

# **iTherapy Process [iTP] Checklist Workflow Manager**

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December 2019, Orthanc Conference



**INSTITUT  
ROI ALBERT II**

CANCÉROLOGIE ET HÉMATOLOGIE  
Cliniques universitaires SAINT-LUC | UCL Bruxelles

# Background

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- **2003 - 2017 | Radiotherapy @CUSL**
  - Head engineer in charge of all the IT / machine of RO Dept.
- **2017 – 2018 | IT Dept @CUSL**
  - IT Project Manager
- **2018 – 2020 | Epic implementation project @CUSL**
  - Reporting coordinator





« The DATA »

# Context – « Safety of IT Medical Data »



*reliability & constancy*



# Why ?

Medical physicist expert

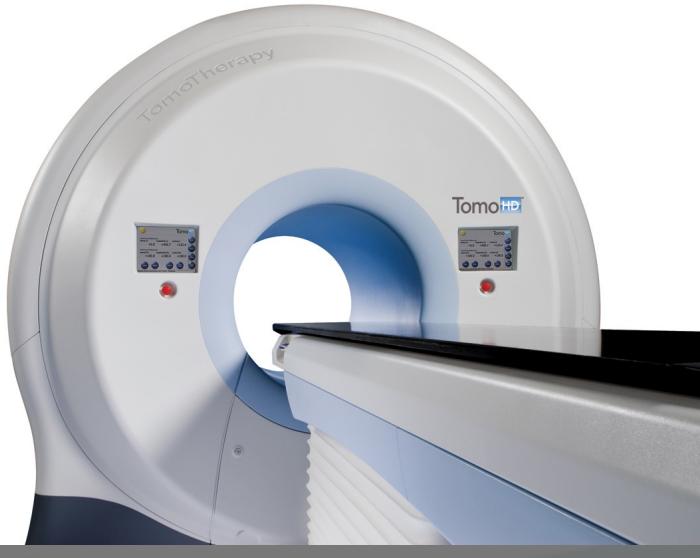


« Member States shall ensure that depending on the medical radiological practice, the medical physics expert takes **responsibility** for dosimetry, including physical measurements for evaluation of the dose delivered to the patient and other individuals subject to medical exposure, give advice on medical radiological equipment, and contribute in particular to the following:

... »

Source: Euratom - RADIATION PROTECTION NO 174  
EUROPEAN GUIDELINES ON MEDICAL  
PHYSICS EXPERT (article 83 , 2014)







Quality Checks



## Quality Assurance

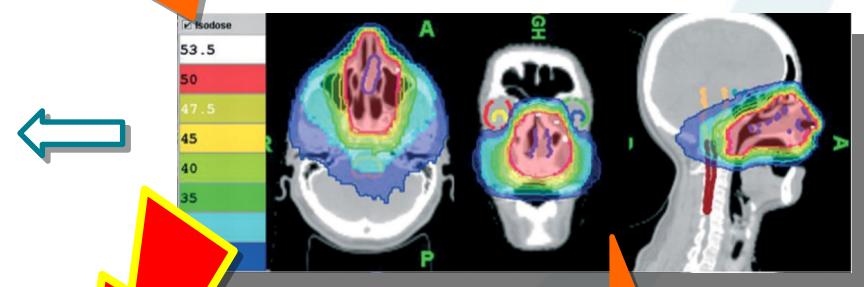
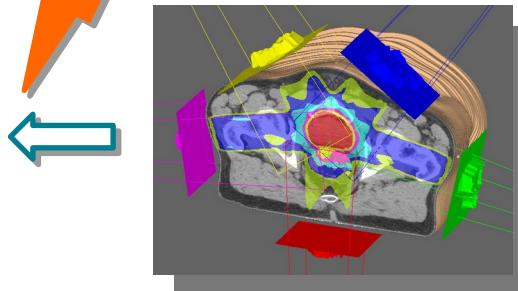
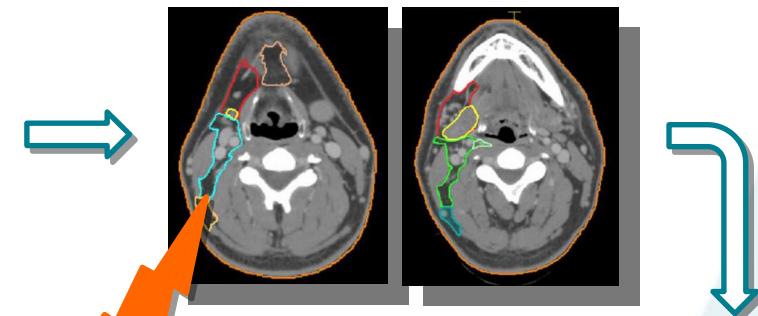
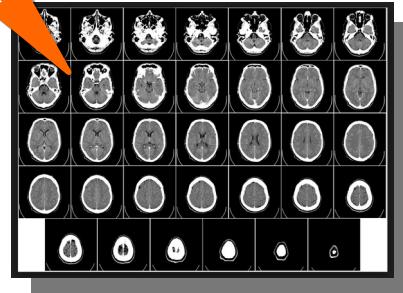
Source: Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom



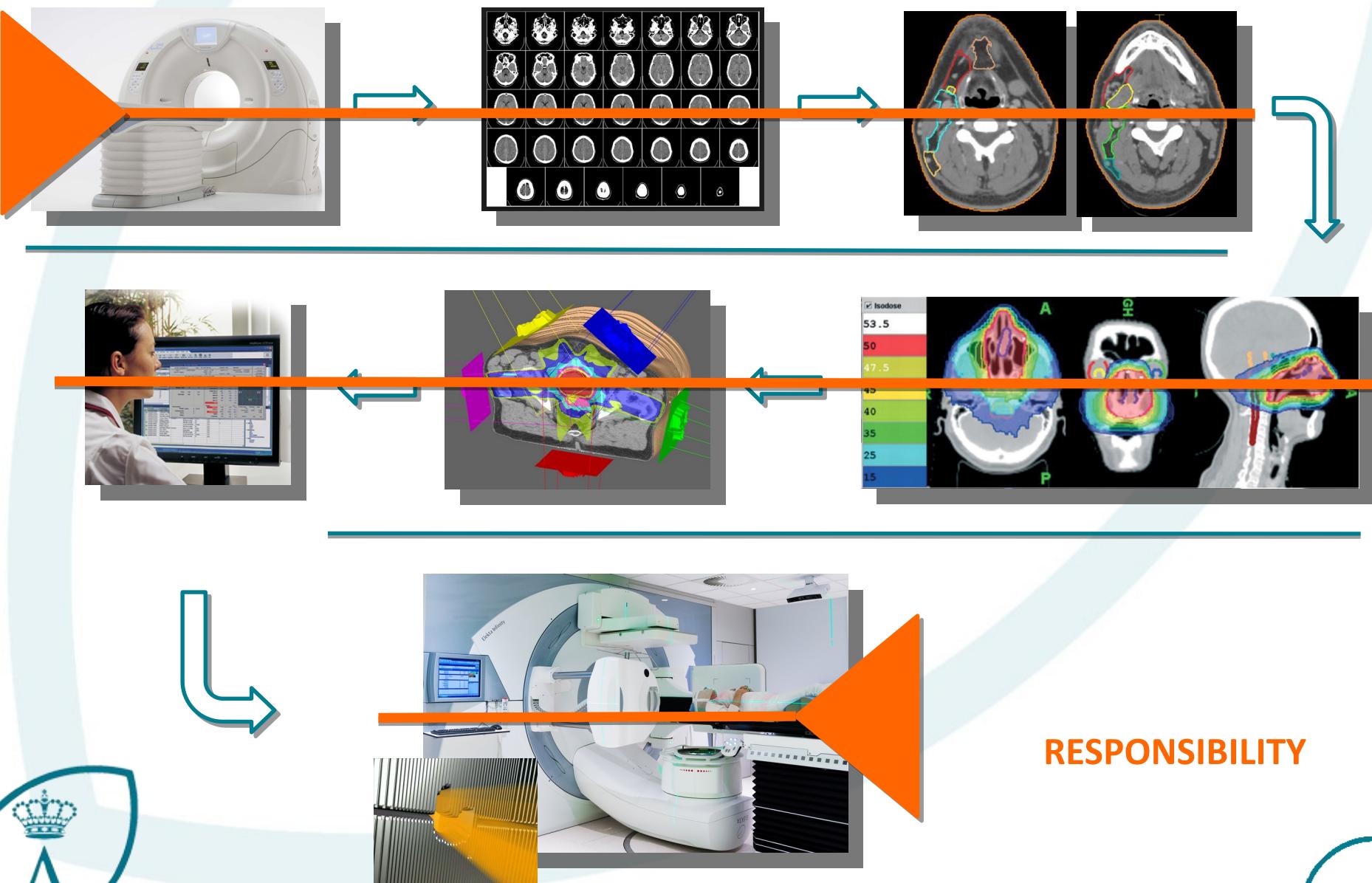
# « Who runs our tools? »



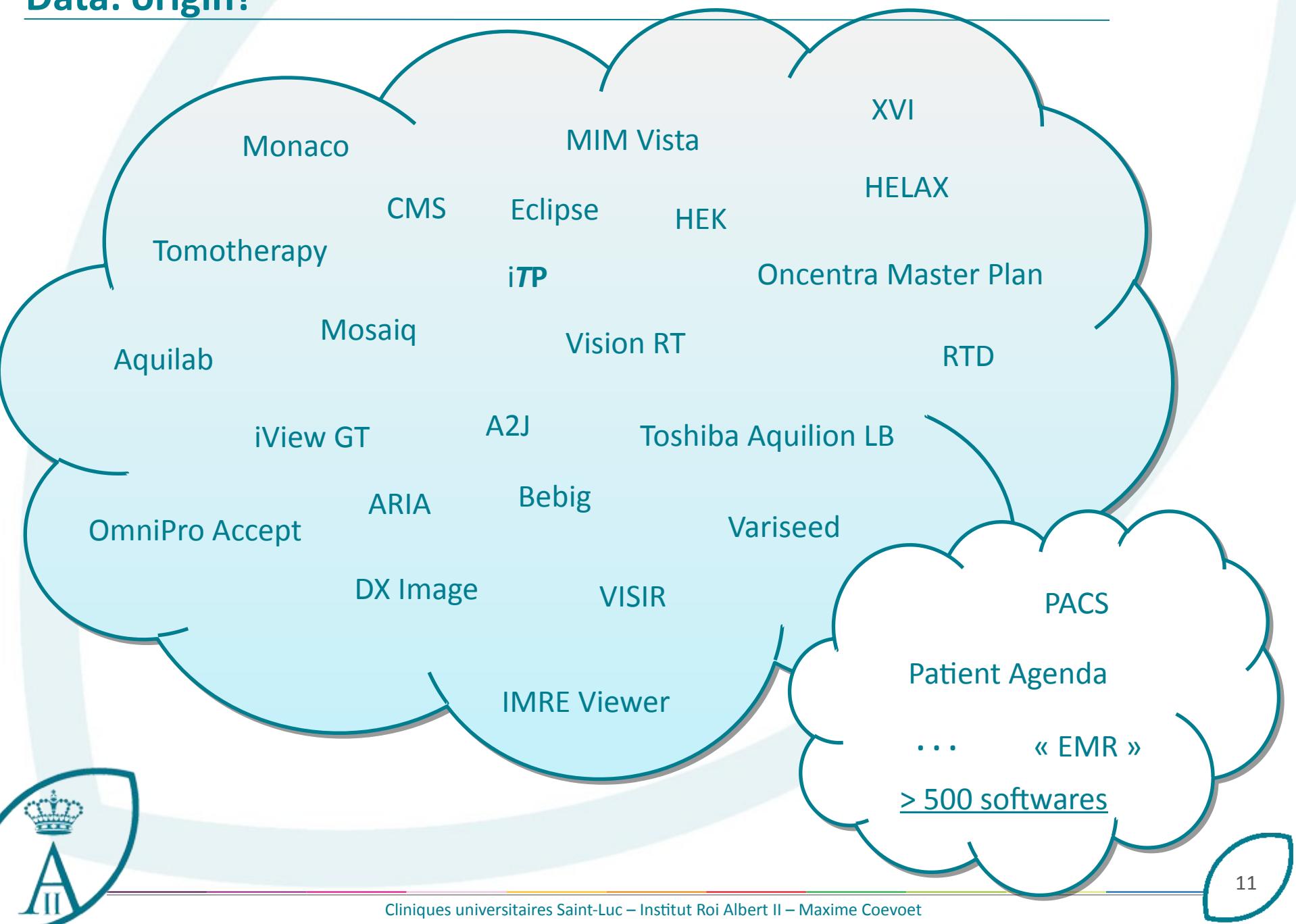
# IT spread in Rad. Onc. Dept.



# IT spread in Rad. Onc. Dept.



# Data: origin?



# Data: amount?

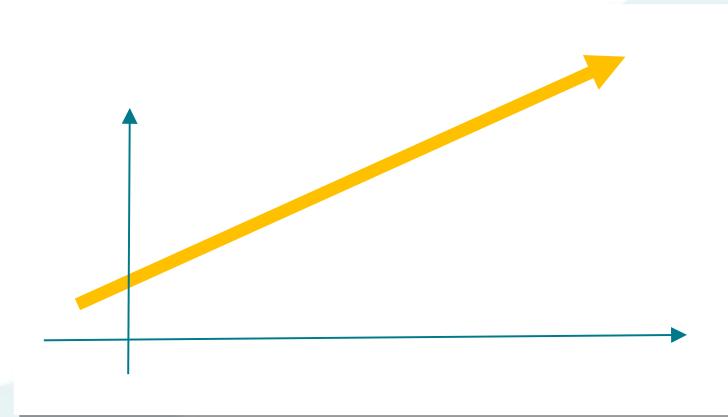
Amount of data per patient inside our RO Dept. :

- +/- ext. RO 1000 patients/year
- ~ 1Gb / 3D patient
- 3 ~ 5 Gb / VMAT patient
- 10Gb / SRS-4D patient



>1 Tb / year  
*excl. Diagnosis data*

- Mulitple modalities for contouring/planning*
- Pre-treatment setup imaging*
- VMAT/IMRT*
- 4D Treatment*
- Adaptive*
- ...*



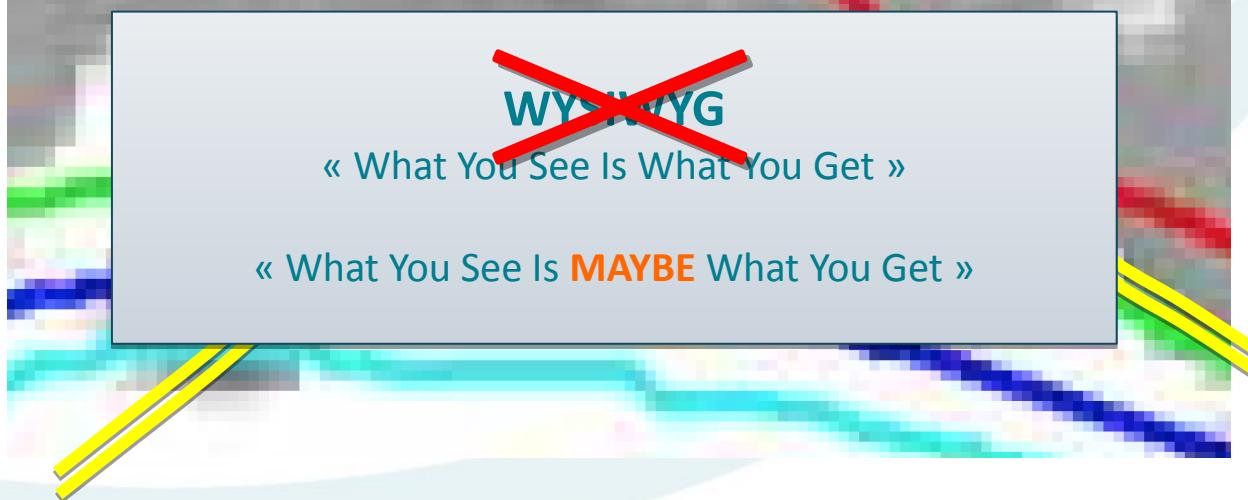
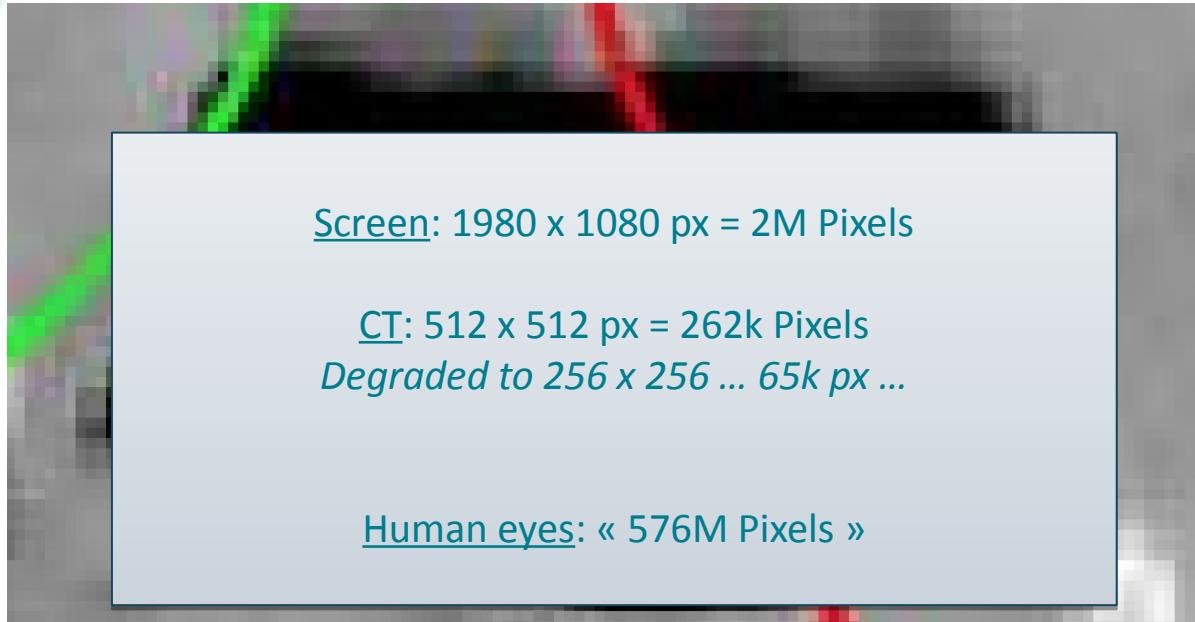


IT is everywhere ...

- In the past: **Workstation – Link – Server – Application**
- Today: **Workstation – « Citrix » – Link – VM – Server – Application**
- « Our softwares treat patients ... »
- HIT Dept do not have any responsibility; we do.

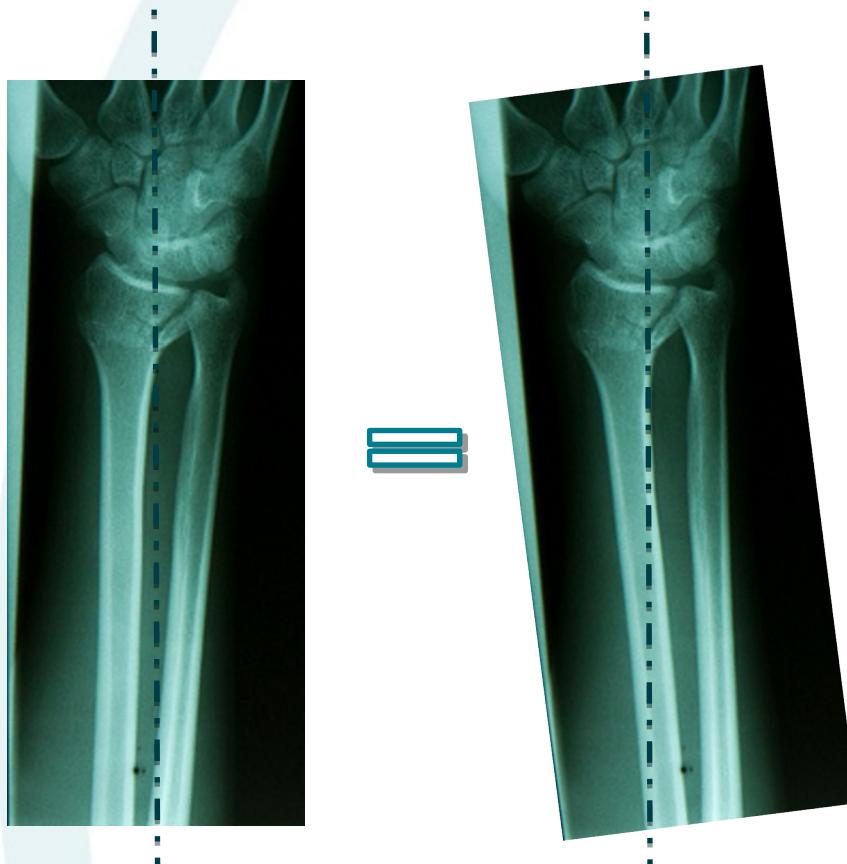


# Example 1

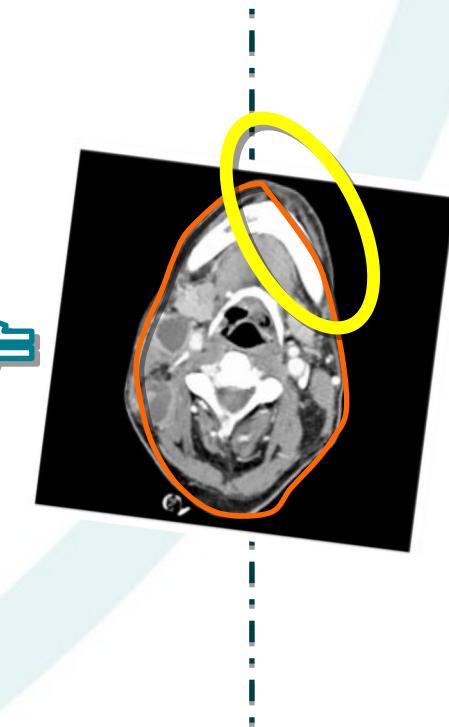


## Example 1.1

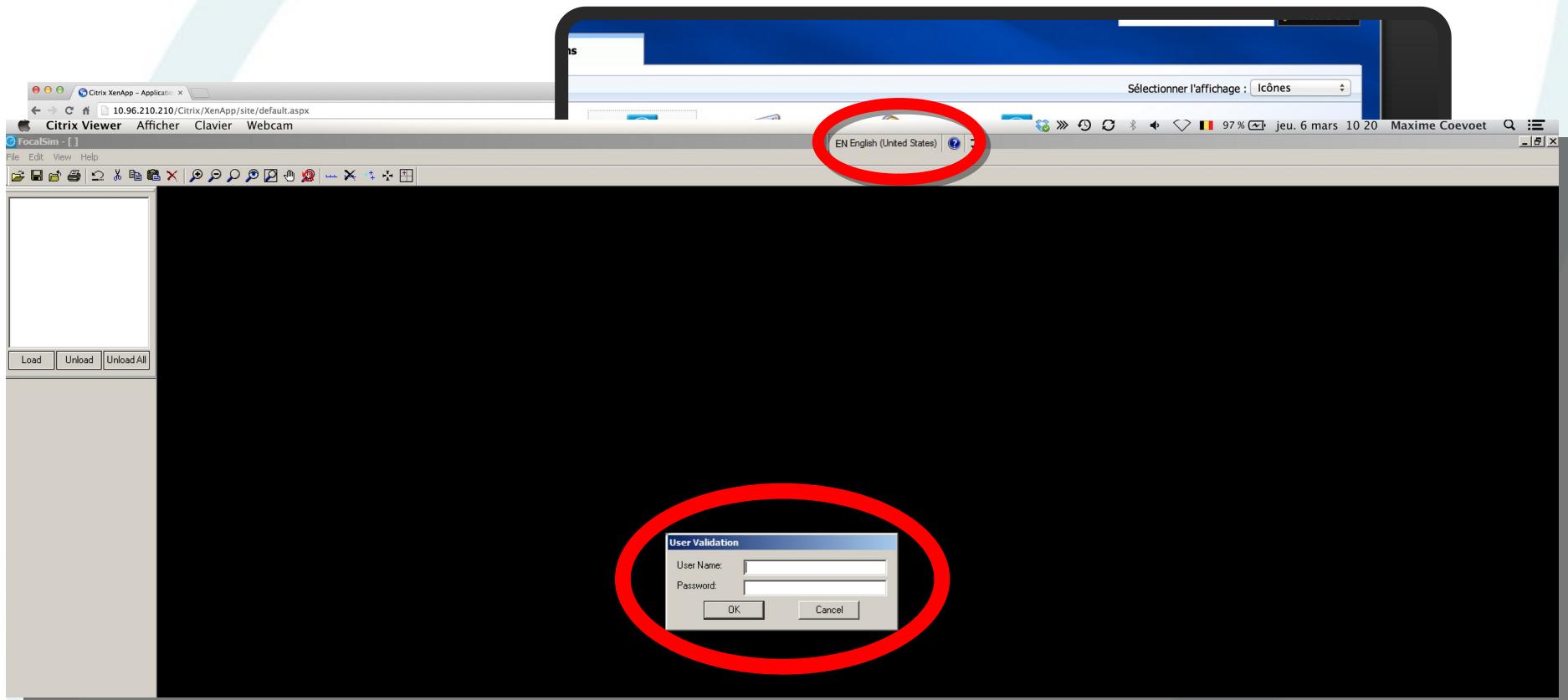
Radiology



Radiation Oncology



## Example 2



?

1,000.000 €  1.000,000 €

cm ... versus mm, quid?



## Example 2.1

Beam pitch 0.287, Field size 25.10 mm

Status Meterset  
TV41.4Gy\_25Mod 394,242 Secs

Région et langue

Formats Emplacement Claviers et langues Administration

Personnaliser le format

Nombres Symbole monétaire Heure Date

Exemples

Positif : 123.456.789,00 Négatif : -123.456.789,00

Symbol decimal : ,

Nombre de décimales : 2

Symbol de groupement des chiffres : .

The screenshot shows a medical software interface with a beam parameter table at the top. Below it is a Windows system settings window for regional and language options, specifically the "Formats" tab. A red oval highlights the "Meterset" value "394,242 Secs". In the foreground, a "Personnaliser le format" (Customize Format) dialog box is open, also with a red oval highlighting the "Nombre de décimales" (Number of decimals) set to 2. An orange oval highlights the decimal separator ",". The Windows logo is visible in the background.

# Example 3

- M
- Th
- 
- 
- 
- 
- 
- 

The DRR is

Should have been seen on verification:

Wou

IB Oropharyn

IB KV AP Setup  
IB KV Rlat Setup  
IB KV Rlat Set-DRR  
IB MY AP Setup  
IB MY Llat Setup  
IB PA-Sinus  
IB ULat  
IB ULat-DRR  
IB LPO  
IB LPO-DRR  
IB LAO Sinus  
IB RAO Sinus  
2 LAN  
AP  
AP-DRR  
PA  
PA-DRR

1 LPO-DRR  
1 LPO  
MLC

IB Oropharyn

Course: 1 - Curative w/chemo Volume: BODY Plan: IB Oropharyn Machine: Clinac 1

Information

Field Order/Type	5 / Treat	6 / Treat	7 / Treat	8 / Treat	9 / Treat
Field ID	IB PA Sinus	IB LPO	IB LAO Sinus	IB RAO Sinus	IB RPO Sinus
Field Name	AP Sinus	LPO	LAO Sinus	RAO Sinus	RPO Sinus
Technique	STATIC	STATIC	STATIC	STATIC	STATIC
Energy / Modus	6X	6X	6X	6X	6X
Dose Rate [MU/min]	300	300	300	300	300
MU	279	254	303	233	255
Time [min]	1.44	1.21	1.58	1.21	1.32
Tot. Table	IMRT_LHN	IMRT_LHN	IMRT_LHN	IMRT_LHN	IMRT_LHN
SSD [cm]	91.2	90.7	94.2	94.4	90.7
Gantry/Source Rth [Deg]	190.0	150.0	80.0	300.0	210.0
Coll Rth [Deg]	90.0	90.0	90.0	90.0	90.0
Field X [cm]	11.0	11.3	11.3	11.3	10.8
K1 [cm]	+1.5	+1.5	+1.5	+1.5	+1.4
K2 [cm]	+8.5	+8.8	+8.8	+8.8	+8.5
Field Y [cm]	14.3	15.0	15.0	15.0	15.0
Y1 [cm]	+7.0	+8.5	+8.8	+8.5	+8.0
Y2 [cm]		+8.5	+8.0	+8.5	+8.0
MLC	Dose Dynamic				
Dynamic Wedge					
Int Mount					
Acc Mount					
Comp Mount					
b-Aperture					
Couch Vrt [cm]					
Couch Leg [cm]					
Couch Lat [cm]					
Couch Rth [Deg]	0.0	0.0	0.0	0.0	0.0
Imager Vrt [cm]					
Imager Leg [cm]					
Imager Lat [cm]					
Setup Note					

Impact: 3 fractions of 13Gy vs 2Gy

Thanks to M. Van Dycke/S. Vynckier

## Example 3



Couch position in  
Absolute / Relative

...

**34 mm difference!**



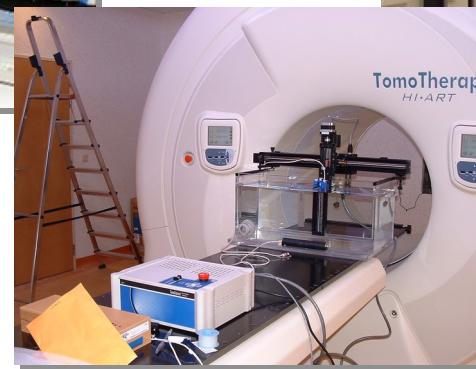
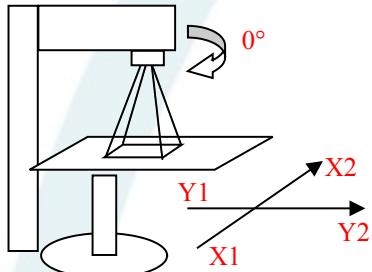
Virtual / Physical  
GPU card

...

**Impact on  
TPS calculation results!**



# What could we do ?

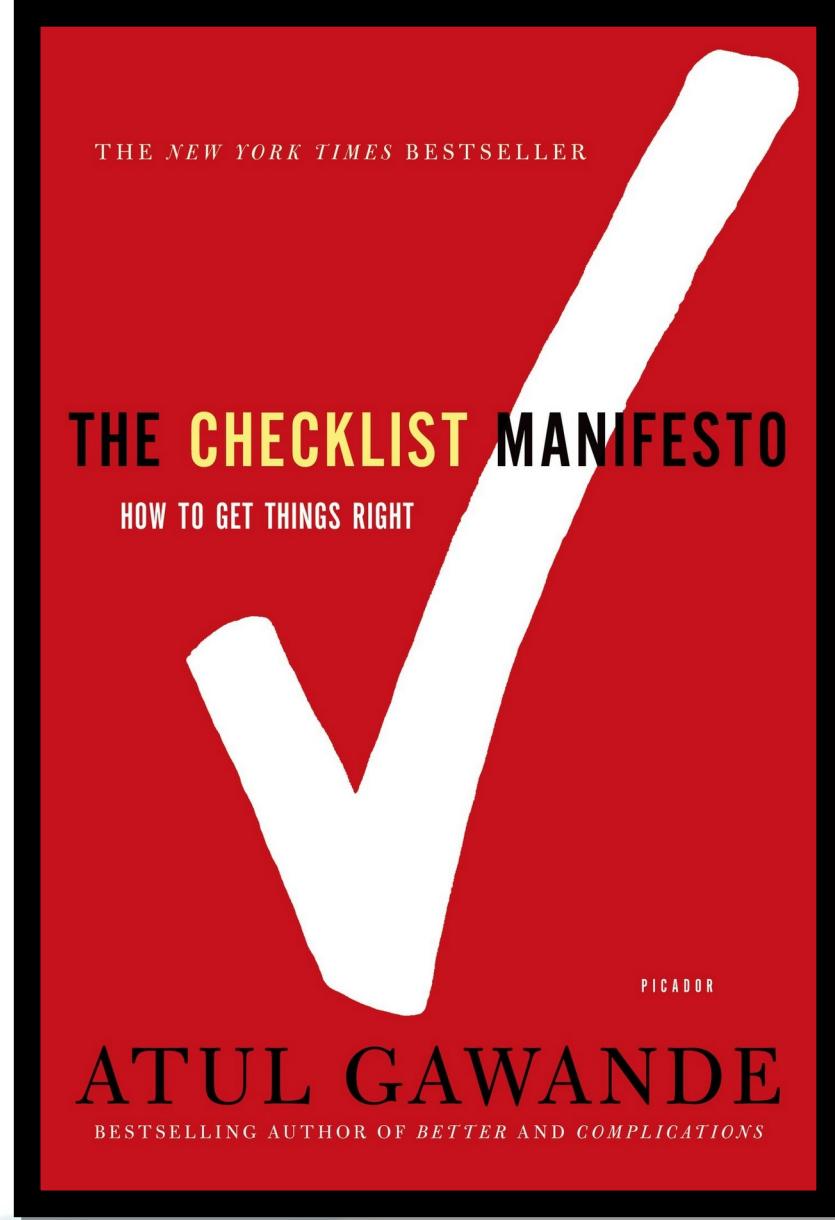




How to secure  
Clinical workflow & Digital workflow?



# Why a CHECKLIST ?





8 hospitals around the world

Results:

35% complication

47% deathrate



# Surgical Safety Checklist



Patient Safety  
A World Alliance for Safer Health Care

## 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

Risk of >500ml blood loss (7ml/kg in children)?

- No
- Yes, and two IVs/central access and fluids planned

## 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?

**Is essential imaging displayed?**

- Yes
- Not applicable

## 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 (read 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?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

© WHO, 2009



# Checklist origin



*« Nor the aircraft, nor the pilot experience were the root cause of the crash. »*



### Same « standard » medical practice

- 1970: 2 clinical FTE
- 2000: > 15 clinical FTE

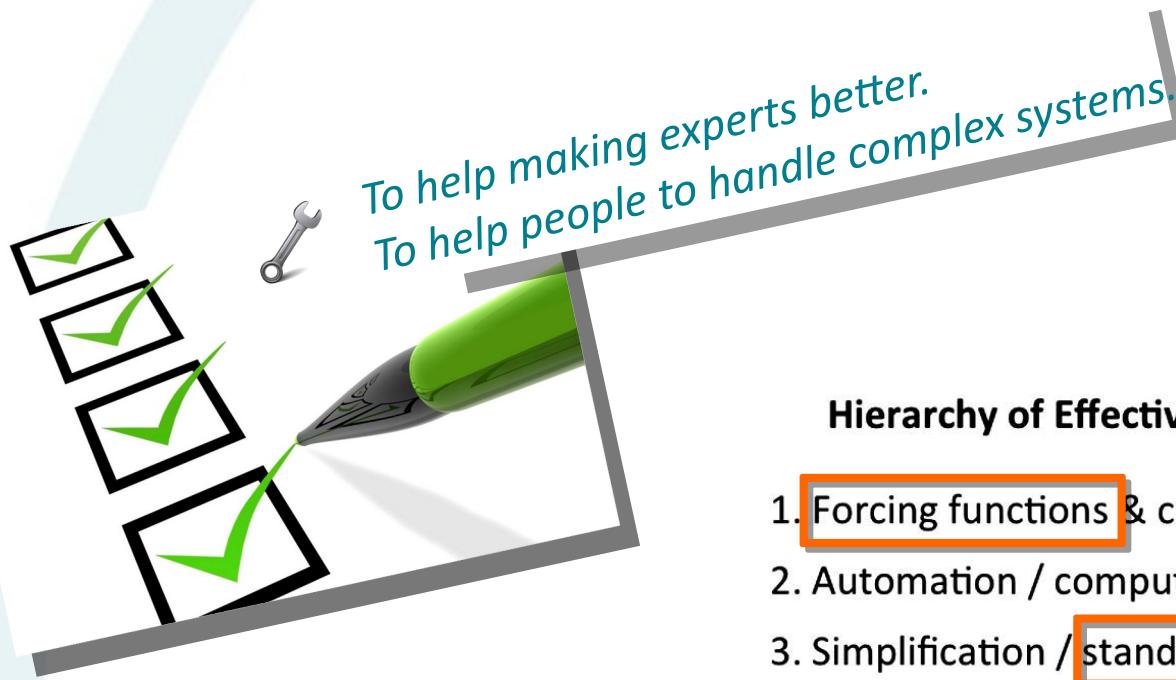
### Healthcare world:

- 4000 medical procedures
- 6000 drugs



*Too complex for 1 expert ...*





## Hierarchy of Effectiveness in Preventing Errors

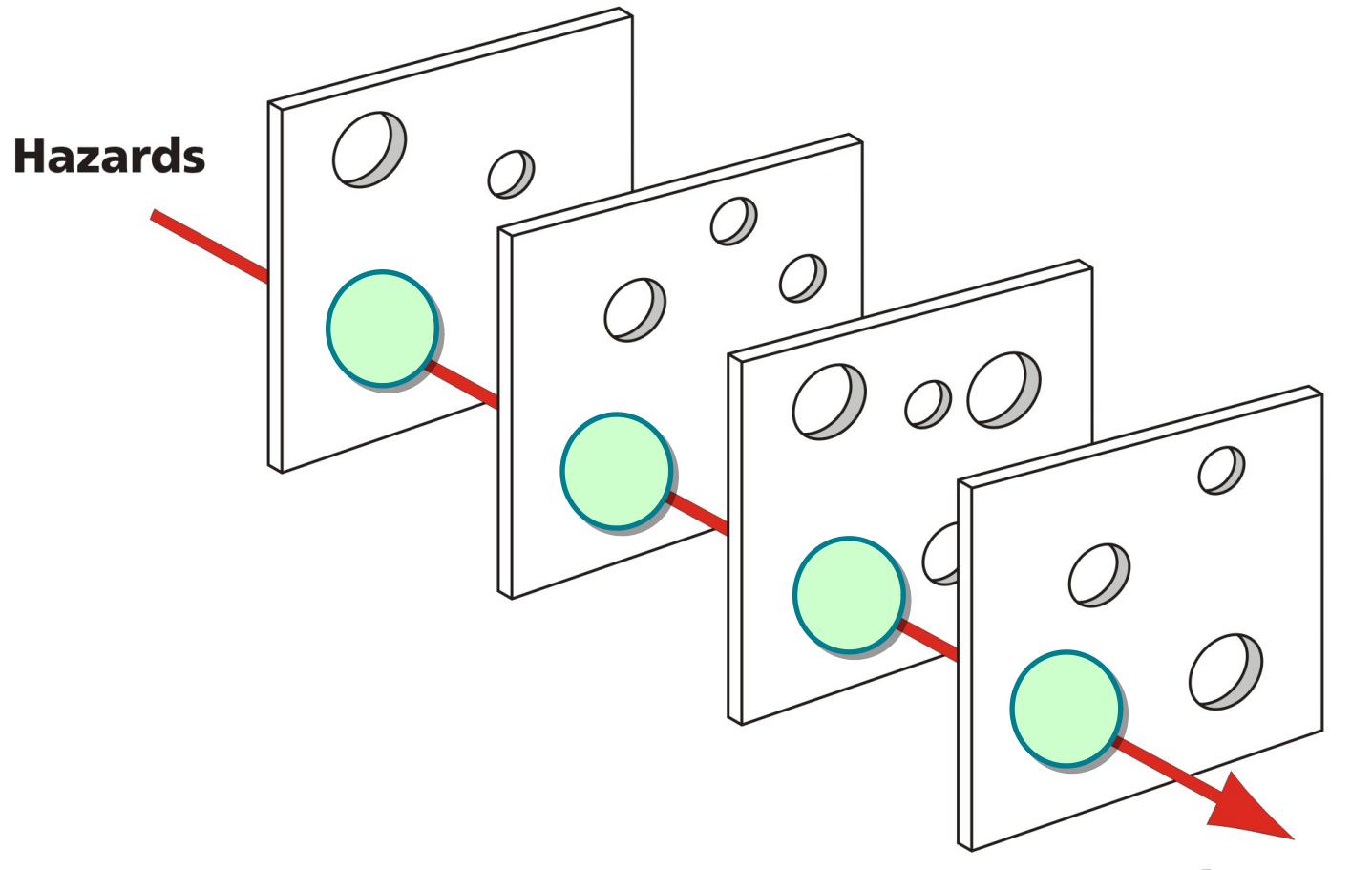
1. Forcing functions & constraints
2. Automation / computerization
3. Simplification / standardization
4. Reminders, checklists, double checks
5. Rules & Policies
6. Education & training

Most effective



Institute for Safe Medical Medication practices. Medication error prevention “toolbox”. Med Safe Alert 1999;4:1.





Cheese Model, J. Reason





GoWBW.com

Herbert William Heinrich

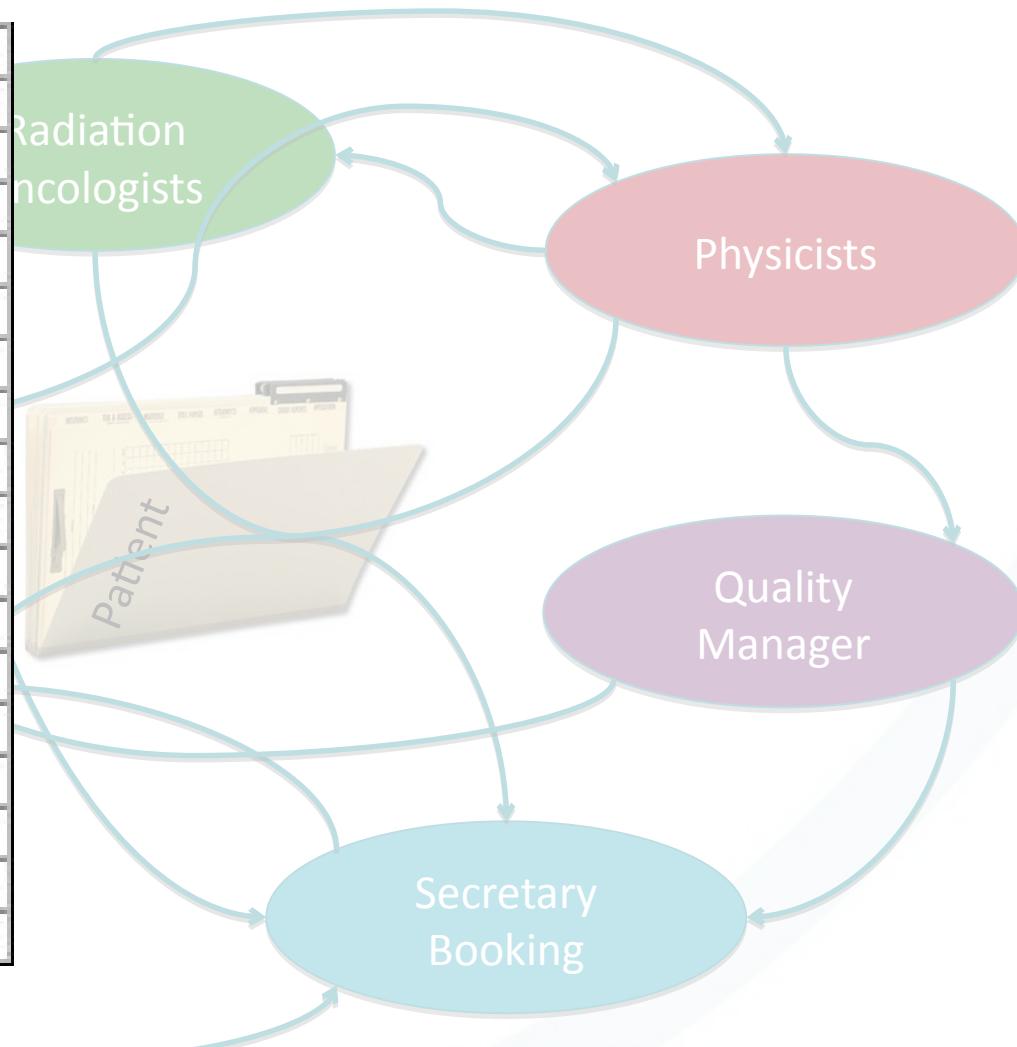




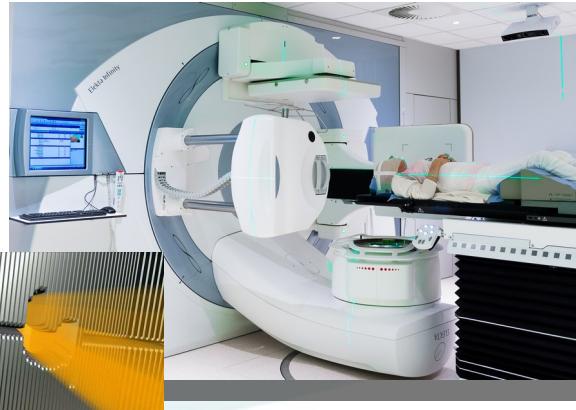
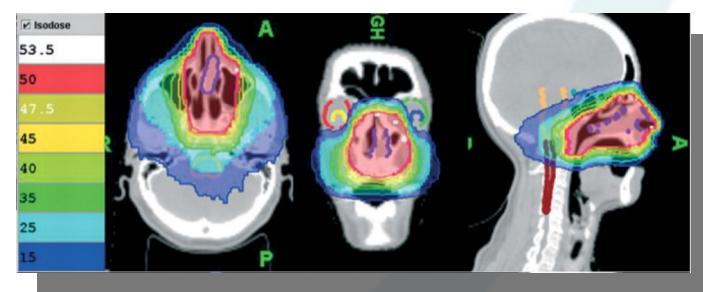
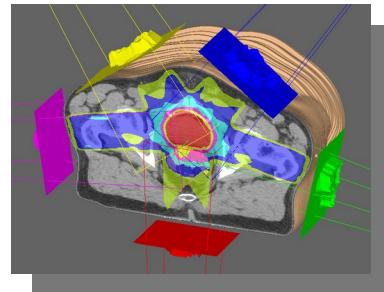
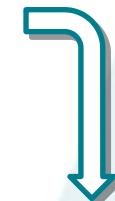
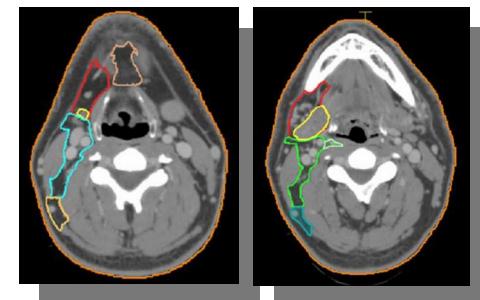
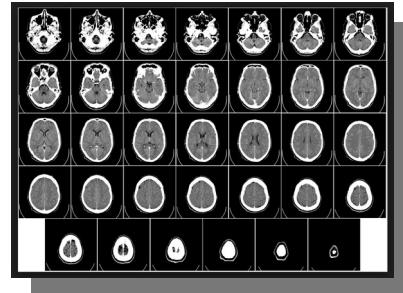
*TP*.wt

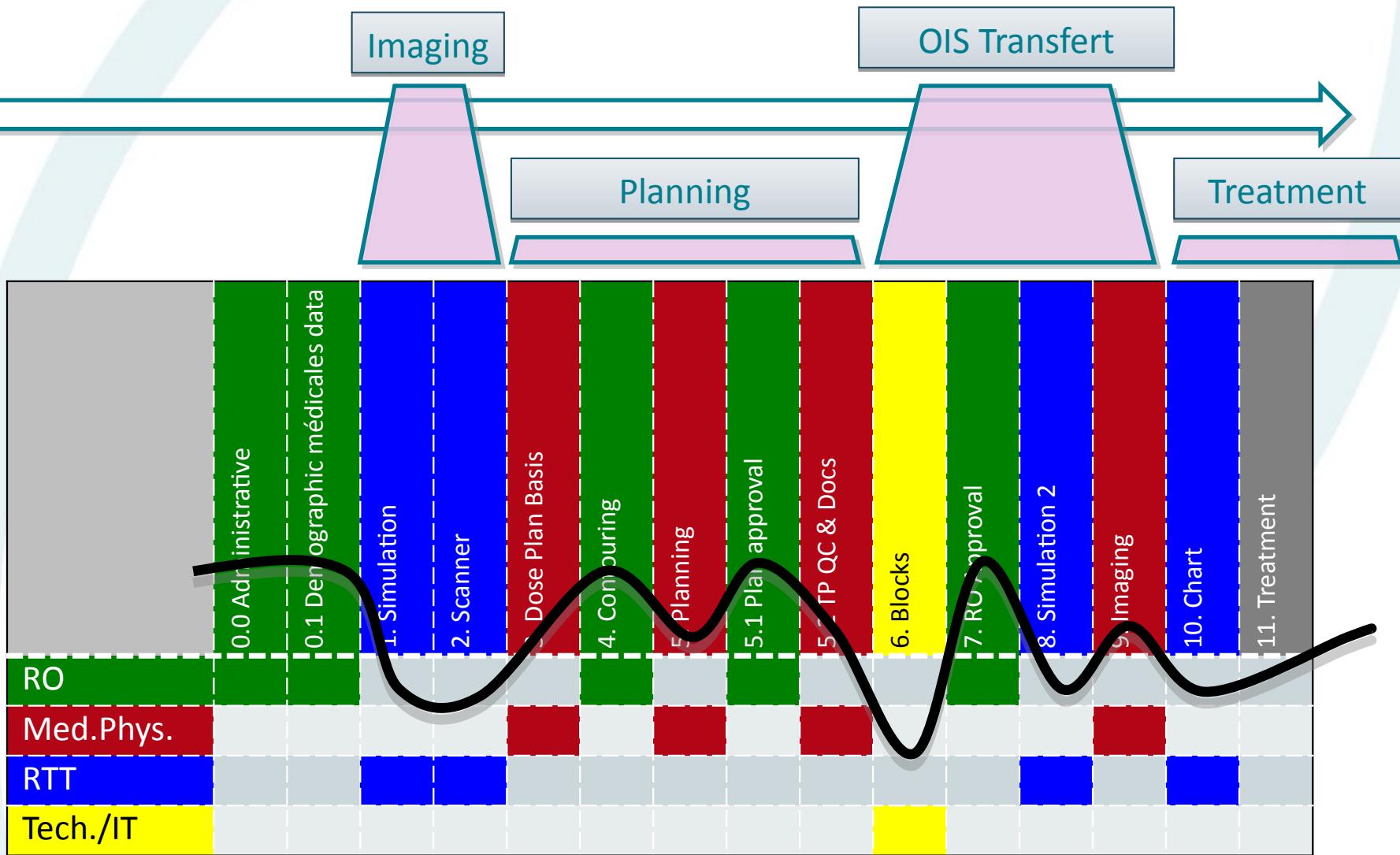
*iTherapy Process*

Etape	Légende
0.0	Administratif
0.1	Coord. med.
1	Sim. 1
1.1	Sim. 1 bis
2	Scanner
3	Dose Plan Basis
4	Contour de vol.
5.0	TP
5.1	Approb. du TP
5.2	TP (QC et Doc)
6	Confection
7	Contre sign. TP
8	Sim. 2
9	Faiscxs de rep.
10	Carte
11	En traitement



# Radiation Oncology Workflow







# Solution ?

## iTherapy Process

the way to go, the way to know

MX - logout  
Service de Radiothérapie des Cliniques universitaires St-Luc  
Pas de nouveau message | 02/10/2012 Anniversaire de:

	Workflow	Médical	Physique	RTT	Technique	Divers					
VERSION TEST SUR SERVEUR TEST 10.96.4.229 URGENCE SOUS 72H											
Process	Etape	Nom	Prénom	Med/Ass/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio.	4.20	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	1	1	-0j, 8 h	...	Tomo2
Radio.	3.20	[REDACTED]	[REDACTED]	PS/CSA/	1	1	1	1	-2j, 8 h	...	Tomo1
Radio.	3.70	[REDACTED]	[REDACTED]	CK/CK/	1	1	1	1	+1j, 8 h	...	SP18
Radio.	4.20	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	1	1	-1j, 8 h	-48j, 8 h	Tomo2
Radio.	2.10	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	2	1	+1j, 8 h	+9j, 8 h	Tomo2
Radio.	0.30	[REDACTED]	[REDACTED]	PS//	1	1	1	1	-3j, 8 h	...	SL25
Radio.	6.00	[REDACTED]	[REDACTED]	PS/CSA/	1	1	1	1	-1j, 8 h	...	Tomo1
Radio.	4.70	[REDACTED]	[REDACTED]	PS/CSA/	1	1	2	1	-1j, 8 h	...	Tomo1
Radio.	3.10	[REDACTED]	[REDACTED]	CK/PSM/	1	1	1	1	-2j, 8 h	...	SP18
Radio.	4.30	[REDACTED]	[REDACTED]	XG//AD	1	1	1	1	-1j, 8 h	...	SL25
Radio.	4.30	[REDACTED]	[REDACTED]	PS/CSA/EB	1	1	1	1	-1j, 8 h	-24j, 8 h	SL25
Radio.	4.00	[REDACTED]	[REDACTED]	LR//EB	1	1	1	1	-0j, 8 h	...	SP18
Radio.	4.30	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	1	1	-0j, 8 h	...	Tomo2
Radio.	4.30	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	2	1	-0j, 8 h	...	Tomo2
Radio.	4.01	[REDACTED]	[REDACTED]	LR/SBO/	1	1	1	1	-1j, 8 h	-48j, 8 h	Tomo2
Radio.	4.00	[REDACTED]	[REDACTED]	LR/SBO/	1	1	2	1	-1j, 8 h	-48j, 8 h	Tomo2
Radio.	6.00	[REDACTED]	[REDACTED]	CK/PSM/EB	1	1	1	1	-3j, 8 h	-29j, 8 h	SP18
Radio.	5.20	[REDACTED]	[REDACTED]	CK/PSM/EB	1	1	2	1	-3j, 8 h	-29j, 8 h	SP18
Radio.	3.00	[REDACTED]	[REDACTED]	CK/CK/	1	1	1	1	-3j, 8 h	-42j, 8 h	SP18
Radio.	3.00	[REDACTED]	[REDACTED]	XG/SBO/AD	1	1	1	1	-3j, 8 h	...	Tomo1
Radio.	4.00	[REDACTED]	[REDACTED]	PS/CSA/	1	1	1	1	-0j, 8 h	...	SL25
Radio.	0.30	[REDACTED]	[REDACTED]	XG/SBO/	1	1	1	1	-2j, 8 h	...	SP18
Radio.	0.30	[REDACTED]	[REDACTED]	LR/SBO/	1	1	1	1	-2j, 8 h	...	SP18
Radio.	0.30	[REDACTED]	[REDACTED]	PS//	1	1	1	1	-0j, 8 h	...	Tomo1
Radio.	4.00	[REDACTED]	[REDACTED]	LR/SBO/	1	1	1	1	-1j, 8 h	...	Tomo2
Radio.	4.00	[REDACTED]	[REDACTED]	LR/SBO/	1	1	2	1	-1j, 8 h	...	Tomo2
Radio.	4.00	[REDACTED]	[REDACTED]	CK//	1	1	1	1	-3j, 8 h	-29j, 8 h	SP18
Radio.	3.00	[REDACTED]	[REDACTED]	CK/PSM/	1	1	1	1	-1j, 8 h	-28j, 8 h	SP18
Nombre de patients: 28											
PATIENTS EN COURS DE TRAITEMENT											
Process	Etape	Nom	Prénom	Med/Ass/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio.	12.00	[REDACTED]	[REDACTED]	PS/SBO/EB	1	1	1	1	+6j, 16 h	...	SL25
Radio.	10.00	[REDACTED]	[REDACTED]	PS/SBO/EB	1	1	1	1	+4j, 16 h	...	SL25
Radio.	12.00	[REDACTED]	[REDACTED]	LR/CSA/	1	1	1	1	+36j, 16 h	...	SL25
Radio.	4.20	[REDACTED]	[REDACTED]	LR/SBO/SV	1	1	1	1	-0j, 8 h	...	Tomo2
Radio.	0.40	[REDACTED]	[REDACTED]	VG/ELO/	1	1	1	1	-13j, 8 h	-44j, 8 h	Tomo1
Radio.	12.00	[REDACTED]	[REDACTED]	CK/PSM/JMD	1	1	1	1	+46j, 16 h	...	SP18

Tri par corps de métier

med
inf
secr
phys
tech

Tri par utilisateur:

Med
Ass
Phys

TOUS

Afficher tous les patients ...  
=>... en traitement  
... archivés

Etape Légende

Radiothérapie Externe

Avant préparation

- 0.00 Demande de mise en traitement
- 0.10 Nouvelles demandes de mises en traitement
- 0.20 Clôture administrative
- 0.30 Préparation Simulation par les médecins

Préparation du traitement

- 0.40 Préparation Simulation par les infirmiers
- 1.00 Simulation
- 1.10 Simulation
- 1.20 Préparation Simulation sur Tomo
- 1.30 Préparation Simulation sur Tomo
- 1.40 Simulation MVCT
- 1.50 Exportation sur Focal (Simul MVCT)
- 1.90 Treatment Calendar
- 2.00 Dose Plan Basis
- 2.00

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Cliniques universitaires Saint-Luc – Institut Roi Albert II – Maxime Coevoet

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# How does it work?

## iTherapy Process

the way to go, the way to know

MX - logout

Service de Radiothérapie des Cliniques universitaires St-Luc

Pas de nouveau message | 02/10/2012 Anniversaire de:

Workflow    Médical    Physique    RTT    Technique    Divers            

VERSION TEST SUR SERVEUR TEST 10.96.4.229

ETAPE 4.20 / APPROBATION DU TP

Status: Treatment  
Mme  , Mlle  , Mr  - Nom:   
ID St-Luc: H42873E / Course: 1  
Superviseur:  / Assistant:  / Physicien:

PROCESS: RADIOTHERAPIE EXTERNE

Prénom:   
Site d'Irradiation: 1  / PTV: 1  / Plan: 1   
Hosp:  - Unité:  - SPO:   
[Plus d'infos ...](#)

Action      Action à réaliser      Réalisée par ... le ...

Oui  Refus  Reset  
2.5 cm  
Helical  
  
  
  
NA

Retour au suivi des patients

PROCESS:

Etape	Légende
0.00	Demande de mise en traitement
0.10	Nouvelles demandes de mises en traitement
0.20	Clôture administrative
0.30	Préparation Simulation par les médecins
0.40	Préparation Simulation par les infirmiers
1.00	Simulation
1.10	Simulation
1.20	Préparation Simulation sur Tomo
1.30	Préparation Simulation sur Tomo
1.40	Simulation MVCT
1.50	Exportation sur Focal (Simul MVCT)
1.90	Treatment Calendar
2.00	Dose Plan Basis
3.00	Contourage de volumes
3.10	Validation des volumes
3.20	Tomostruct
4.00	TP
4.01	Validation physique
4.10	Optimisation (Tomo)
4.20	Approbation du TP
4.30	Documentation dosimétriste
4.40	Plombs, plomb électron ctc, ...
4.50	Importation dans Mosaïq
4.60	Préparation DQA
4.70	Mesures DQA
4.80	Analyse DQA
5.00	Fabrication des plombs
5.20	Simulation cicatrice
6.00	Contre-signature
6.10	Mesure du facteur plomb
6.20	Introduction des UM dans Mosaïq
7.00	Carte de traitement
10.00	Verification physique de la carte
11.00	Correction suite à la vérification

Commentaires:  
26/09/2012 - 13:48 - SV => PTV60Gy (PTV nodule RMN confirmé)

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# How does it work?

## iTherapy Process

the way to go, the way to know

MX - logout  
Service de Radiothérapie des Cliniques universitaires St-Luc  
Pas de nouveau message | 02/10/2012 Anniversaire de:

VERSION TEST SUR SERVEUR TEST 10.96.4.229

Terre (Connexion : H42873E)

### ETAPE 4.20 / APPROBATION DU TP

Status: Treatment

Mme  Mlle  Mr  - Nom: [REDACTED]

ID St-Luc: H42873E / Course: 1

Superviseur:  / Assistant:  / Physicien:

Prénom: [REDACTED]

Site d'Irradiation: 1 Bassin / PTV: 1 Loge prost / Plan: 1 [REDACTED]

Hospit:  - Unité: [REDACTED] - SPO:

[Plus d'infos ...](#)

**PROCESS: RADIOTHERAPIE EXTERNE**

Action	Action à réaliser	Réalisée par ... le ...
Approbation du TP (Tomo) *	<input checked="" type="radio"/> Oui <input type="radio"/> Refus <input type="radio"/> Reset	MX - Tuesday 02/10/2012 - 10:35
Taille des mâchoires	2.5 cm	MX - Tuesday 02/10/2012 - 10:35
Direct ou Helical	Helical	MX - Tuesday 02/10/2012 - 10:35
Nom du plan approuvé *	Plan test	MX - Tuesday 02/10/2012 - 10:35
Vérification des lasers *	<input checked="" type="checkbox"/>	MX - Tuesday 02/10/2012 - 10:35
Vérification du fractionnement *	<input type="checkbox"/>	MX - Tuesday 02/10/2012 - 10:35
Final Accept *	<input type="checkbox"/>	MX - Tuesday 02/10/2012 - 10:35
Il y a une proposition avec un changement d'iso	NA	MX - Tuesday 02/10/2012 - 10:35

\* : étapes obligatoires

Commentaires:

26/09/2012 - 13:48 - SV => PTV60Gy (PTV nodule RMN confirmé?)

[Sauver](#)

**Retour au suivi des patients**

**PROCESS:**

Etape	Légende
0.00	Demande de mise en traitement
0.10	Nouvelles demandes de mises en traitement
0.20	Clôture administrative
0.30	Préparation Simulation par les médecins
0.40	Préparation Simulation par les infirmiers
1.00	Simulation
1.10	Simulation
1.20	Préparation Simulation sur Tomo
1.30	Préparation Simulation sur Tomo
1.40	Simulation MVCT
1.50	Exportation sur Focal (Simul MVCT)
1.90	Treatment Calendar
2.00	Dose Plan Basis
3.00	Contourage de volumes
3.10	Validation des volumes
3.20	Tomospatial
4.00	TP
4.01	Validation physique
4.10	Optimisation (Tomo)
4.20	Approbation du TP
4.30	Documentation dosimétriste
4.40	Plombs, plomb électron ci...
4.50	Importation dans Mosaïq
4.60	Préparation DQA
4.70	Mesures DQA
4.80	Analyse DQA
5.00	Fabrication des plombs
5.20	Simulation cicatrice
6.00	Contre-signature
6.10	Mesure du facteur plomb
6.20	Introduction des UM dans Mosaïq
7.00	Carte de traitement
10.00	Vérification physique de la carte
11.00	Correction suite à la vérification

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# How does it work?

## iTherapy Process

the way to go, the way to know

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Workflow    Médical    Physique    RTT    Technique    Divers            

VERSION TEST SUR SERVEUR TEST 10.96.4.229

ETAPE 4.30 / DOCUMENTATION DOSIMÉTRISTE

Status: Treatment  
Mme  Mlle  Mr  - Nom: [REDACTED]  
ID St-Luc: H42873E / Course: 1  
Superviseur: LR / Assistant: SBO / Physicien: SV

Prénom: [REDACTED]  
Site d'Irradiation: 1 Bassin / PTV: 1 Loge prost / Plan: 1 [REDACTED]  
Hospit:  - Unité: [REDACTED] - SPO:

PROCESS: RADIOTHERAPIE EXTERNE

Action    Action à réaliser    Réalisée par ... le ...  
Impression et docs par dosimétriste \*      
Y a-t-il un changement d'iso? \*     Oui  Non  Reset  
Nom du plan approuvé    Plan test

\* : étapes obligatoires

Commentaires:  
26/09/2012 - 13:48 - SV => PTV60Gy (PTV nodule RMN confirmé?)

Retour au suivi des patients

PROCESS:

Etape	Légende
0.00	Demande de mise en traitement
0.10	Nouvelles demandes de mises en traitement
0.20	Clôture administrative
0.30	Préparation Simulation par les médecins
0.40	Préparation Simulation par les infirmiers
1.00	Simulation
1.10	Simulation
1.20	Préparation Simulation sur Tomo
1.30	Préparation Simulation sur Tomo
1.40	Simulation MVCT
1.50	Exportation sur Focal (Simul MVCT)
1.90	Treatment Calendar
2.00	Dose Plan Basis
3.00	Contourage de volumes
3.10	Validation des volumes
3.20	Tomosynthétiseur
4.00	TP
4.01	Validation physique
4.10	Optimisation (Tomo)
4.20	Approbation du TP
4.30	Documentation dosimétriste
4.40	Plombs, plomb électron ctc... Importation dans Mosaiq
4.50	Préparation DQA
4.60	Mesures DQA
4.70	Analyse DQA
4.80	Fabrication des plombs
5.00	Simulation cicatrice
5.20	Contre-signature
6.00	Mesure du facteur plomb
6.10	Introduction des UM dans Mosaiq
7.00	Carte de traitement
10.00	Vérification physique de la carte
11.00	Correction suite à la vérification

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# How does it work?

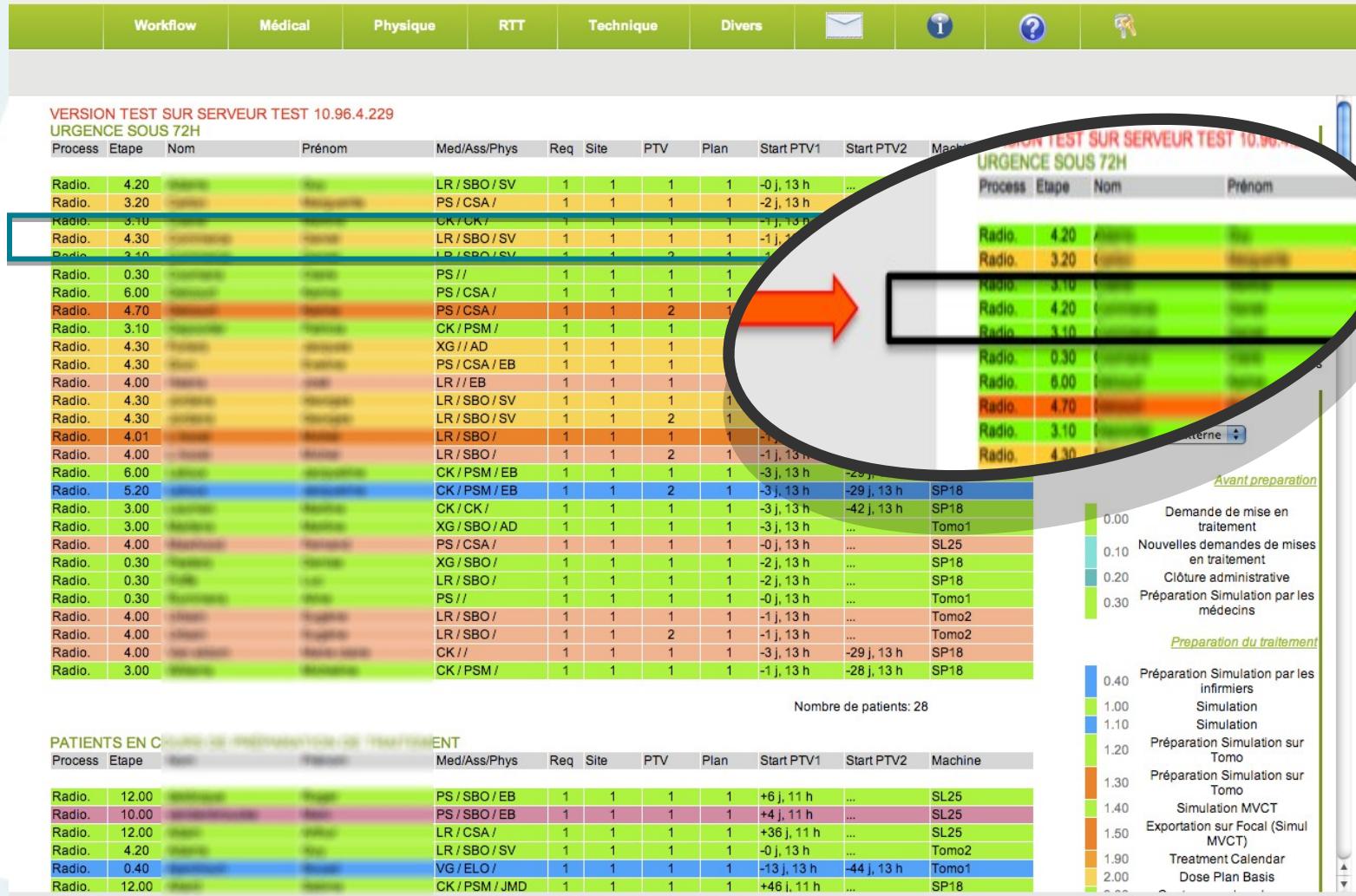
## iTherapy Process

the way to go, the way to know

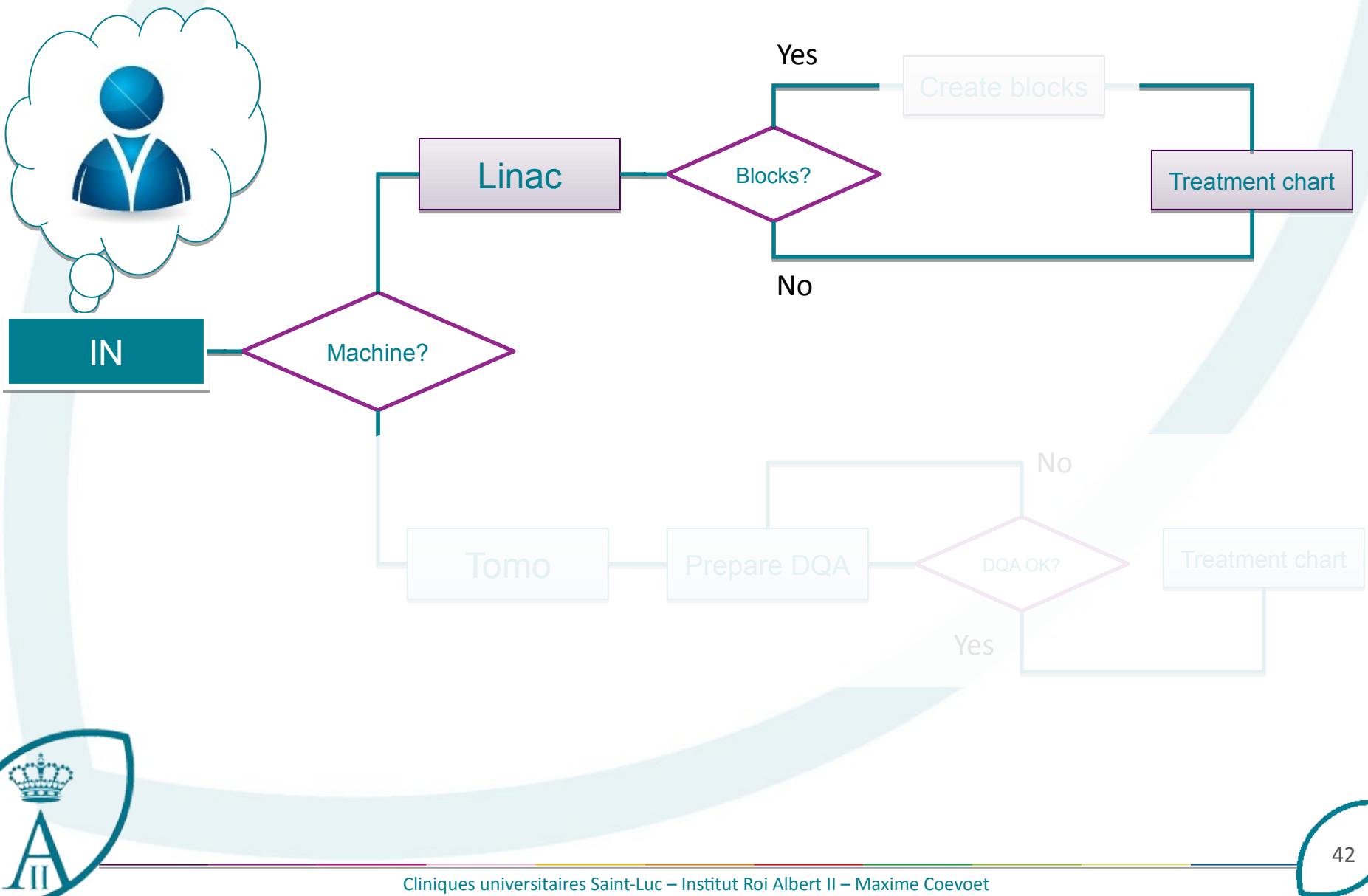
MX - logout

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# Personalized workflow



# Concept ...

**iTherapy Process**  
the way to go, the way to know

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Workflow Médical Physique RTT Technique Divers

URGENCE SOUS 72H

Process	Etape	Nom	Prénom	Med/Ass/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio.	12.00			XG / SBO / ADR	1	1	1	1	+10 j, 18 h	...	SL25
Radio.	12.00			XG / ELO / EB	1	1	1	1	+31 j, 18 h	...	SP18
Radio.	12.00			XG / SBO / EB	1	1	1	1	+23 j, 18 h	...	SL25
Radio.	12.00			XG / SBO / DD	1	1	1	1	+8 j, 18 h	...	SL25
Radio.	12.00			XG / SBO / AD	1	1	1	1	+54 j, 18 h	...	Tomo1
Radio.	12.00			XG / SBO / NDP	1	1	1	1	+58 j, 18 h	...	Tomo1
Radio.	12.00			XG / ELO / VR	2	1	1	1	+16 j, 18 h	...	SP18
Radio.	12.00			XG / ELO /	1	1	1	1	+15 j, 18 h	...	SP18
Radio.	12.00			XG / SBO / AD	1	1	1	1	+11 j, 18 h	...	SL25

PATIENTS EN COURS DE PRÉPARATION DE TRAITEMENT

Process	Etape	Nom	Prénom	Med/Ass/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio.	12.00			XG / SBO / ADR	1	1	1	1	+10 j, 18 h	...	SL25
Radio.	12.00			XG / ELO / EB	1	1	1	1	+31 j, 18 h	...	SP18
Radio.	12.00			XG / SBO / EB	1	1	1	1	+23 j, 18 h	...	SL25
Radio.	12.00			XG / SBO / DD	1	1	1	1	+8 j, 18 h	...	SL25
Radio.	12.00			XG / SBO / AD	1	1	1	1	+54 j, 18 h	...	Tomo1
Radio.	12.00			XG / SBO / NDP	1	1	1	1	+58 j, 18 h	...	Tomo1
Radio.	12.00			XG / ELO / VR	2	1	1	1	+16 j, 18 h	...	SP18
Radio.	12.00			XG / ELO /	1	1	1	1	+15 j, 18 h	...	SP18
Radio.	12.00			XG / SBO / AD	1	1	1	1	+11 j, 18 h	...	SL25

Nombre de patients: 0

Nombre de patients: 9

Tri par corps de métier:  
med int phys  
secr tech

Tri par utilisateur:  
XG Ass Phys

TOUS

Afficher tous les patients ...  
=> en traitement ... archivés

Etape Légende  
Radiothérapie Externe

Avent preparation  
0.00 Demande de mise en traitement  
0.10 Nouvelles demandes de mises en traitement  
0.20 Clôture administrative  
0.30 Préparation Simulation par les médecins

Preparation du traitement  
0.40 Préparation Simulation par les infirmiers  
1.00 Simulation  
1.10 Simulation  
1.20 Préparation Simulation sur Tomo  
1.30 Préparation Simulation sur Tomo  
1.40 Simulation MVCT  
1.50 Exportation sur Focal (Simul MVCT)  
2.00 Dose Plan Basis  
3.00 Contourage de volumes  
3.10 Validation des volumes

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... one team

... one step

... one physician/physicist

... a mix of teams/users/steps





IT world

## 1. Upgrade & update



## 2. QA ! [specific & process]

- Link R&V Linac
- Dicom transfers (CT, TPS, CBCT, OIS, ...)
- Dosimetric calculation/parameters (TPS)
- DB consistency (= post-validation stability)
- IT systems consistency (OS, Applications, ...)
- Tomorrow:
  - Data Mining
  - Clinical aid decision (Adaptive TRT)
  - Process intelligence
  - Machine learning, ...



The process [including data transfers] become « the product » throughout which a QC will be applied.

AAPM TG100: *Method for Evaluating QA Needs in Radiation Therapy*

**iTherapy Process**  
the way to go, the way to know

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URGENCE SOUS 72H

Process	Etape	Nom	MedAss/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio	4.20		LR / SBO / SV	1	1	1	1	-0.8 h	...	Tomo2
Radio	4.00		PS / CSA / EB	1	1	1	1	-1.8 h	...	SP18
Radio	3.10		CX / OK /	1	1	1	1	-1.8 h	...	SP18
Radio	4.20		LR / SBO / SV	1	1	1	1	-1.8 h	-48 J. 8 h	Tomo2
Radio	0.30		LR / SBO / SV	1	1	1	1	-1.8 h	-48 J. 8 h	Tomo2
Radio	0.30		PS / I	1	1	1	1	-1.8 h	...	SL25
Radio	6.00		PS / CSA /	1	1	1	1	-1.8 h	...	Tomo1
Radio	4.70		PS / CSA /	1	1	1	1	-1.8 h	...	Tomo1
Radio	4.00		CX / PSM / EB	1	1	1	1	-1.8 h	...	SP18
Radio	4.30		XG // AD	1	1	1	1	-1.8 h	...	SL25
Radio	4.30		PS / CSA / EB	1	1	1	1	-1.8 h	-24 J. 8 h	SL25
Radio	6.00		UR / SBO / SV	1	1	1	1	-1.8 h	...	SP18
Radio	4.30		LR / SBO / SV	1	1	1	1	-0.8 h	...	Tomo2
Radio	4.30		LR / SBO / SV	1	1	1	1	-0.8 h	...	Tomo2
Radio	4.00		UR / SBO / SV	1	1	1	1	-0.8 h	-48 J. 8 h	Tomo2
Radio	4.00		LR / SBO /	1	1	2	1	-1.8 h	-48 J. 8 h	Tomo2
Radio	6.00		CX / PSM / EB	1	1	1	1	-3.8 h	-29 J. 8 h	SP18
Radio	5.20		DW / PSM / EB	1	1	2	1	-3.8 h	-29 J. 8 h	SP18
Radio	3.00		OK / SBO / AD	1	1	1	1	-3.8 h	-42 J. 8 h	SP18
Radio	4.00		PS / CSA /	1	1	1	1	-0.8 h	...	SL25
Radio	0.30		UR / SBO /	1	1	1	1	-0.8 h	...	SP18
Radio	0.30		XR / SBO /	1	1	1	1	-0.8 h	...	SP18
Radio	4.00		LR / SBO /	1	1	1	1	-2.8 h	...	SP18
Radio	0.30		PS / I	1	1	1	1	-0.8 h	...	Tomo1
Radio	4.00		UR / SBO /	1	1	1	1	-0.8 h	...	SP18
Radio	4.00		LR / SBO /	1	1	2	1	-1.8 h	...	Tomo2
Radio	4.00		CX //	1	1	1	1	-3.8 h	-29 J. 8 h	SP18
Radio	3.00		CX / PSM /	1	1	1	1	-2.8 h	-29 J. 8 h	SP18

PATIENTS EN CC

Process	Etape	INT	MedAss/Phys	Req	Site	PTV	Plan	Start PTV1	Start PTV2	Machine
Radio	12.00		PS / SBO / EB	1	1	1	1	+0 J. 16 h	...	SL25
Radio	10.00		PS / SBO / EB	1	1	1	1	+0 J. 16 h	...	SL25
Radio	4.20		LR / CSA /	1	1	1	1	+36 J. 16 h	...	SL25
Radio	12.00		UR / SBO / SV	1	1	1	1	-0.8 h	...	Tomo2
Radio	12.00		UR / SBO / SV	1	1	1	1	+0 J. 16 h	-44 J. 8 h	Tomo1
Radio	12.00		DK / PSM / JMD	1	1	1	1	+46 J. 16 h	...	SP18

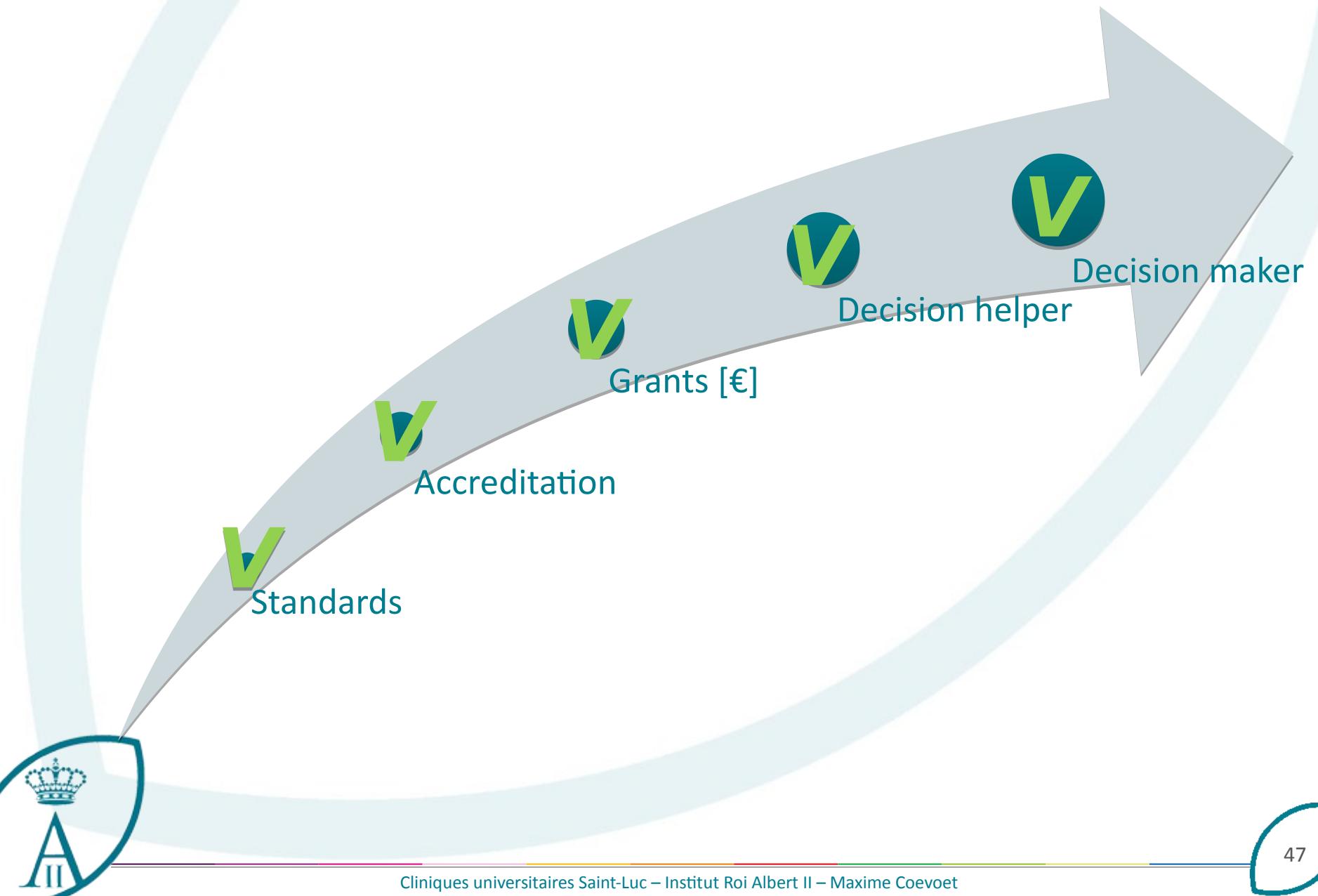
MX - logo  
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**iTherapy Process** [[www.itp.wf](http://www.itp.wf)]

Workflow manager by checklist

# Regulatory: huge challenge!

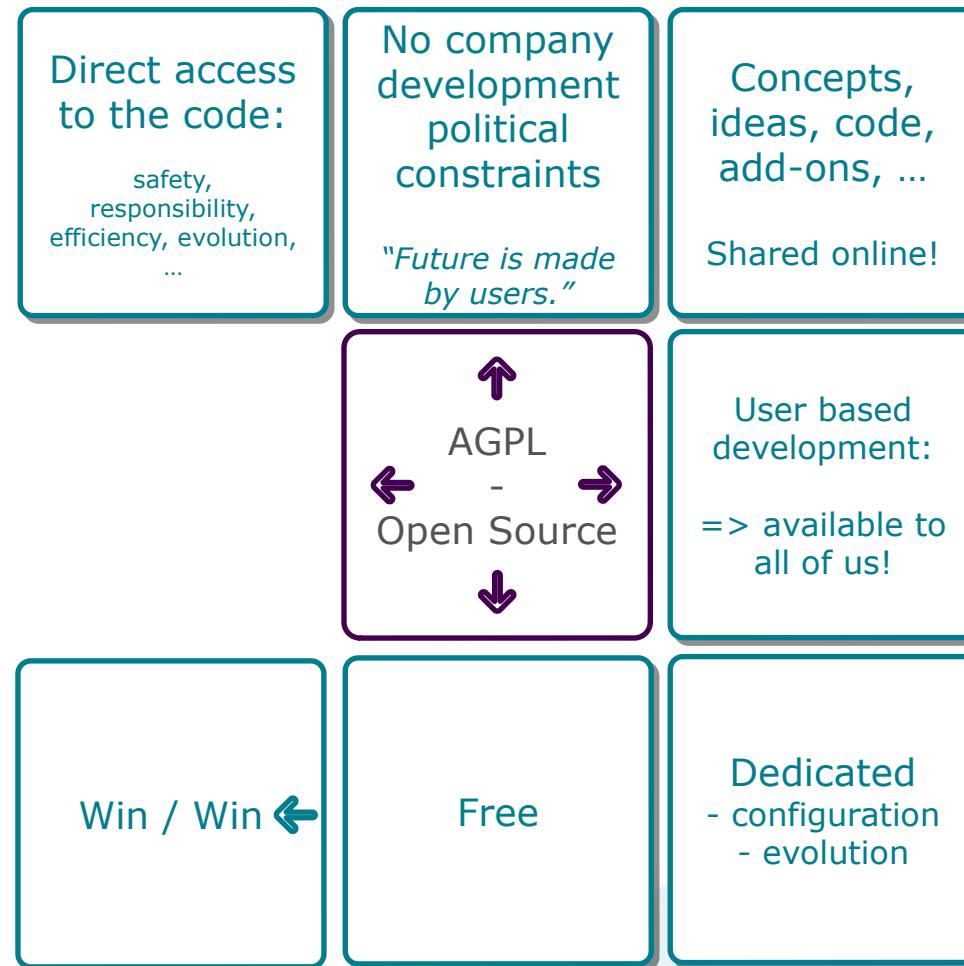




**iTP** is a Treatment Planning System that integrates all aspects of cancer treatment planning and delivery. It includes modules for medical oncology, radiation therapy, and surgery. Key features include Tumor Planning, Protons Physics, Chart Mechanic, Dosimetry MPE, Chemotherapy, BrachyTherapy, ClinicalPathways, OncologyInformationSystem, Contouring, Electronic TreatmentPlanningSystem HL7, Simulation Radiotherapy, Optimisation, Electrons, MaskDelivery, Surgery, iTherapyProcess Assurance, OAR Target Quality Process, Physician Volume, Engineer Patient, DicomRT DVH, PTV Beam.

# Licence: AGPL

« Same concept as a recipe »



## Conclusions

- Standardization of workflow
- Integration of checklists and forcing functions
- Clear task attribution
- Workflow monitoring
- Increased efficiency
- Decreased risk of error

## Challenges

- Automation
- More integration
- Clinical & Digital WORKFLOWS link



*ITP*.wf



Thank you!

[www.itp.wf](http://www.itp.wf)

