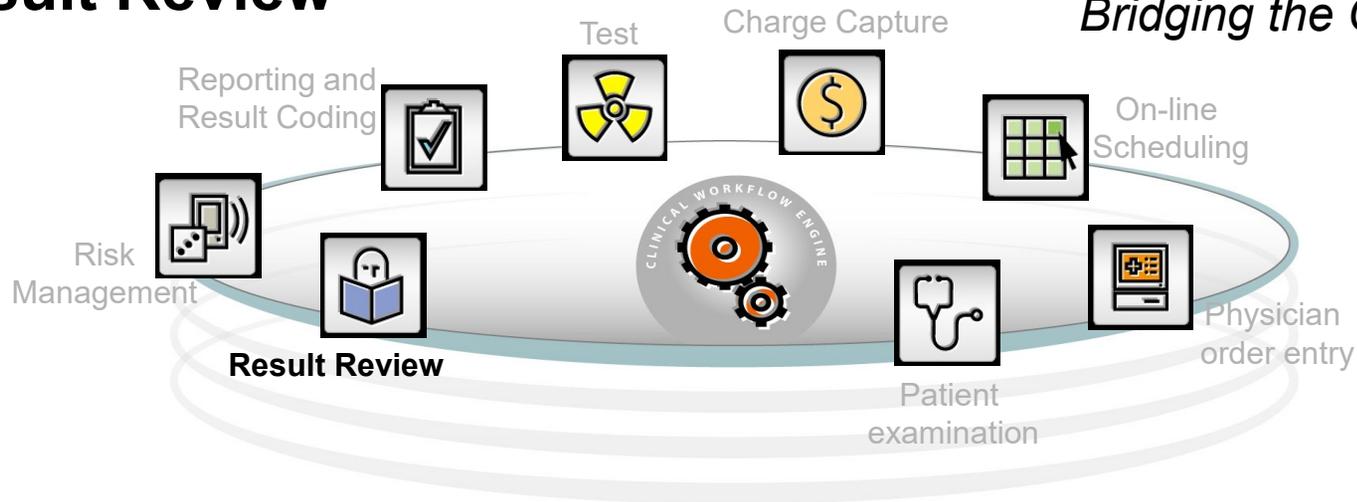
Bridging the Gap at BWH...



- Strengthen communication between specialist (e.g. radiologist) and physician
 - ➔ Physician alerted about abnormal results
- Integrated with Partners fax, pager, and e-mail systems
- Planned integration with Blackberry

Result Review

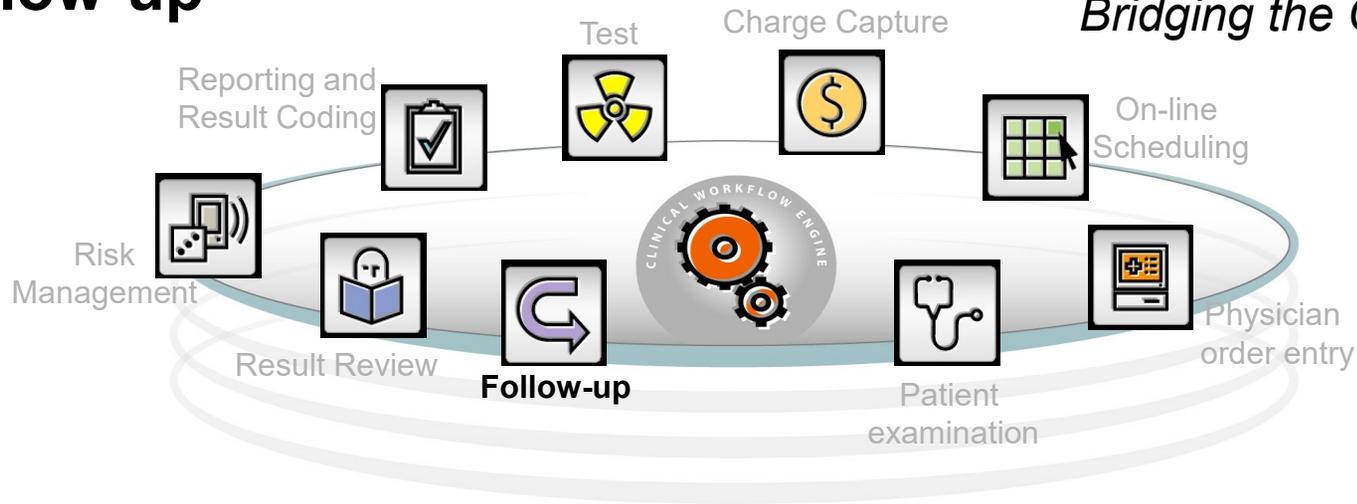
Bridging the Gap at BWH...



- Integrated with Mitra's products to provide
 - Text reports from departments
 - Web based images from departments

Follow-up

Bridging the Gap at BWH...



- Patient portal in progress
 - Enables patient to review appointments, results and communicate with physician

Summary of Partners' Healthcare Solution



Percipio and Intelligo allows BWH radiology sites to perform ~1000 outpatient radiology orders every week.

Percipio and Intelligo ensure radiology receives documented, appropriate, and billable requisitions from outpatient centers, and that results are made available to those centers in a timely manner.



Canadian Initiatives

Tremendous Momentum in Endorsing Evidence Based Medicine Decision Support Systems

- Commission on the Future of Health Care in Canada (Romanow)
- The Health of Canadians – The Federal Role (Kirby Senate Committee)
- Canada Health Infoway
- Institute of Health Economics of Alberta

Demonstration



Summary

- Just In Time knowledge improves healthcare
 - Static knowledge (i.e. digital medical textbook)
 - Dynamic knowledge (i.e. based on large set of results)

- Technology improves healthcare
 - Linking the primary care providers with diagnostic test centers products a number of positive outcomes
 - Dramatically improves the level of care that a patient experiences
 - System wide efficiencies in resource utilization are achieved
 - PCP provides richer content that can be used during test
 - Results available to PCP quickly and easily

