eHIT: Effectively Harnessing Information to Drive Change

Activity Overview
You’ve got the data, but do you use it? Learn how pharmacy leaders translate data from electronic health information technology (eHIT) into business intelligence and change in day-to-day activities to maximize the pharmacy staff’s impact on patient care.

Learning Objectives
After participating in this application-based educational activity, participants should be able to

- List strategic dashboards that pharmacy departments should be monitoring in real time.
- Describe innovative approaches to business intelligence.
- Develop an analytic and predictive analysis for the pharmacy business environment.
Leading the Pharmacy Enterprise: Advancing Practice with Transitions in Health Care

eHIT: Effectively Harnessing Information to Drive Change

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Outline

• Definitions and background
• Suggestions and infrastructure for effective analytics
• Analytics and predictive analysis in business
  – Small groups: Business case study
• Business intelligence in healthcare
  – Small groups: Dashboard development, part I
• Business intelligence in pharmacy
  – Small groups: Dashboard development, part II
• Innovative approaches to business intelligence

What is your understanding of business intelligence as it relates to health care?

1. I am a wizard at predictive analytics and data mining and I don’t get out of bed without creating a dashboard.

2. I know what “business intelligence” is, but don’t know as much as I probably should.

3. I have no idea what you are talking about.
Where are you with use of a data warehouse for pharmacy initiatives?

1. We routinely use a data warehouse for drug utilization efforts, population management, and/or pharmacy efficiency projects.
2. We have access to data, but don’t use it as effectively as we probably should.
3. We have a warehouse, but it is full of boxes (i.e., we don’t have the data we need).

Where are you with use of dashboards to monitor pharmacy performance?

1. We use multiple dashboards for everything from financial performance to medication safety.
2. We pull together data as needed, but don’t have dashboards that we routinely monitor.
3. The only dashboard I ever see is in my car.

Does your department analyze drug utilization data and report trends and/or external benchmarking data?

1. We have access to a database that we use to benchmark drug utilization against our peers.
2. We have access, but rarely use the database.
3. We don’t have the means for comparing our drug utilization to our peers.
The Next Era of Healthcare IT

Business Intelligence and Analytics
Current State

Business Intelligence & Analytics Drivers

- Reporting / Transparency requirements
  - CMS Core Measures
  - Leapfrog
  - Meaningful Use Measures
  - Value-Based Purchasing
  - Quality & Health Grades

Business Intelligence & Analytics

WATER, WATER EVERYWHERE.....

no shortage of data

.....BUT NOT A DROP TO DRINK

but limited ability to effectively use data for decision making
"One can only separate necessary from unnecessary care by using reliable, relevant clinical data. With the inexhaustible mass of data available today, deciding which to collect and analyze will require judgment and experience."

James Lock, M.D.
Chairman, Pediatric Cardiology
Children's Hospital Boston

**BI versus BA**

### Business Intelligence
- Answers the questions
  - What happened?
  - When?
  - Who?
  - How many?
- Includes
  - Reporting (KPI's, metrics)
  - Automated monitoring/alerting thresholds
  - Dashboards
  - Scorecards
  - Ad Hoc queries

### Business Analytics
- Answers the questions
  - Why did it happen?
  - Will it happen again?
  - What will happen if we change X?
  - What else does the data tell us?
- Includes
  - Statistical/Quantitative analysis
  - Data mining
  - Predictive modeling
  - Multivariate testing

Population Health Management

- Management of “health outcomes” for a group of individuals, including the distribution of such outcomes within the group
- Factors affecting health outcomes include
  - Medical care
  - Public health interventions
  - Social environment (income, education, employment, social support, and culture)
  - Physical environment (urban design, clean air and water),
  - Genetics, and individual behavior

Population Health Management

- Addresses health needs at all points along the continuum of health and well being, through participation of, engagement with and targeted interventions for the population
- The goal is to maintain and/or improve the physical and psychosocial well being of individuals through cost-effective and tailored health solutions
- Automation makes population health management feasible, scalable and sustainable
Analytic Challenges

- Inconsistent Data Quality
- Siloed Information Systems
- Inefficient reporting
- Data locked in disparate systems
- Report generation is technically challenging, limiting adoption

Keys to BI success

- Design - single source of truth
- Architecture - virtual data warehouse strategy
- Stewardship - Data quality oversight
- Governance - Standardization
- Education & Skills

Design & Architecture

- Source Systems: Combine operational and transactional data for daily business functions
- Acyclic Data Store (ADS): Replication of all-warehouse data
- Data from staging is cleaned, transformed, and ingested
- Data Mart: Specialized datasets supporting specific activity or analysis
- Data is summarized, aggregated, and stored

Enlarged on page 26
Stewardship & Governance

Types of Data Standards

- Model
- Element
- Types & Formats
- Business Rules
- Terminology
- Provenance
- Transport protocols

Stewardship & Governance

Business Information Model

- Defines relationships between important data
- Focuses on structure, not process
- Improved reporting analytics
- Promotes standardization
- Identifies information needed to operate the business

Enlarged on page 27
Stewardship & Governance

Components of Data Quality
- Accuracy
- Timeliness
- Reliability
- Completeness
- Relevance
- Understandability
- Conformance

Risks of poor data quality
- Patient care compromised
- Safety risks increased
- Financial reporting
- Regulatory and compliance fines
- Increased legal costs
- Higher liability rates

Types of data quality issues
- Dissimilar data definitions & formats
- Non-standard terminologies
- Source data cannot be accepted downstream
- Context differs between input & output for the same data element
- Repeatable human error perpetuated through multiple systems
Stewardship & Governance

- Infrastructure for knowledge, metadata, & terminology management
- Architecture that supports data interchange
- Consistent use of maps to internal & external standards & reference data

Stewardship & Governance

Fundamentals of Metadata

What do you think of when I say the word “apple”?

Is this your “Apple”?

Stewardship & Governance

Fundamentals of Metadata

The answers to the ?’s metadata about your
### Stewardship & Governance

For each pillar, identify 3 examples of needs in your operational work area that can be resolved through better data standards, data quality & data architecture and systems.

### Upskilling the Analytics Team

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work Experience (Management, Enterprise insight, Leadership)</td>
</tr>
<tr>
<td>2</td>
<td>IT Interest and Acumen</td>
</tr>
<tr>
<td>3</td>
<td>Pharmacy Informatics Residency Program Graduate (≈ 12-15/year)</td>
</tr>
<tr>
<td>4</td>
<td>HIT Certifications (e.g., CPHIMS)</td>
</tr>
<tr>
<td>5</td>
<td>AMIA 10x10 course</td>
</tr>
<tr>
<td>6</td>
<td>Graduate Studies in Health Informatics</td>
</tr>
<tr>
<td>7</td>
<td>Health IT domain examinations (HIT PRO)</td>
</tr>
<tr>
<td>8</td>
<td>Computer Science coursework</td>
</tr>
<tr>
<td>9</td>
<td>Vendor-specific Credentials</td>
</tr>
</tbody>
</table>

### Business Analytics Workshop

- **The good news...**
  - As more human interactions move to digital platforms, consumers will be more likely to leave behind a trail of data about what they are interested in....
- **The bad news...**
  - Not all data sources will come from a single customer view controlled by your business.
- **As a business owner how much and what data are you willing to pay for...**
Business Analytics Workshop

Drivers for data / information
- Predictiveness
- Newness
- Uniqueness

Business Analytics Workshop

Analytics Project
- You currently own a bicycle shop business in your home town and are concerned that the new shop across town may have an effect on your bottom line.
- Identify 20 sources of data that will help you identify potential customers or products that will grow your customer base and keep you competitive in this growing market.
- Determine data sources that would be of greater value in real time.
- Facilitators will aggregate data sources and assign costs.
- Small groups will then be given $5000 to create a data and information budget based on available sources of data.

eHIT: Effectively Harnessing Information to Drive Change

Clinical Surveillance Systems
Detection and Monitoring of High-Risk Patients
Careveillance

- 2009 approached by Computer Sciences Corporation (CSC, Inc.) to partner in development of a computer-based clinical decision support tool
- Goal: Improve the quality and safety of patient care at Univ of Kansas Hospital
  - Leverage the power of EMR documentation
  - Continuous surveillance of patient information
  - Real-time detection and management of high-risk patients

Careveillance

- Pattern-detecting algorithms applied to O₂
- At-risk patients populate to a list continuously monitored by Surveillance and Triage Nurses
  - Review and validate clinical information
  - If warranted, CARE ALERT notification to RN/MD
- Conditions to be monitored
  - Sepsis
  - VTE Prophylaxis
  - Core Measures
  - Glycemic Control
  - Readmissions

Sepsis Algorithm

Enlarged on page 27
eHIT: Effectively Harnessing Information to Drive Change

Drug Utilization Reporting

Use of a Clinical Benchmarking Database to Drive Prescribing Change

UHC Clinical Database

- University Health-System Consortium
- 96 participating institutions submit charge data for inpatient and outpatient encounters
- Allows for resource use evaluation for drugs, imaging, lab, and blood products at focus institution and peer UHC institutions
- Many fields available for query

<table>
<thead>
<tr>
<th>UHC Clinical Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields for query:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Patient outcomes (length of stay, mortality, readmissions)</td>
</tr>
<tr>
<td>Cost (drug cost per case, total cost per case)</td>
</tr>
<tr>
<td>Resource utilization (% of population, duration of use)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fields for query:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician Service</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Individual Drug</td>
</tr>
<tr>
<td>Diagnosis</td>
</tr>
<tr>
<td>Discharge Physician</td>
</tr>
<tr>
<td>Race</td>
</tr>
<tr>
<td>Drug Class</td>
</tr>
<tr>
<td>ICD-9 Procedure</td>
</tr>
<tr>
<td>Procedure Physician</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Imaging</td>
</tr>
<tr>
<td>Core Measure Cases Length of Stay Age Accommodations</td>
</tr>
<tr>
<td>Severity of Illness ECU Days Pager Lab</td>
</tr>
<tr>
<td>Risk of Mortality Admission Source Med Record Number Blood Products</td>
</tr>
<tr>
<td>Hosp-Acq Conditions Discharge Status Encounter Number Materials Mgmt</td>
</tr>
</tbody>
</table>

Select fields to assess:
UHC Clinical Database

- Applications
  - Research
    - Does alvimopan reduce length of stay?
    - Does dexmedetomidine reduce days on a ventilator?
    - Readmissions analysis
  - Pharmacy & Therapeutics Committee
    - Support for drug use evaluations
    - Market share calculations
  - Drug Utilization and Financial Management
    - Identify variance in drug use versus top performers
    - Payer mix and patient demographics

Treprostinil Utilization

Drug Utilization Improvement Initiative

- Historically we have provided high quality care while being a relatively poor performer in terms of drug cost per case
- Project involved use of UHC clinical database to identify areas where cost per case significantly exceeded UHC average, then reporting of variances in these areas to key prescribers
- Question: Can we lower our drug cost per case without negatively impacting quality?
Target Area Identification

- Calculate savings opportunity, or variance between drug cost per case and University Health-System Consortium (UHC) average, times annual cases

<table>
<thead>
<tr>
<th>MS-DRG</th>
<th>Hospital</th>
<th>Resource</th>
<th>Cases</th>
<th>Cost per Case</th>
<th>Annual Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>005 liver transplant w mcc</td>
<td>Kansas</td>
<td>45</td>
<td>399,701</td>
<td>$ 8,750</td>
<td>$ 114,435</td>
</tr>
<tr>
<td>005 liver transplant w mcc</td>
<td>Comparison</td>
<td>1,226</td>
<td>7,610,322</td>
<td>$ 6,207</td>
<td></td>
</tr>
</tbody>
</table>

Variance = (KUH cost per case – UHC avg cost per case) x KUH cases

- Don’t cut corners when selecting a patient group for analysis

**MS-DRG 009**
Bone Marrow Transplant

- If unsure, run a case profile report and look at the diagnosis codes of patients within an MS-DRG

Drug Utilization Improvement Initiative

- Run drug utilization reports for the selected MS-DRG to view line item-level detail
  - Compare data to top performing peer group
- Factor VIIa use in liver transplant

<table>
<thead>
<tr>
<th>Individual Resource</th>
<th>% Cases Receiving Resource</th>
<th>Mean Days Resource Received</th>
<th>Resource Total $</th>
<th>Cost per Case</th>
<th>Annual Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor VIIa Kansas</td>
<td>15.38</td>
<td>1.5</td>
<td>14,310</td>
<td>$ 367</td>
<td>$ 7,203</td>
</tr>
<tr>
<td>Factor VIIa Comparison</td>
<td>8.04</td>
<td>1.6</td>
<td>10,350</td>
<td>$ 181</td>
<td></td>
</tr>
</tbody>
</table>
Select Compare Group

- Identify top performers for comparison
  - Unless your cost per case is worst in peer group, no sense in comparing against peer group average
- 96 institutions in UHC database for comparison
- Four measures used by KUH to select top performing peer group:

<table>
<thead>
<tr>
<th>Case volume</th>
<th>Expected mortality/LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality/LOS index</td>
<td>Name recognition</td>
</tr>
</tbody>
</table>

Prepare Outcomes Data

- Include outcomes data in the drug utilization reports
  
<table>
<thead>
<tr>
<th>Hospital</th>
<th>Cases</th>
<th>% Deaths Obs (Obs)</th>
<th>% Deaths Exp (Exp)</th>
<th>Mortality Index</th>
<th>Cost per Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kansas</td>
<td>391</td>
<td>1.30</td>
<td>2.56</td>
<td>5.39</td>
<td>0.46</td>
</tr>
<tr>
<td>Comparison - Top</td>
<td>572</td>
<td>1.30</td>
<td>2.27</td>
<td>5.39</td>
<td>0.39</td>
</tr>
<tr>
<td>Comparison - All</td>
<td>1,229</td>
<td>1.25</td>
<td>3.91</td>
<td>5.31</td>
<td>0.74</td>
</tr>
</tbody>
</table>

  Notice difference in mortality index

- Goal is to identify and benchmark against similar organizations who have achieved outstanding outcomes with lesser use of high-cost drugs

Drug Utilization Reports

- Comparison of outcomes data
- Inpatient drug cost per case
- Comparison of our utilization of high-impact drugs to top performer average

NOTE: The role that our drug utilization behaviors contribute to our greater outcomes must be considered carefully.

High Impact Drug Utilization Comparison to UHC Top Performers – Jan 2010 through Dec 2010
### Drug Utilization Reports

- Utilization breakdown by drug class
- Example of how to interpret data

### Example of how to interpret data:

KUH used cyclosporine in 6 of 21 cases (28.6%) during the selected time period. This exceeds the utilization rate of the UHC compare group average (7.4%). The average duration of cyclosporine use at KUH is 4.0 days of treatment versus 5.4 days for the compare group. Cyclosporine costs roughly $60 per day of intravenous treatment.

#### Key variances that exceed top performer average:
- basiliximab
- thymoglobulin (duration)
- cyclosporine

#### Key variances that are less than top performer average:
- thymoglobulin
- ivig
- tacrolimus

### Anti-Bacterials and Anti-Fungals

<table>
<thead>
<tr>
<th>Drug Name/Class</th>
<th># of Cases receiving drug (KUH)</th>
<th>% Cases (KUH)</th>
<th>% Cases (UHC)</th>
<th>Mean Duration (KUH)</th>
<th>Mean Duration (UHC)</th>
<th>Typical Cost per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminoglycosides</td>
<td>0 of 21</td>
<td>0.0</td>
<td>22.2</td>
<td>0.0 days</td>
<td>1.0 days</td>
<td>$2</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>11 of 21</td>
<td>52.4</td>
<td>0.8</td>
<td>3.6 days</td>
<td>1.7 days</td>
<td>$1</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>0 of 21</td>
<td>0.0</td>
<td>21.7</td>
<td>0.0 days</td>
<td>3.5 days</td>
<td>$2 (PO)</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>10 of 21</td>
<td>47.6</td>
<td>14.6</td>
<td>5.1 days</td>
<td>2.3 days</td>
<td>$6 (PO)</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>0 of 21</td>
<td>0.0</td>
<td>7.9</td>
<td>0.0 days</td>
<td>1.9 days</td>
<td>$12</td>
</tr>
</tbody>
</table>

#### Key variances that exceed top performer average:
- fluoroquinolones (utilization and duration)

#### Key variances that are less than top performer average:
- none

### Anti-Virals

<table>
<thead>
<tr>
<th>Drug Name/Class</th>
<th># of Cases receiving drug (KUH)</th>
<th>% Cases (KUH)</th>
<th>% Cases (UHC)</th>
<th>Mean Duration (KUH)</th>
<th>Mean Duration (UHC)</th>
<th>Typical Cost per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acyclovir</td>
<td>9 of 21</td>
<td>42.9</td>
<td>21.1</td>
<td>3.0 days</td>
<td>3.4 days</td>
<td>$1</td>
</tr>
<tr>
<td>Ganciclovir</td>
<td>0 of 21</td>
<td>0.0</td>
<td>17.4</td>
<td>0.0 days</td>
<td>2.8 days</td>
<td>$34</td>
</tr>
<tr>
<td>Valganciclovir</td>
<td>1 of 21</td>
<td>4.8</td>
<td>77.3</td>
<td>1.0 days</td>
<td>3.6 days</td>
<td>$80</td>
</tr>
</tbody>
</table>

#### Key variances that exceed top performer average:
- none

#### Key variances that are less than top performer average:
- ganciclovir
- valganciclovir

### Report Distribution

- Reports are distributed via hard copy and electronically to all attending physicians involved in care of patients for selected MS-DRG
- Cover letter describing drug utilization improvement initiative accompanies each report
  - Focus on variance in utilization
  - Prompt prescribers to question whether this variance is positively impacting outcomes
- Email summarizes key findings and progress
- Direct response to reports has varied, but indirect results have exceeded expectations
Opportunity Knocks

- Reports do not always produce results on their own, but they may open the door for discussion
  - Albumin utilization pilot in critical care areas
  - Meet with BMT physicians to discuss transition from melphalan to cyclophosphamide
  - Collaboration with liver transplant to develop induction protocol
  - Factor VIIa protocol re-design and increased awareness

Summary of Results

- 18 reporting areas
- Comparing drug utilization to top performers
- Annualized savings of over $900,000
- Weighted average reduction of 12.2% in length of stay
  - 1.1% decrease across non-reporting areas
- No detrimental impact on mortality
  - Significant reduction in mortality index in severe sepsis w/ mechanical ventilation

Physician-Specific Reporting

- Pitfalls
  - Do you really know who was responsible for prescribing a given drug?
  - Drilling down to physician level may reduce patient volumes to the point of insignificance
- Potential value
  - Drug use tied to a particular procedure
  - Example: Peri-operative Factor VIIa use in cardiothoracic surgery
What about me?

• Consider reporting your own internal utilization and cost trends, even in the absence of external benchmarking data
• UHC may consider data from non-UHC institutions
• Encourage your group purchasing organization or hospital system to develop similar external benchmarking tools

Benchmarking Lessons Learned

• Beware of the DRG
  – Even MS-DRGs often require further drill down to the ICD-9 diagnosis/procedure level
• Avoid physician-specific reporting
  – Tyranny of small numbers
• Do not cut corners when selecting a compare group
  – No sense in comparing against those with inferior clinical outcomes
• Focus on variance in utilization and avoid emphasis on cost

Key Points

• Find out where your dollars are going
• If you cannot benchmark externally, find out what your physicians would like to see and find a way to report it
• If you can benchmark, prompt your physicians to question whether drug-related variances are positively impacting outcomes
• Let competitive people know how they match up against the best and many of them will change their behaviors
eHIT: Effectively Harnessing Information to Drive Change

Pharmacy Workflow Scorecards

Patient Prioritization and Productivity Management

Pharmacy Workflow Scorecards

- IT system-generated scorecard in use at multiple institutions
- University of Kansas Hospital patterned scorecard after one in use by Exempla Healthcare of Colorado
- Aim was to develop a workflow prioritization tool to support practice model change

Pharmacy Workflow Scorecards

- Scorecard allows pharmacists to view their assigned patients and any changes in clinical status that warrant review or intervention
- Clinical metrics that populate dashboard include drug levels, an IV-to-PO indicator, creatinine score, and presence of high-alert and/or monitorable drugs
Pharmacy Workflow Scorecards

- Workflow indicators include status of VTE prophylaxis and immunizations along with indicators for completeness of admission history and medication reconciliation activities
- Metrics roll up into a total score that allows for quick prioritization of assigned patients
- Pharmacists can also see a calculation of how the score has changed since the last profile review
Design & Architecture

Source Systems
- Contains operational and transactional data for daily business functions

Atomic Data Store (ADS)
- Repository of all warehouse data
- Data from staging is cleansed, transformed, and organized

ETL
- Extract
- Transform
- Load

Staging
- Landing area for source data
- Data extracted and homogenized into a common DBMS

Data Marts
- Specialized databases supporting a specific activity or analysis
- Data summarized, aggregated, and focused

Design & Architecture

Virtual Data Warehouse & BI Tool
- Business Views
  - Clinical
  - Financial
  - Operational

Consolidate Clinical Data Across Entire Organization into "Central Source of Truth"

Research, Decision Support, Quality Analysis
- Reports
- Dashboards
- Reviews
- Schedules
- Budgets

Business Intelligence
Analytic Environment

Mapping, Validation, Normalization
Extract, Transform, and Load (ETL)
Stewardship & Governance

Sepsis Algorithm
### Careveillance Sepsis Screen Shot: Potential List

#### Sepsis Clinical Surveillance

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Age</th>
<th>Gender</th>
<th>Race</th>
<th>Status</th>
<th>Severity Level</th>
<th>SIRS Score</th>
<th>Septic Shock</th>
<th>Hypotension</th>
<th>Confirmed Sepsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCH</td>
<td>62</td>
<td>Male</td>
<td>White</td>
<td>Yes</td>
<td>3</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MCH</td>
<td>65</td>
<td>Male</td>
<td>White</td>
<td>Yes</td>
<td>3</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MCH</td>
<td>68</td>
<td>Male</td>
<td>White</td>
<td>Yes</td>
<td>3</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MCH</td>
<td>70</td>
<td>Male</td>
<td>White</td>
<td>Yes</td>
<td>3</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MCH</td>
<td>72</td>
<td>Male</td>
<td>White</td>
<td>Yes</td>
<td>3</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

### Careveillance Sepsis Screen Shot: Patient Detail Screen

#### Patient Information

- **Name:** John Doe
- **ID:** 1234
- **DOB:** 01/01/2000
- **Address:** 123 Main St, Anytown, USA
- **Phone:** 555-555-5555
- **Email:** johndoe@example.com

#### Medical History

- **Allergies:** Penicillin
- **Medications:** Aspirin, Metformin
- **Diagnoses:** Hypertension, Diabetes Type 2

#### Clinical Information

- **Temperature:** 38.5°C
- **Heart Rate:** 110 bpm
- **Blood Pressure:** 130/80 mmHg
- **Respiration Rate:** 20 bpm

#### Laboratory Results

- **WBC:** 12,000/cu mm
- **RBC:** 4.5 million/cu mm
- **Hematocrit:** 40%
- **Platelet Count:** 200,000/cu mm

#### Vital Signs

- **Body Temperature:** 36.5°C
- **Heart Rate:** 70 bpm
- **Respiration Rate:** 16 bpm

#### Other Information

- **Emergency Contact:** Jane Doe (555-555-5555)
- **Next of Kin:** John Smith (555-555-5555)
SUGGESTED READINGS


eHIT Project Worksheet