Healthcare Data Analytics for better care and cash flow
ScienceSoft is an international IT company, an expert in **design**, **development** and **delivery** of healthcare IT solutions.
Whom We Serve

- Hospitals
- Outpatient centers
- Private practices
- Retirement homes
- Nursing homes
- Home care agencies
Why Analyze Healthcare Data

1. Reporting to CMS and complying with value-based care model
2. Defining profitability of different patient segments
3. Finding and fixing problems in internal clinical processes
4. Identifying best practices of facilities, doctors and nurses
5. Predicting and eliminating patient satisfaction gaps
What to Analyze

- Outcomes
- Patient-generated health data (PGHD)
- Costs
- Internal processes
- Finance
Outcomes: Measures

Performance-based outcomes measures
- Length of hospital stay, time to return to work, readmissions, mortality, etc.

Patient-reported outcomes measures
- Quality of life, health status, patient satisfaction and experience, pain, etc.

Data sources:
- EHR / EMR
- ADT
- Department-specific systems
- Chronic disease management / population health management

Measure sources:
- National standards (CMS, AHRQ, NQF, etc.)
- Internally developed measures
- Custom measures developed together with ScienceSoft
Outcomes: Sample Reports

Outcome variations based on demographic factors (gender, age, income level, lifestyle)

Outcome variations based on a health organization’s internal factors (a specific physician, treatment, facility)
PGHD: Measures

**Vital signs**
Temperature, blood pressure, blood glucose, weight, etc.

**Lifestyle data**
Diet, hydration, medication adherence, physical activity, etc.

**Perceived quality of life**
Mood, sleep quality, level of pain, etc.

**Data sources:**
- Patient mobile application
- Patient portal
PGHD: Sample Insights

- **Abnormally high or low** blood glucose levels (for diabetes patients)

- ** Significant SpO2 level changes** (for COPD patients)

- **Overall trends** in patients’ nutrition, hydration, temperature, weight, blood pressure, etc.
To determine the real cost of health care, caregivers must measure **costs for the episode**, not for departments, services, or line items.

- **Tracking expenses on treating the condition over the full cycle of care**
- **Comparing costs of caring for a condition with the outcomes achieved**
- **Finding opportunities to substantially reduce costs without negatively affecting outcomes**
Costs: Measures

1. **Time unit costs**: Costs of supplying each resource used
   - EHR / EMR
   - LIS
   - RIS
   - Department-specific systems
   - Accounting system / ERP

2. **Care delivery costs**: Staff, medical equipment, facilities

3. **Overhead costs**: IT, administration, and department-level overheads

Data sources:
- EHR / EMR
- LIS
- RIS
- Department-specific systems
- Accounting system / ERP
Costs: Sample Reports

Variations of expenses for treating **specific conditions**, supported with data on each patient.

**Relationships** between **costs and reimbursements** covering certain periods.

**Relationships** between **costs and outcomes** covering certain periods.
Internal Processes: Measures

**Health facilities and care**
- Proportion of patients treated according to clinical guidelines (e.g., beta-blocker prescribed at discharge for AMI), ER waiting time, bed occupancy rate, etc.

**Health equipment and pharmaceuticals**
- Equipment utilization rates, availability, distribution and use of medicines, lab turnaround time, etc.

**Health personnel indicators**
- Facility staff utilization, patient loads and time spent with patients, personnel qualifications, certifications and more

**Data sources:**
- PMS
- EHR / EMR
- LIS
- RIS
- Workforce management system
- Department-specific systems
**Internal Processes: Sample Reports**

**Proportion of patients** with diabetes given **regular foot care** (by specific facilities)

**Unnecessary use** of antibiotics (by specific physicians, diseases, facilities)

**Median time to transfer to another facility** for acute coronary intervention
Finance: Measures

**Profitability indicators**
Total margin, cash flow margin, return on equity, operating margin

**Liquidity indicators**
Current ratio, days cash on hand, net days revenue in accounts receivable

**Capital structure indicators**
Equity financing, debt service coverage, long-term debt to capitalization

**Revenue indicators**
Outpatient revenues to total revenues, hospital Medicare outpatient cost to charge, Medicare acute inpatient cost per day, etc.

**Data sources:**
- ERP or FMS
- Revenue Cycle Management
Finance: Sample Reports

**Actual cash flow**

**Outstanding payments** by specific payers (departments, facilities, diseases)

**Actual ROI** by types of investments (new facilities, medical equipment, such as CT or MRI, etc.)
Enterprise-wide BI Solutions

The **advantages of enterprise-wide BI solutions** over analytical tools built into EHR, RCM and other systems:

1. Offering complete understanding of clinical, operational and financial processes
2. Finding cause-and-effect relationships between internal processes, quality of care and cash flows
3. Adapting to changing business needs (such as transition to a value-based care environment)
Success Story

BI for 200 Healthcare Centers

Customer

200 US healthcare centers and retirement homes

Solution

System of 200 databases for data management and reporting on medication inventory, clinical services, patient data, marketing activities and others

Tools & Technologies

MS SQL Server, Transact-SQL, JReport
Health Monitoring Module for Caregivers

**Customer**

US assisted living organizations

**Solution**

A health monitoring module to automatically collect, store and analyze patients’ vitals and test results, as well as send alerts on negative changes to a patient’s condition

**Tools & Technologies**

Ext JS, Sass, Java, Spring, Hibernate, Apache Maven, Apache Tomcat, MS SQL Server
How to Start

1. Contact us
2. Get a workshop
3. Get a proof-of-concept of your BI solution