

EHR adoption in an European environment and public management hospital



Carlos Sousa,

ICT Director at HFF

 carlos.sousa@hff.min-saude.pt

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

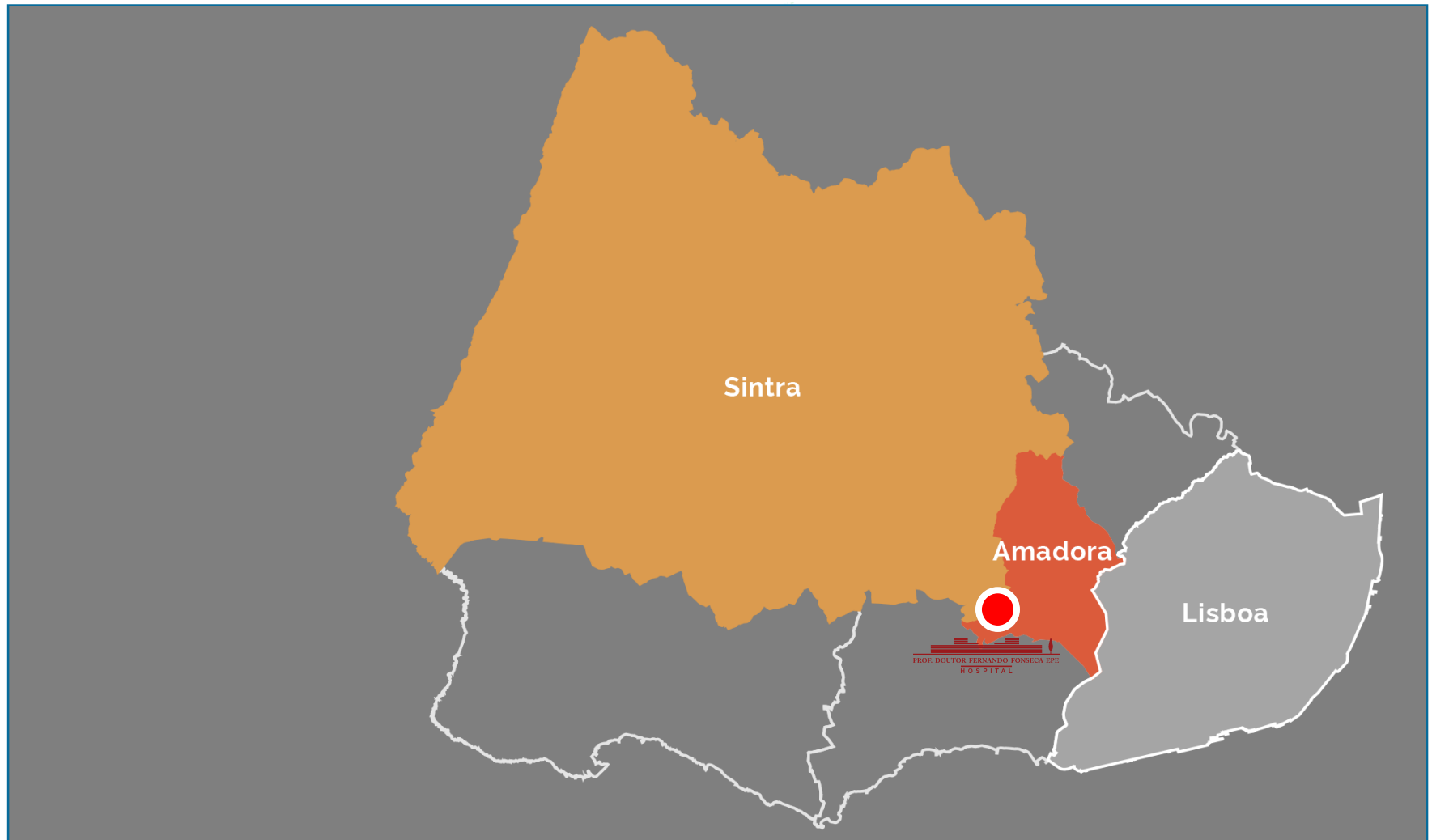
National clinical data exchange - case study

Benefits Achieved



COUNTRY OVERVIEW

NHS Healthcare figures (2014)



HFF OVERVIEW

Reference area



Sintra

Amadora

HFF OVERVIEW

Population, organization, care delivery offer

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



HFF OVERVIEW

Population, organization, care delivery offer

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

1995	Inauguration
2000	1st Portuguese Hos
2002	Accreditation by the
2004	ISO 9001-2000 Cer
2005	Reaccreditation by t
2009	Creation Hospital P
2010	HAB Certification
2011	System Reporting a
2012	Electronic Health R
2013	Quality Standards P



ng's Fund

<S)

seca, EPE



PROJECT OVERVIEW

Purposes and Goals

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

Caregivers Group

Physician

Nurse

Health Technician

Social worker

Pharmaceutical

Administrative

Clinical Setting

Inpatient

Outpatient

Emergency

Operating Room

Ambulatory

Ancillary Services

Outpatient Surgery

Process Design

Assessment

Order, Prescription

Clinical Summary

Work List, Workflow

Census, ED Tracking Board

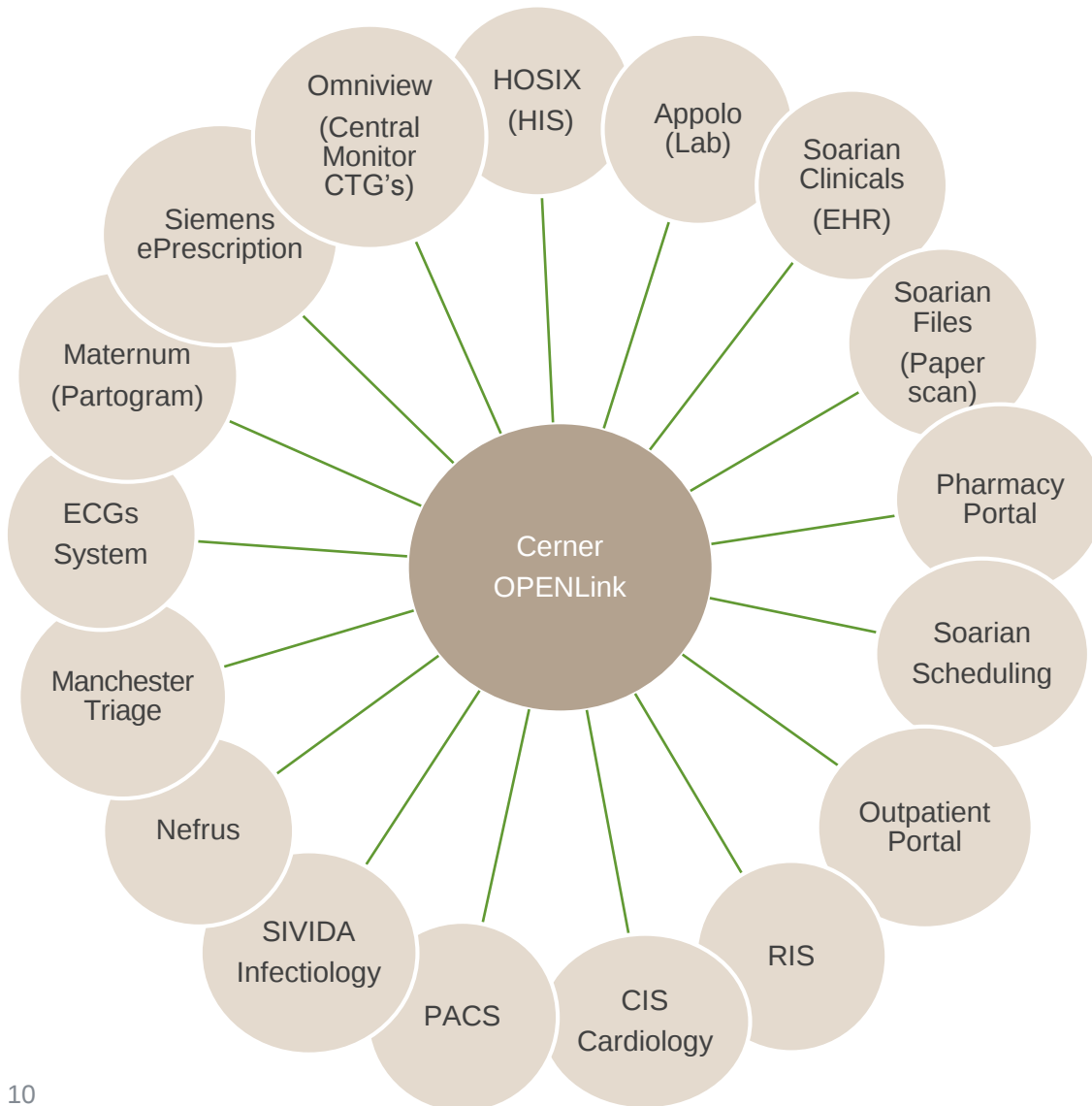
Plan of Care

Reports, Favorite's



PROJECT OVERVIEW

Interoperability Landscape



17 Systems Integrated

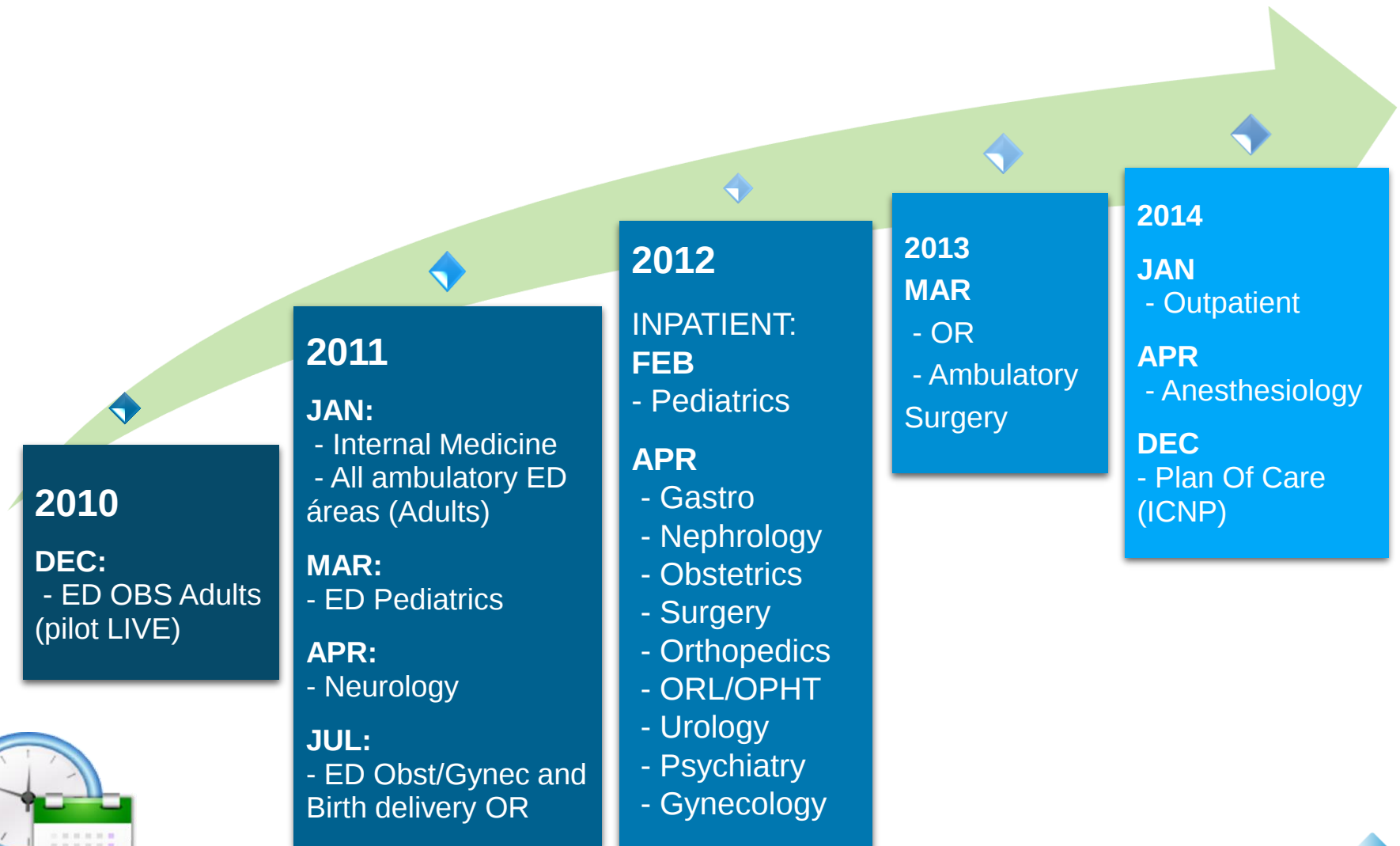
36 Interfaces

HL7 and WebServices

Over 400.000
HL7 messages/day

PROJECT OVERVIEW

Timeline



PROJECT OVERVIEW

Multidisciplinary, Buy-In, Inhouse custom,



CIC “Clinical IT Committee” – as driver to enable engagement, consense and to enforce EHR ground rules



PROJECT OVERVIEW

Our Critical Success Factors

Vision

Leadership

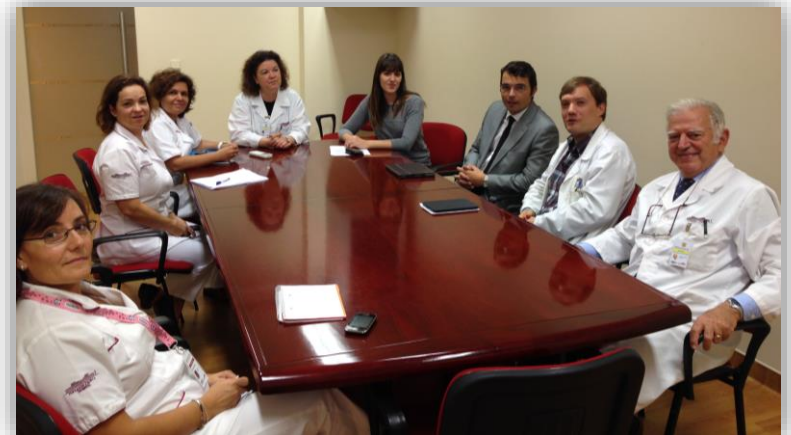
Empower

Multidisciplinary team

Inhouse IT Team

Creativity

Communication



PROJECT IMPLEMENTATION

EHR approach methodology

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

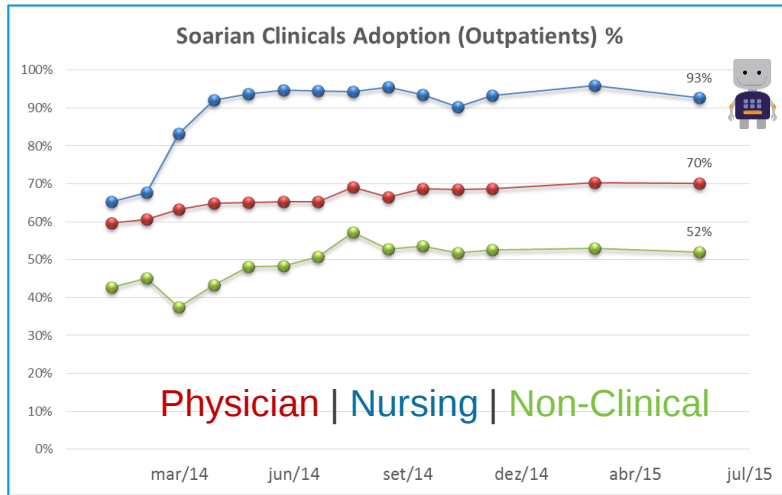
PhD MD Henrique Martins (hmartins@fcsaude.ubi.pt), published in “Sistemas de Informação para na Saúde”, Ed. Silabo - 2011

Adapted and translated by Carlos Sousa, 2015

PROJECT IMPLEMENTATION

Outpatient Department case study

Soarian Clinicals Adoption (Outpatients) %



March 2013

24%

March 2014

63%

June 2015

71%

Overall Outpatient “Soarianization” Index

MAJOR CHALLENGES:

Cardiology

Inpatients and ICU Coronary requirements

Critical Care

Pediatrics and Adults requirements

Outpatients

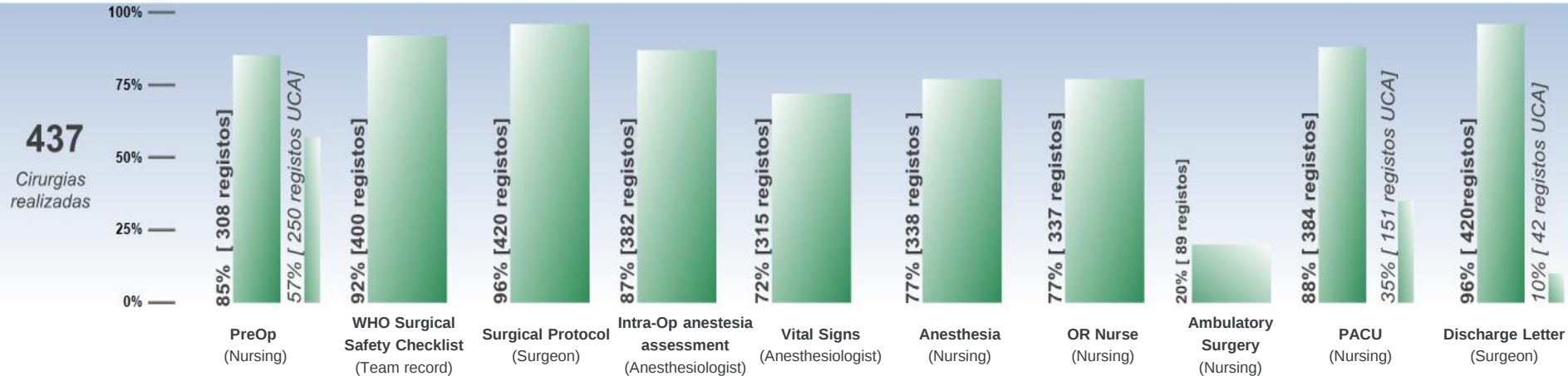
Specific specialty assessments, non-clinical caregivers records and change management

Communication

User Training availability
Medication requirements

PROJECT IMPLEMENTATION

OR case study – Jun 2015



“SOARIANIZATION”

94,5%



WHO Patient Safety Checklist

97%



10 'A Decorrer'

Nursing Records

99%



26 'A Decorrer'

Surgeon Records

100%



PROJECT IMPLEMENTATION

OR case study – Jun 2015

Major criteria from CHKS Referencial - 2013

*“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.”*

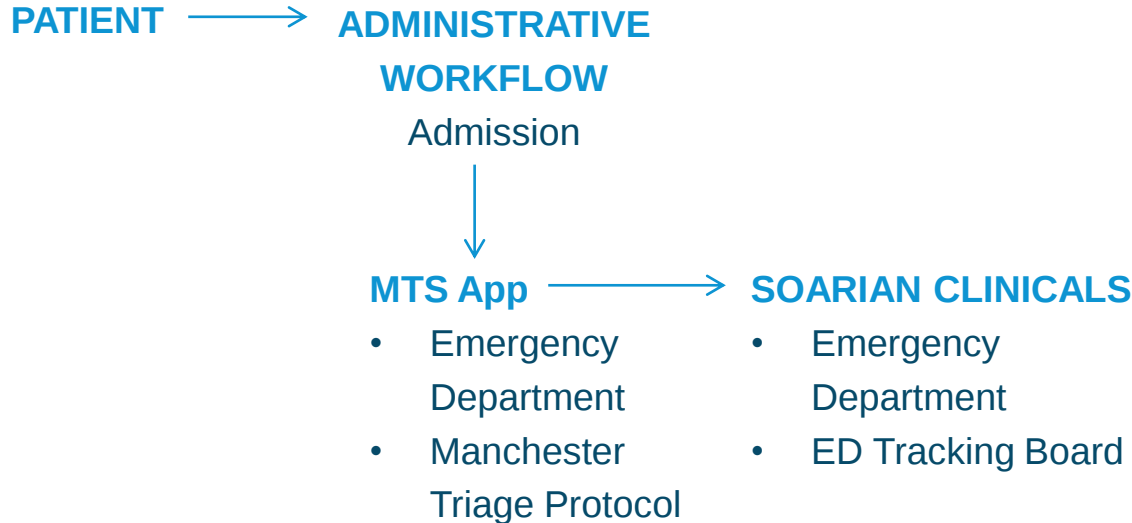
Allergy ADE	Surgeon record	Anesthesia record	WHO Surgery Patient Safety Check-list	Informed consent
95%*	100%	91%	97%	100%**

*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

PROJECT IMPLEMENTATION

ED case study – Manchester Triage Protocol v.II



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.

Data	Nome	Idade	Tempo Admitido	Status	Tempo Triage	Prioridade
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente
8/27/1990 (42A)		42	5:00 PM	Em re-triagem	4:05 PM	Pouco urgente

COLORS	MTS PRIORITY	Waiting Time (m)
Red	Immediate	0
Orange	Very Urgent	10
Yellow	Urgent	60
Green	Standard	120
Blue	Non-Urgent	240

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.

PROJECT IMPLEMENTATION

ED case study – Manchester Triage Protocol v.II

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/emered-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

Correspondence to
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



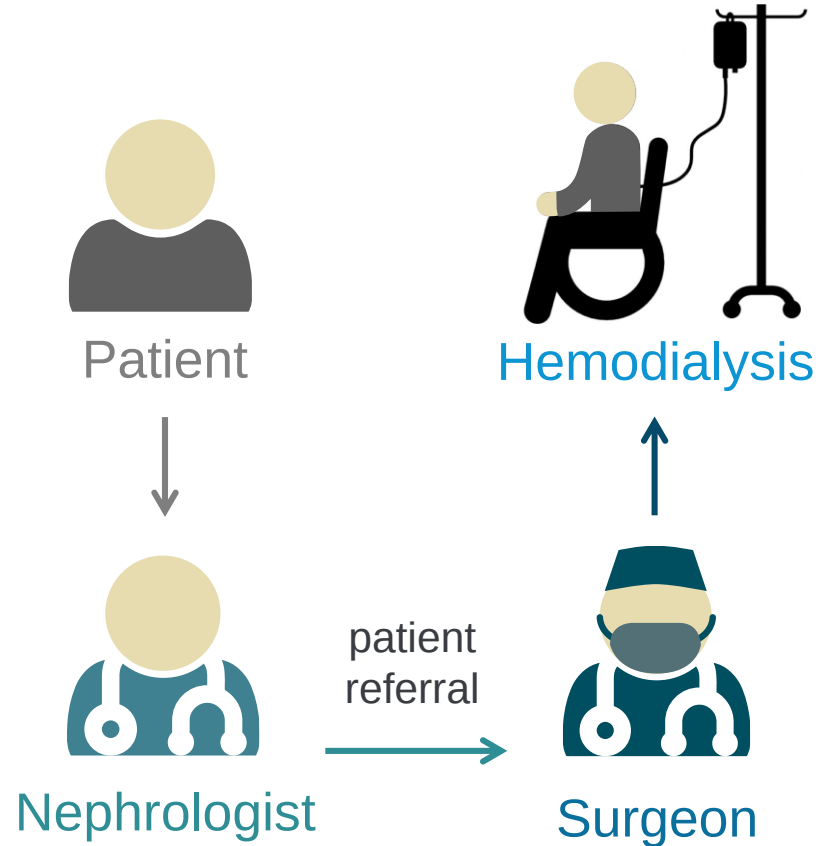
PROJECT IMPLEMENTATION

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



PROJECT IMPLEMENTATION

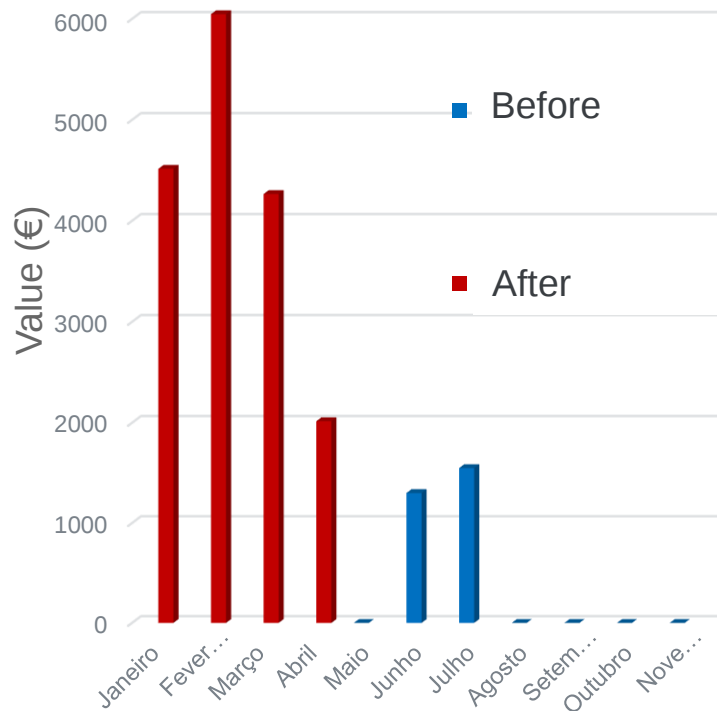
Vascular access case study - Achievements

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

PROJECT IMPLEMENTATION

Vascular access case study – Cost saving

Total outsourced vascular access procedure during 2014



Month	BEFORE paper based	AFTER EHR support
Jan	4.515,53	
Feb	6.046,59	
Mar	4.265,53	
Apr	2.015,53	
May		0
Jun		1.300
Jul		1.550
Aug		0
Sep		0
Oct		0
Nov		0
Cost (€)	16.843	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.

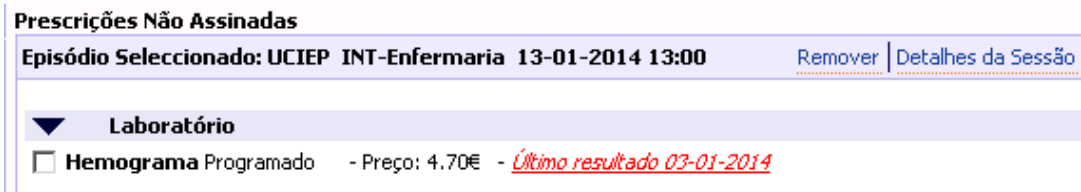
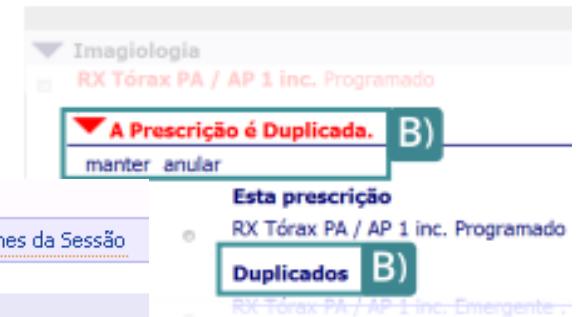
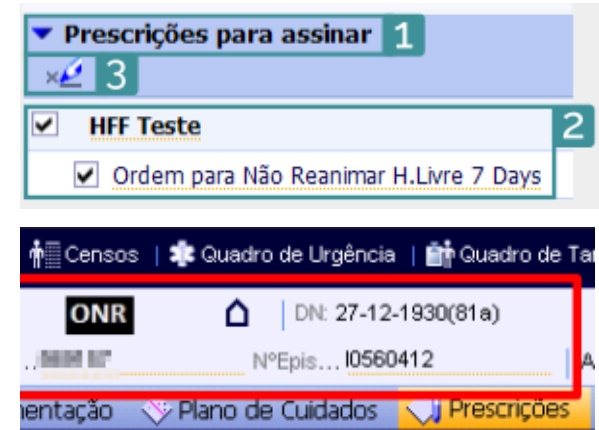
Involved Care Units: ED Adults, OBS, ICU

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**



Soarian_ONR.mp4



Soarian_VVS.mp4



WFE_ONR.mp4



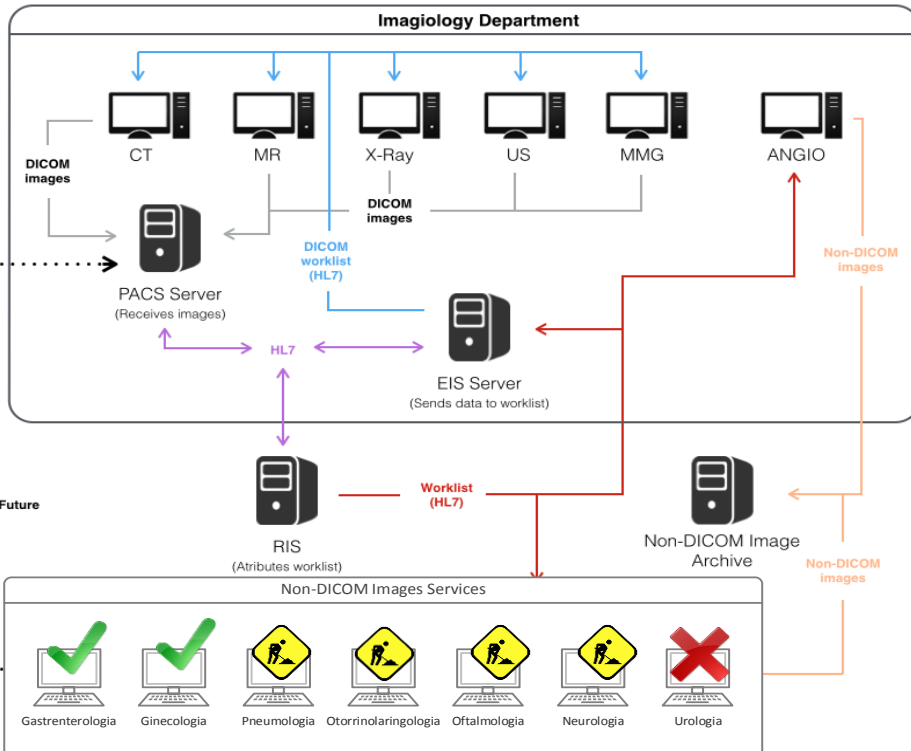
WFE_VVS.mp4

PROJECT IMPLEMENTATION

Medical Image case study

100 %

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



Sistema Imagin@ria 	
Processo:	141945
Nome(s) Senhor(a):	
Data do Relatório:	17-Nov-2013 16:21
Data do Exame:	07-Nov-2013 5:45
Nº Episódio:	C08853789
Serviço:	CCN
Tipo de Exame:	Mamografia Espectro
2013-11-16 MAMOGRAFIA Exame de seguimento em doente submetida a mastectomia à direita em 2007 com posterior reconstrução. Estado comparativo com o exame anterior de 03/04/2013. Não se observam estruturas linfoglandulares direitas, distribuído pelo quadrante alar-médio e região central. Não se observam condensações nodulares suspeitas nem aglomerados de microcalcificações. Não estão observados completamente desde este exame não se identificam alterações vasculares. Também não se identificam alterações esqueléticas na região de cicatriz da reconstrução nem alterações anómalas ou metastáticas internas. Não observamos. Suporta-se a manutenção da vigilância ajustada aos antecedentes da examinada. Seu(s) nome(s): BIRNACZI I Médico: PEDRO CABRAL 	



Colposcopia

SERVIÇO GINECOLÓGICO

Paciente:		Data:	09/09/2019
Nome:		Idade:	(00 anos)
Telefone:			

Indicação:	Colúgeno + HSL		
Estado:	Normal	Virgins:	Normal
Exame:	Autoclave Colposcopia Normal		
DI:	☐ 21 ☐ 27 ☐ 31 ☐ 33 ☐ 35 ☐ 37 ☐ 39 ☐ 41 ☐ 43 ☐ 45 ☐ 47 ☐ 49 ☐ 51 ☐ 53 ☐ 55 ☐ 57 ☐ 59 ☐ 61 ☐ 63 ☐ 65 ☐ 67 ☐ 69 ☐ 71 ☐ 73 ☐ 75 ☐ 77 ☐ 79 ☐ 81 ☐ 83 ☐ 85 ☐ 87 ☐ 89 ☐ 91 ☐ 93 ☐ 95 ☐ 97 ☐ 99 ☐ 101 ☐ 103 ☐ 105 ☐ 107 ☐ 109 ☐ 111 ☐ 113 ☐ 115 ☐ 117 ☐ 119 ☐ 121 ☐ 123 ☐ 125 ☐ 127 ☐ 129 ☐ 131 ☐ 133 ☐ 135 ☐ 137 ☐ 139 ☐ 141 ☐ 143 ☐ 145 ☐ 147 ☐ 149 ☐ 151 ☐ 153 ☐ 155 ☐ 157 ☐ 159 ☐ 161 ☐ 163 ☐ 165 ☐ 167 ☐ 169 ☐ 171 ☐ 173 ☐ 175 ☐ 177 ☐ 179 ☐ 181 ☐ 183 ☐ 185 ☐ 187 ☐ 189 ☐ 191 ☐ 193 ☐ 195 ☐ 197 ☐ 199 ☐ 201 ☐ 203 ☐ 205 ☐ 207 ☐ 209 ☐ 211 ☐ 213 ☐ 215 ☐ 217 ☐ 219 ☐ 221 ☐ 223 ☐ 225 ☐ 227 ☐ 229 ☐ 231 ☐ 233 ☐ 235 ☐ 237 ☐ 239 ☐ 241 ☐ 243 ☐ 245 ☐ 247 ☐ 249 ☐ 251 ☐ 253 ☐ 255 ☐ 257 ☐ 259 ☐ 261 ☐ 263 ☐ 265 ☐ 267 ☐ 269 ☐ 271 ☐ 273 ☐ 275 ☐ 277 ☐ 279 ☐ 281 ☐ 283 ☐ 285 ☐ 287 ☐ 289 ☐ 291 ☐ 293 ☐ 295 ☐ 297 ☐ 299 ☐ 301 ☐ 303 ☐ 305 ☐ 307 ☐ 309 ☐ 311 ☐ 313 ☐ 315 ☐ 317 ☐ 319 ☐ 321 ☐ 323 ☐ 325 ☐ 327 ☐ 329 ☐ 331 ☐ 333 ☐ 335 ☐ 337 ☐ 339 ☐ 341 ☐ 343 ☐ 345 ☐ 347 ☐ 349 ☐ 351 ☐ 353 ☐ 355 ☐ 357 ☐ 359 ☐ 361 ☐ 363 ☐ 365 ☐ 367 ☐ 369 ☐ 371 ☐ 373 ☐ 375 ☐ 377 ☐ 379 ☐ 381 ☐ 383 ☐ 385 ☐ 387 ☐ 389 ☐ 391 ☐ 393 ☐ 395 ☐ 397 ☐ 399 ☐ 401 ☐ 403 ☐ 405 ☐ 407 ☐ 409 ☐ 411 ☐ 413 ☐ 415 ☐ 417 ☐ 419 ☐ 421 ☐ 423 ☐ 425 ☐ 427 ☐ 429 ☐ 431 ☐ 433 ☐ 435 ☐ 437 ☐ 439 ☐ 441 ☐ 443 ☐ 445 ☐ 447 ☐ 449 ☐ 451 ☐ 453 ☐ 455 ☐ 457 ☐ 459 ☐ 461 ☐ 463 ☐ 465 ☐ 467 ☐ 469 ☐ 471 ☐ 473 ☐ 475 ☐ 477 ☐ 479 ☐ 481 ☐ 483 ☐ 485 ☐ 487 ☐ 489 ☐ 491 ☐ 493 ☐ 495 ☐ 497 ☐ 499 ☐ 501 ☐ 503 ☐ 505 ☐ 507 ☐ 509 ☐ 511 ☐ 513 ☐ 515 ☐ 517 ☐ 519 ☐ 521 ☐ 523 ☐ 525 ☐ 527 ☐ 529 ☐ 531 ☐ 533 ☐ 535 ☐ 537 ☐ 539 ☐ 541 ☐ 543 ☐ 545 ☐ 547 ☐ 549 ☐ 551 ☐ 553 ☐ 555 ☐ 557 ☐ 559 ☐ 561 ☐ 563 ☐ 565 ☐ 567 ☐ 569 ☐ 571 ☐ 573 ☐ 575 ☐ 577 ☐ 579 ☐ 581 ☐ 583 ☐ 585 ☐ 587 ☐ 589 ☐ 591 ☐ 593 ☐ 595 ☐ 597 ☐ 599 ☐ 601 ☐ 603 ☐ 605 ☐ 607 ☐ 609 ☐ 611 ☐ 613 ☐ 615 ☐ 617 ☐ 619 ☐ 621 ☐ 623 ☐ 625 ☐ 627 ☐ 629 ☐ 631 ☐ 633 ☐ 635 ☐ 637 ☐ 639 ☐ 641		

Medical Image solution diagram:

Electro-medicine integration for
DICOM imaging
NON-DICOM imaging
Report integration
Scheduling and equipment
worklists

PROJECT IMPLEMENTATION

Medical Image case study – Clinical Value and Cost Saving

Nov.14		Physician Order Entry Outcome?				TOTAL Quant.	TOTAL Cost
TYPE	Sub TYPE	Canceled		Proceed			
		Quant.	Cost	Quant.	Cost		
RAD	US	67	€ 1.362,82	117	€ 2.405,99	184	€ 3.768,81
RAD	X-RAY	720	€ 3.707,88	2004	€ 9.735,06	2724	€ 13.442,94
RAD	MR	3	€ 383,70	8	€ 1.009,00	11	€ 1.392,70
RAD	TC	107	€ 7.600,36	268	€ 19.181,78	375	€ 26.782,14
Total		897	€ 13.054,76	2.397	€ 32.331,83	3.294	€ 45.386,59

Canceled means that the physician decided to cancel the Order due to Check Duplicate notification.

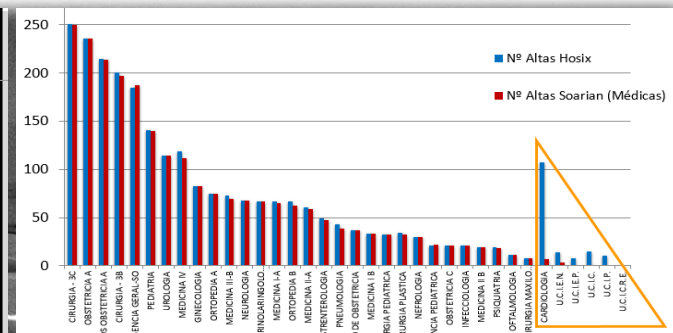
Proceed means that the physician decided to sign the Order.

Check Duplicate applied to Radiology Exams (November 2014),
aiming for potential savings about **€ 13.000,00/month**

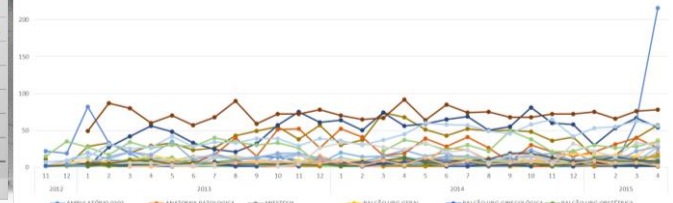
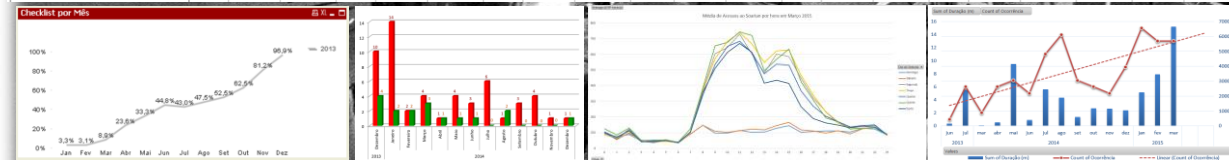
PROJECT FOLLOW-UP

Adoption and Maturity – Measuring tools and indicators

serviço	Tipo Consulta / Atividade															Junho		
	CONS ENFERM						CONS MED											
	PRIMEIRAS			SUBSEQUENTES			PRIMEIRAS			SUBSEQUENTES			CONS N MED					
	hosiz	soarian	%	hosiz	soarian	%	hosiz	soarian	%	hosiz	soarian	%	hosiz	soarian	%	Total hosiz	Total soarian	% Total
CIRURGIA MAXILO FACIAL							55	55	100	53	52	98,11				108	107	99,07
CIRURGIA PLASTICA							224	221	98,66	273	268	98,17				497	489	98,39
DIETETICA							396	386	97,47	642	625	97,35				247	243	98,38
OBSTETRICA A	24	20	83,33	10	8	80	396	386	97,47	642	625	97,35	60	58	96,67	187	185	98,93
MEDICINA IV							104	100	96,15	382	362	94,76				497	489	98,39
UROLOGIA							193	188	97,41	563	518	92,01				1072	1039	96,92
MEDICINA I-A							100	94	94	195	181	92,82				756	706	93,39
MEDICINA III-B							84	76	90,48	205	191	93,17				295	275	93,22
CIRURGIA - 3B							367	336	91,55	532	480	90,23				289	267	92,39
CIRURGIA PEDIATRICA	11	11	100	82	81	98,78	127	111	87,4	331	303	91,54				992	908	91,53
NEFROLOGIA							75	69	92	427	393	92,07				458	414	90,39
MEDICINA II-A	3	3	100	193	173	89,64	160	142	88,75	526	469	89,16				502	452	90,04
GASTROENTEROLOGIA	1	1	100	38	37	97,37	337	299	88,72	567	502	88,54				892	787	88,23
ORTOPEDIA A							306	274	89,54	315	277	87,94				943	839	88,97
PEDIATRIA	1	1	100	21	20	95,24	691	607	87,84	1469	1296	88,22	58	53	91,38	198	178	89,9
PNEUMOLOGIA	54	53	98,15	95	93	97,89	159	123	77,36	396	293	73,99				2438	2155	88,39
GINECOLOGIA							435	361	82,99	676	515	76,18				704	562	79,83
OTORRINOLARINGOLOGIA							546	491	89,93	720	593	79,86	30	27	90	123	114	92,68
M.F.R.							126	112	88,89	267	229	85,77	60	0	0	5	0	0
CIRURGIA - 3C	3	2	66,67	32	31	96,88	296	232	78,38	379	253	66,75				710	518	72,96
ORTOPEDIA B							240	169	70,42	210	144	68,57				450	313	69,56
PSQUIATRIA							159	99	62,26	2158	1344	62,28	19	3	15,73	451	101	22,39
HOSP. DIA-ONCOLOGIA	39	30	76,92	1035	954	92,17	58	38	65,52	1197	694	57,98				1294	762	58,89
IMAGIOLOGIA							72	37	51,39							72	37	51,39
CARDIOLOGIA	16	16	100	22	22	100	203	135	66,5	667	221	33,13				908	394	43,39
ANESTESIA							393	70	17,81	355	90	25,35				748	160	21,39
OFTALMOLOGIA							601	97	16,14	1061	167	15,74				1662	264	15,88
NEUROLOGIA	2	1	50	20	20	100	256	37	14,45	670	54	8,06				348	112	31,81
Total Geral-Junho	154	138	89,61	1548	1439	92,96	6763	4959	73,33	15246	10494	68,83	227	141	62,11	964	478	49,59

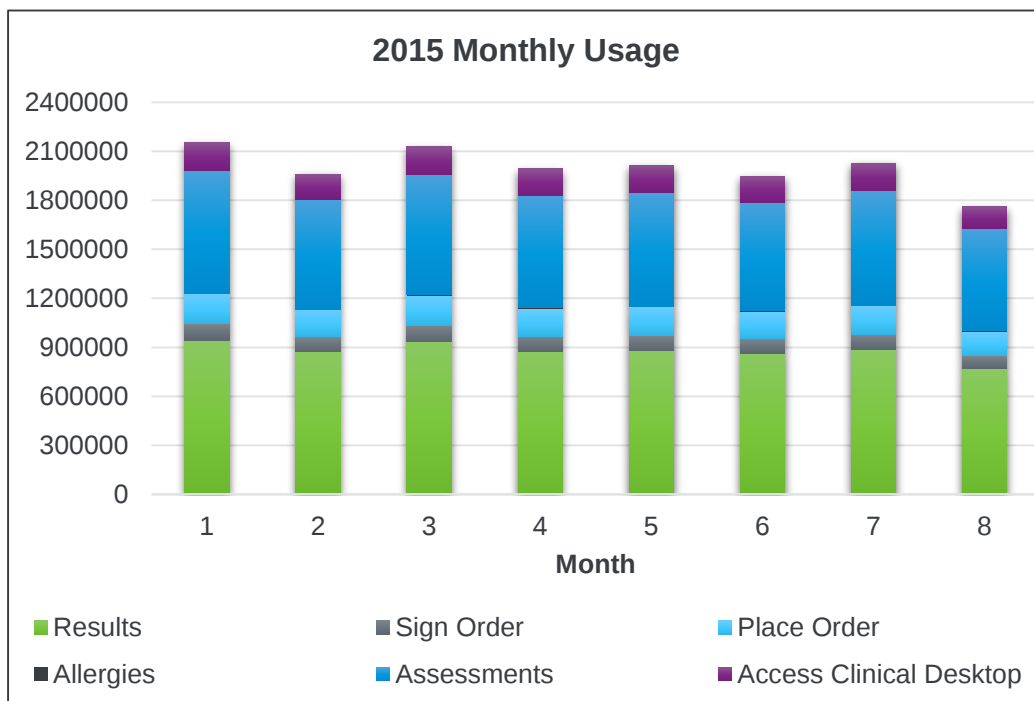


NOME	STATUS	Impacto	Kick-Off Date	EXECUÇÃO	REPORT
DGTI - Reorg	✓	DGTI	jan-14	✓	Reorganizar o FTE e Procedimentos BAGE escritos e aprovados e Regulamento organico
GH - Upgrade HW	✓	HFF	ago-14	✓	Em fase de testes, com substituição de recursos. Limitações pela falta de verificação do site, integração com a Worklist e validação do resultado no Soarian.
HOSIX - Interface WebGDH	✓	HFF	ago-14	✓	Em produção o sistema de interface WebGDH.
OutSystem - Reg. Dispositivo M.	✓	Bloco Operatório	jan-14	✓	Em produção o sistema de interface WebGDH.
PACS - Consolidação Non-DICOM	✓	HFF	nov-14	✓	Em produção o sistema de interface WebGDH.
PAI	✓	HFF	abr-14	✓	Em produção o sistema de interface WebGDH.
PCFI	✓	HFF	nov-13	✓	Em produção o sistema de interface WebGDH.
PDS - NA	✓	HFF	ago-14	✓	Em produção o sistema de interface WebGDH.
PDS - NNascimento	✓	Obstetrícia	ago-14	✓	Em produção o sistema de interface WebGDH.
PortalAmbulatorio + PEM-HFF	✓	HFF	abr-14	✓	Em produção o sistema de interface WebGDH.
RIS - MEDWEB	✓	Imagiologia	nov-14	✓	Em produção o sistema de interface WebGDH.
SAP - Upgrade	✓	HFF	ago-14	✓	Em produção o sistema de interface WebGDH.
SAP EAPS	✓	DF	jan-15	✓	Em produção o sistema de interface WebGDH.
Soarian - Consulta	✓	HFF	mar-13	✓	Em produção o sistema de interface WebGDH.
Soarian - HELICS	✓	Bloco Operatório	ago-14	✓	Em produção o sistema de interface WebGDH.



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**

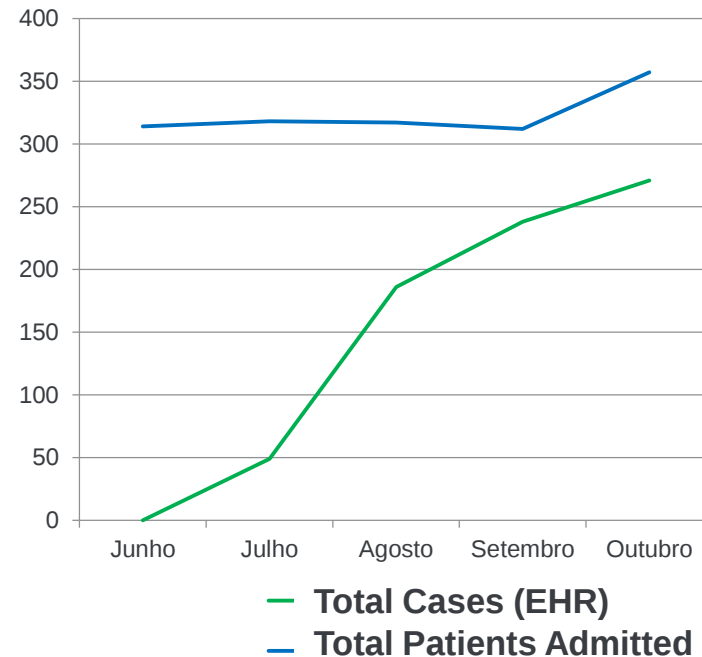
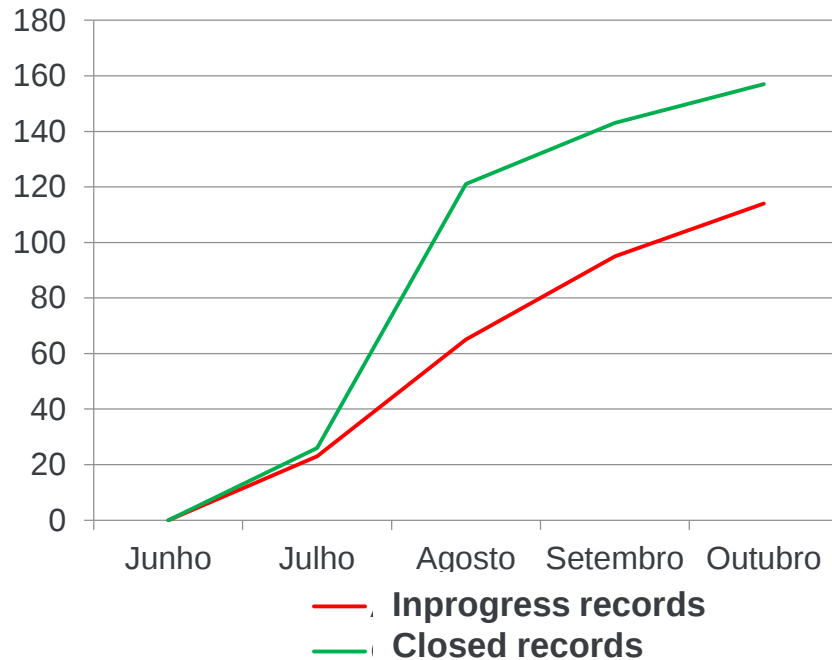
Custom	Indicators (since LIVE)
29.432.884	Registered assessments
11.246	Stages in use from 341 assessments
159.579	Access Clinical Desktop
3.023	Registered users (current)

*2015's Monthly Average Figures

**Cumulative Figures since Jan.2015

PROJECT FOLLOW-UP

Data Quality and Patient Safety features

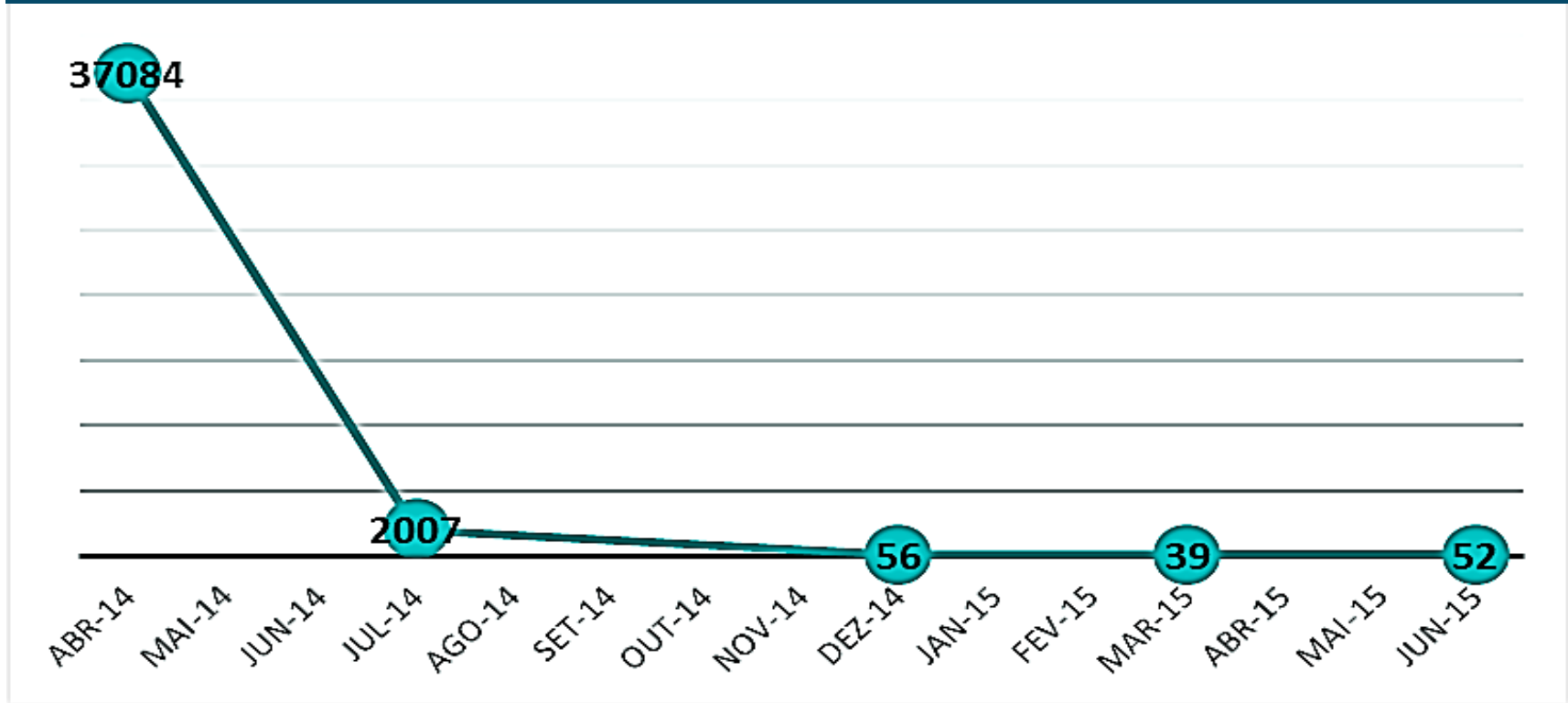


Resuscitation room and reanimation assessment status (“inprogress” and “closed”) until Oct. 2014, plus adoption indicator (Filled vs Admitted)

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

Surgical Safety Checklist  **World Health Organization** | **Patient Safety**
© World Health Organization 2009

Before induction of anaesthesia
(with at least nurse and anaesthetist)

- Has the patient confirmed his/her identity, site, procedure, and consent?
☐ Yes
- Is the site marked?
☐ Yes
☐ Not applicable
- Is the anaesthesia machine and medication check complete?
☐ Yes
- Is the pulse oximeter on the patient and functioning?
☐ Yes
- Does the patient have a:
 Known allergy?
☐ No
☐ Yes
 Difficult airway or aspiration risk?
☐ No
☐ Yes, and equipment/assistance available

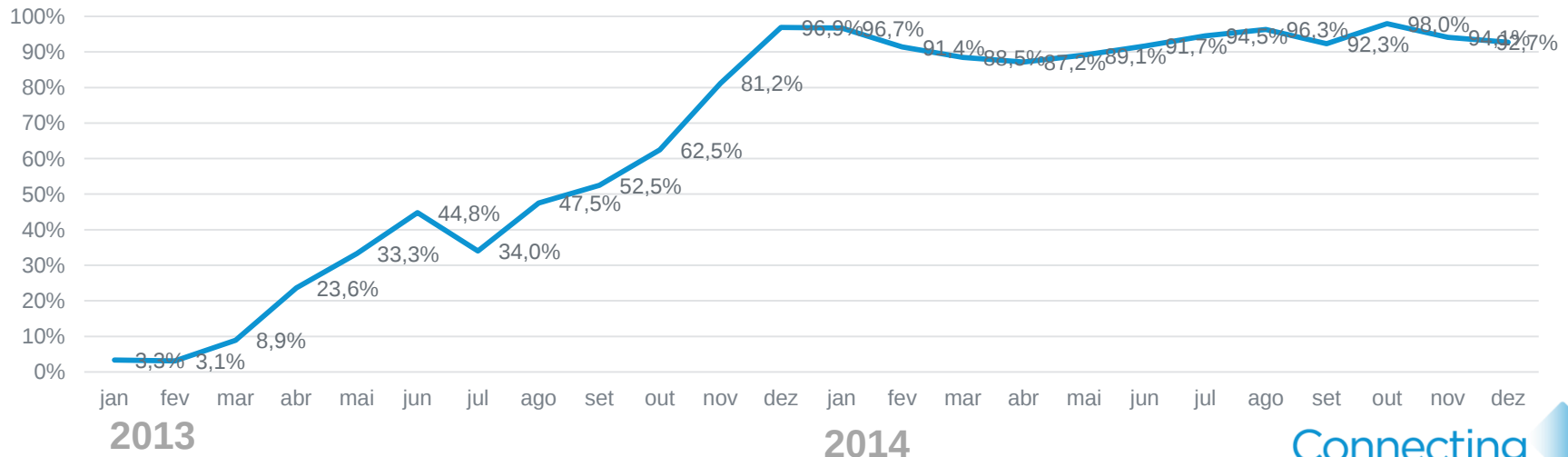
Before skin incision
(with nurse, anaesthetist and surgeon)

- Confirm all team members have introduced themselves by name and role.
- Confirm the patient's name, procedure, and where the incision will be made.
- Has antibiotic prophylaxis been given within the last 60 minutes?
☐ Yes
☐ Not applicable
- Anticipated Critical Events**
 To Surgeon:
☐ What are the critical or non-routine steps?
☐ How long will the case take?
☐ What is the anticipated blood loss?
 To Anaesthetist:
☐ Are there any patient-specific concerns?
 To Nursing Team:
☐ Has sterility (including indicator results) been confirmed?
☐ Are there equipment issues or any concerns?

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

- Nurse Verbally Confirms:**
 - ☐ The name of the procedure
 - ☐ Completion of instrument, sponge and needle counts
 - ☐ Specimen labelling (load specimen labels aloud, including patient name)
 - ☐ Whether there are any equipment problems to be addressed
- To Surgeon, Anaesthetist and Nurse:**
 - ☐ What are the key concerns for recovery and management of this patient?

WHO - Surgical Safety Checklist, HFF adoption rate



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



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

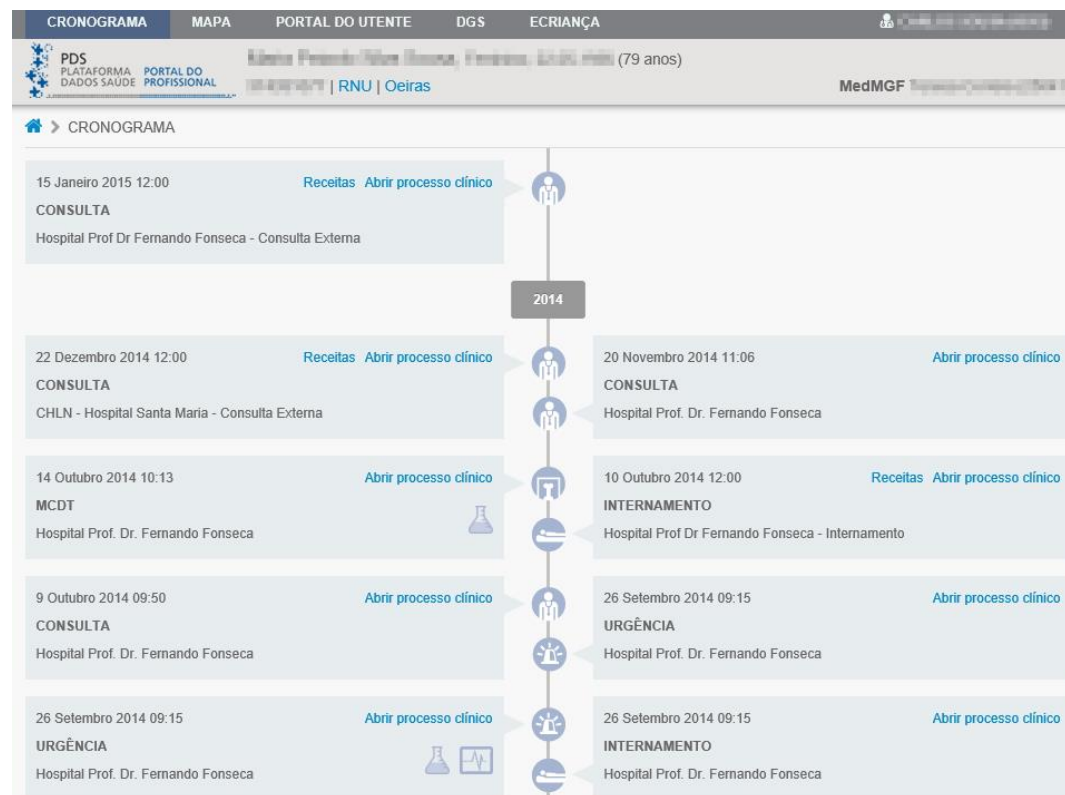
Medication, Allergies and diseases

Oral health

Prescription history

Vital Testament (non-care voluntarily patient decision)

Patient emergency contacts



ADDITIONAL BENEFITS

PDS (Professional Portal) – HFF data shared

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, ...)

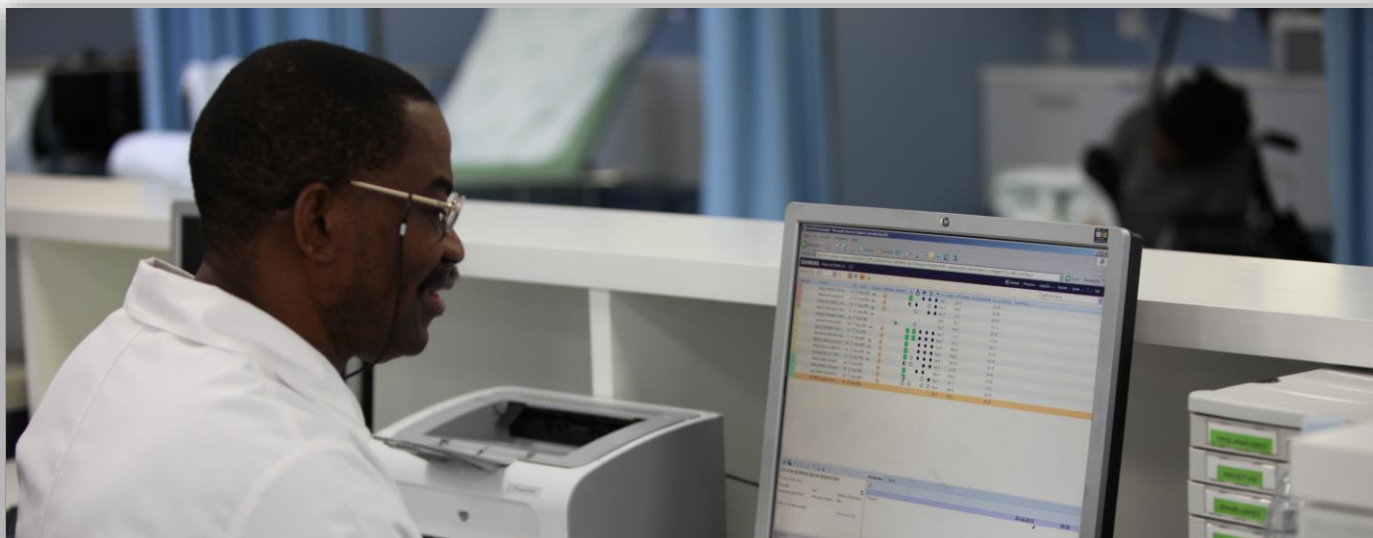
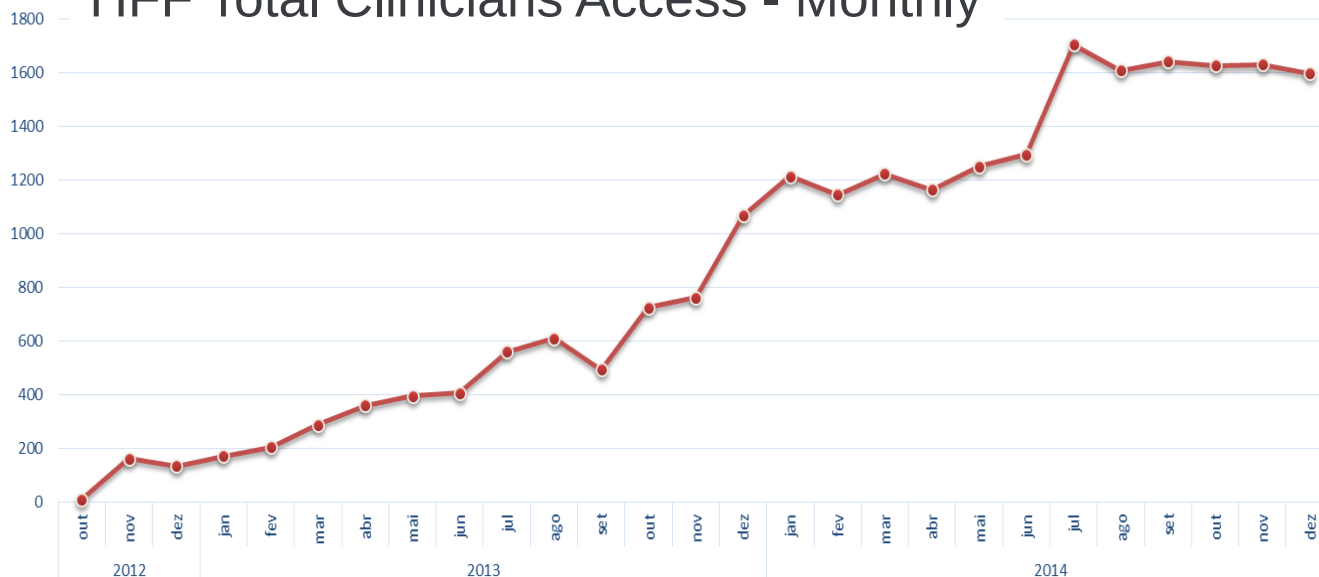
ED Manchester Triage Notes, Medication prescription for Community Pharmacy

The screenshot displays the PDS (Professional Portal) interface. At the top, there are navigation tabs: CRONOGRAMA, MAPA, PORTAL DO UTENTE, DGS, and ECRANÇA. Below these, the user's profile is shown: PDS, PLATAFORMA DADOS SAÚDE, PORTAL DO PROFISSIONAL, and a patient named João Pedro Silva Sousa, 79 years old. The main content area is titled 'MAPA' and shows a map of Portugal with two orange markers labeled '2' and '5'. To the right of the map is a list of hospitals, including 'Venda Nova', 'ACES Lisboa Ocidental e Oeiras', 'Ajuda', 'Alcântara', 'Carnaxide', 'Oeiras', 'Sto. Condestável', 'USF Dafundo', 'USF Descobertas', 'ACES Almada - Seixal', 'ACES Arco Ribeirinho', 'ACES Arrábida', 'ACES Cascais', 'ACES Estuário do Tejo', 'ACES Lezíria', 'ACES Lisboa Central', 'ACES Lisboa Norte', 'ACES Loures', 'ACES Médio Tejo', 'ACES Oeste Norte', 'ACES Oeste Sul', and 'ACES Sintra'. On the far right, there is a section titled 'Hospitais' listing various hospitals such as 'Centro Hospitalar de Lisboa Norte - Santa Maria', 'Centro Hospitalar de Lisboa Ocidental', 'Hospital Prof. Dr. Fernando Fonseca', 'Centro Hospitalar Barreiro/Montijo', 'Centro Hospitalar de Lisboa Central', 'Centro Hospitalar de Setúbal', 'Centro Hospitalar do Médio Tejo', 'Centro Hospitalar Oeste', 'Centro Hospitalar Psiquiátrico de Lisboa', 'Hospital Beatriz Ângelo', 'Hospital de Cascais Dr. José de Almeida', 'Hospital Distrital de Santarém', 'Hospital Garcia de Orta', 'Hospital Vila Franca de Xira', 'Instituto de Oftalmologia Dr. Gama Pinto', and 'IPO de Lisboa'. The bottom of the interface features logos for the GOVERNO DE PORTUGAL, SPMS, COMPETE, QUADRO DE REFERÊNCIA ESTRATÉGICO NACIONAL, and the EUROPEAN UNION, along with the text 'Desenvolvido por Serviços Partilhados do Ministério da Saúde © 2015'.

ADDITIONAL BENEFITS

PDS (Professional Portal) – HFF adoption

HFF Total Clinicians Access - Monthly



ADDITIONAL BENEFITS

epsos pilot - HFF pilot site



Smart Open Services for European Patients

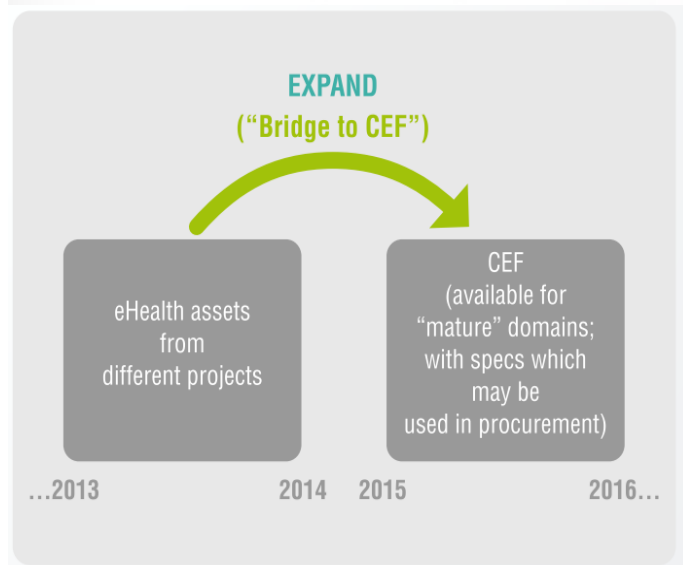
epSOS Participating Nations		
Austria	Greece	Slovakia
Belgium	Hungary	Slovenia
Croatia	Italy	Spain
Czech Republic	Luxembourg	Sweden
Denmark	Malta	Switzerland
Estonia	Norway	The Netherlands
Finland	Poland	Turkey
France	Portugal	United Kingdom
Germany		

<http://www.epsos.eu/>



ADDITIONAL BENEFITS

epsos goals and next step – EXPAND European Project



Clinical resume, meaningful to caregivers whenever needed (ER across nation or EU), autom/ 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 PrimaryCare and)**
- Medical Devices (implants)
- Chronic medication (according to PrimaryCare)

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

<http://www.expandproject.eu/>

* Progressive upload/validation (GP's)

** MFG edition/ PrimaryCare Nursing/USF



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.



Centro de Investigação e Criatividade em Informática
Hospital Prof. Doutor Fernando Fonseca EPE



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 fulfil our customer's needs.

From Computer Applications to Robots nothing is impossible.



Our Partners

Translational Medicine "à la" HFF

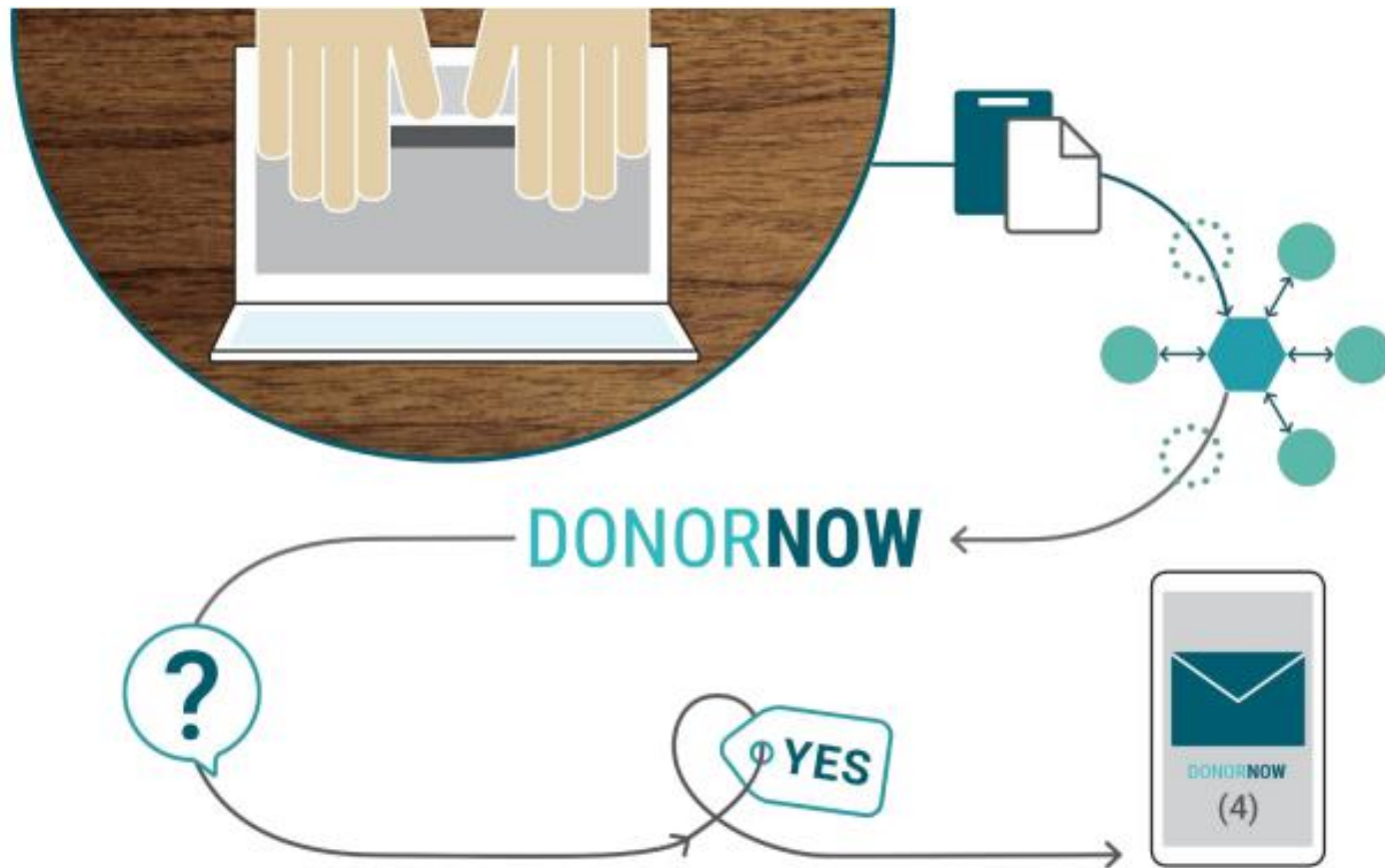


www.ci2.pt

Connecting
what matters

ADDITIONAL BENEFITS

DonorNOW – Social ROI



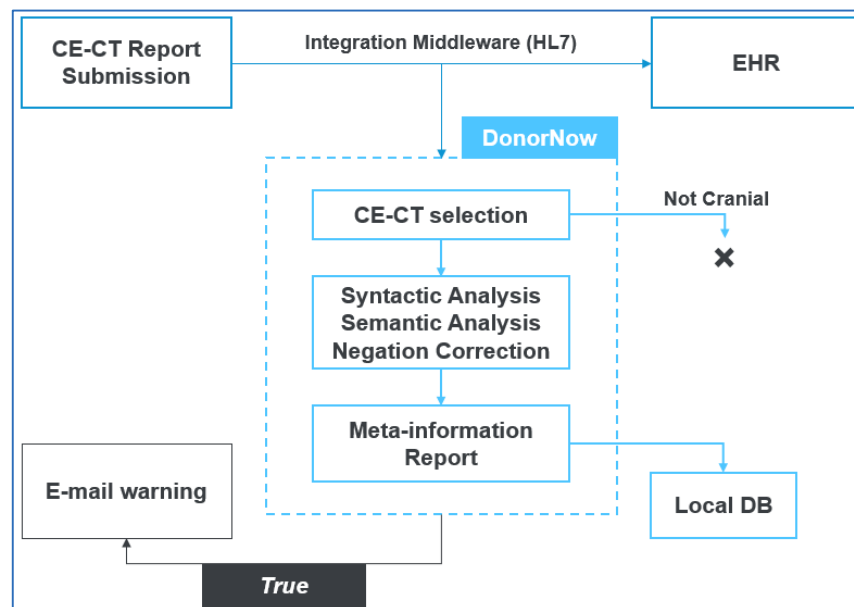
Software application developed to identify devastating neurological injury victims who may progress to brain death and can be possible organ donors.

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.



DonorNOW architecture diagram

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)



ADDITIONAL BENEFITS

DonorNOW – HFF preliminary results

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**

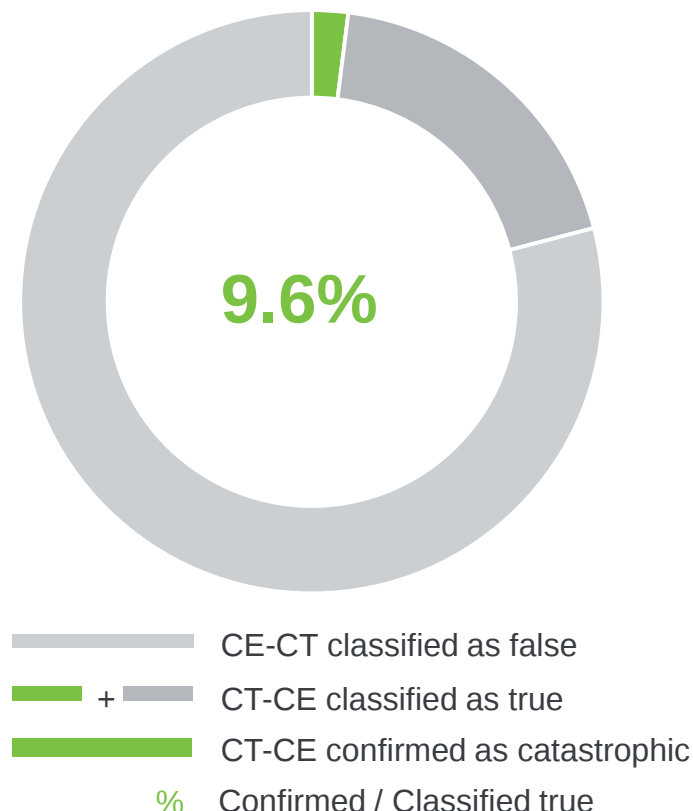
Organ collections nearly doubled
and surpassed the expected value for a
Hospital without Neurosurgery



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

A.P. Fernandes^{a,b,*}, A. Gomes^{a,c}, J. Veiga^d, D. Ermida^d, and T. Vardasca^d

^aHospital Organ Donation Coordination, ^bIntensive Care Department, ^cB Surgery Department, and ^dCI2 – Centro de Investigação e Criatividade em Informática, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal



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

Quadro 1 - Modelo para identificação da Síndrome Grial de acordo com o discriminador do MTS atribuído.

Síndrome Grial	Síndrome Grial Não Provável
Adulto quente Sinais de dor moderada Cefaleias Broncospasmo Criança quente e muito quente Dificuldade respiratória Febre ou febrícula Dispneia aguda Sinais de aumento do trabalho respiratório Saturação de oxigênio baixa / muito baixa	Todos os outros discriminadores

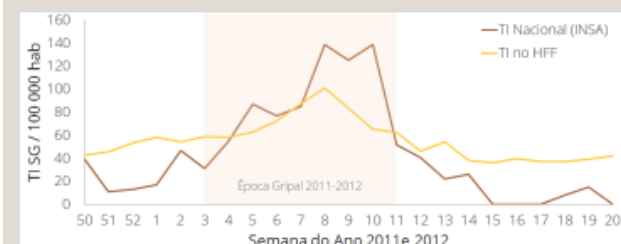
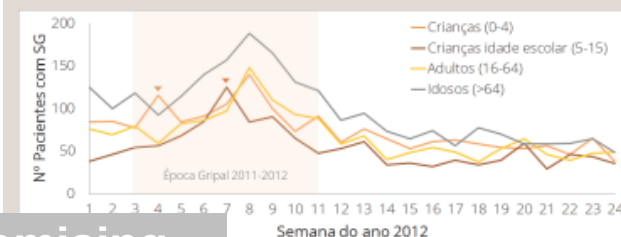


Figura 1 - Taxa de Incidência da Síndrome Grial a nível nacional e local



entes com Síndrome Grial por idade

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.

The image shows a screenshot of the HOUSE web application interface. At the top, it says "HOUSE Health Query Literature in Use" and "stand alone _b_0.3". The interface is divided into several sections: "Demographics" with fields for Age (Years), Gender, Weight (Kg), and Height (cm); "Background Medical History" with a grid of checkboxes for various conditions like Myocardial Ischemia, Hypertension, Stroke, etc.; "Current Episode Diagnosis" with a dropdown menu; "Vital Signs" with fields for Heart Rate (bpm), Temperature (°C), Glasgow Coma Scale, Systolic BP (mmHg), and Diastolic BP (mmHg); and "Laboratory Results" with fields for HbB (g/dL), Creatinine (mg/dL), and Bilirubin (mg/dL). Each section has a blue arrow icon to its right.

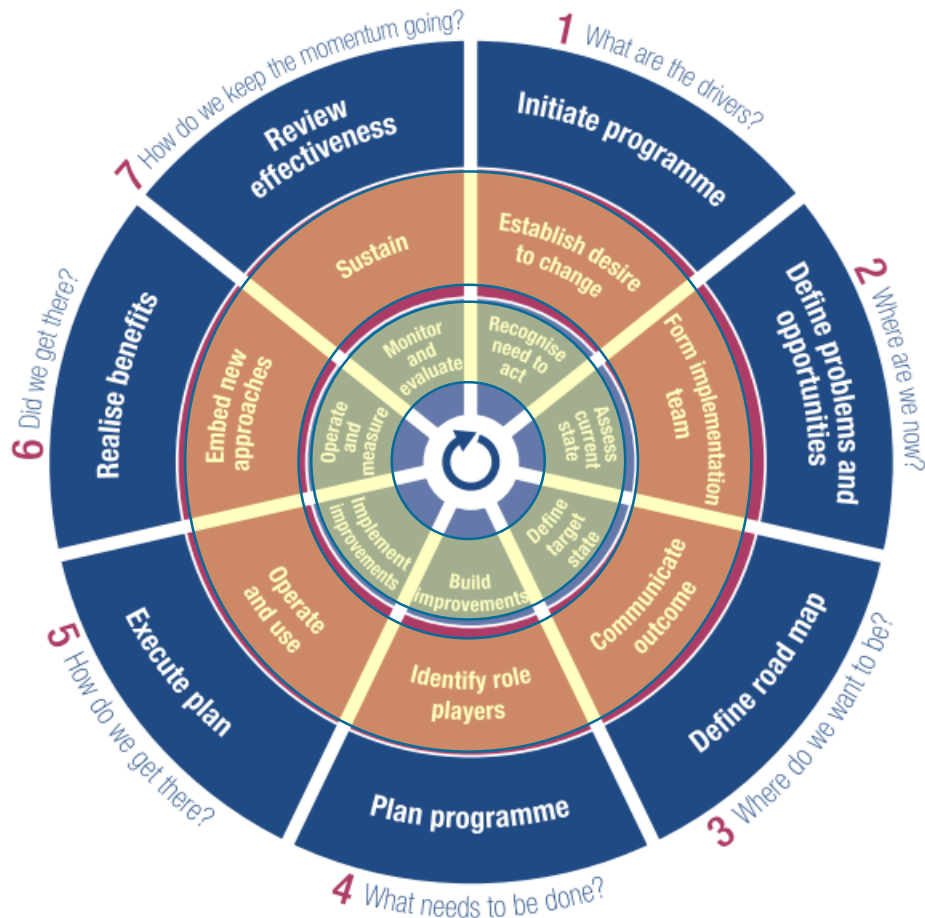
Temporary user interface (Beta phase – accuracy tests only)

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



● **Programme management**
(outer ring)

● **Change enablement**
(middle ring)

● **Continual improvement life cycle**
(inner ring)

COBIT[®] 5

Critical Success factors:

- Vision
- Leadership
- Empower
- Multidisciplinary team
- inhouse IT Team
- Creativity
- Communication

TAKEAWAY

HFF next steps

Scheduling enterprise wide implementation

Close Loop Medication & Interactions (CDSS)

Clinical **datawarehouse** (BI)

Interoperability Roadmap

HIMSS evaluation (**EMRAM**)



HIMSS Europe
EMRAM6&7Club

Q & A

