EHR adoption in an European environment and public management hospital

Carlos Sousa,
ICT Director at HFF

October 11-14, 2015
SESSION OBJECTIVES

Share our experience on EHR maturity, on an European setting (Portugal)

Emphasize clinical outcomes and social ROI obtained by EHR adoption

Critical success factors & lessons learned

Adoption measurement tools and follow-up

Clinical workflow features - case study

National clinical data exchange - case study

Benefits Achieved
<table>
<thead>
<tr>
<th>Category</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>10,562</td>
</tr>
<tr>
<td>Hospitals</td>
<td>119</td>
</tr>
<tr>
<td>Outpatients</td>
<td>11,833,412</td>
</tr>
<tr>
<td>Physicians</td>
<td>46,739</td>
</tr>
<tr>
<td>Inpatients</td>
<td>824,849</td>
</tr>
<tr>
<td>Nurses</td>
<td>66,340</td>
</tr>
<tr>
<td>ED</td>
<td>6,168,324</td>
</tr>
<tr>
<td>Hospital Beds</td>
<td>35,478</td>
</tr>
<tr>
<td>Surgery</td>
<td>658,040</td>
</tr>
<tr>
<td>Total Expenditure as % (GDP)</td>
<td>6.3</td>
</tr>
</tbody>
</table>

COUNTRY OVERVIEW
NHS Healthcare figures (2014)
HFF OVERVIEW

Reference area

Sintra

Amadora

Connecting what matters
Serves 2 cities with +700,000 inhabitants

5 Hospital Departments
- Medical and surgery inpatient
- Pediatrics
- Ambulatory Surgery
- Woman
- Anesthesiology and ICU

Emergency (Adult, Pediatrics and Obst/Gyn)

Ambulatory (Psychiatry, Oncology, Infectiology)

Several ologies specific exams

Homecare service provider (Psychiatry, Neo)

Outpatient encounters within the GP setting
Number of Beds: **790**
OR Rooms: **17**
Outpatients Offices: **117**
Emergency Departments: **3**
Number of Employees: **3,270**

Introduced to Soarian: **2011**
IT Professionals: **20**
Multidisciplinary clinical committee: **3**

General activity Figures (Annual - 2014)
- Outpatient Appointments: **290,194**
- ED admissions: **267,701**
- Inpatient admissions: **32,083**
- Surgery Interventions: **21,740**
## HFF OVERVIEW

### Milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Inauguration</td>
</tr>
<tr>
<td>2000</td>
<td>1st Portuguese Hospital to be accredited by the King's Fund</td>
</tr>
<tr>
<td>2002</td>
<td>Accreditation by the Health Quality Service</td>
</tr>
<tr>
<td>2004</td>
<td>ISO 9001-2000 Certification</td>
</tr>
<tr>
<td>2005</td>
<td>Reaccreditation by the Health Quality Service (CHKS)</td>
</tr>
<tr>
<td>2009</td>
<td>Creation Hospital Professor Doutor Fernando Fonseca, EPE</td>
</tr>
<tr>
<td>2010</td>
<td>HAB Certification</td>
</tr>
<tr>
<td>2011</td>
<td>System Reporting and Events Management</td>
</tr>
<tr>
<td>2012</td>
<td>Electronic Health Record (Soarian Clinicals)</td>
</tr>
<tr>
<td>2013</td>
<td>Quality Standards Program for Nursing Care</td>
</tr>
</tbody>
</table>
Promote care delivery in a **collaborative way** encouraging best practices

Contribute as “**enabler**” for patient and professionals satisfaction

Improve **data quality to allow decisions** more informed and patient safety

“**Principle of unity**” (avoid data duplication, migrate elements between assessments and share common core data in any clinical context (ED, Ambulatory)

Improve **Security, Confidentiality and Traceability**

**Usefulness Principle** to assure that patient records don’t compromise clinical, epidemiological, educational, research and management domains

Support **dematerialization** of guidelines (Clinical Pathways)
## PROJECT OVERVIEW
### Scope

<table>
<thead>
<tr>
<th>Caregivers Group</th>
<th>Clinical Setting</th>
<th>Process Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>Inpatient</td>
<td>Assessment</td>
</tr>
<tr>
<td>Nurse</td>
<td>Outpatient</td>
<td>Order, Prescription</td>
</tr>
<tr>
<td>Health Technician</td>
<td>Emergency</td>
<td>Clinical Summary</td>
</tr>
<tr>
<td>Social worker</td>
<td>Operating Room</td>
<td>Work List, Workflow</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>Ambulatory</td>
<td>Census, ED Tracking Board</td>
</tr>
<tr>
<td>Administrative</td>
<td>Ancillary Services</td>
<td>Plan of Care</td>
</tr>
<tr>
<td></td>
<td>Outpatient Surgery</td>
<td>Reports, Favorite’s</td>
</tr>
</tbody>
</table>
PROJECT OVERVIEW
Interoperability Landscape

Over 400,000 HL7 messages/day

17 Systems Integrated
36 Interfaces
HL7 and WebServices
PROJECT OVERVIEW
Timeline

2010
DEC: - ED OBS Adults (pilot LIVE)

2011
JAN: - Internal Medicine - All ambulatory ED áreas (Adults)
MAR: - ED Pediatrics
APR: - Neurology
JUL: - ED Obst/Gynec and Birth delivery OR

2012
INPATIENT: FEB - Pediatrics

2013
MAR - OR - Ambulatory Surgery

2014
JAN - Outpatient
APR - Anesthesiology
DEC - Plan Of Care (ICNP)
PROJECT OVERVIEW
Multidisciplinary, Buy-In, Inhouse custom,

CIC “Clinical IT Committee” – as driver to enable engagement, consensus and to enforce EHR ground rules
PROJECT OVERVIEW
Our Critical Success Factors

Vision
Leadership
Empower
Multidisciplinary team
Inhouse IT Team
Creativity
Communication

Soarianito
Mascot
# PROJECT IMPLEMENTATION

EHR approach methodology

<table>
<thead>
<tr>
<th></th>
<th>Hardware</th>
<th>SoftWare</th>
<th>PeopleWare</th>
<th>LocalWare</th>
<th>IntegraWare</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Custom</strong></td>
<td>Requirements and prerequisites assessment</td>
<td>Develop assessments, catalogues,…</td>
<td>Build Team</td>
<td>Workflow analysis and gap analysis</td>
<td>ID third party Apps and Data Bases</td>
</tr>
<tr>
<td><strong>PreLive</strong></td>
<td>Install</td>
<td>Tests and simulations</td>
<td>3 Perspectives: Training, Users and IT Support</td>
<td>Process documentation</td>
<td>Integration Tests, migrate clinical history (recent)</td>
</tr>
<tr>
<td><strong>Live</strong></td>
<td>Last minute adjusts; Printers, network performance</td>
<td>2ª line support for workaround, hotfix and patch</td>
<td>Custom personal favorites, On-Job Training</td>
<td>Measure and communicate use, planned adjusts</td>
<td>Check connector bugs and performance, apply hotfixs</td>
</tr>
<tr>
<td><strong>PostLive</strong></td>
<td>Sharing “How to”, tips &amp; tricks guide</td>
<td>Reporting adjust and tunnning</td>
<td>Training policy enforce</td>
<td>Support change, new procedures and routines</td>
<td>Electromedicina integration, data migration (old)</td>
</tr>
<tr>
<td><strong>FollowUp</strong></td>
<td>Device integration</td>
<td>Improvement (Updates); Personalized customization</td>
<td>Outcome aware, Visibility and Coaching</td>
<td>Process consolidation</td>
<td>Centralized clinical repository, full clinical view</td>
</tr>
</tbody>
</table>

PhD MD Henrique Martins ([hmartins@fcsauede.ubi.pt](mailto:hmartins@fcsauede.ubi.pt)), published in “Sistemas de Informação para na Saúde”, Ed. Silabo - 2011

Adapted and translated by Carlos Sousa, 2015
PROJECT IMPLEMENTATION
Outpatient Department case study

MAJOR CHALLENGES:

Cardiology
Inpatients and ICU Coronary requirements

Critical Care
Pediatrics and Adults requirements

Outpatients
Specific specialty assessments, non-clinical caregivers records and change management

Communication
User Training availability
Medication requirements

Soarian Clinicals Adoption (Outpatients) %

March 2013 24%
March 2014 63%
June 2015 71%

Overall Outpatient “Soarianization” Index
PROJECT IMPLEMENTATION
OR case study – Jun 2015

Informatização Clínica (92.2%)
Checklists de Segurança Cirúrgica (97%)
Registos Intra-Operatórios de Enfermagem (99%)
Protocolos Operatórios Concluídos (100%)

"SOARIANIZATION" 94,5%
WHO Patient Safety Checklist 97%
Nursing Records 99%
Surgeon Records 100%
**PROJECT IMPLEMENTATION**  
OR case study – Jun 2015

**Major criteria from CHKS Referencial - 2013**

“All 14.39…All organisations will develop their own views on what these items are, but documented consent for interventions, and operation note, and anaesthetic record and allergy and adverse reaction notations are four examples of health record content which **should always be present** and therefore an audit should demonstrate 100% completion.”

<table>
<thead>
<tr>
<th>Allergy ADE</th>
<th>Surgeon record</th>
<th>Anesthesia record</th>
<th>WHO Surgery Patient Safety Check-list</th>
<th>Informed consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%*</td>
<td>100%</td>
<td>91%</td>
<td>97%</td>
<td>100%**</td>
</tr>
</tbody>
</table>

*Source: Quality Department; Data refers to May-2015, collected through monitoring electronic discharge letters - Governmental order N.2784, 13 Feb 2013.

**Source: Clinical Records Committee; Data refers to May-2015, collected by observational auditing approach
**WORKFLOW:**

1. The patient arrive at the hospital emergency.
2. After admission is referred for nursing attendance.
3. The nurse will ask some questions about the coming reason (Protocol), fill in all the data and gets a color as output (care priority).
4. After that, the patient will be added to Soarian in ED Tracking Board worklist.

Colors: There are 5 colors, Red, Orange, Yellow, Green and Blue. These colors represent patient degree of gravity and the clinical acceptable time for medical evaluation and treatment.

<table>
<thead>
<tr>
<th>COLORS</th>
<th>MTS PRIORITY</th>
<th>Waiting Time (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Immediate</td>
<td>0</td>
</tr>
<tr>
<td>Orange</td>
<td>Very Urgent</td>
<td>10</td>
</tr>
<tr>
<td>Yellow</td>
<td>Urgent</td>
<td>60</td>
</tr>
<tr>
<td>Green</td>
<td>Standard</td>
<td>120</td>
</tr>
<tr>
<td>Blue</td>
<td>Non-Urgent</td>
<td>240</td>
</tr>
</tbody>
</table>
Emergency Medicine Journal

An international peer-reviewed journal for health professionals and researchers in emergency medicine

Online First  Current issue  Archive  About the journal

Online First  Current issue  Archive  Supplements  eLetters  Topic collections

Home > Online First > Article

Emerg Med J doi:10.1136/emergmed-2012-201782

Original article

Manchester triage system version II and resource utilisation in emergency department

André Peralta Santos¹, Paulo Freitas², Henrique Manuel Gil Martins³

Author Affiliations

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Professor Henrique Manuel Gil Martins, Centro de Investigação e Criatividade em Informática, Hospital Professor Doutor Fernando Fonseca, IC 19—Venteira, Amadora, Lisboa 2720-276, Portugal; henrique.m.martins@hff.min-saude.pt

Received 20 July 2012
Revised 14 December 2012
Accepted 19 December 2012
Published Online First 23 January 2013
PROJECT IMPLEMENTATION
Vascular access case study - workflow for hemodialysis

GOALS

Early patient referral;

Clinician involvement and criteria set out

Improve transparency for worklist responsibility

Operational report availability for caregivers

Comply with legal timeframe obligations

WORKFLOW

Patient

Nephrologist

Surgeon

Hemodialysis

patient referral
**PROJECT IMPLEMENTATION**  
Vascular access case study - Achievements

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inefficient paper based process</td>
<td>Improved care management process (quality and quantity)</td>
</tr>
<tr>
<td>Risk of data missing</td>
<td>Traceability for VA surgery and discharge within 48h</td>
</tr>
<tr>
<td>Resources bottleneck</td>
<td>Overall cost savings</td>
</tr>
<tr>
<td>Patients sent out for VA procedure</td>
<td>Waiting time reduction for VA related to increased surgery figures</td>
</tr>
<tr>
<td>Higher patient list waiting time</td>
<td></td>
</tr>
<tr>
<td>Huge operational costs</td>
<td></td>
</tr>
</tbody>
</table>
## PROJECT IMPLEMENTATION

### Vascular access case study – Cost saving

**Total outsourced vascular access procedure during 2014**

<table>
<thead>
<tr>
<th>Month</th>
<th>BEFORE paper based</th>
<th>AFTER EHR support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>4.515,53</td>
<td>0</td>
</tr>
<tr>
<td>Feb</td>
<td>6.046,59</td>
<td>1.300</td>
</tr>
<tr>
<td>Mar</td>
<td>4.265,53</td>
<td>1.550</td>
</tr>
<tr>
<td>Apr</td>
<td>2.015,53</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jun</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jul</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aug</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sep</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oct</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nov</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Cost (€):**

- BEFORE paper based: 16.843
- AFTER EHR support: 2.850

**Potencial savings:** € 13.993
PROJECT IMPLEMENTATION
Clinical decision support and patient safety features

DNR Order – Do not resuscitate orders (ONR)

VVS (SEPSIS Via Verde) –
Activated when there is a patient with a suspected infection in triage. The VVS workflow can start during Manchester Triage encounter. Involved Care Units: ED Adults, OBS, ICU

Signpost that migrates from Manchester Triage App to Soarian Clinicals (Live Dec.2013)

Several rules for clinical notification:
CVC; IV Med vs Oral, Thoracentesis

Check-Duplicate (per time, per guideline), pricing, and last result available during the next order entry
**PROJECT IMPLEMENTATION**

Medical Image case study

100%

All DICOM Images from Imagiology Specialty are being archived and accessed through the PACS System

**Medical Image solution diagram:**

Electro-medicine integration for DICOM imaging
NON-DICOM imaging
Report integration
Sheduling and equipment worklists
## PROJECT IMPLEMENTATION
Medical Image case study – Clinical Value and Cost Saving

### Nov.14

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Sub TYPE</th>
<th>Physician Order Entry Outcome?</th>
<th>Canceled</th>
<th>Proceed</th>
<th>TOTAL Quant.</th>
<th>TOTAL Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quant.</td>
<td>Cost</td>
<td>Quant.</td>
<td>Cost</td>
</tr>
<tr>
<td>RAD</td>
<td>US</td>
<td>Canceled</td>
<td>67</td>
<td>€ 1.362,82</td>
<td>117</td>
<td>€ 2.405,99</td>
</tr>
<tr>
<td>RAD</td>
<td>X-RAY</td>
<td></td>
<td>720</td>
<td>€ 3.707,88</td>
<td>2004</td>
<td>€ 9.735,06</td>
</tr>
<tr>
<td>RAD</td>
<td>MR</td>
<td></td>
<td>3</td>
<td>€ 383,70</td>
<td>8</td>
<td>€ 1.009,00</td>
</tr>
<tr>
<td>RAD</td>
<td>TC</td>
<td></td>
<td>107</td>
<td>€ 7.600,36</td>
<td>268</td>
<td>€ 19.181,78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>897</td>
<td>€ 13.054,76</td>
<td>2.397</td>
<td>€ 32.331,83</td>
</tr>
</tbody>
</table>

- **Canceled** means that the physician decided to cancel the Order due to Check Duplicate notification.
- **Proceed** means that the physician decided to sign the Order.

Check Duplicate applied to Radiology Exams (November 2014), aiming for potential savings about € **13.000,00/month**
PROJECT FOLLOW-UP
Adoption and Maturity – Measuring tools and indicators

NOME STATUS Impacto KPI Off Date EXECUÇÃO REPORT
DGTI - Reorg DGTI jan-14 Recrutar 2 FTE + Procedimentos BASE escritos e aprovados + Regulamento orgânico
GH - Upgrade HW HFF jul-14 Suspenso
HOSIX - Interface WebGDH HFF ago-14 Em processo de análise. Pelo Gab. Codificação/DGTI
PACS - Consolidação Non-DICOM HFF mar-13 Iniciado projecto de integração HL7 MedWeb->RIS/Soarian. Limitação de meios para executar face ao “pipeline”
PAC - Upgrade SAP fev-13 Em execução (na dependência do upgrade SAP)
Soarian - Consulta HFF mar-13 Enfoque na Cardiologia, Neurologia, Anestesiologia e Oftalmologia.
Soarian - HELICS Bloco Operatório Fase I Concluída e em produção. A aguardar prioridade para a Fase II.
Soarian - Internamento Internamento abr-13 A aguardar plano de ação para adopção Soarian, em função da decisão estratégica já tomada.
Soarian - PoC (Plano de Cuidados) HFF jan-13 Em produção desde desde 17.12.14 LIVE na NEUROLOGIA. Processo de formação para outras áreas em curso.
Soarian - SINAS HFF jun-14 Limitações graves no nível dos registos clínicos. Soarian não adaptado aos requisitos que o SINAS exige e inexistência de ferramenta integrada.
Soarian - UCI HFF jan-14 A aguardar plano de ação para adopção Soarian, em função da decisão estratégica já tomada.
Soarian - PoC (Plano de Cuidados) HFF jan-13 Em produção desde desde 17.12.14 LIVE na NEUROLOGIA. Processo de formação para outras áreas em curso.
Soarian - Sinas HFF jun-14 Limitações graves no nível dos registos clínicos. Soarian não adaptado aos requisitos que o Sinas exige e inexistência de ferramenta integrada.

NOME STATUS Impacto KPI Off Date EXECUÇÃO REPORT
PCFI HFF fev-13 Suspenso. A aguardar meios técnicos (Storage) e upgrade do Soarian. Só depois o mecanismo de replicação pode ser activado.
PROJECT FOLLOW-UP
Fast figures

CLINICAL RESULTS*:
Radiology: 26.999
Laboratory: 836.686
Reports (RAD and others): 747
Sign Order: 93.282
Enter/Revise Allergy: 4.881
Admission Assessment (Inpatient):
  Medical: 13.246 and Nursing: 17.594
Discharge/transfer Summary:
  Medical: 18.892 and Nursing: 18.881

CLINICAL RECORDS**:
Birth Records (Soarian Babies): 4.193
Filled Assessment: 693.136
Social services: 4.015
Rehab: 5.968

*2015’s Monthly Average Figures
**Cumulative Figures since Jan.2015
PROJECT FOLLOW-UP
Data Quality and Patient Safety features

Resuscitation room and reanimation assessment status (“inprogress” and “closed”) until Oct. 2014, plus adoption indicator (Filled vs Admitted)
PROJECT FOLLOW-UP
Data Quality – Incomplete records (ongoing status)

“in progress” assessment status within closed encounters

Monthly basis monitor for nursing assessments in the context of discharged encounters. Afterwards, status type was removed from 74 different nursing assessments (Clinical Diary Discharge Letter, care records, Initial evaluation)
PROJECT FOLLOW-UP
Data Quality and Patient Safety features

WHO - Surgical Safety Checklist, HFF adoption rate

http://www.who.int/patientsafety/safesurgery/en/
ADDITIONAL BENEFITS
External interoperability (PDS Gateway) – Social ROI

**PDS** (National Healthcare Data Gateway)

The PDS is a data sharing system, managed by the Health Institute SPMS (health.gov)

Allow patient’s data to be shared between different healthcare entities, caregivers and patients across the country and outside

http://spms.min-saude.pt/english-version/
ADDITIONAL BENEFITS
PDS (Professional Gateway) – Available Features

Major features and data repositories Professional Portal):

Gateway to access hospital and GP EHR (NSH only)
SAUDE24 – ContactCenter
Patient clinical history timeline
Medication, Allergies and diseases
Oral health
Prescription history
Vital Testament (non-care voluntarily patient decision)
Patient emergency contacts
Major patient clinical data shared within active physician or nurse encounter:

- Allergies
- Diagnosis
- Lastest Lab results
- Discharge letter
- Additional Reports (Pregnancy, New Born, Clinical Note for GP,…)
- Radiology - Imaging (DICOM viewer) – Lastest Clinical Images and Text Reports
- Specialty Exams (Non-DICOM) and Reports (ex: Gastro, OPH, Pneumo, …)
- ED Manchester Triage Notes, Medication prescription for Community Pharmacy
ADDITIONAL BENEFITS
PDS (Professional Portal) – HFF adoption

HFF Total Clinicians Access - Monthly
**ADDITIONAL BENEFITS**

epsos pilot - HFF pilot site

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**Smart Open Services for European Patients**

**epSOS Participating Nations**

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Greece</td>
<td>Slovakia</td>
</tr>
<tr>
<td>Belgium</td>
<td>Hungary</td>
<td>Slovenia</td>
</tr>
<tr>
<td>Croatia</td>
<td>Italy</td>
<td>Spain</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Luxembourg</td>
<td>Sweden</td>
</tr>
<tr>
<td>Denmark</td>
<td>Malta</td>
<td>Switzerland</td>
</tr>
<tr>
<td>Estonia</td>
<td>Norway</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>Finland</td>
<td>Poland</td>
<td>Turkey</td>
</tr>
<tr>
<td>France</td>
<td>Portugal</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clinical resume, meaningful to caregivers whenever needed (ER across nation or EU), automated/translated to clinician mother language:

- ADT (Patient demographics, health unit and family doctor)
- Emergency Contacts
- Allergy’s (CPARA) – underway SNOMED migration
- Medical Diagnosis (ICD 9 CM – since 2000)*
- Medical Diagnosis (ICPC2 – Since electronic records exist)*
- Medical Procedures (ICD 9 CM – since 2011)*
- Focus and Nursing Diagnosis (ICNP – Hospital and Primary Care and )**
- Medical Devices (implants)
- Chronic medication (according to Primary Care)

* Progressive upload/validation (GP’s)
** MFG edition/PrimaryCare Nursing/USF

Project Coordinator Henrique Martins
henrique.martins@spms.min-saúde.pt

http://www.expandproject.eu/
ADDITIONAL BENEFITS
IT landscape as enabler for hospital research initiatives

The Center for Research and Creativity in Informatics promotes ideas, new technologies and research at the service of Health.

Creative Thinking
Creativity is the phenomenon of creating something NEW.
Technology and the application of creative resources have come to improve health processes and change the world.

Hospital Feedback
Our work is 100% related to healthcare and health solutions.
The extreme proximity to the hospital enables us to achieve the best results and explore the best solutions.

Software and Hardware
By developing a dynamic range of solutions, we can fulfill our customer's needs.
From Computer Applications to Robotics, nothing is impossible.

Our Partners

Translational Medicine "à la" HFF

www.ci2.pt
Software application developed to identify devastating neurological injury victims who may progress to brain death and can be possible organ donors.
ADDITIONAL BENEFITS
DonorNOW – Architecture

CHALLENGE

In Portugal, as in most countries, the most frequent organ donors are brain-dead donors. To answer the increasing need for transplants, donation programs, the goal is to recognize virtually all the possible and potential brain-dead donors admitted to Hospitals.

Automatic algorithm based on natural language processing for selected keywords/expressions present in the cranio-encephalic computerized tomography (CE CT) scan reports (Soarian Clinicals repository), to identify catastrophic neurological situations, with e-mail notification to the Transplant Coordinator (TC).
17066 reports analyzed (Oct’13-Oct’14)
1148 classified as catastrophic
110 confirmed and followed by the Donation Coordination
0 catastrophic reports that were not detected
7 cases lead to organ collection

Organ collections nearly doubled
and surpassed the expected value for a Hospital without Neurosurgery

Imaging Screening of Catastrophic Neurological Events Using a Software Tool: Preliminary Results

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ADDITIONAL BENEFITS
FLU – Process Efficiency

To create a Influenza Syndrome Model, based on MTS (Manchester Triage System) to:

- Improve Influenza surveillance
- Monitor flu activity in real time
- Predict the evolution and behavior of influenza epidemic curves
- Predict influenza peaks and higher health care utilization
- Generate alerts to the clinical staff when the threshold of Influenza activity is achieved
- Explore the behaviour of age related influenza epidemic curves
- Understand the mortality rates associated with influenza in the elderly

The methodology proposed in this work seems promising showing that’s possible to identify flu syndrome using MTS discriminators. Also discovered the FLU draws a pattern dependent to age.
ADDITIONAL BENEFITS
HOUSE – Clinical Value

Developing a Service that consumes structured information from clinical repository (Soarian Clinicals), consults online search engine (PUBMed) for credited online medical literature.

CHALLENGE:
Provide clinicians with “single click” search result link within EHR user interface (Soarian Clinicals), contextualized to patient demographics, general diagnosis, as well as, clinical severity levels.
TAKEAWAY

Lessons Learned

Critical Success factors:
- Vision
- Leadership
- Empower
- Multidisciplinary team
- Inhouse IT Team
- Creativity
- Communication
Scheduling enterprise wide implementation

Close Loop Medication & Interactions (CDSS)

Clinical datawarehouse (BI)

Interoperability Roadmap

HIMSS evaluation (EMRAM)