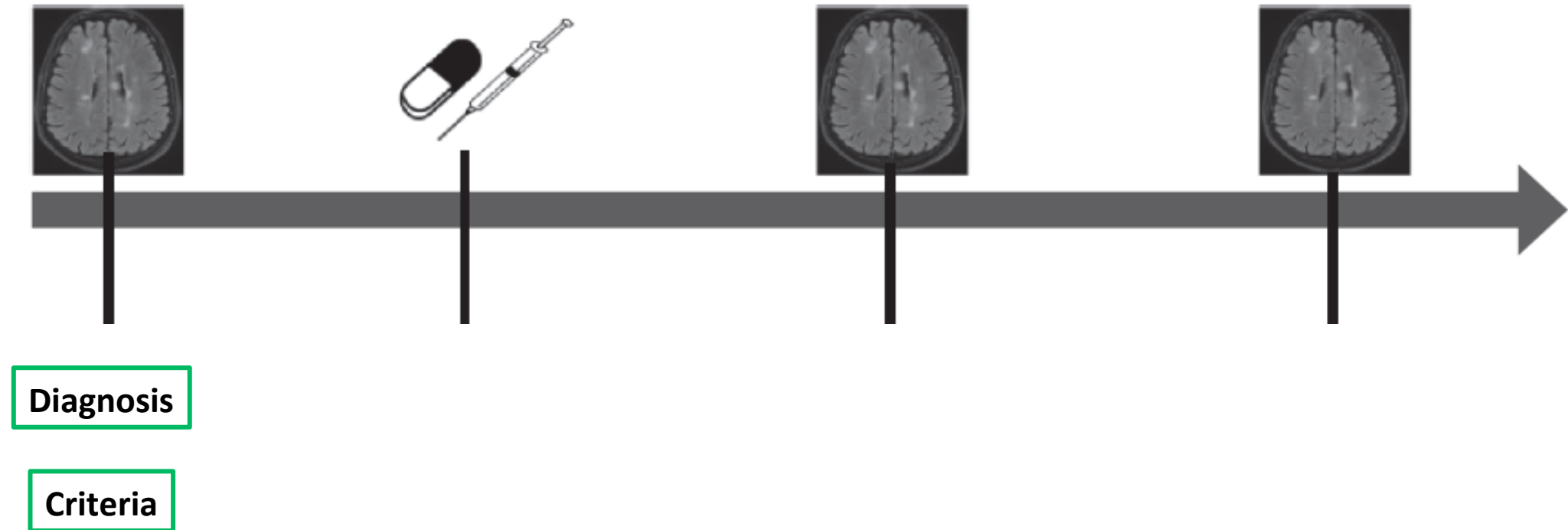
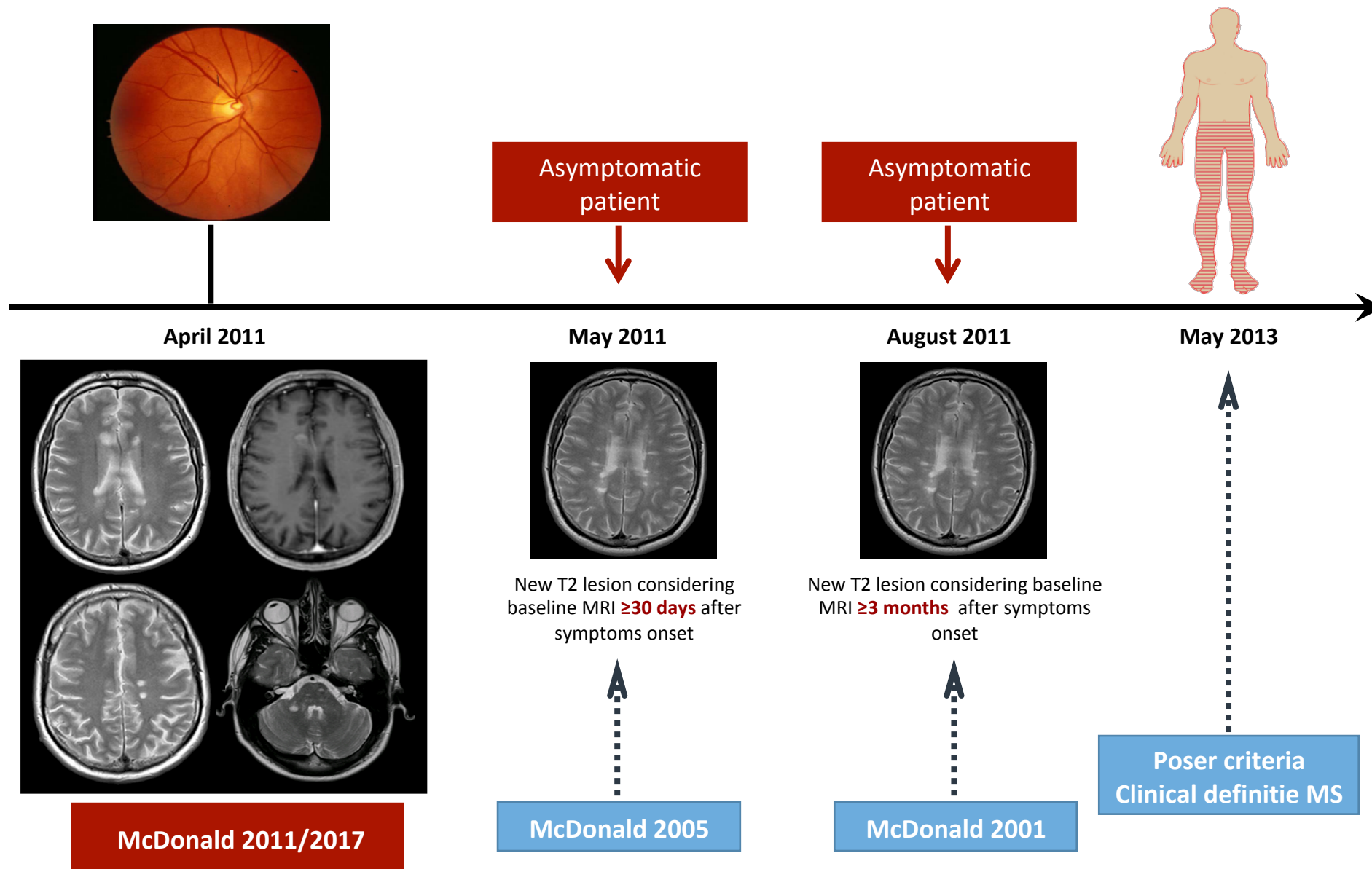


MUSIC Project

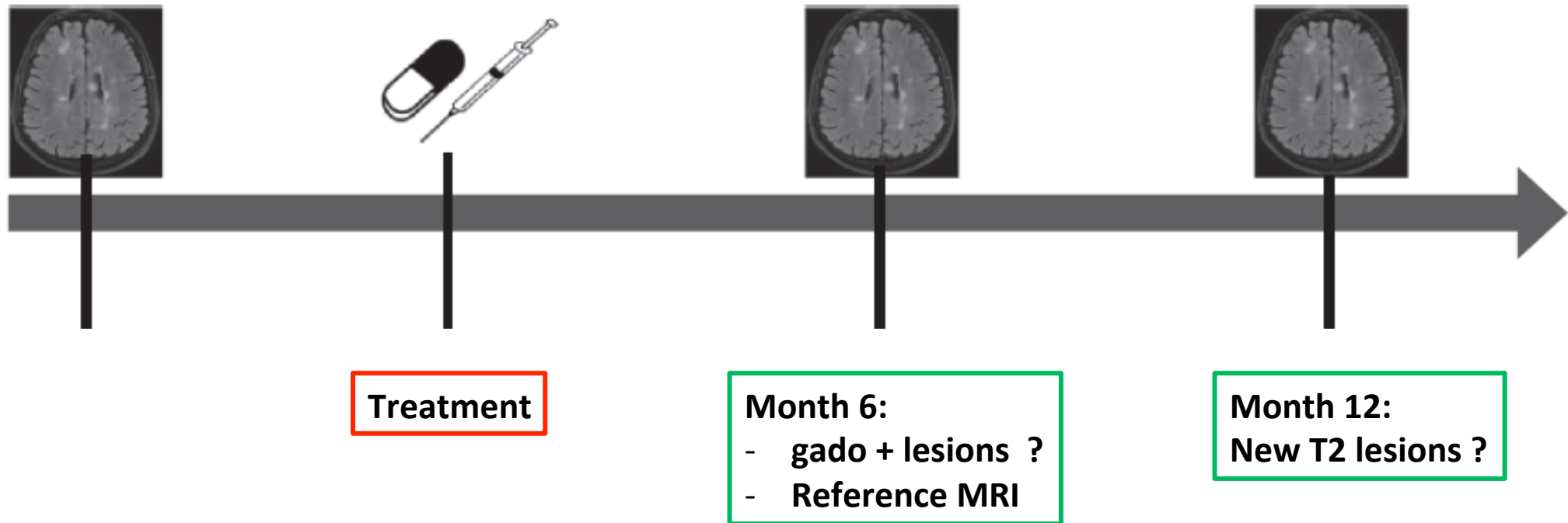
Gilles Edan and Anne Kerbrat

MRI in early RRMS patients



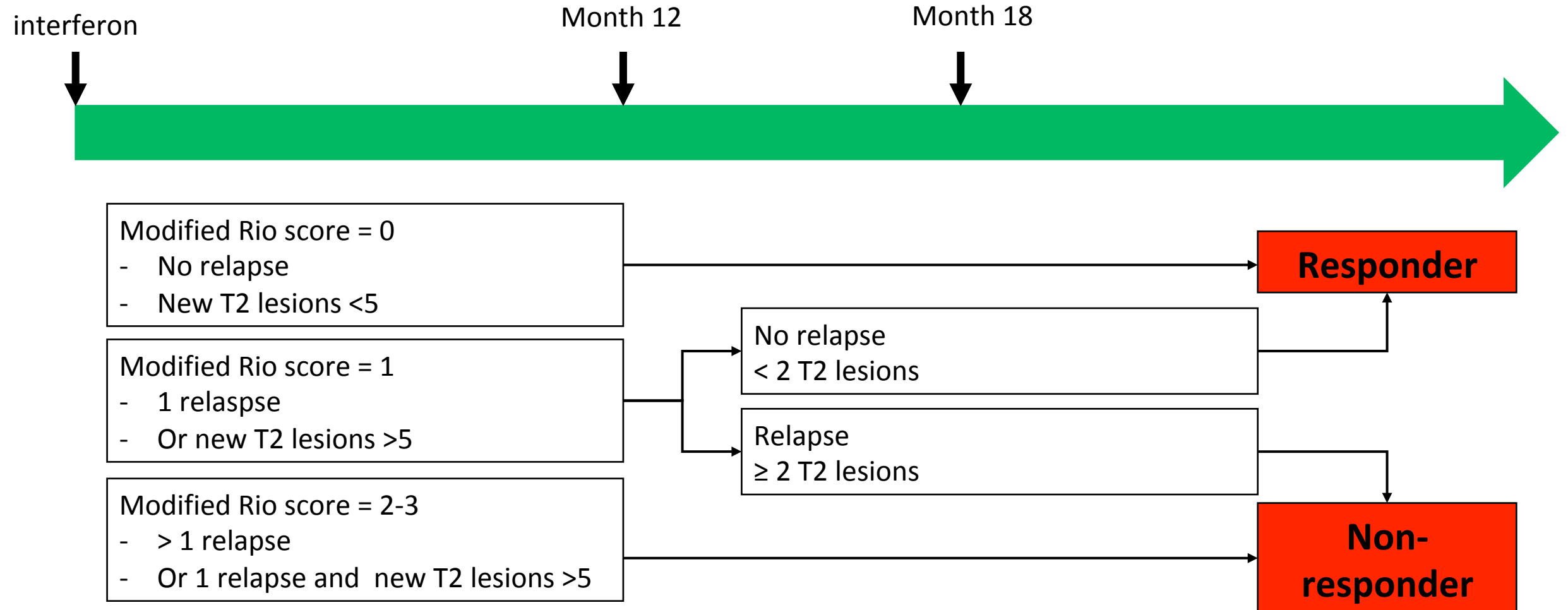


MRI in early RRMS patients



MRI to assess treatment response

(Sormani MP et De Stefano N
Nat. Rev. Neurol, 2013)



Assessing response to interferon-beta in a multicenter dataset of patients with MS.

Sormani, Maria; Gasperini, Claudio; Romeo, Marzia; Rio, Jordi; Calabrese, Massimiliano; Cocco, Eleonora; Enzinger, Christian; Fazekas, Franz; Filippi, Massimo; Gallo, Antonio; Kappos, Ludwig; Marrosu, Maria; Martinelli, Vittorio; Prosperini, Luca; Rocca, Maria; Rovira, Alex; Sprenger, Till; Stromillo, Maria; Tedeschi, Giocchino; Tintore, Mar; Tortorella, Carla; Trojano, Maria; Montalban, Xavier; Pozzilli, Carlo; Comi, Giancarlo; De Stefano, Nicola

Neurology. 87(2):134-140, July 12, 2016.

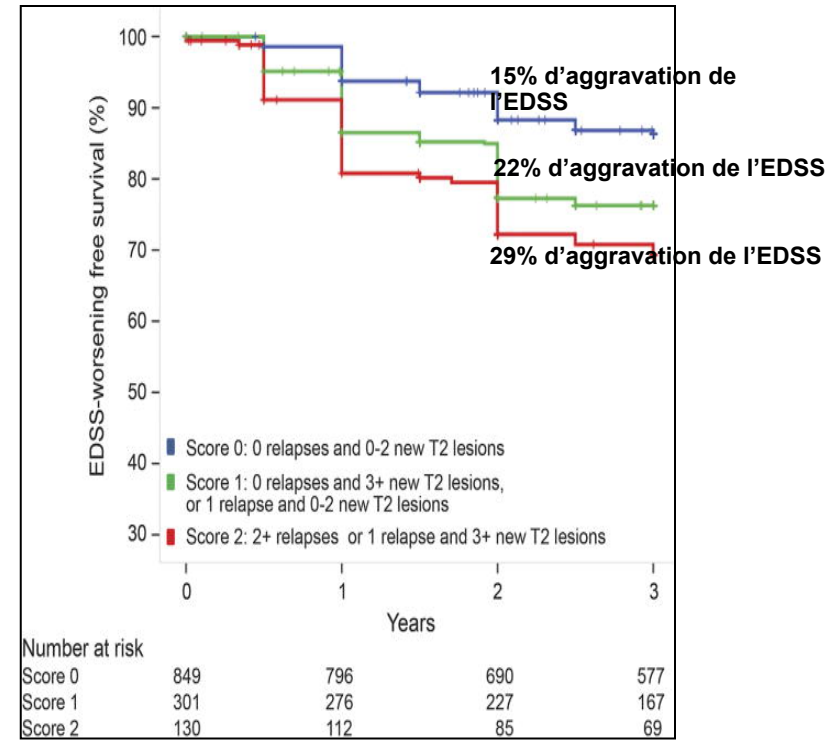
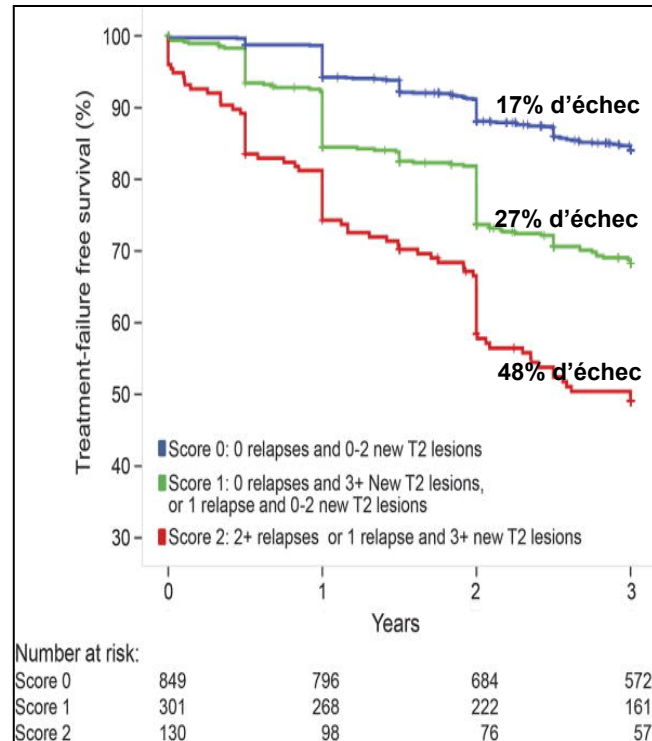
Table 3 Multivariate Cox model on the merged MAGNIMS dataset for risk of 3-year treatment failure on 1-year variables (excluding Rome center) (n = 1,280)

Variables	HR (95% CI)	p Value
New T2 lesions = 0	Ref	
New T2 lesions = 1	0.93 (0.62-1.4)	0.76
New T2 lesions = 2	1.13 (0.73-1.76)	0.58
New T2 lesions = 3	1.55 (0.92-2.60)	0.09
New T2 lesions = 4	2.36 (1.35-4.16)	<0.001
New T2 lesions = 5	1.87 (0.81-4.37)	0.14
New T2 lesions = 6+	2.57 (1.53-4.33)	<0.001
Relapse = 0	Ref	
Relapse = 1	1.84 (1.39-2.44)	<0.001
Relapse = 2+	3.03 (2.06-4.45)	<0.001

Assessing response to interferon-beta in a multicenter dataset of patients with MS.

Sormani, Maria; Gasperini, Claudio; Romeo, Marzia; Rio, Jordi; Calabrese, Massimiliano; Cocco, Eleonora; Enzinger, Christian; Fazekas, Franz; Filippi, Massimo; Gallo, Antonio; Kappos, Ludwig; Marrosu, Maria; Martinelli, Vittorio; Prosperini, Luca; Rocca, Maria; Rovira, Alex; Sprenger, Till; Stromillo, Maria; Tedeschi, Gioacchino; Tintore, Mar; Tortorella, Carla; Trojano, Maria; Montalban, Xavier; Pozzilli, Carlo; Comi, Giancarlo; De Stefano, Nicola

Neurology. 87(2):134-140, July 12, 2016.



We need to optimise the use of MRI...

The objectives

- To standardise MRI acquisition
- To store the MRI data
- To visualize the new T2 lesions
- To visualize gado+ lesions



How ?

- Fast
- Intuitive (colour code)

Who ?

- Early MS patients
- Radiologist and neurologist

Example (1)

Prague (2015)

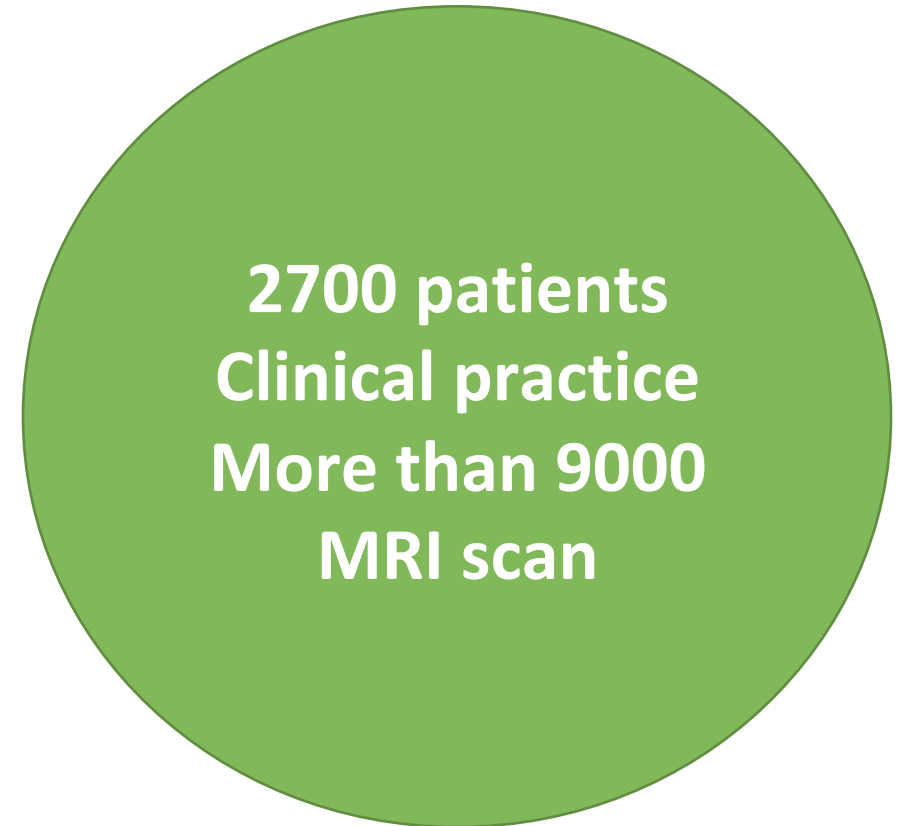
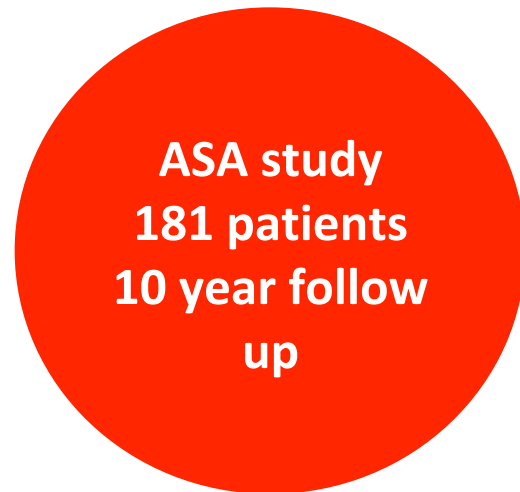


Dana Horakova

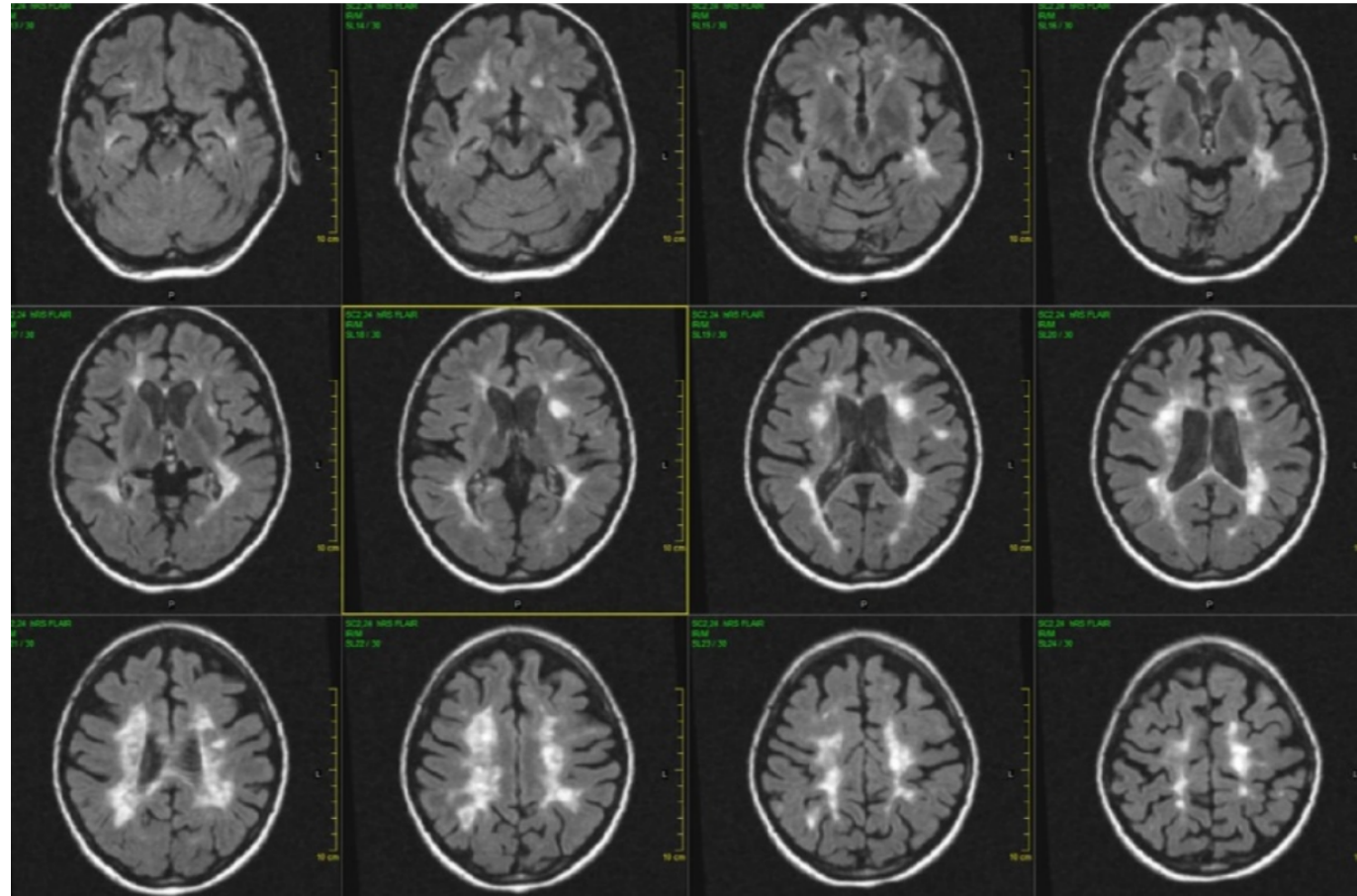


Jan Krasensky

Example (1)

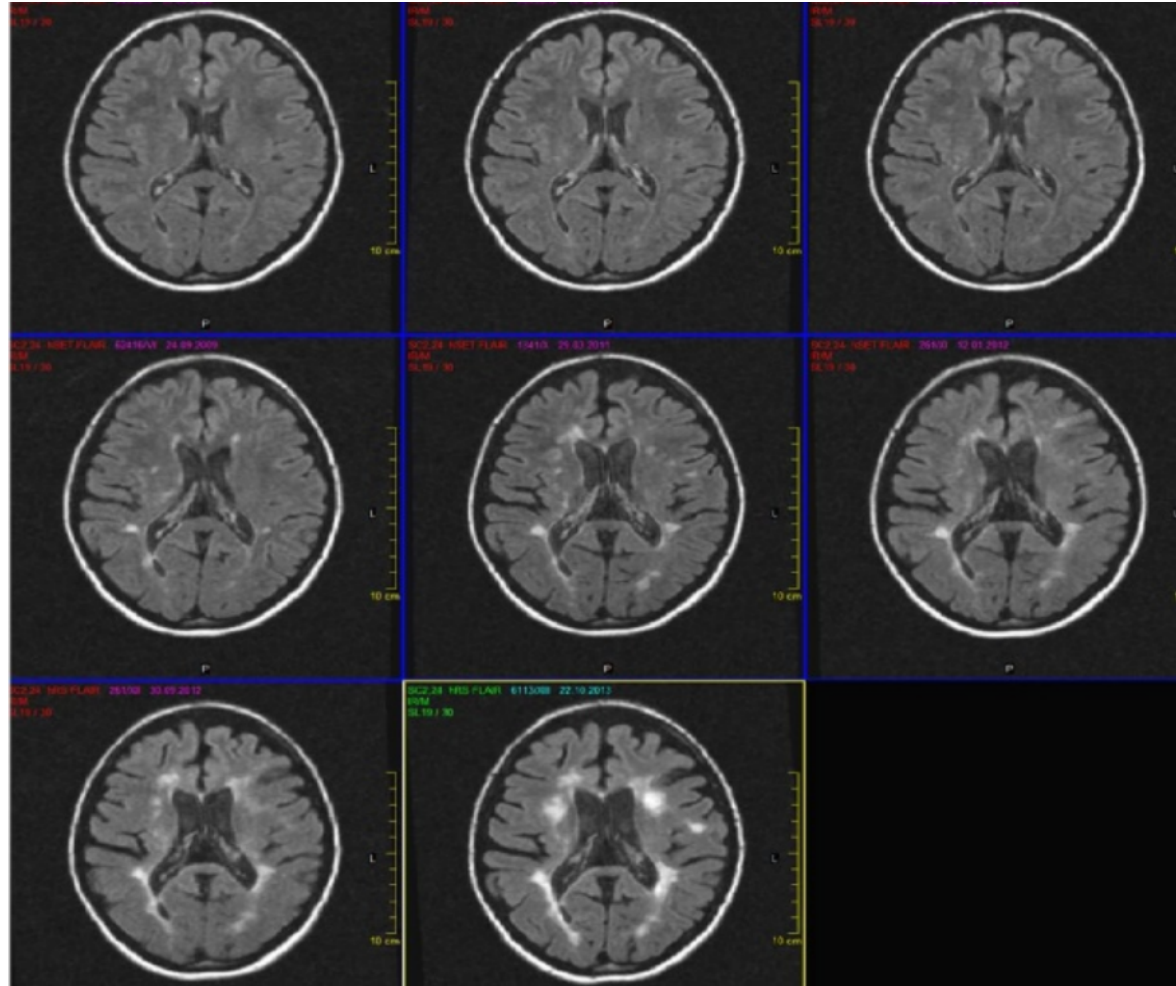


Example of a patient



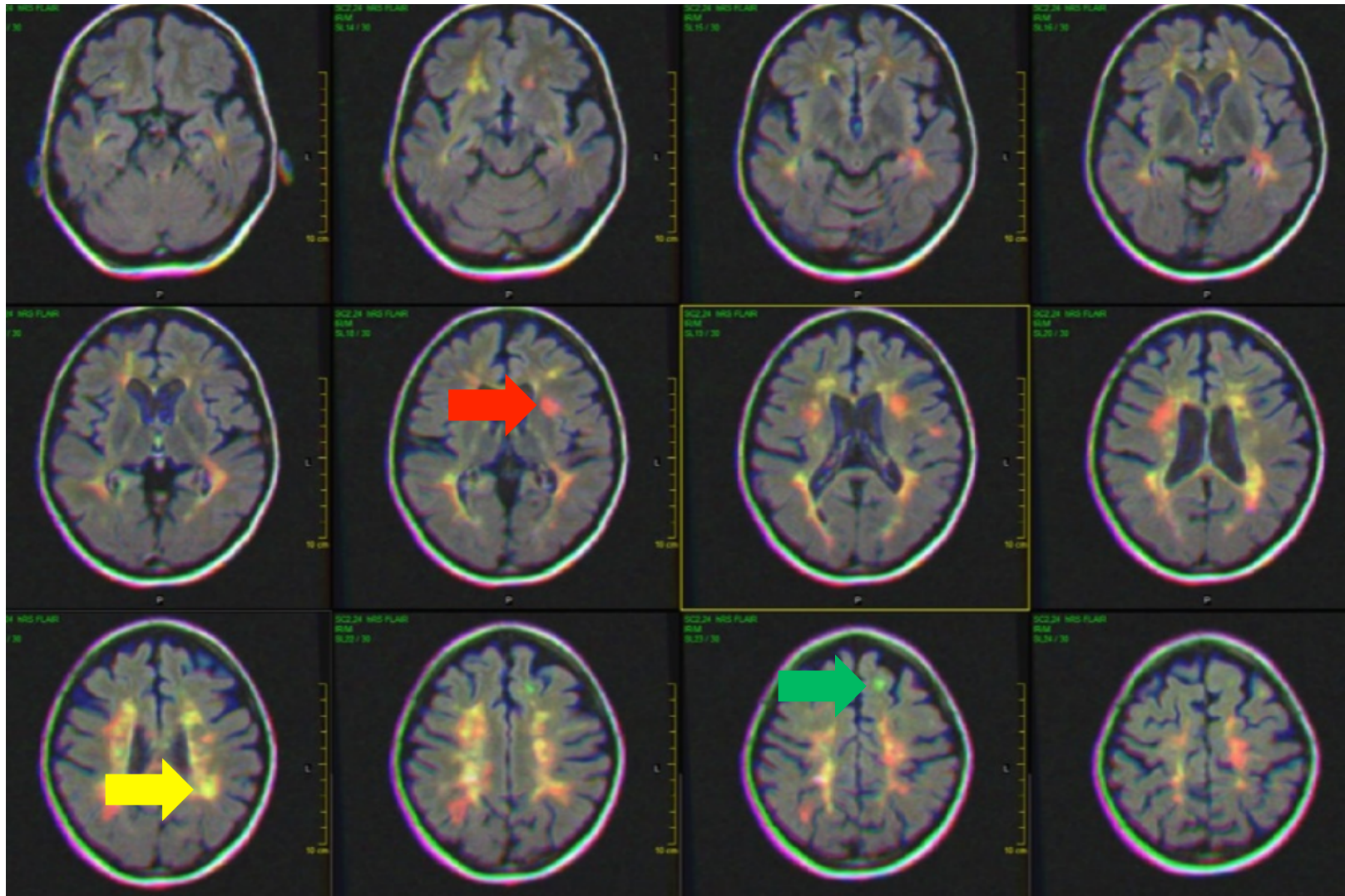
Registration

From 2007



to 2014

Lesions segmentation



Results

Date	Code of purpose	Research	Effects	Anatomy	Pathology	Load	BPF	Atrophy	CC (%)
13.06.2006				HEAD	1.7.1				
15.08.2006				HEAD	1.7.1	0.58	84,864	0.00	0,000
17.01.2007				HEAD	1.7.1	0.66	83,888	-2.01	-3,307
15.08.2007				HEAD	1.7.1	0.79	83,634	-2.51	-6,688
11.08.2008				HEAD	1.7.1	0.92	84,181	-1.42	-4,227
24.09.2009				HEAD	1.7.1	3.82	83,830	-2.86	-18,623
27.10.2009				SPINE C-TH	1.7.1				
12.03.2010				HEAD	1.7.1				
13.10.2010				HEAD	1.7.1	14.37			
29.03.2011				HEAD	1.7.1	11.51	80,127	-7.78	-28,991
12.01.2012				HEAD	1.7.1	12.59	81,674	-5.60	-32,471
30.09.2012				HEAD	1.7.1	21.07			
22.10.2013				HEAD	1.7.1	48.75	79,666	-9.31	-38,016

MUSIC Project

Objective:

To improve the use of MRI data in clinical practice

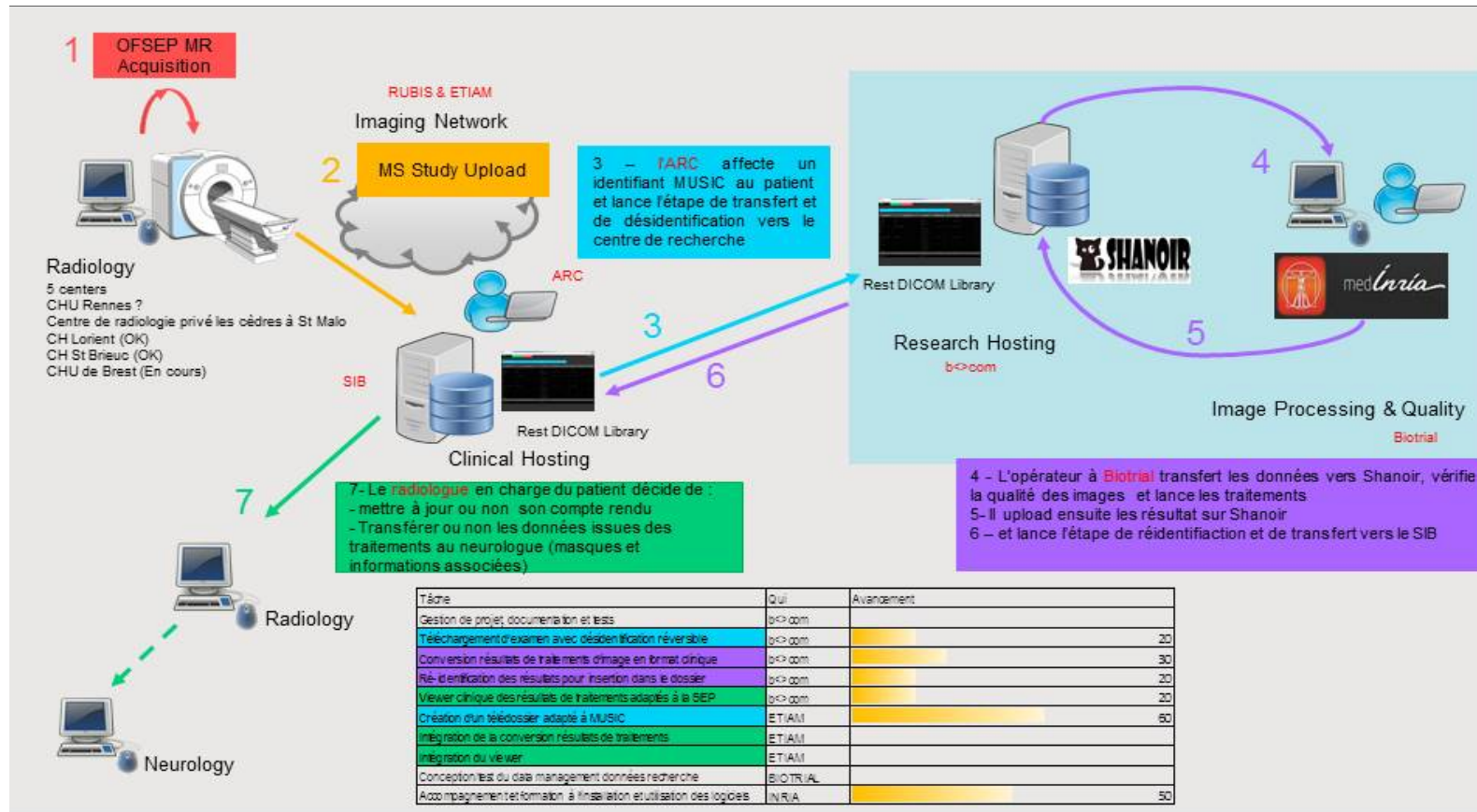
- **To have standardised MRI acquisition**
- **To store the MRI data of MS patients (in Brittany)**
- **To detect and visualize the new T2 lesions**

The actors of the project

Radiologist

neurologist

Visages
INRIA

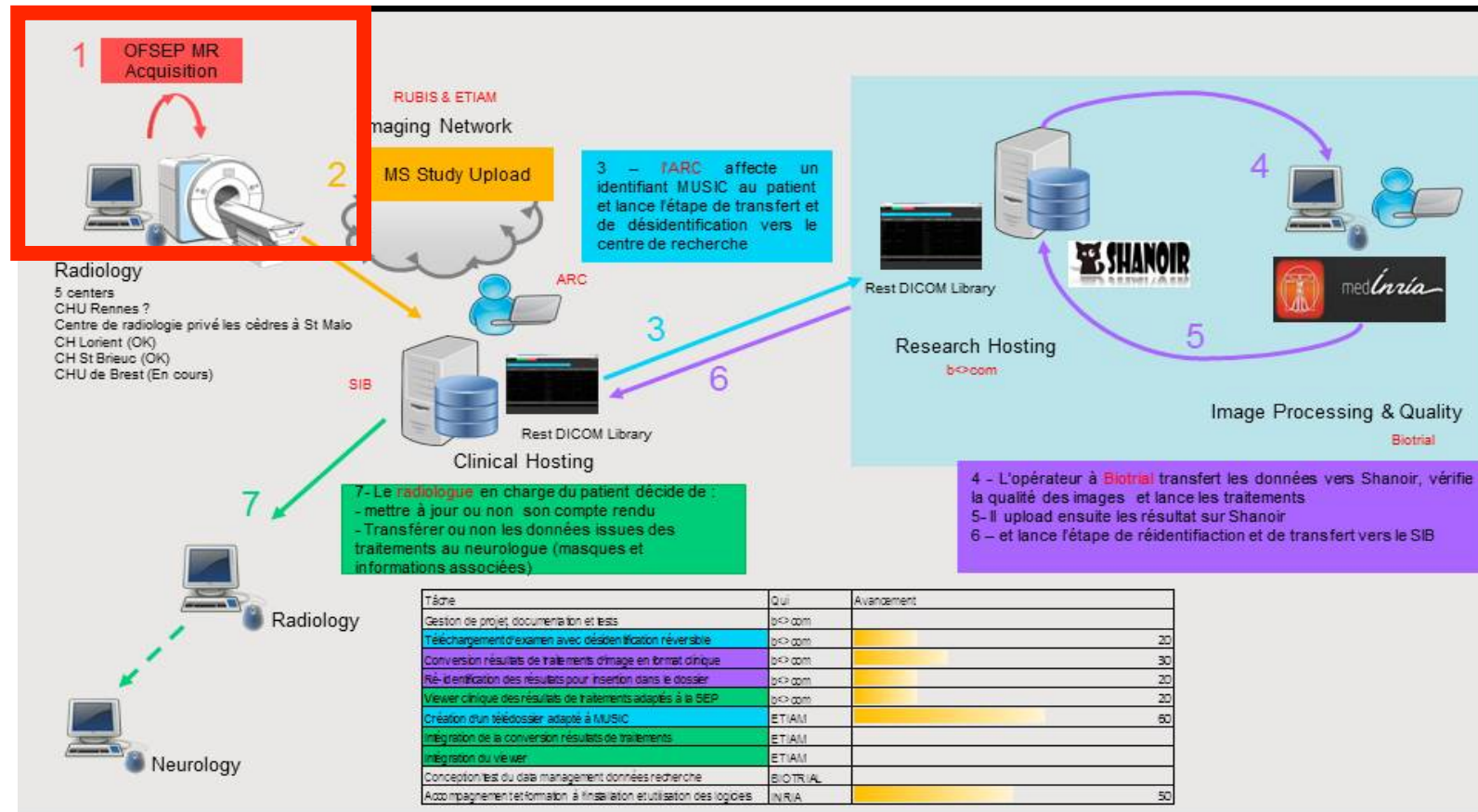


B-com

Biotrial

Pharmaceutical
companies

The steps of the project



Step 1: standardised MRI data

OFSEP protocol

Protocole IRM du cerveau

Recommandé

- 3D T1

- DWI Axiale avec carte ADC

- 2D DP/T2 Axiale ou 3D T2

=> *Injection de Gadolinium (0.1 mmol/kg)*

- 3D FLAIR ou 2D FLAIR Axiale si la 3D FLAIR n'est pas disponible sur la machine) [C4 – avec reconstruction]

- 3D T1 Gadolinium

Optionnel

- DTI \geq 15 directions (pour remplacer le DWI)

- 2D T2 EG (recommandé pour un premier diagnostic)

Protocole IRM de la moelle

Recommandé

- T2 Sagittale

- T1 Sagittale avec injection de gadolinium (recommandé pour un premier diagnostic)

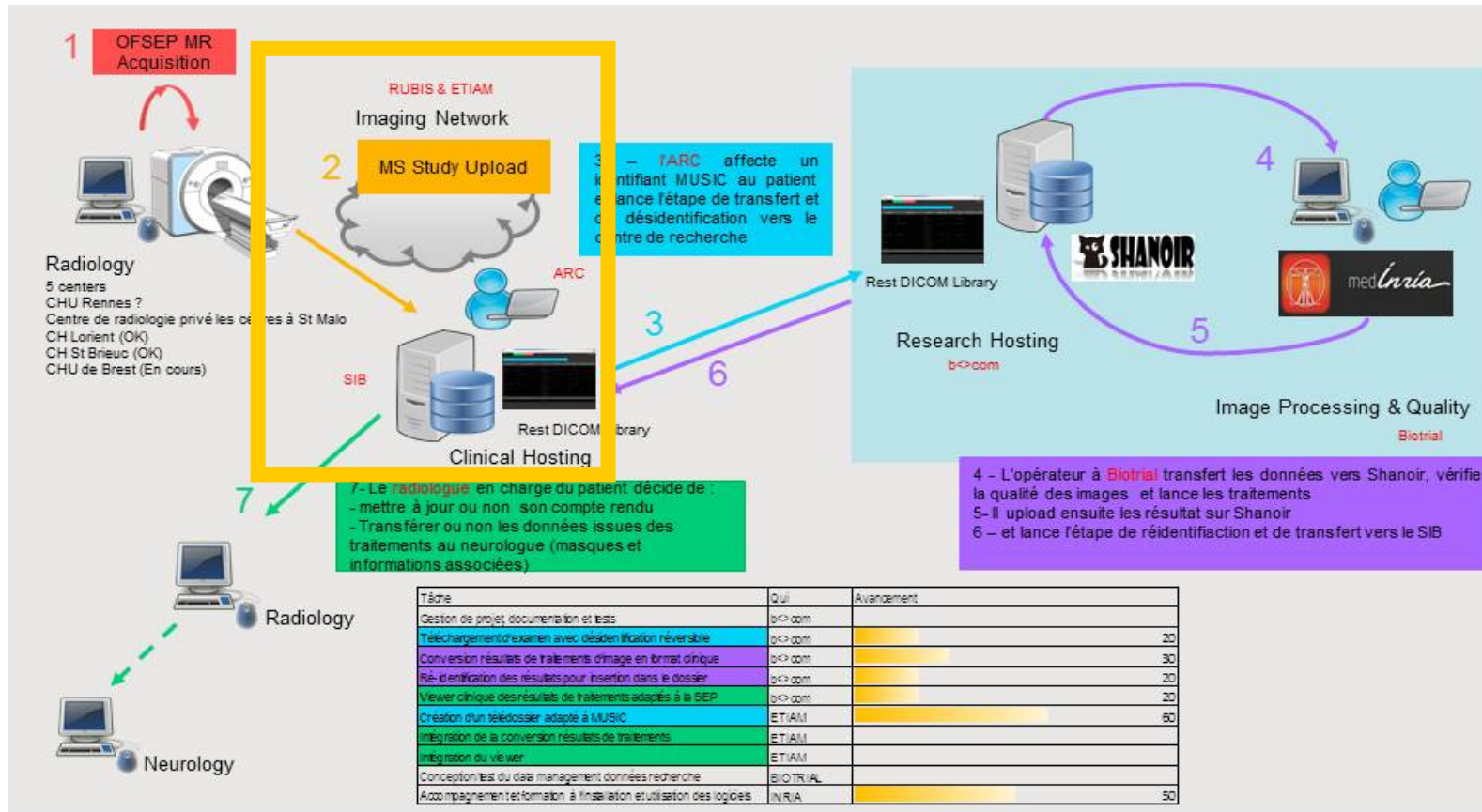
Optionnel

- T2 EG Axiale

- T1 Axiale (avec injection de Gadolinium)

- STIR Sagittale

The steps of the project



Step 2: the data are sent and stored

etiam Nexus | Télédossiers 📅 ? 🔔 61 Anne KERBRAT

Transfert d'imagerie (v4)
Créé le 10 oct 2016 - 16:56
Routine En cours de création

Patient 🔍

Nom :
Prénom :
Né(e) le :
Sexe :
Identifiant :

Expéditeur
KERBRAT Anne Envoyer au nom de :

Correspondants

Demande

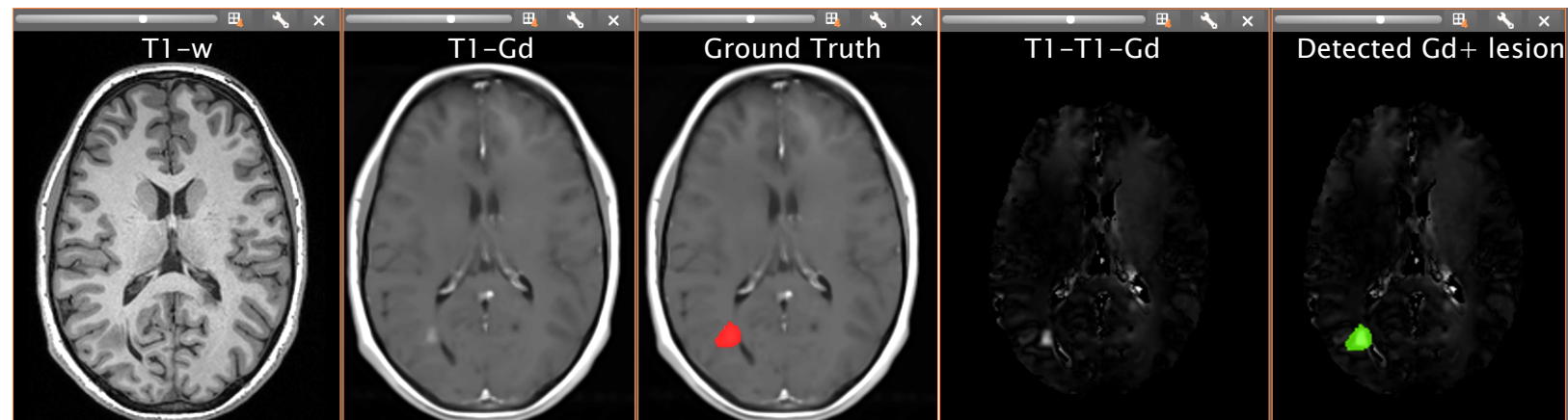
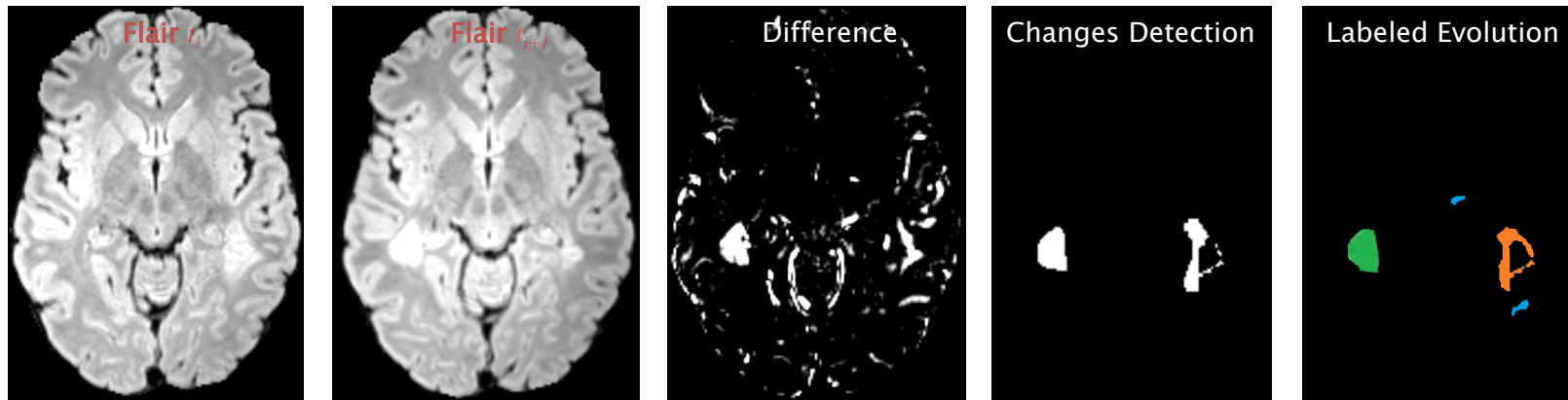
Commentaire

Examens DICOM Cette version de télédossier ne permet pas d'ajouter d'examens depuis le télédossier. Accédez à la page "Examens" et sélectionnez l'examen voulu.

Documents joints



Step 3: lesion detection



Step 3: a delicate step...

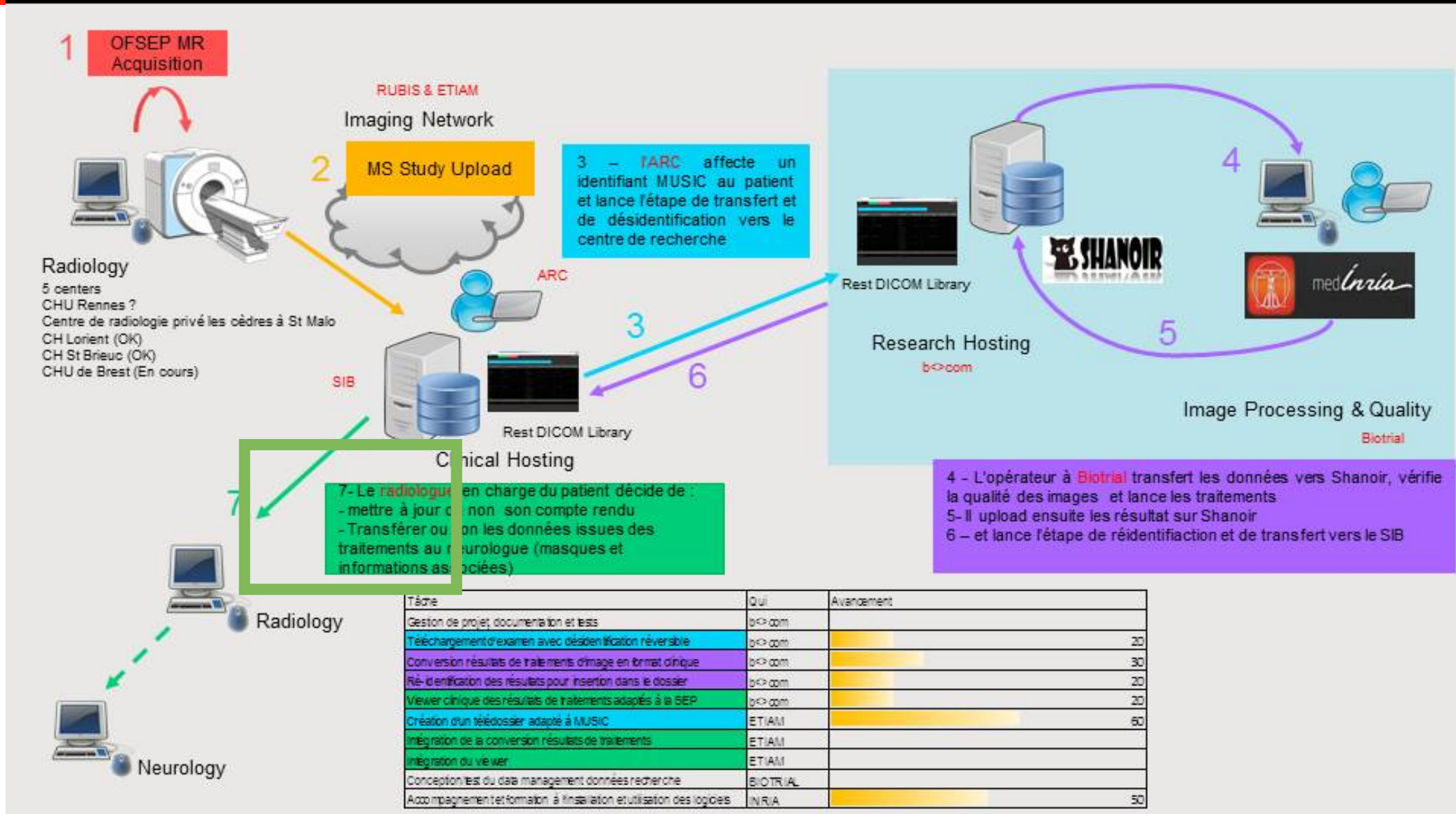
A study to improve and validate the tool (pocadims)

A post doctoral researcher

ETUDE POCADIMS

Performance d'un outil d'aide au diagnostic des lésions visualisées en IRM dans le diagnostic et le suivi de la SEP (CADIMS) en pratique clinique

The steps of the project

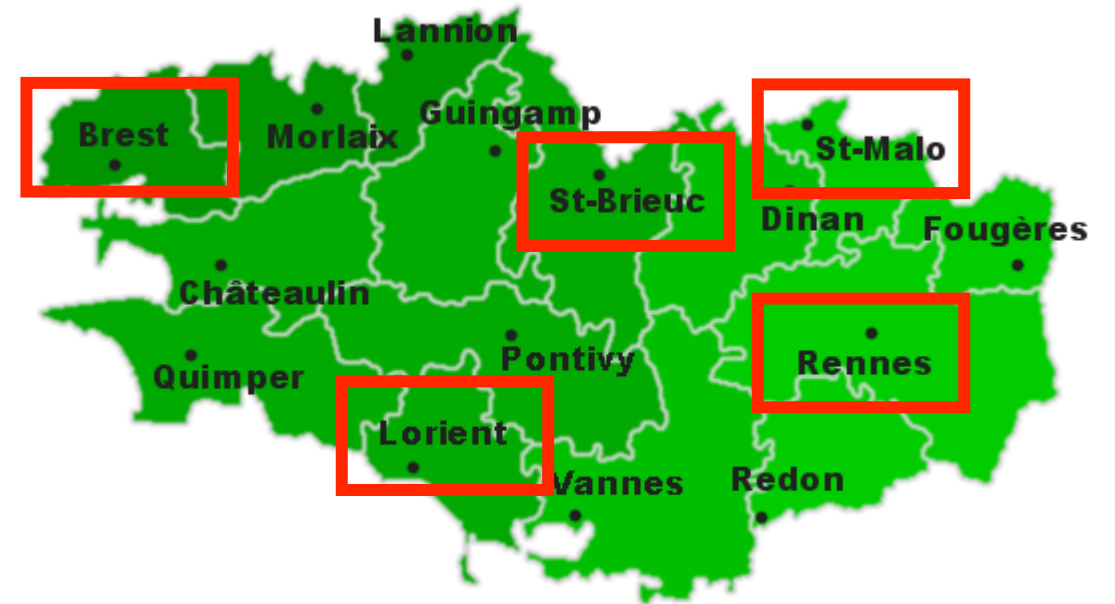


Step 4: an image viewer

The screenshot displays the b.com CADIMS Viewer interface. At the top left, the logo "b.com" and the title "* CADIMS Viewer *" are visible. On the top right, there is a "DISPLAY REPORT" button with a help icon. Below the header, there are navigation icons for brain slices and a "Slice" control with minus and plus buttons. A color calibration bar at the top right includes sliders for "New lesions" (yellow), "Increasing lesions" (blue), "Gado lesions" (red), and "Dropping lesions" (green). The main area is divided into three vertical panels, each showing a brain MRI slice. The left panel shows a "Reference date: 2016-06-24" and "OFSEP 3D FLAIR: Registered" with a WW/WC slider. The middle panel shows "StudyDate: 2017-09-26" and "T1 MPRAGE OFSEP : Registered" with a WW/WC slider. The right panel shows "StudyDate: 2017-09-26" and "3D FLAIR FS OFSEP : Registered" with a WW/WC slider. Each panel also displays "158 / 255" indicating the current slice position. The rightmost slice shows a small orange lesion.

Where are we now ?

- The 5 steps have been implemented
- 5 experimental sites
 - Rennes university hospital
 - Brest university hospital
 - St Briec hospital
 - Lorient hospital
 - St Malo
- 9/200 patients



Translational research: Crossing the Valley of Death...



Butler D. 2008, Nature

Merci pour votre attention

