

HERCA: Heads of the European Radiological Protection Competent Authorities

Multi-stakeholder Meeting on the optimised
use of CT scanners

- i. The self commitments approach with
COCIR regarding CT scanners

Definition and identification of stakeholders in medical practices

- A stakeholder is someone who is (or should be) entitled to have an interest in radiation protection in medicine.
- Stakeholders are split into three groups:
 - ✓ Justification
 - ✓ Optimisation
 - ✓ General

Stakeholder involvement in Optimisation

- Medical doctors, medical physicists, radiographers, other medical staff
- Manufacturers and suppliers, staff undertaking installation and maintenance
- The undertaking (Hospital directors)
- Radiology information system (RIS) -picture archiving and communication system (PACS) managers

Important stakeholder in CT dose optimisation: CT Manufacturers

In 2010, HERCA started a dialogue with the four main CT manufacturers (GE, Philips, Siemens and Toshiba) and COCIR, which represents the radiological, electromedical and healthcare IT industry in Europe.

As an important result of this process, COCIR and the CT manufacturers were willing to underline their responsibility on patient dose reduction and provided a voluntary self-commitment by 2011.

CT Manufacturers actions

The CT Manufacturers committed themselves to actions that offer the potential to achieve CT dose reduction

The actions included:

- The development and implementation of a standardised benchmarking of CT systems by characterising the dose efficiency related to image quality
- The implementation of dose reduction measures in CT
- The implementation of dose management and reporting tools
- The provision of specific training curricula

HERCA Sub-Working Group “WP Stakeholder involvement of CT- Manufacturers”

- Creation of the subgroup
- Chairperson
- Co chair
- Members of the WGMA

Initial Mission: Establishment of criteria based on which the commitments could be developed

Development of the Commitments

- Proposals were made by HERCA for the four commitments based on the criteria developed by the WP Stakeholder involvement of CT- Manufacturers
- The CT manufacturers responded by:
 - ✓ Agreeing
 - ✓ Disagreeing
 - ✓ Making a comment or a proposal
- Result of the process: Four voluntary self commitments proposed by COCIR

Layout of the commitments

- **Background** : Why is the commitment required
- **Aim**: What is to be achieved by the commitment
- **Concept**: How it is to be achieved
- **Timelines** : By when should it be achieved

Commitment 4: Provision of specific training curricula

Background

CT manufacturers share with HERCA the concern for keeping the CT user well trained on dose optimisation and dose awareness in daily practice. This is of particular importance with the growing number of dose reduction features in CT products.

Aim

CT manufacturers' aim is to ensure the appropriate, safe and effective use of imaging equipment by the clinical user. This includes the provision of specific training curricula on existing and new dose reduction techniques, on how to deploy these product features in daily practice, and to enable users to continue to reduce patient dose.

Commitment 4: Provision of specific training curricula

Concept

CT manufacturers are committed to make a significant contribution to this aim via:

1. The offering of vendor specific equipment training curricula to the CT user, and through user programs that help CT operators optimising the patient dose settings on their scanners, and the offering of continuing professional education optional training.

Timelines

Work of the subgroup “WP Stakeholder involvement of CT- Manufacturers”

- Regular meetings to discuss the progress of the work
- Progress reports are elaborated
- Regular Reports are made to the WGMA
- Regular Reports are made to the BoH

Collaboration HERCA-COCIR

- COCIR Annual Progress reports
- Annual HERCA-COCIR face to face meetings
- Actions for the following year are planned
- Regular contact through e-mail and Tcon

Outcomes of the collaboration 2010-2015

The collaboration between HERCA and COCIR has been very beneficial to both parties as a lot of good work has been accomplished in CT dose optimisation, management and reporting

- HERCA expresses its concerns on radiation protection issues concerning CT imaging
- The CT Manufacturers try to find solutions
- Great benefit for the CT end user and the patient

Outcomes of the collaboration 2010-2015

- 1 Commitment fulfilled, 2 commitments almost fulfilled and 1 commitment on-going
- Joint HERCA-COCIR Press release issued on the 17th of June 2014 on both HERCA and COCIR websites
- HERCA position paper on “CT dose optimisation through education and training” was published on the HERCA website 20.11.2014
- Multi-stakeholder meeting on the optimised use of CT scanners on 1st April 2015 in Paris at the asn

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Multi-stakeholder Meeting on the optimised
use of CT scanners

ii. HERCA position paper on optimisation
and the application of a self-commitments
approach

Position paper on CT dose optimisation through training and education

- **Why a position paper?** To show the results of the collaboration between HERCA and COCIR in more detail following the press release in June 2014
- **What is the aim of the position paper?** To show HERCAs position concerning CT dose optimisation through training and education

Construction of the Position paper

Introduction

- Identification of the issue: For the collective effective dose from X-ray procedures in Europe CT yields the highest contribution on average 57% (DDM2)
- Statement of HERCAs position: Actions need to be taken against the increasing trend to higher medical exposures of the European population. All stakeholders involved in the radiological process should be part in this important initiative to reduce patient dose.

Construction of the Position paper

The Legislation

Council Directive 2013/59/Euratom:

- Article 56 “ Optimisation” : All doses due to medical exposure should be kept as low as reasonably achievable
- Article 57 “ Responsibilities”: The practitioner, the medical physicist and those entitled to carry out practical aspects of medical exposures are involved in the optimisation process
- Article 58 “Clinical audits”: Clinical audits are carried out in accordance with national procedures

Construction of the Position paper

The body

Identification of the stakeholders involved in CT dose optimisation:

Radiologists and other specialists involved in CT imaging:

- Acquisition of appropriate CT scanner
- Definition of CT protocols
- Definition of required image quality for a certain diagnosis
- Optimisation of CT protocols in relation with the required image quality

Construction of the Position paper

Identification of the stakeholders involved in CT dose optimisation:

2. Medical Physicists and CT technologists:

- Quality assurance/control
- Dose optimisation
- Patient dose measurements
- Establishment of DRLs
- Investigation of events where a patient receives a high dose

Construction of the Position paper

Identification of the stakeholders involved in CT dose optimisation:

3. CT Manufacturers are responsible for providing:

- The dose reduction and management tools
- Extensive education and training on the use of these tools
- Education and training for their technicians/engineers

4. The undertaking:

- Should ensure that its staff has adequate training and education
- Patient care is optimised

Construction of the Position paper

The body

Identification of CT dose optimisation tools:

- Dose reduction tools
- Dose management tools
- Dose and image quality
- Education and training
- Audit

Construction of the Position paper

Discussion: A discussion of both sides of the issue

- Arguments against are: mainly those of time and cost
- Arguments for are:
 1. The Directive
 2. The possibility of saving money and time by not producing bad quality CT images and having to repeat CT examinations
 3. Not carrying out unjustified CT examinations
 4. Most importantly providing good quality care to the patient!!

Construction of the Position paper

Conclusions:

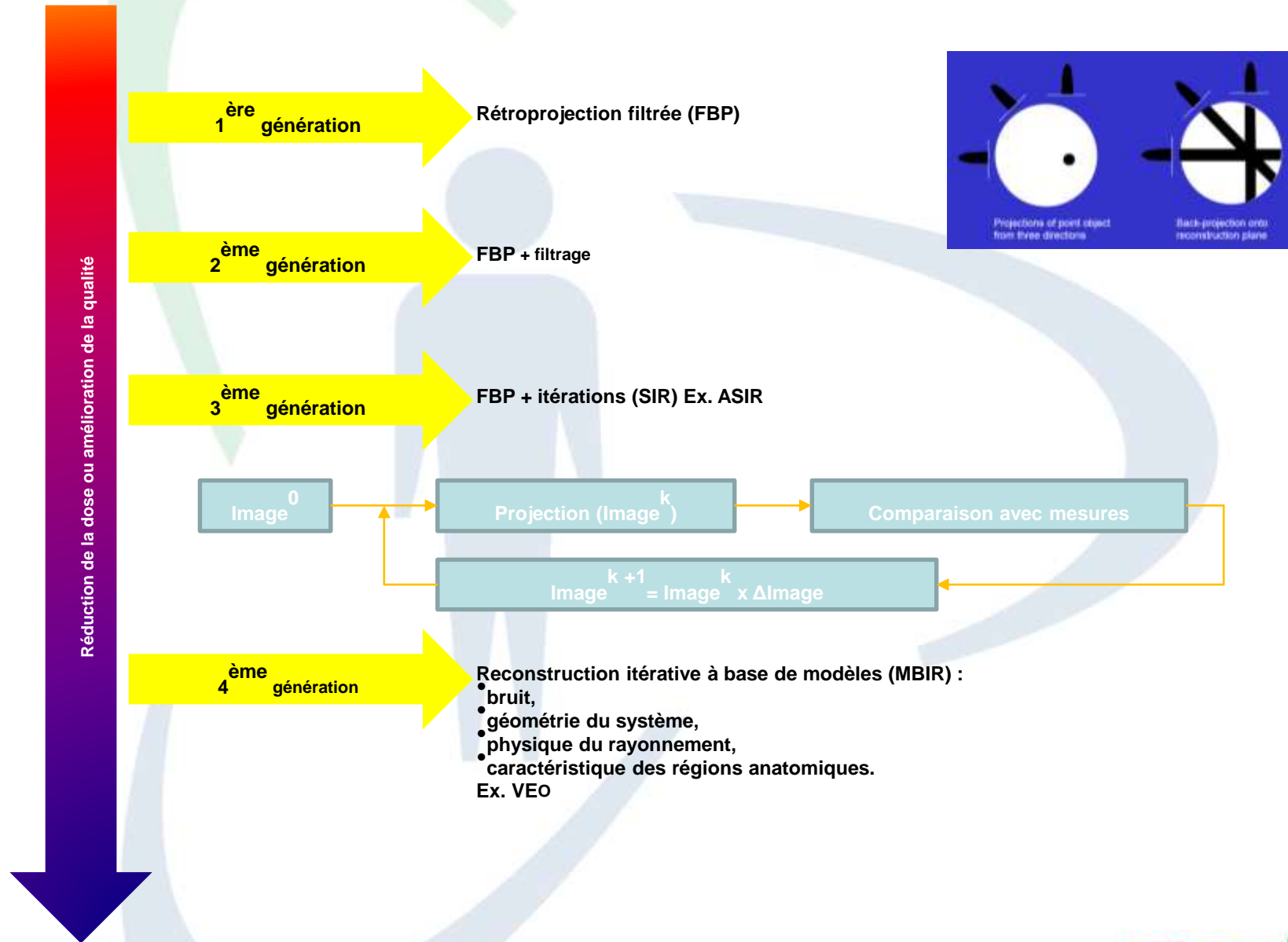
CT Manufacturers provide:

- Dose reduction and management tools
- Education and training on the use of these tools

Imaging specialists, medical physicists and CT technologists need to commit to:


- Being made aware of the existence of these tools
- Being trained and educated on the use of these tools
- Making use of these tools in their daily practice
- Working together as a team!!

2- Reconstruction de l'image à faible dose



2- Reconstruction de l'image à faible dose : cas réel

→ 2 séries (HD 750): 120kV, 222/187mA, 0.5/0.7 s par rotation, Pitch=1.38, épaisseur=2.5 mm


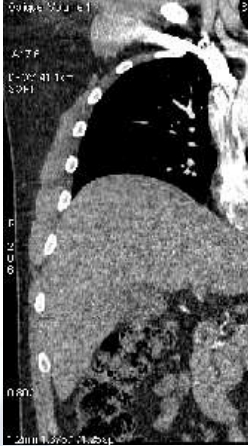


Accession Number: KIRC01361522
 Patient ID: 2158135 **VEO**
 Exam Description: Scanner Thoraco-abdomi

21 May 2013
 Discovery CT750 HD

Dose Report

Series	Type	Scan Range (mm)	CTDIvol (mGy)	DLP (mGy-cm)	Phantom cm	
1	Scout	-	-	-	-	
2	Helical	S31.250-I336.250	6.27	271.05	Body 32	L=43 cm
2	Helical	I103.750-I676.250	7.47	475.74	Body 32	L=64 cm
Total Exam DLP:				746.79		





Accession Number: KIRC01219199
 Patient ID: 2158135 **FBP**
 Exam Description: Scanner Thoraco-abdomi

02 Jul 2012
 LightSpeed16

Dose Report

Series	Type	Scan Range (mm)	CTDIvol (mGy)	DLP (mGy-cm)	Phantom cm	
1	Scout	-	-	-	-	
2	Helical	I1.500-I465.500	9.21	454.63	Body 32	L=49 cm
2	Helical	I168.500-I716.500	12.95	748.18	Body 32	L=58 cm
Total Exam DLP:				1202.81		



Commitment 2

Row Labels	nb de séries	BMI Moyen	CTDI vol (mGy) Moy	DLP/série (mGy.cm) Moy	DLP/examen (mGy.cm) Moy	Gain CTDi vol
Arthro-Scanner de la H	7	28.1	32.88	666.3	666.3	
Discovery 750 HD	4	27.4	23.19	405.0	405.0	49.34964
LightSpeed 16	3	29.1	45.79	1014.8	1014.8	
Arthro-Scanner de l'Ep	52	28.2	48.73	587.7	603.6	
Discovery 750 HD	31	28.8	48.14	573.5	600.2	2.954242
LightSpeed 16	21	27.3	49.60	608.6	608.6	
Arthro-Scanner du Coud	8	29.3	40.17	518.8	629.1	
Discovery 750 HD	2	24.4	26.26	289.5	289.5	41.38896
LightSpeed 16	6	31.3	44.80	595.2	742.3	
Arthro-Scanner du Geno	44	26.8	37.43	581.6	761.2	
Discovery 750 HD	25	25.5	28.93	484.0	751.1	40.50318
LightSpeed 16	19	28.3	48.62	710.1	774.4	
Arthro-Scanner du Poig	26	25.1	42.58	443.2	496.6	
Discovery 750 HD	9	23.8	28.96	326.1	326.1	41.8321
LightSpeed 16	17	25.9	49.78	505.2	586.8	
Dentascanner	23	24.5	11.27	84.7	105.2	
Discovery 750 HD	8	23.6	10.02	96.1	96.1	16.4131
LightSpeed 16	15	25.0	11.99	78.2	110.4	

Commitment 2

Scanner Corps Entier	129	26.4	26.12	482.7	2659.8	
Discovery 750 HD	11	25.3	13.45	398.7	1450.4	50.73653
LightSpeed 16	118	26.5	27.30	490.5	2772.6	
Scanner Crâne et Abdom	10	26.1	24.22	318.4	1715.6	
Discovery 750 HD	7	22.9	20.77	271.6	1901.0	35.66577
LightSpeed 16	3	33.7	32.28	427.7	1283.1	
Scanner de la Cheville	10	25.0	42.24	607.9	607.9	
Discovery 750 HD	4	23.4	29.37	360.3	360.3	42.22602
LightSpeed 16	6	26.2	50.83	772.9	772.9	
Scanner de la Main Dro	5	25.1	24.96	311.4	311.4	
Discovery 750 HD	4	23.8	18.50	312.9	312.9	63.60721
LightSpeed 16	1	27.8	50.83	305.3	305.3	
Scanner de l'Aorte Abd	9	26.2	11.39	372.4	981.1	
Discovery 750 HD	7	25.9	9.91	300.3	1079.7	40.18388
LightSpeed 16	2	27.2	16.57	624.5	635.8	
Scanner des Artères Ca	23	26.8	25.46	408.4	1349.4	
Discovery 750 HD	14	23.4	20.05	284.6	1146.2	40.8001
LightSpeed 16	9	32.0	33.87	601.0	1665.5	
Scanner des Artères Pu	45	25.4	7.29	207.8	673.3	

PROTOCOLES CT CRANE

DoseWatch Accueil Examens Patients Analyses Outils Rapports Administration A propos

Analyse CT du PDL par protocole

Analyse par protocole Graphique

Options du graphique

AE Nom usuel: [---] Nom du protocole: *5.4 THORAX BASSE DOSE | poids

OK

- 1.1 CRANE SANS(+ RECON OS) ET AVEC IV*
- 1.1 CRANE SANS(+ RECON OS) ET AVEC IV*/
- 1.10 CRANE HELICE DR (■■■■■■) 2.5MM
- 1.12 CRANE HORS TETIERE CRANE
- 1.19 CRANE SANS + WILLIS GSI
- 1.2 CRANE AGITE INCREMENTAL
- 1.2 CRANE RAPIDE PATIENT AGITE(+ RECON OS)
- 1.3 ::CRANE HELICE::
- 1.3 CRANE SANS /POLYGONE DE WILLIS / CRANE IV
- 1.4 CRANE INCREMENTAL A ESSAYER JH
- 1.4 POLYGONE DE WILLIS
- 1.5 ::ROCHERS HELICE::
- 1.8 ::CRANE 2,5mm/5mm::Auto Ma
- 1.9 ::MORT CEREBRALE::
- 1.9 CRANE IV -/ TSA ANGIOSCANNER CERVICAL
- 10.1 ::POLYTRAUMA :

1- Management de la dose : l'optimisation

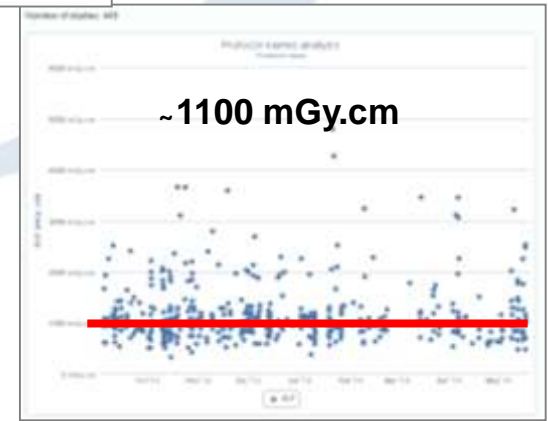
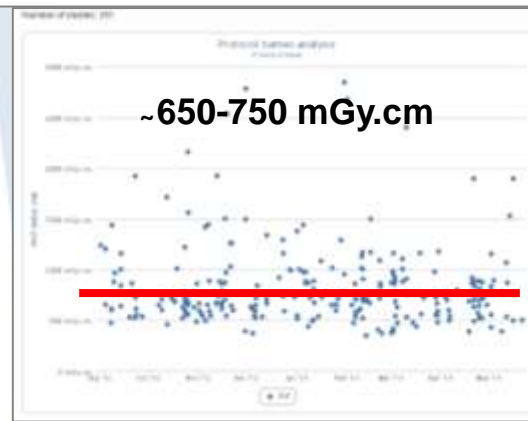
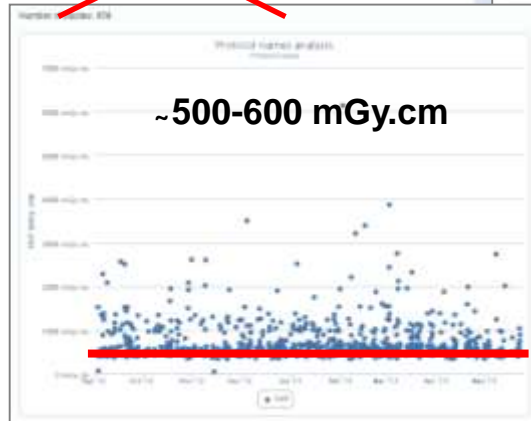
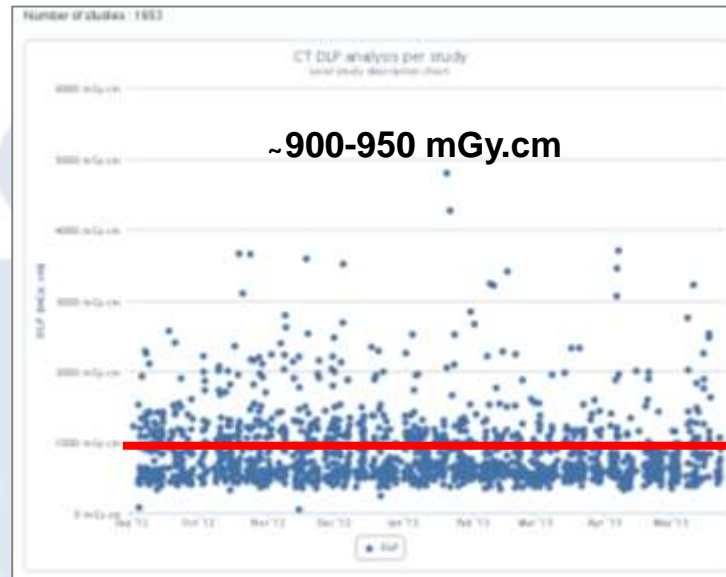
Scanner du crâne

3 protocoles (CT16) :

→ Séquentiel

→ Spiralé jointif P=1

→ ~~Spiralé P=0.6~~



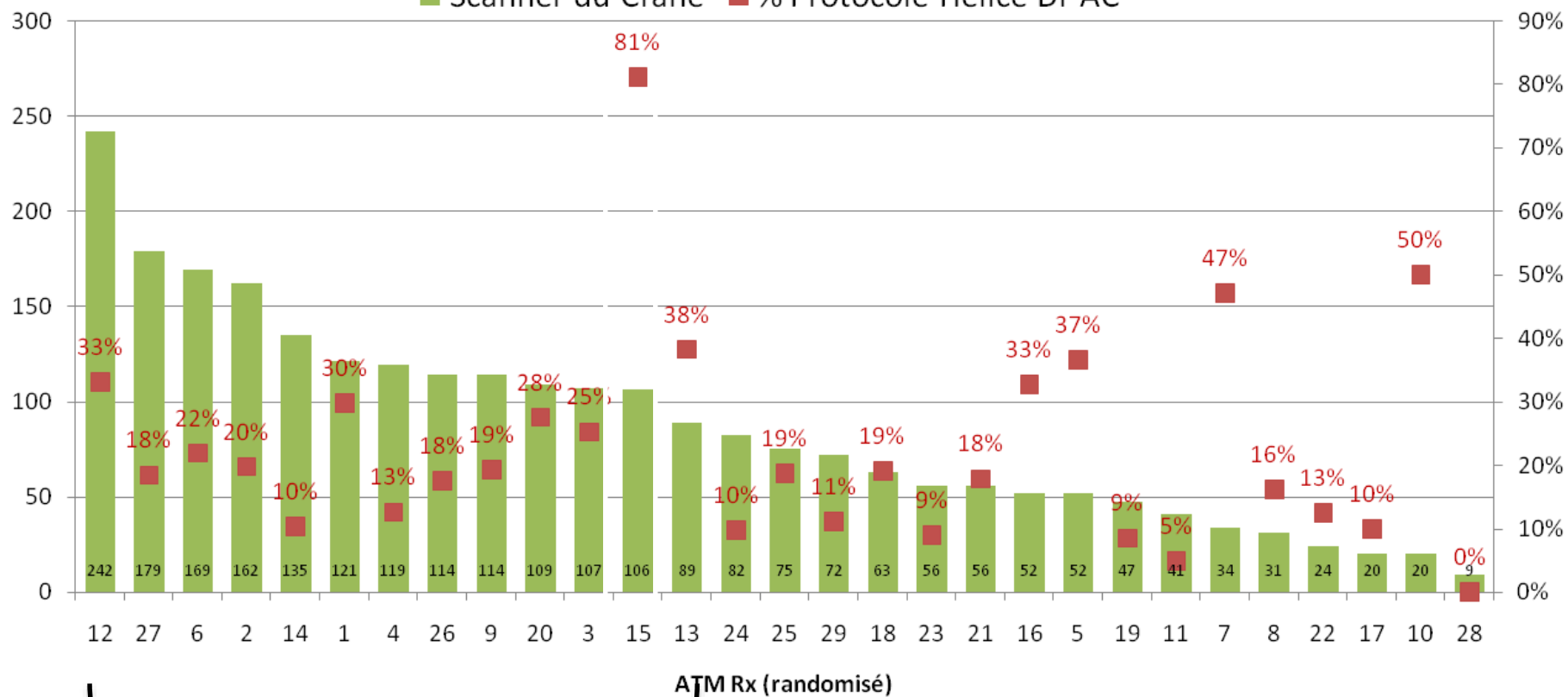
DOSE TEAM

UTILISATION DU PROTOCOLE AC PAR ATM RX

Tri sur les examens

Période : 24.08.2012 - 25.02.2013

■ Scanner du Crane ■ % Protocole Hélice Dr AC



Potential d'amélioration important

Possible issues to be discussed

1. CT Protocols:
 - Too many CT protocols- nomenclature
 - Protocols not optimised
 - NRDs need to be established per protocol and not just per examination
 - Coding – false dose alerts
2. Paediatric imaging :
 - Use of adult protocols
 - Child not placed at the isocenter
3. SPECT-CT, PET-CT, treatment planning CT
 - CT scanners not optimised



Thank you for your attention!