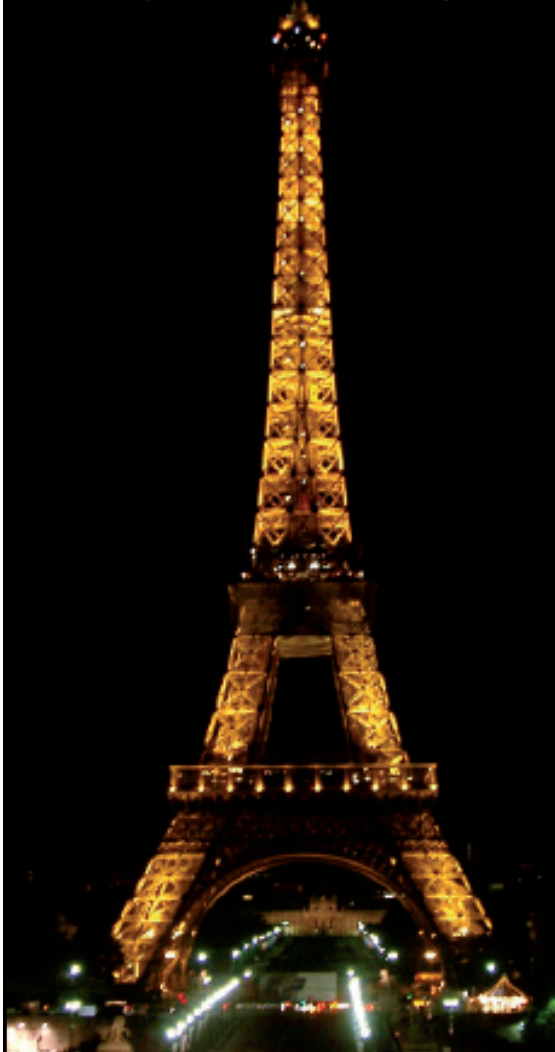


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■ **ATELIER EUROPÉEN/EUROPEAN WORKSHOP**

Rôle de la télémédecine et des systèmes d'information dans la sécurité des patients en Europe/The Role of Telemedicine and Information Systems for Patient Safety in Europe

- **Système de prescription électronique en Andalousie pour améliorer la sécurité des patients**
Integrated information and health care management support system and patient safety in Andalusia.
Dr J.L. Rocha, Vice-Président du Réseau ENRICH, Ministère Régional de la Santé en Andalousie (Espagne) / Vice-President of the ENRICH network, Regional Ministry of Health of Andalusia (Spain)

José L. ROCHA

General Secretary for Quality and Modernisation
Regional Ministry of Health
Government of Andalusia, Spain

josel.rocha@juntadeandalucia.es



Andalusia

8,302,923 inhabitants

87,597 Km²



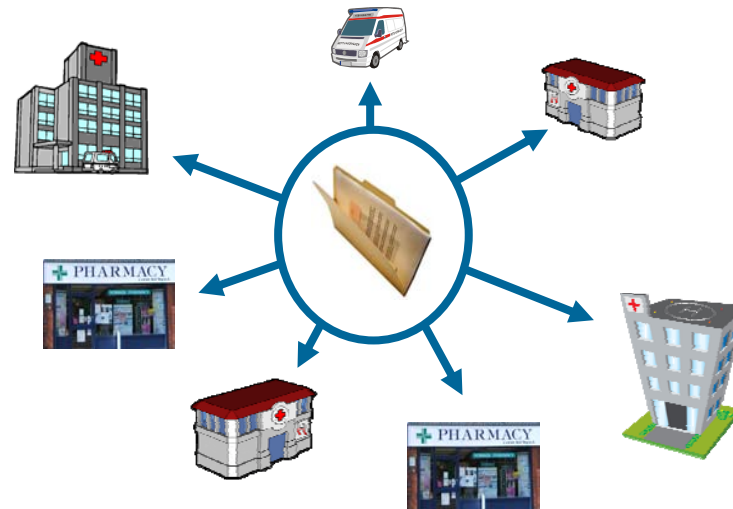
Andalusian Public Healthcare System: Main features

1,146	Primary care centers
360	Auxiliary offices for primary care
49	Public Hospitals (16,821 beds)
102,000	Healthcare professionals
9,390 M €	Health Budget 2011, 6.67% GDP

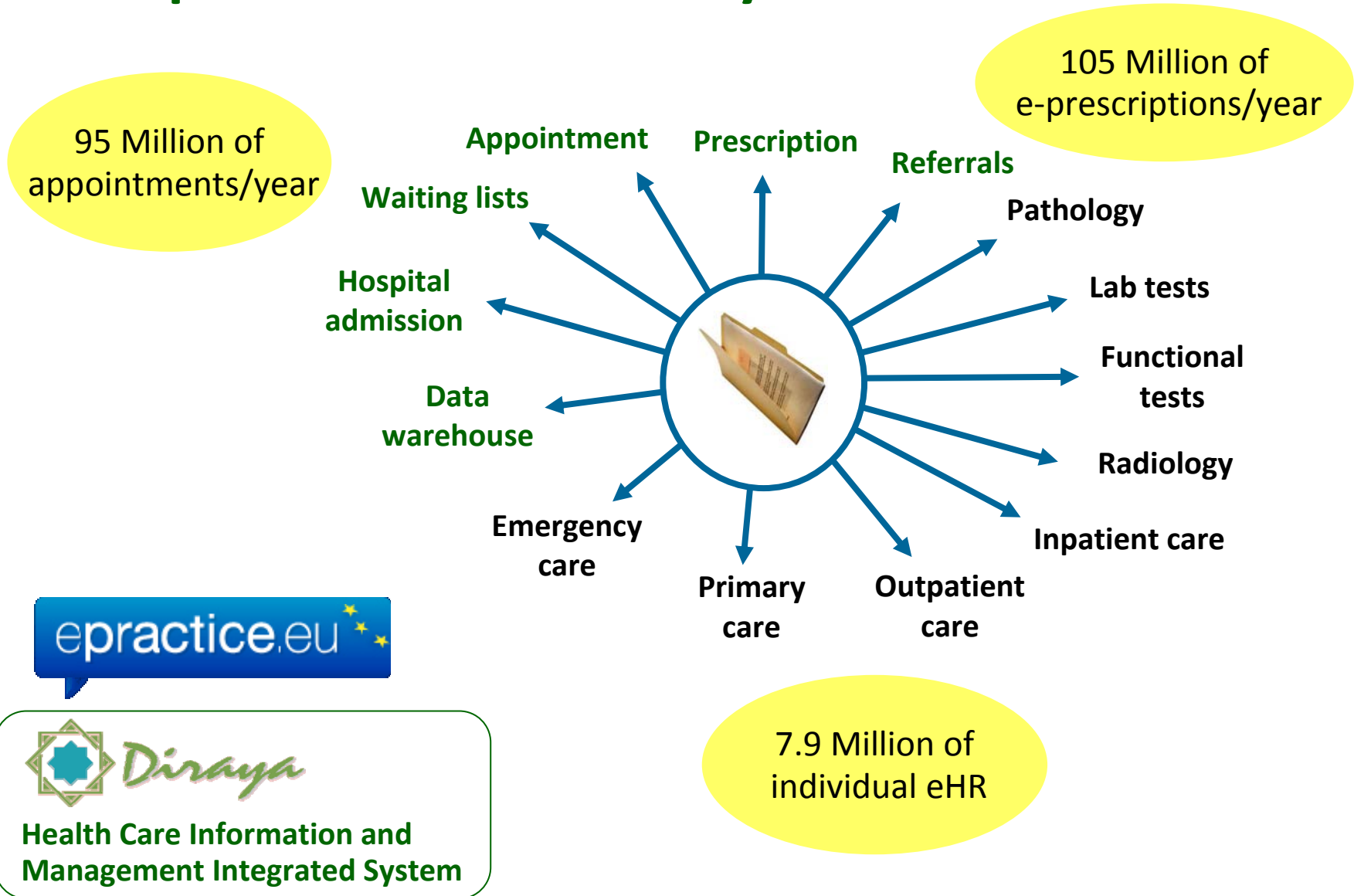


The Digital Strategy of the Public Healthcare System of Andalusia: The *Diraya* Project

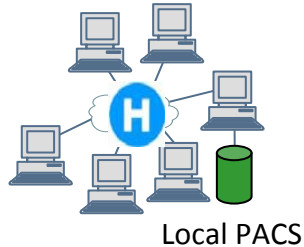
- A **long-term** Strategy: From 1999
- A single **health record number** for all citizens of Andalusia
- A single **electronic Health Record** for every person
- A individual **smart card** for each person as a key for access
- A **regional eHR** shared among:
 - Primary care
 - Pharmacies
 - Hospitals
 - Emergencies



Much more than an eHR: A corporate information system

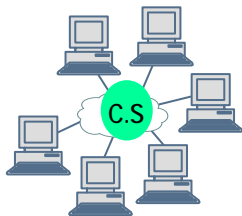
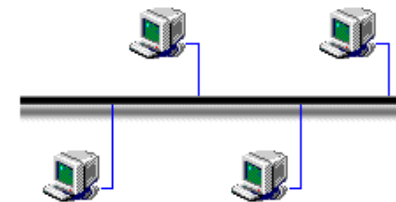


Functional architecture of the eHR in Andalusia



De-centralised structure for Hospitals: Admission, Clinical Stations for inpatients, outpatients and emergencies. Internal Local Bus for connecting tools: Lab tests, Functional tests, PACs, Pathology...

Central Bus for Hospital-Primary Care connection, data exchange and shared tools: lab module, RIS/PACs, Referrals. Also for some centralised tools: surgical waiting list, etc



Centralised electronic Clinical Station and tools for primary care: appointment, e-prescription, vaccines

Centralised (duplicated) substructure: Citizens data base, Operators Module, Resources Structure



Centralised replicated database for data mining, indicators and evaluation reports

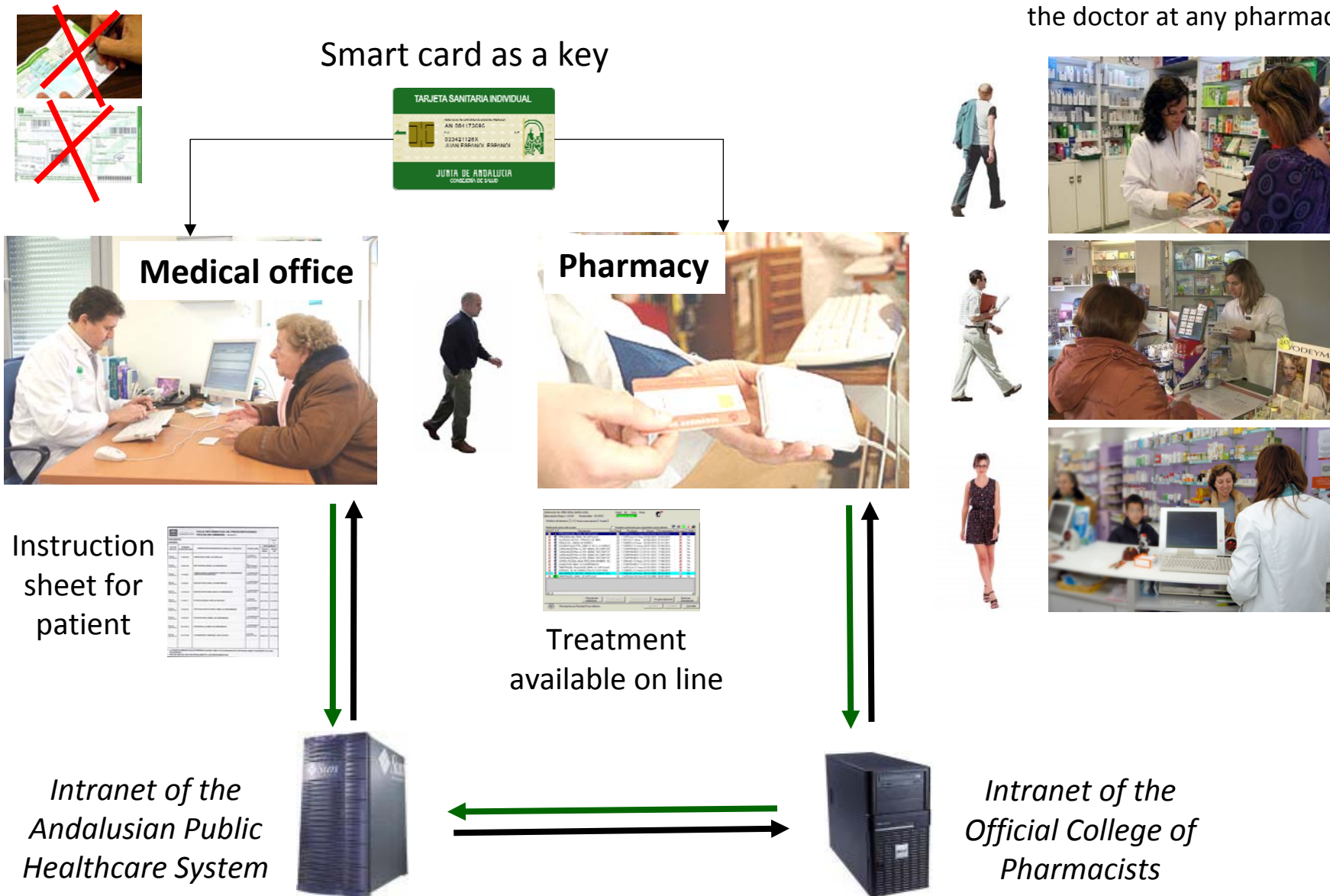


Current extension of the eHR in Andalusia

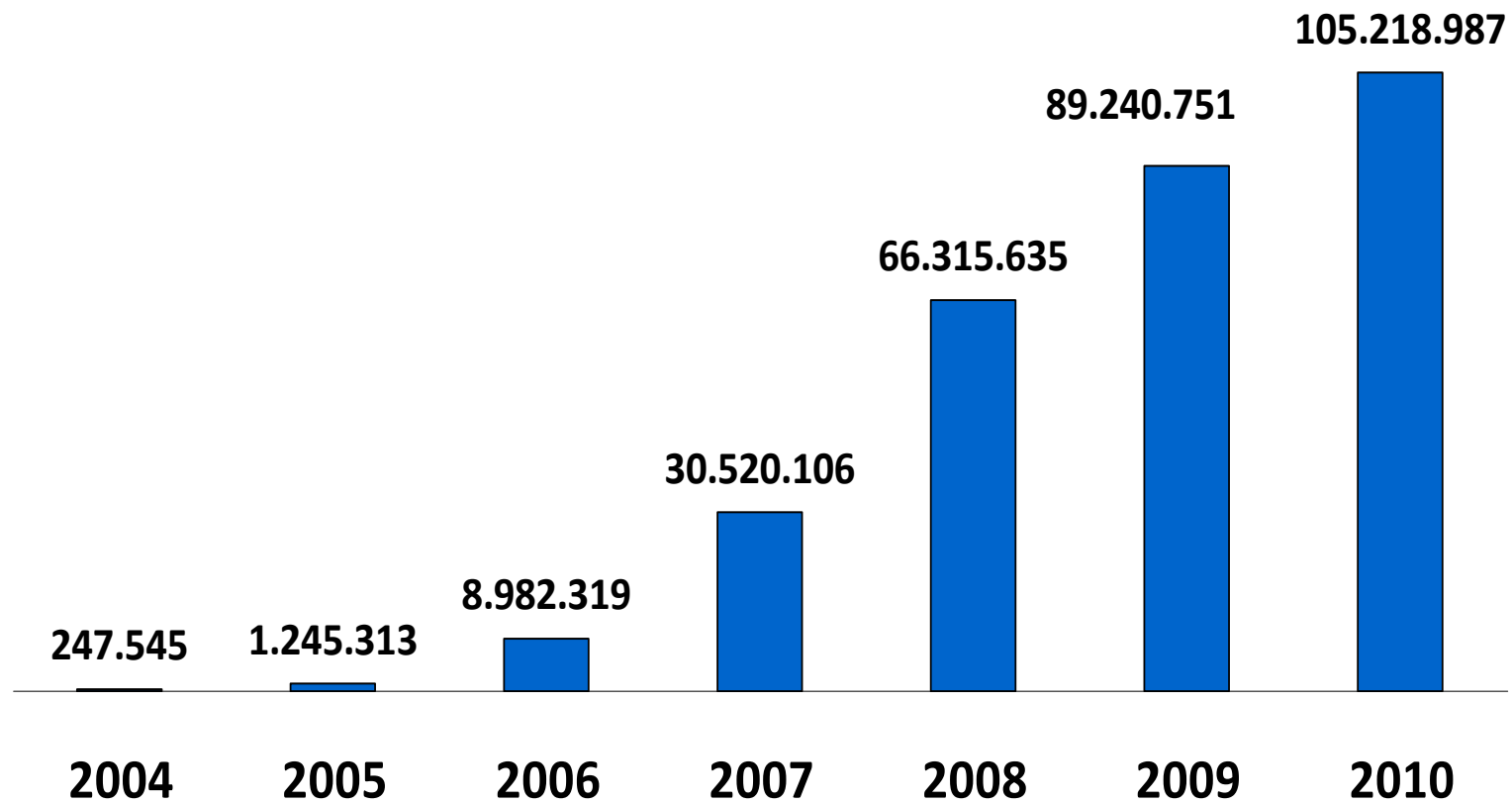
Completion level	Tool	Population	Cases in 2010
████████████████	Clinical Station	100%	7.9 M Pat / 39.7 M Sheets
████████████████	Appointment	100%	83 Million
████████████████	Referral tool	100%	39.7 Million
████████████████	e-Prescription	99.8%	105 Million
██████████	Radiology (RIS)	71%	3.4 Million
██████	Lab tests	49%	360,000
████████████████	Clin Station - Hosp. Emergencies	100%	3.4 Million
████████████████	Clinical Station – Outpatients	100%	1.5 Million
██	Clinical Station – Inpatients	26%	916,890
█	Admission	18%	60,000
████████████████	Appointment	100%	12 Million
███████	e-Prescription	56%	505,862
██	Lab tests	25%	
██	Radiology (PACS)	29%	3.4 Million
█	Out of Hosp. Emergencies	20%	

ePrescription module: "Receta XXI"

The system allows the dispensation of the treatment during the time established by the doctor at any pharmacy

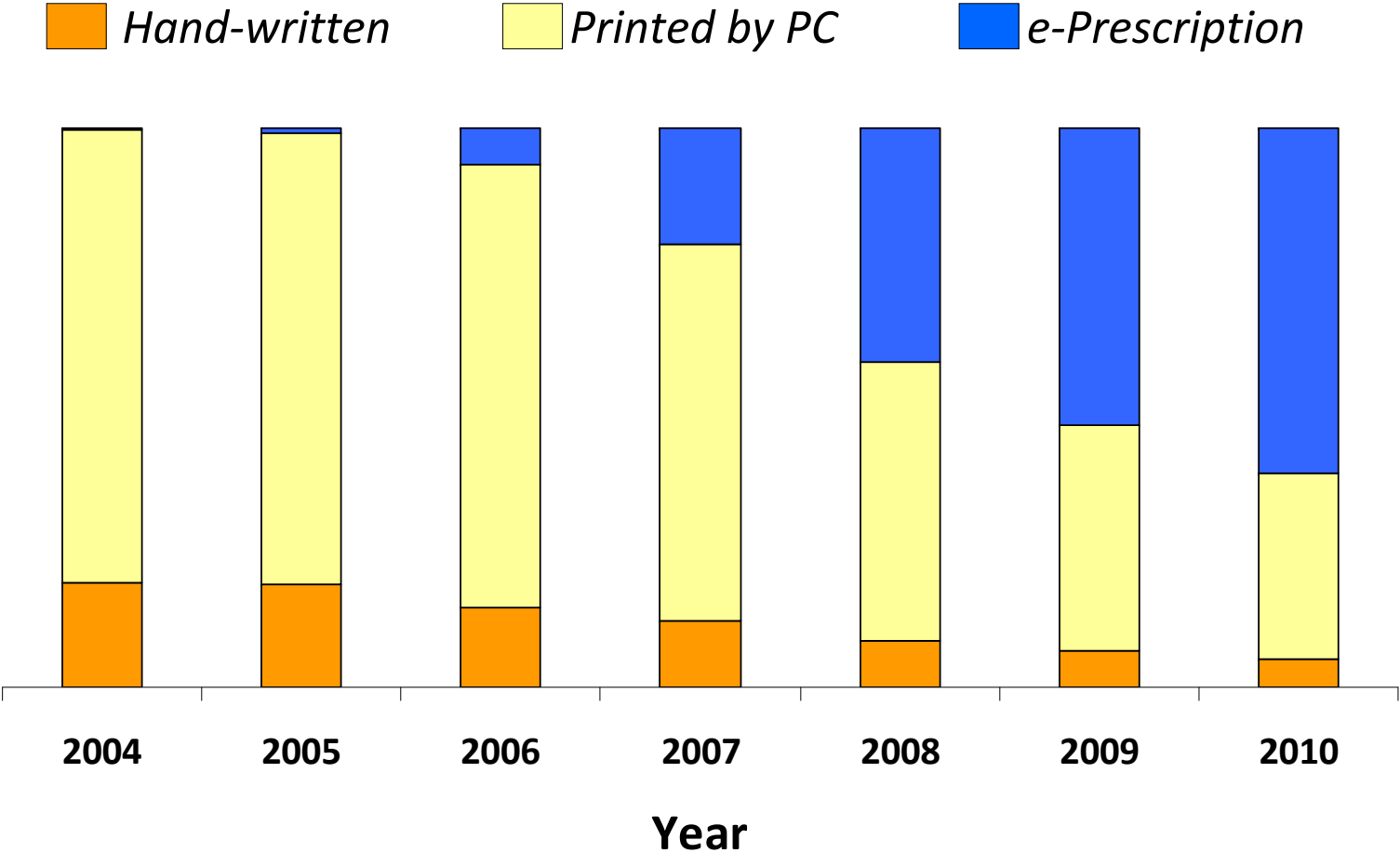


Use of the e-Prescription module in Andalusia



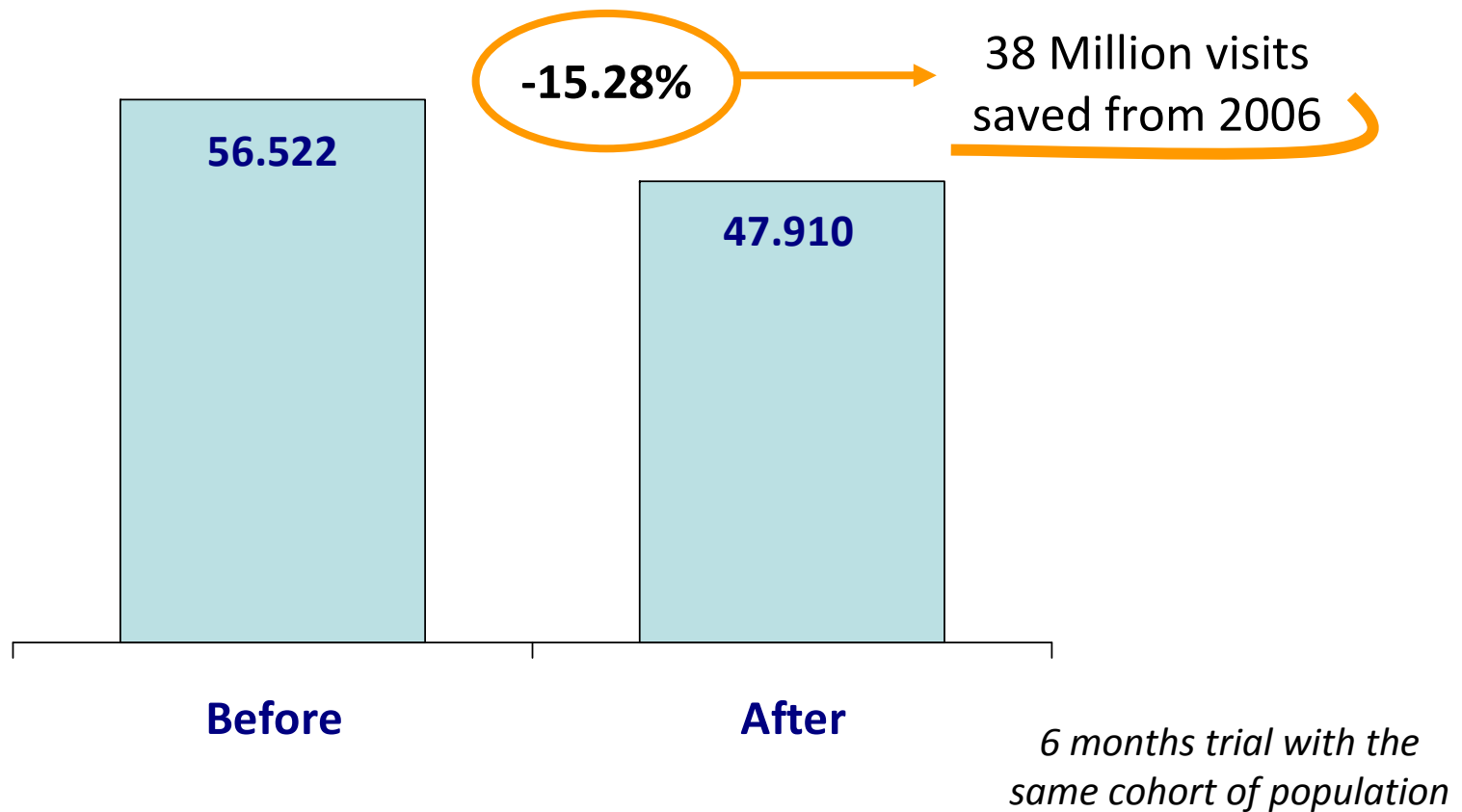
Number of e-Prescriptions in the Andalusian Public Healthcare System from 2004 to 2010

Use of the e-Prescription module in Andalusia

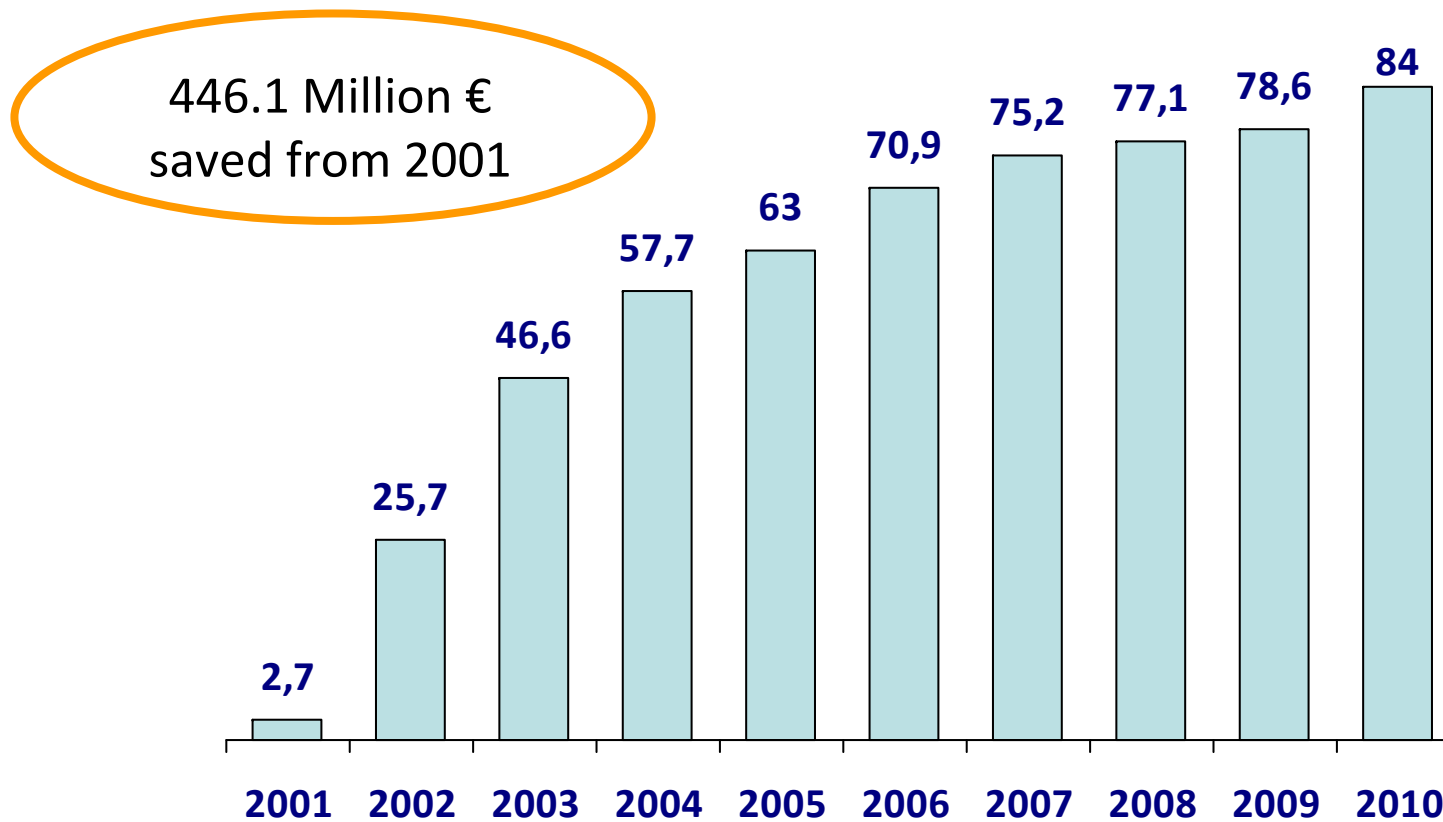


Percentage of the different types of prescription in the Andalusian Public Healthcare System from 2004 to 2010

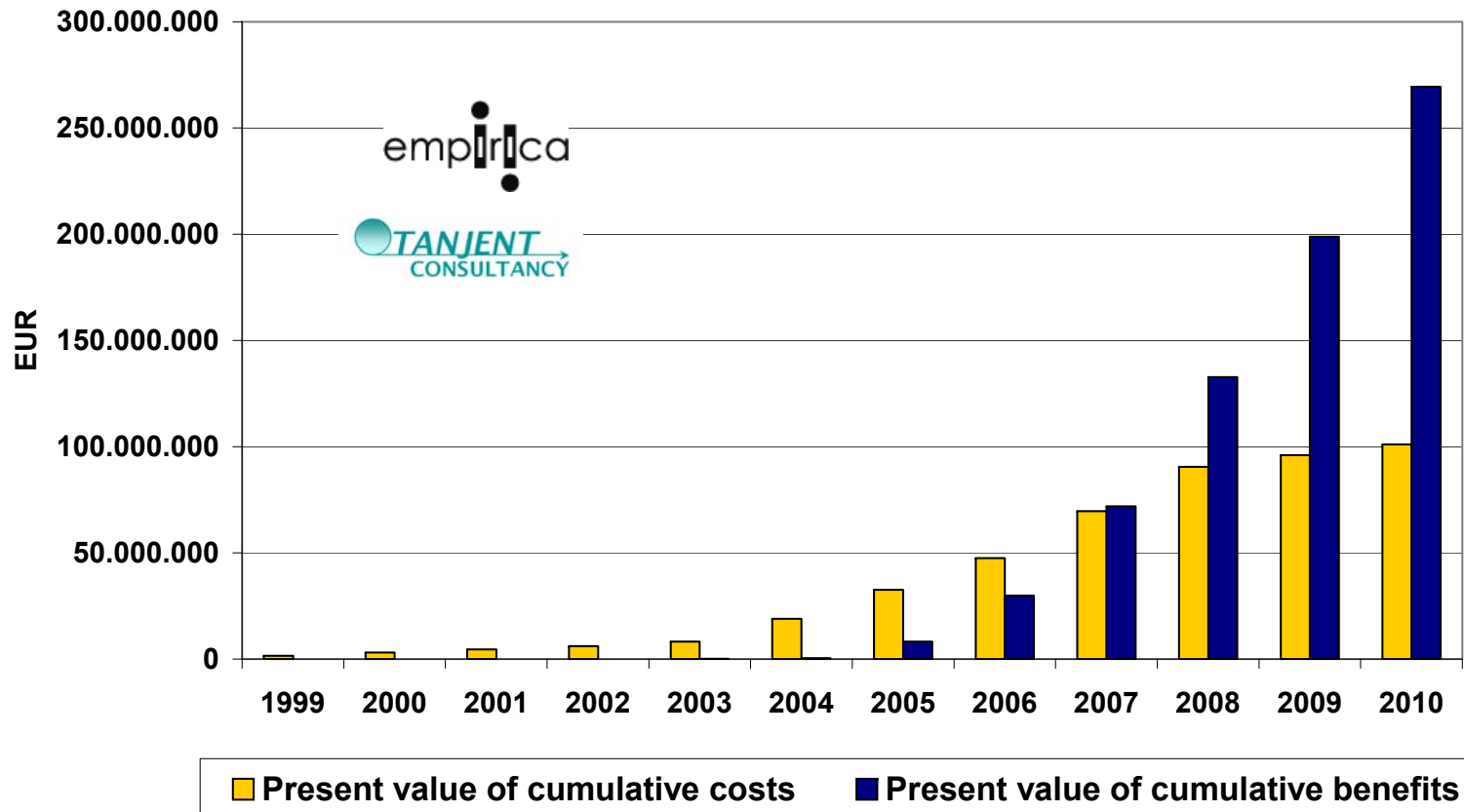
Use of the e-Prescription module: primary care appointments after introducing this module



Use of the e-Prescription module: % of prescriptions done by INN (international nonproprietary name) and estimated savings



Use of the e-Prescription system in Andalusia: cumulative economic performance



Case studies. European Commission. <http://www.ehr-impact.eu/cases/cases.html>

07/2009 The socio-economic impact of Receta XXI, the regional ePrescribing system of Andalucía's public health service. http://www.ehr-impact.eu/cases/documents/EHRI_case_Receta_XXI_final.pdf

Much more than an e-Prescription module: a Decision support system

- Single medicines record
- Updated catalogue (Nomenclator)
- Prescription by International Nonproprietary Name
- Help in filling up dosage
- Warnings for duplicated prescription
- Evidence-based guide by Medical Primary Care Society
- Info on drugs
- Allergies and contraindications
- Help reporting adverse reactions
- Interactions
- Warning maximum daily doses
- Warning therapeutic redundancy
- Forms included

Medical decision support system: selection of the recommended treatment from the approved Guidelines

PIÑA VERA, MARIA JOSE (Adra)-HISTORIA DE SALUD DIGITAL DEL CIUDADANO - Centro de atención primaria-Historia de salud d...

Atención al usuario Atención clínica Historias Profesionales y agendas Centro Consultas generales Ayuda Salir

Medicación de: Edad: 44 años Sexo: Mujer **Farmacia normal**

Historico de fármacos | LT Nueva prescripción | Visado

Nombre comercial:

Nombre comercial	P.V.P (€)	Grupo terapéutico	VI	Max env	Visado	Novedad terapéutica
NEXIUM MUPS 20MG 14 COMPRIMIDOS GA	19,03	INHIBIDORES DE LA BOMBA DE PRO A	A	1	<input type="checkbox"/>	
NEXIUM MUPS 20MG 28 COMPRIMIDOS GA	35,76	INHIBIDORES DE LA BOMBA DE PRO A	A	1	<input type="checkbox"/>	
NEXIUM MUPS 40MG 14 COMPRIMIDOS GA	27,3	INHIBIDORES DE LA BOMBA DE PRO A	A	1	<input type="checkbox"/>	
NEXIUM					<input type="checkbox"/>	

ESOMEPRAZOL no está incluido en la Guía Terapéutica SEMFYC 2003

Alternativas contenidas en la guía

OMEPRAZOL

08/2006

Imprimir hoja de


RXXI Imp Fe

Inicio | PIÑA VERA, MARIA JO...

Medical decision support system: selection of the active principle (INN) vs. commercial brand

PIÑA VERA, MARIA JOSE (Pozoblanco)-HISTORIA DE SALUD DIGITAL DEL CIUDADANO - Centro de atención primaria-Historia de salud de un usuario - [Medicación de usu]

Atención al usuario Atención clínica Historias Profesionales y agendas Consultas generales Pruebas Analíticas Ayuda Salir

Medicación de: [] Edad: 46 Sexo: Mujer 

Prescripción Diraya v. 4.4.02 Nomenclátor 05/2010 **Farmacia normal**

Histórico de fármacos | **LT Nueva prescripción** | Visado

Principio activo: Nombre comercial

Nombre comercial	P.V.P (€)	ATC	VI	Max env	Visado	Novedad terapéutica
PLAVIX 75MG 28 COMPRIMIDOS RECUBIERT	57,68	INHIBIDORES DE LA AGREGACION P/A		1	<input checked="" type="checkbox"/>	

Nombre comercial: **Información acerca del medicamento**

1 envase máximo por receta

Prescripción por principio activo

Composición	Precio menor
CLOPIDOGREL 75MG, 28 COMPRIMIDOS	39

Valor intrínseco elevado Incluir volante prescripción tr

Prescripción por nombre comercial

Especialidades	P.V.P(€) facturación
PLAVIX 75MG 28 COMPRIMIDOS RECUBIERTOS PELICULA	57,68
CLOPIDOGREL BEXALABS 75MG 28 COMPRIMIDOS RECUBIERT	27,3
CLOPIDOGREL SANDOZ 75MG 28 COMPRIMIDOS RECUBIERTOS	27,3
CLOPIDOGREL ACTAVIS 75MG 28 COMPRIMIDOS RECUBIERTO	39
CLOPIDOGREL ARROW 75MG 28 COMPRIMIDOS RECUBIERTOS	39
CLOPIDOGREL HCS 75MG 28 COMPRIMIDOS RECUBIERTOS CO	39
CLOPIDOGREL KERN PHARMA 75MG 28 COMPRIMIDO RECUBIE	39
CLOPIDOGREL LESVI 75MG 28 COMPRIMIDOS RECUBIERTOS	39
CLOPIDOGREL MYLAN 75MG 28 COMPRIMIDOS RECUBIERTOS	39
CLOPIDOGREL NEREDAL 75MG 28 COMPRIMIDOS RECUBIERTO	39
CLOPIDOGREL QUALIGEN 75MG 28 COMPRIMIDOS RECUBIERT	39
CLOPIDOGREL PATIPHARMA 75MG 28 COMPRIMIDOS RE	39

Medical decision support system: avoid a drug already prescribed in the current treatment by other doctor

PIÑA VERA, MARIA JOSE (Adra)-HISTORIA DE SALUD DIGITAL DEL CIUDADANO - Centro de atención primaria-Historia de salud d...

Atención al usuario Atención clínica Historias Profesionales y agendas Centro Consultas generales Ayuda Salir

His Medicación de: Edad: 44 años Sexo: Mujer **Farmacia normal**

Histórico de fármacos | LT Nueva prescripción | Visado

Principio activo: CIPROFLOXACINO Dosis: Via de administración:

Nombre presentación	P.M.A (€)	Grupo terapéutico	VI	Max env	Visado	Novedad terapéutica
CIPROFLOXACINO 3MG/G 3,5G POMAD	4,48	OTROS ANTIINFECCIOSOS	A	1	<input type="checkbox"/>	
CIPROFLOXACINO 3MG/ML 5ML COLIR	4,64	OTROS ANTIINFECCIOSOS	A	1	<input type="checkbox"/>	
CIPROFLOXACINO 3MG/ML 5ML GOTAS	6,46	ANTIINFECCIOSOS	A	1	<input type="checkbox"/>	
CIPROFLOXACINO						
CIPROFLOXACINO						
CIPROFLOXACINO						
CIPROFLOXACINO						

Nombre comercial

Valor intrínseco elevado

Imprimir hoja de instrucciones

08/2006

Prescripción por RecetaXXI por defecto.

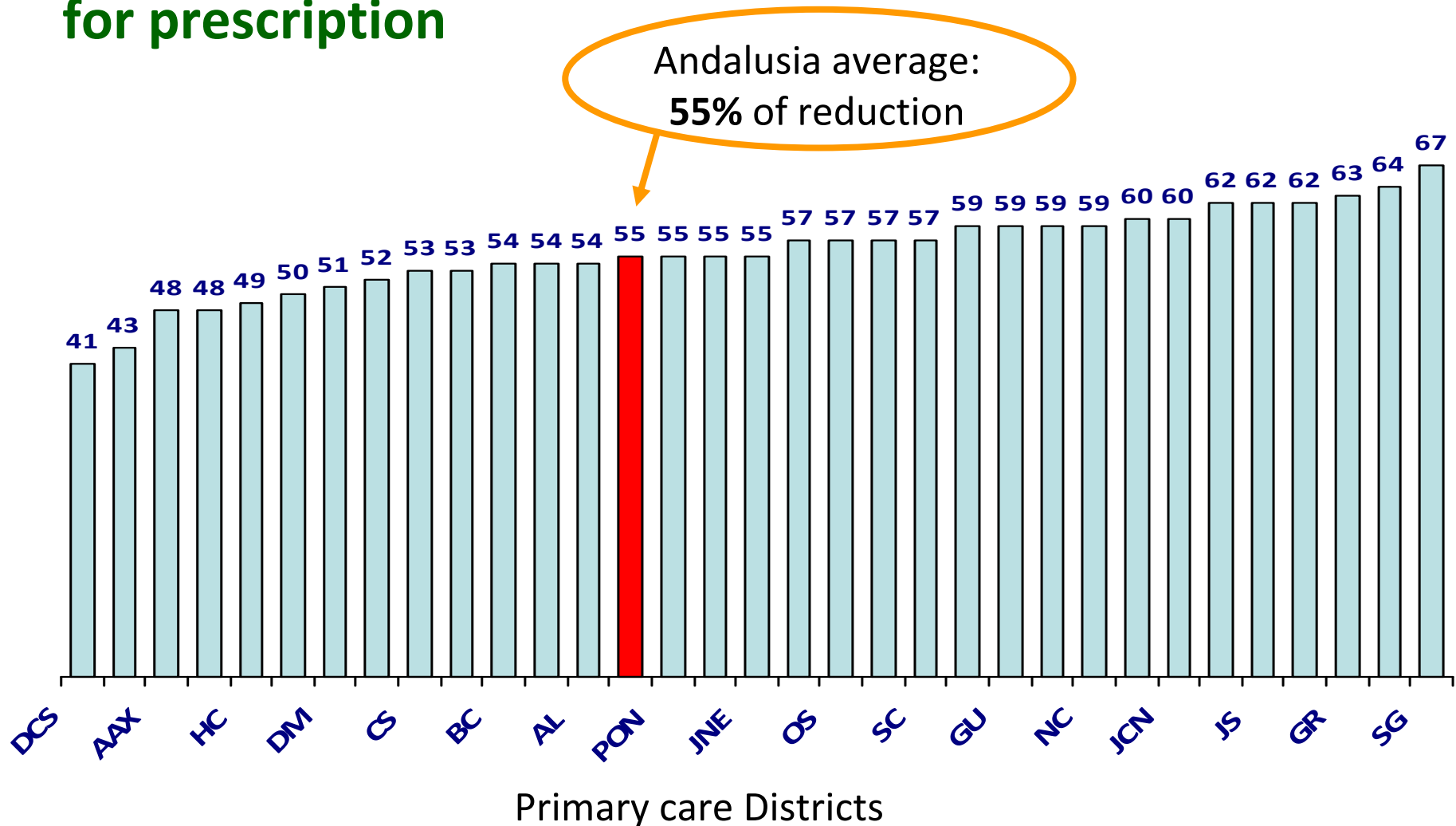
Historia de Salud

El paciente está en tratamiento con los siguientes medicamentos que contienen también el principio activo CIPROFLOXACINO:

Medicamentos	Crédito para x días
CIPROFLOXACINO 250MG, 20 COMPRIMIDOS	10

¿Desea prescribir el medicamento?

% of unnecessarily repeated drugs avoided in elderly patients receiving multiple medication after the introduction of a Medical Decision Support System for prescription



Medical decision support system: detection of pharmacological interactions between drugs

The screenshot shows a web-based medical decision support system interface. The main window displays patient information: "Gutierrez Toledano, Luis (Pozoblanco)-HISTORIA DE SALUD DIGITAL DEL CIUDADANO - Centro de atención primaria-Historia de salud de un usuario - [Medicación de]". The patient's age is 11, sex is Mujer, and the pharmacy is Farmacia normal. A "Descripción Interacción" dialog box is open, showing a warning for the combination of Acetylsalicylic Acid and Ibuprofen. The dialog box contains the following text:

ACETILSALICILICO ACIDO - IBUPROFENO

Interacción Grave

Efecto: Hemorragia especialmente de tipo gastrointestinal

Recomendaciones: Evitar asociación
Como analgésico, la alternativa más segura es paracetamol
Uso ocasional de ibuprofeno entre 30-120 minutos después de AAS o al menos 8 horas antes

Buttons for "Más información" and "Cerrar" are visible at the bottom of the dialog box.

The background interface includes a sidebar with various icons and a table with the following data:

Rx	Imp	Fecha
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	26/08/2009
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	26/08/2009
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	26/08/2009

Medical decision support system: detection of allergies or previous intolerance to drugs

PIÑA YERA, MARIA JOSE (Adra)-HISTORIA DE SALUD DIGITAL DEL CIUDADANO - Centro de atención primaria-Historia de salud d...

Medicación de usuario

Medicación de: TALLON ARJONA, ESTHER Edad: 44 años Sexo: Mujer **Farmacia normal**

Histórico de fármacos LT Nueva prescripción Visado

Nombre comercial: CLAMO

Nombre comercial	P.V.P (€)	Grupo terapéutico	VI	Max env	Visado	Novedad terapéutica
CLAMOXYL IM 1G/VIAL 1 INYECTABLE	2,09	PENICILINAS CON ESPECTRO AMPLIA	A	4	<input type="checkbox"/>	
CLAMOXYL IM 500MG/VIAL 1 INYECTABLE	1,25	PENICILINAS CON ESPECTRO AMPLIA	A	4	<input type="checkbox"/>	
CLAMOXYL MUCOLITICO 250/4 60ML SUSP	5,07	EXPECTORANTES Y/O MUCOLÍTICOS B	B	1	<input type="checkbox"/>	
CLAMOXYL MUCOLITICO 500/8 12 CAPSULA	6,02	EXPECTORANTES Y/O MUCOLÍTICOS B	B	1	<input type="checkbox"/>	
CLAMOXYL 1G 12 COMPRIMIDOS	3,36	PENICILINAS CON ESPECTRO AMPLIA	A	2	<input type="checkbox"/>	
CLAMOXYL 1G 24 COMPRIMIDOS	6,63	PENICILINAS CON ESPECTRO AMPLIA	A	2	<input type="checkbox"/>	

Valor intrínseco elevado

Imprimir hoja de instru

 08/2006

RXXI	Imp	Fecha	Nombre comercial	Cant	D.Cant	Nº-Ord.	Cada	Unidad	D.Trat días	D.Env	Nºe
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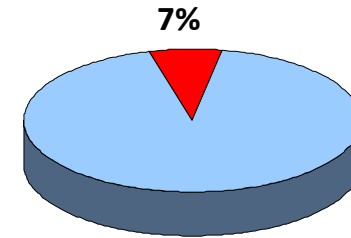
ePrescription module: Role of the pharmacist



Pharmacy

Pharmacist can send an alert to the individual eHR and block a prescription until the Doctor can check it and confirm or not

ROD	Descripción	Unid	Seal	Prescripción	Un pes	Fin tratamiento	En curso	RAM
✓	TRIGABALINA 75MG, 30 CAPSULAS	1		1 CAPSULA/12 Horas	15/02/2010	15/02/2010		No
✓	FLUIDAGA GOTAS 1 FRASCO DE 30ML	1		1 GOTAS/1 Hora	02/02/2010	01/07/2011		No
✓	PENILEVEL 250MG 30 SOBRES	1		1 SOBRES/3 Horas	02/02/2010	01/07/2011		No
✓	ELEMENTALITRAL 2000/12 101 D. 6 SOBRES	1		1 SOBRES/12 Horas	28/01/2010	07/08/2010		No
✓	CARBAMACEPINA ALTER 400MG 30 COMP EPE	1		1 COMPRIMIDO/12	07/07/2010	17/08/2010		No
✓	CARBAMACEPINA ALTER 400MG 100 COMP EF	1		1 COMPRIMIDO/12	07/07/2010	17/08/2010		No
✓	CARBAMACEPINA ALTER 200MG 50 COMP EPE	1		1 COMPRIMIDO/12	07/07/2010	17/08/2010		No
✓	CARBAMACEPINA ALTER 200MG 100 COMP EF	1		1 COMPRIMIDO/12	07/07/2010	17/08/2010		No
✓	SONDA VESICAL BAJA FRICCION HOMBRE 10	1		1 UNIDAD/12 Horas	07/07/2010	17/08/2010		No
✓	DIMACION 80MG 20 COMPRIADOS	1		1 COMPRIMIDO/12	07/07/2010	17/08/2010		No
✓	DIMEFRAZOL FLACASO 20MG 14 CAPSULAS	1		1 CAPSULA/12 Horas	07/07/2010	17/08/2010		No
✓	EFENSOL 30 40 SOBRES POLVO SUSP ORAL	1		1 SOBRES/12 Horas	07/07/2010	17/08/2010		No
✓	DIOSPERINE 100MG 30 COMPRIADOS	1		1 COMPRIMIDO/12 Horas	07/07/2010	17/08/2010		No
✓	DIMEFRAZOL 20MG, 28 CAPSULAS	1		1 CAPSULA/24 Horas	07/10/2009	28/07/2010		No

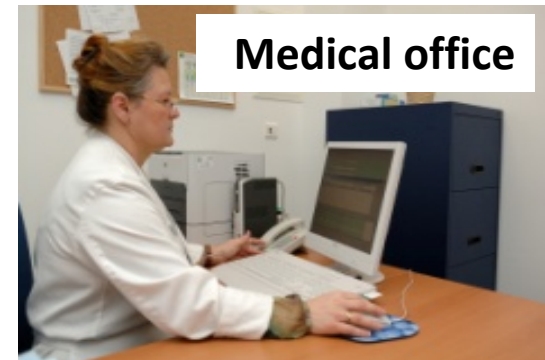


Confirmed Re-activated

Intranet of the Official College of Pharmacists



Intranet of the Andalusian Public Healthcare System



Medical office

A warning appears at the patient's eHR and Doctor can check the comments from the pharmacist and confirm this criteria or maintain the drug

The electronic prescription as a tool for improving patient safety



The Andalusian Strategy for improving Patient Safety

Adverse events are a main cause of mortality and morbidity.

In Andalusia 6.93% of hospitalized patients and 1.01% of primary care patients have an adverse event (ENEAS Study, 2005 and APEAS Study, 2006)

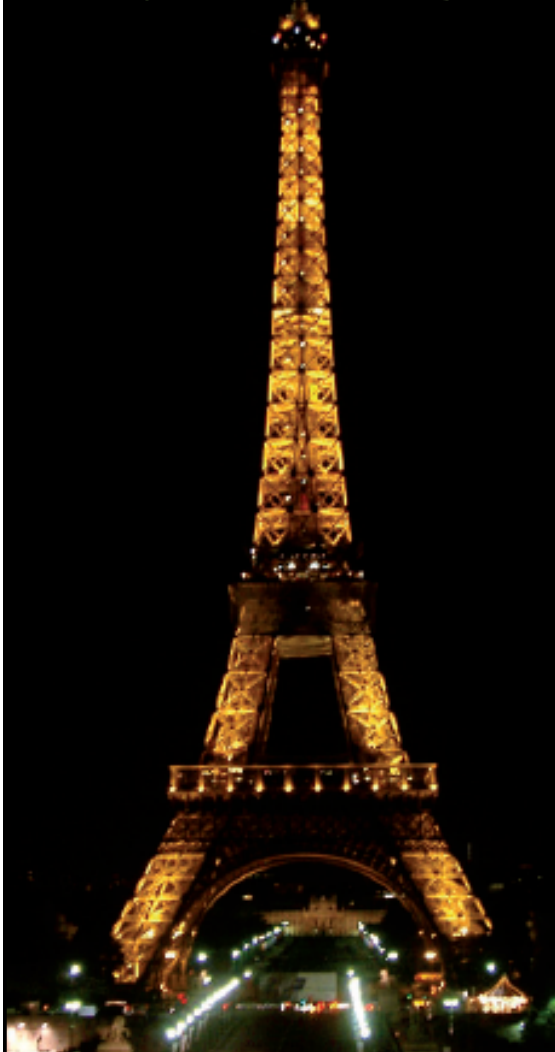
28.8% of adverse events in medical areas in Andalusia are drug-related

Electronic prescription tools may play a tremendous role improving patient safety throughout the entire healthcare process, avoiding mistakes in denomination and dosage, duplicity, interactions or incompatibilities, checking for previous allergies and intolerance

Furthermore, e-prescription systems can facilitate the collaborative work between pharmacists, doctors and other professionals, and provide information about drug compliance.

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Rôle de la télémédecine et des systèmes d'information dans la sécurité des patients en Europe/The Role of Telemedicine and Information Systems for Patient Safety in Europe

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Dr J.L. Rocha, Vice-Président du Réseau ENRICH, Ministère Régional de la Santé en Andalousie (Espagne) / Vice-President of the ENRICH network, Regional Ministry of Health of Andalusia (Spain)

Thank you very much!

Merci beaucoup!