

Innovation in the clinical management of patients with complex BJI: experience at the Lyon CRIOAc infection reference centre

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Centre de Référence des IOA complexes de Lyon



Multidisciplinar management

The level of interaction is variable

Surgery

Orthopedic suraeon

Interested in septic surgery?

Bone and joint infections

A full investment & strong interactions are required in complex cases

OPTIMAL DECISION

THE BEST MEDICO-SURGICAL STRATEGY

Microbiologist

Microbiologist

Infectiologist

Interested in septic surgery?

Interested in septic surgery?

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CRIOAc concept in France

- *Centre de Référence des Infections ostéoarticulaires complexes*
- Regional reference centers for the management of complex BJI
- A network established by the DGOS (Health ministry)

Why?

- Incidence of complex BJI is fortunately low
- But is associated with high morbidity, motor disability, cost and mortality
- Wandering patients undergoing numerous suboptimal surgeries

CRIOAc concept in France

- ***Centre de Référence des Infections ostéoarticulaires complexes***
- Regional reference centers for the management of complex BJI
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How?

- By labelling university hospitals through the territory
- Provide funding for
 - 1 secretary and 1 study nurse per center
 - The creation of a dedicated secure national website to perform multidisciplinary meetings
 - Revaluation of the surgical act (paid 12% more)

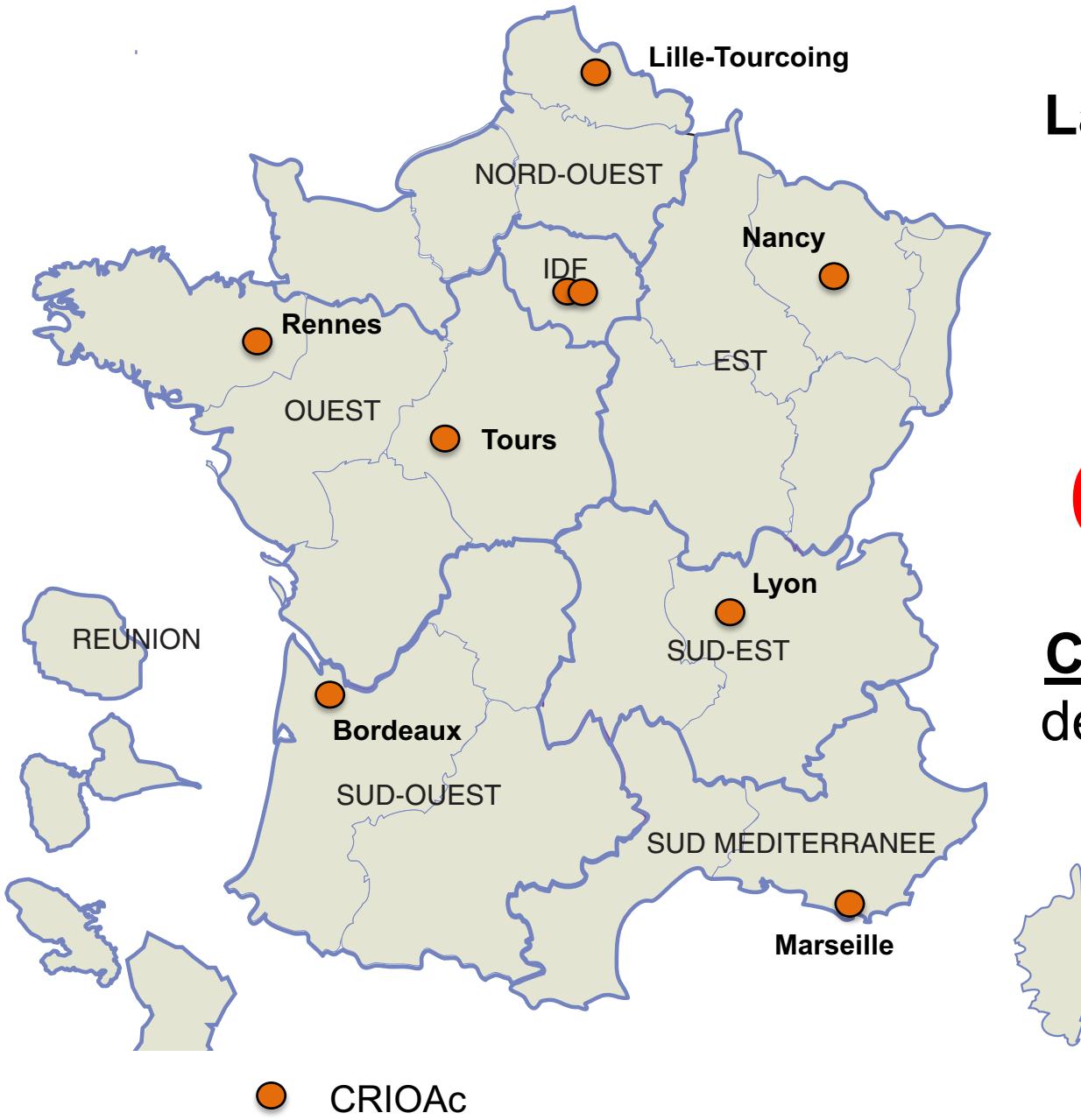
CRIOAc concept in France

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In order to:

- Facilitate the multidisciplinar management of BJI
- Increase the skill of dedicated physicians
- Create winning teams
- Promote the research and education in the field of BJI

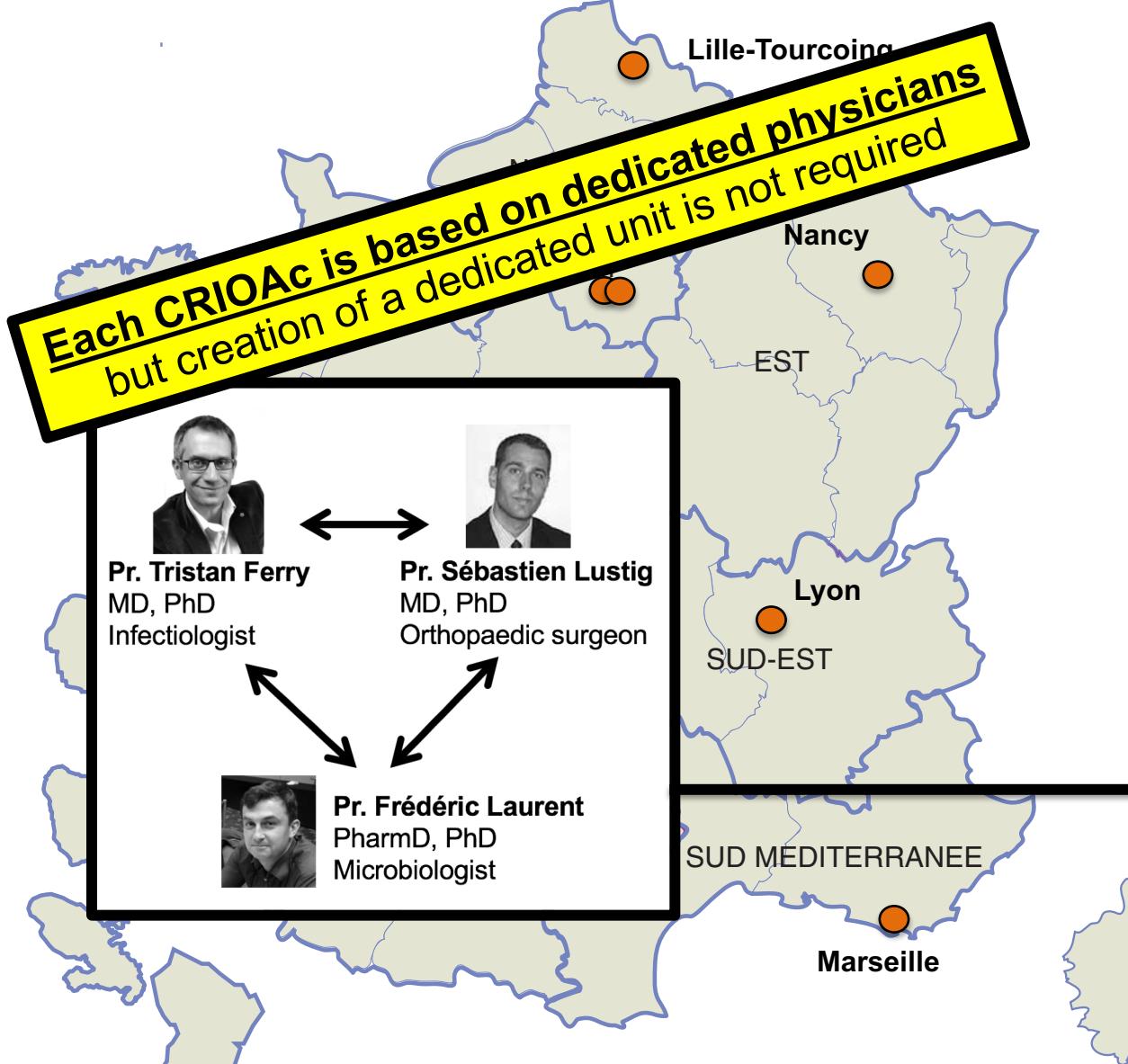




Labellisation by the
French health
ministry of
Regional centers

CRIOAc

Centre de Référence
des Infections Osteo-
Articulaires
complexes



2013

Sud-Est - CR - Hôpitaux civils de Lyon - RCP Chirurgie Septique

MO [REDACTED] E, 72 ans

Contexte de la RCP	Synthèse clinique	Localisation/Microbiologie/Chirurgie	Antibiothérapie	Finalisation et validation de la RCP												
Episode : <input type="radio"/> Premier épisode <input checked="" type="radio"/> Rechute	Motif : <input type="radio"/> Stratégie médico-chirurgicale <input type="radio"/> Bilan pré-thérapeutique <input checked="" type="radio"/> Réévaluation en cours de traitement <input type="radio"/> Deuxième temps de chirurgie après infection	Passage en recours/deuxième avis : <input checked="" type="radio"/> Oui <input type="radio"/> Non	<ul style="list-style-type: none">• Pdf documents• Incorporated in the patient's chart• Medicolegal importance													
<table border="1"><thead><tr><th colspan="2">Précédentes fiches RCP</th></tr></thead><tbody><tr><td>Intitulé RCP</td><td>Date de passage</td></tr><tr><td>+ HCL</td><td>15/05/2014</td></tr><tr><td>+ HCL</td><td>20/03/2014</td></tr><tr><td>+ HCL</td><td>16/01/2014</td></tr><tr><td>+ HCL</td><td>05/12/2013</td></tr></tbody></table>					Précédentes fiches RCP		Intitulé RCP	Date de passage	+ HCL	15/05/2014	+ HCL	20/03/2014	+ HCL	16/01/2014	+ HCL	05/12/2013
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<p>Page 1 sur 1 Page courante 1 - 5 sur 5</p>																



Contexte de la RCP **Synthèse clinique** **Localisation/Microbiologie/Chirurgie** **Antibiothérapie** **Finalisation et validation de la RCP**

Age : 72 Poids actuel : 89 kg Taille : 175 cm IMC : 29.06

Dosage CRP : 25 mg/L

Score ASA : 3 - Patient avec anomalie systémique sévère

Créatininémie : 120 µmol/L Clairance de la créatinine : 52,5 mL/min/1,73m²

Comorbidités ou terrains interférents :

- Insuffisance rénale Insuffisance hépatique Insuffisance cardiaque
- Polypathologie Immunodépression Diabète

Justification :

Facteurs de risque :

- | | |
|---|---|
| <input checked="" type="checkbox"/> Traitement immunosupresseur | <input type="checkbox"/> Infection par le virus VIH ou par les virus des hépatites |
| <input type="checkbox"/> Cirrhose | <input type="checkbox"/> Néoplasie évolutive |
| <input type="checkbox"/> Chimiothérapie anti-cancéreuse | <input type="checkbox"/> Maladies auto-immunes et rhumatismes inflammatoires chroniques |
| <input type="checkbox"/> Rhumatisme inflammatoire chronique | <input checked="" type="checkbox"/> Drépanocytose |
| <input checked="" type="checkbox"/> Hémophile | <input type="checkbox"/> Transplantation d'organe |
| <input type="checkbox"/> Obésité morbide (IMC > 30) | <input type="checkbox"/> Tabagisme actif |
| <input type="checkbox"/> Diabète avec complication(s) | <input type="checkbox"/> Autre : |

Si Autre, préciser :

Allergie connue aux antibiotiques :

Résumé clinique :

Patient vue à 3 semaines de l'implantation de la prothèse arthrodèse. Antibiothérapie probabiliste par TAZOCILLINE et LINEZOLIDE. Patiente sous TRIFLUCAN au moins jusqu'à l'automne 2014. Cultures positives à Staphylocoque épidermidis multi résistant (2 prélèvements positifs uniquement en milieu liquide). Localement bonne cicatrisation.

Microbiologie**Ajouter**

Site

Genou

'Document site' créé le 09/12/2013 à 11:04 par Tristan FERRY

Site :

Genou

Côté :

 Gauche Droit

Cadre nosologique :

 Prothèse Ostéite Pseudarthrose Arthrite Matériel d'ostéosynthèse Autres**Microbiologie**

Microbiologie :

 Documenté fiable Non documenté Non contributif

Germe(s)

Staphylococcus epidermidis

 Avec résistance

Commentaire :

Prise en charge

Actualiser

Site

Genou

PEC Chirurgicale

Acte :

-- Sélectionner --

+

Remarques :

-- Sélectionner --

- Ablation de matériel
- Abstention chirurgicale contre indication
- Abstention chirurgicale non-indication
- Abstention chirurgicale refus du patient
- Amputation
- Arthrodèse
- Biopsie
- Changement prothèse 1 temps
- Changement prothèse 2 temps
- Changement prothèse partiel
- Espaceur

No surgery
Debridement
DAIR
Explantation 1-stage exchange
Explantation 2-stage exchange

Fermer

Enregistrer

MOR 72 ans

Contexte de la RCP

Synthèse clinique

Localisation/Microbiologie/Chirurgie

Antibiothérapie

Finalisation et validation de la RCP

IOA complexe : Non Oui

Critères de complexité

Critères : Echec de traitement antérieur Programme chirurgical
 Terrain Microbiologie

Etablissement de prise en charge :

Liste des établissements

Criteria of complexity

- **Host :**
 - Patients with **severe comorbidities** that limit the therapeutic program
 - Patients with **severe allergy**
- **Microbiological criteria :**
 - **Difficult-to-treat** or **multidrug resistant** bacteria
- **Surgery is validated as « Complex »**
 - **Major bone resection** and bone and/or soft-tissue **reconstruction**
- **Relapse**



Recruitment of
the most
complex
patients

In the CRIOAc
network

To increase the
knowledge and
skill of
dedicated
surgeons and
physicians

Start in 2010/2013...

Does it work ?

Place of residence of patients managed in CRIODC Lyon



La Région
Auvergne-Rhône-Alpes

≈ 8 million inhabitants

Area of recruitment
close to that of
Switzerland

2017

2016

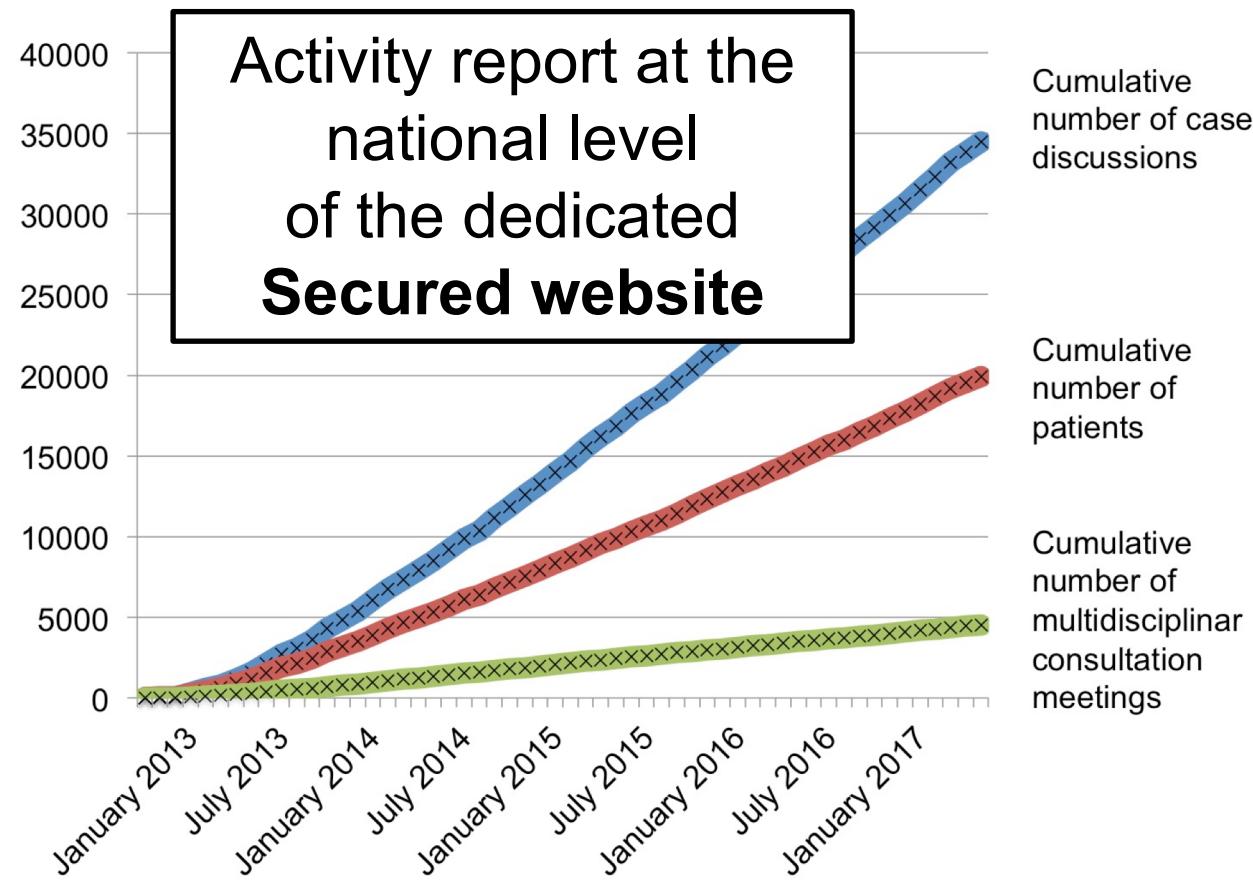
2015

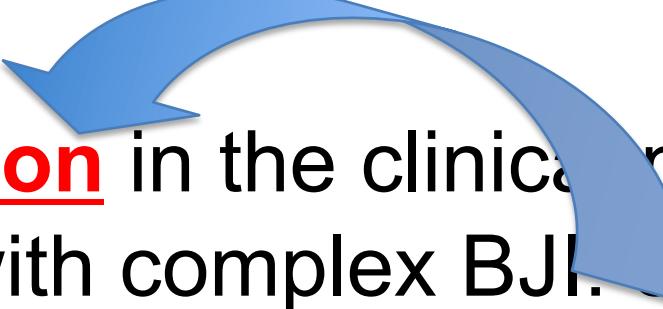
2014

≈ 500 patients/year

Google My Maps

The CRIODAc healthcare network in France: A nationwide Health Ministry program to improve the management of bone and joint infection





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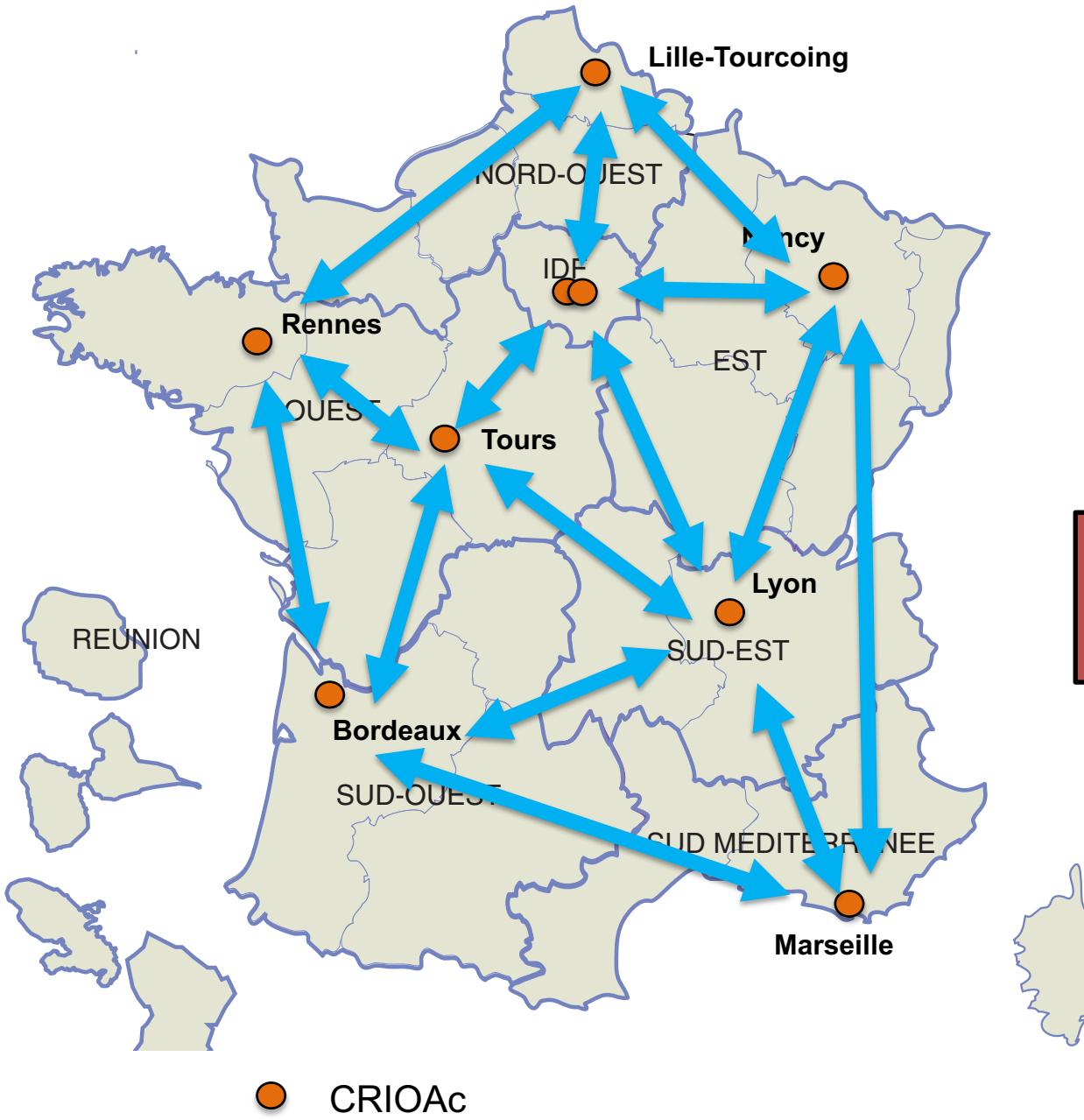


CRIoAc
**National scientific
committee**

9 members

Infectiologists
Surgeons
Microbiologists

**Real life epidemiology of
complex BJI in France
(website data extraction)**

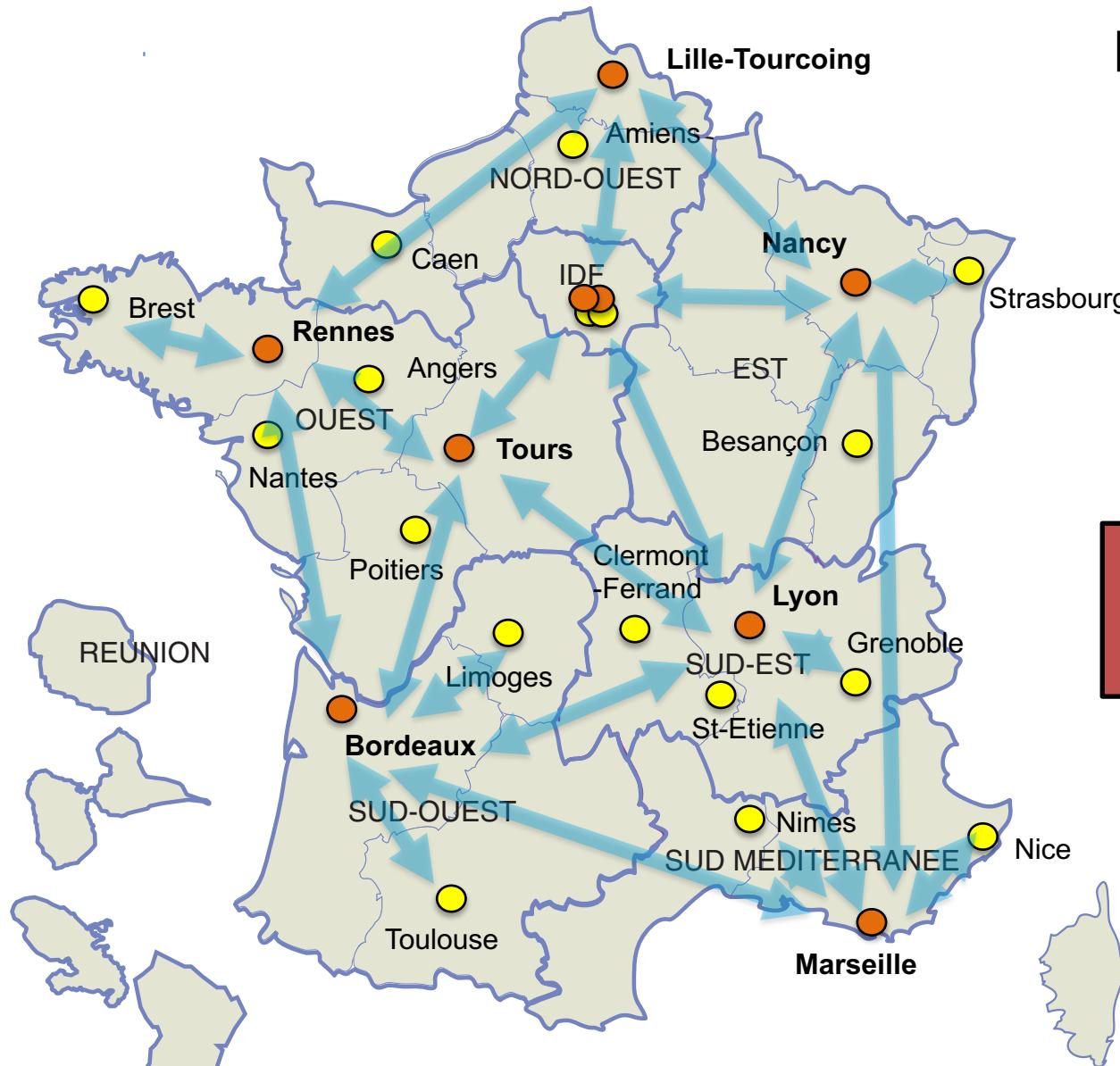


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**Real life epidemiology of
complex BJI in France
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● CRIoAc

● Corresponding centers



inovelan
CHRU de Tours

g4 CRI OAC
Centre de Référence des Infections Osteo-articulaires Complexes

CRIOAC SUD
MÉDITERRANÉE



CENTRE DE RÉFÉRENCE DES INFECTIONS
OSTEO-ARTICULAIRES COMPLEXES
CRI OAC
ÎLE DE FRANCE

Centre de Référence des Infections
Osteo-articulaires Complexes
CRI OAC LYON



CRI OAC du Grand Est
Centre de Référence des Infections Osteo-Articulaires Complexes

UNIVERSITÉ
FRANÇOIS - RABELAIS
TOURS
FACULTÉ DE MÉDECINE

CHRU
HÔPITALS DE TOURS

6 - 8 September 2018 · Helsinki, Finland

37th Annual Meeting of the
European Bone and Joint Infection Society

EB
JIS
European Bone & Joint Infection
Society



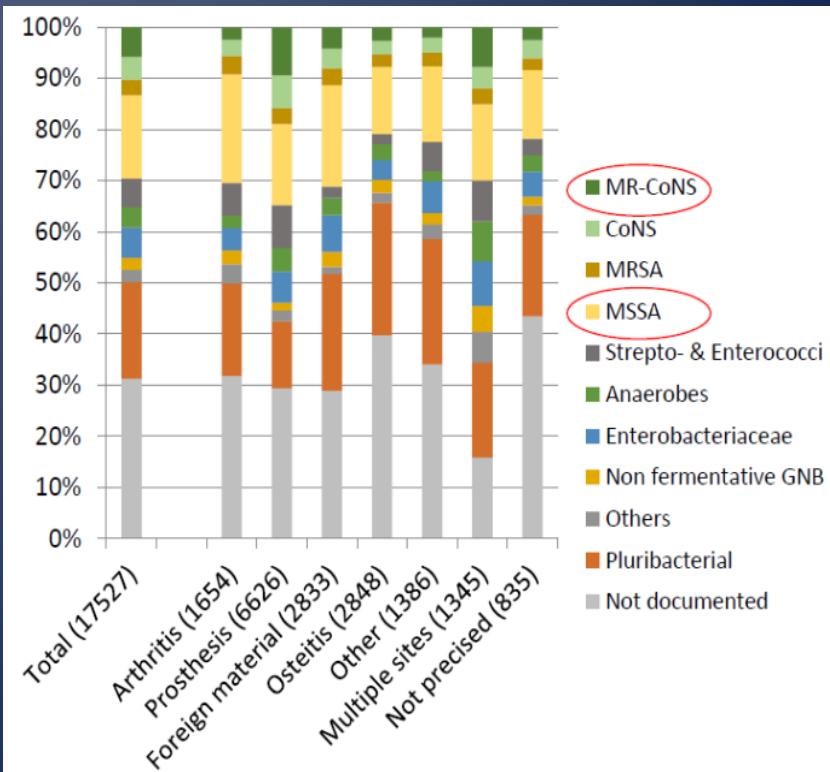
EPIDEMIOLOGY OF 17,517 BONE AND JOINT INFECTIONS ADDRESSED IN REFERRAL CENTERS IN FRANCE BETWEEN 2012 AND 2016

Adrien Lemaignen ¹⁻², Pascal Astagneau²⁻³, Simon Marmor ⁴, Tristan Ferry ⁵, Piseth Seng ⁶, Didier Mainard ⁷, Jean-Yves Jenny ⁸, Frédéric Laurent ⁹, Marion Grare ¹⁰, Anne Jolivet-Gougeon ¹¹, Eric Senneville ¹², Louis Bernard ¹, on behalf of the Scientific Council for Complex Bone and Joint Infections Referral Centers (CRI OAC)

¹: Infectious Diseases - CHRU de Tours, 2: EA 7348 - Management des Organisations de Santé, 3: Centre d'appui pour la prévention des infections liées aux soins (CPIAS) Ile de France, 4: Orthopaedics - GHDCSS, Paris, 5: Infectious Diseases - Hospices Civils de Lyon, 6: Infectious Diseases - APHM, Marseille, 7: Orthopaedics - CHU de Nancy, 8: Orthopaedics - CHU de Strasbourg, 9: Microbiology - Hospices Civils de Lyon, 10: Microbiology - CHU de Toulouse, 11: Microbiology - CHU de Rennes, 12: Infectious Diseases - Hôpital Dron, Tourcoing

PATIENT CHARACTERISTICS AND MICROBIOLOGY

Variables	Total	
Age (median)	64 years	[50 - 76]
Weight (median)	76 kg	[65 - 90]
BMI (median)	26.4 kg/m ²	[23.1 - 30.8]
Male sex	10,961	(61.76%)
Diabetes	2,919	(16.45%)
Neoplasia	1,624	(9.15%)
Renal failure	1,819	(10.25%)
Liver failure	401	(2.26%)
Immunodeficiency	1,111	(6.26%)
Inflammatory disease	819	(4.61%)
Alcohol abuse	790	(4.45%)
IV drug user	196	(1.1%)
Obesity	2,877	(16.21%)



TREATMENT ADVISED DURING MULTIDISCIPLINAR MEETINGS

	Septic arthritis 1654	Prosthesis 6626	Infected fractures 2833	Osteomyelitis 2848
No surgery	152 9.2%	626 9.4%	343 12.1%	320 11.2%
Debridement (synovectomy)	794 48.0%	1558* 23.5%	1032* 36.4%	941 33.0%
Osteosynthesis	26 1.6%	36 0.5%	201 7.1%	161 5.7%
Amputation	225 13.6%	95 1.4%	48 1.7%	453 15.9%
Implant removal	0 0%	364 5.5%	1419 50.1%	0 0%
Surgical flap	47 2.8%	102 1.5%	112 4.0%	280 9.8%
1 stage exchange	0 0.0%	1873 28.3%	0 0.0%	0 0.0%
2 stages exchange	0 0.0%	851 12.8%	0 0.0%	0 0.0%

* Debridement, Antibiotics and Implant Retention (DAIR)

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* Debridement, Antibiotics and Implant Retention (DAIR)

No information about the treatment really performed
No information about the outcome

CRIoAc

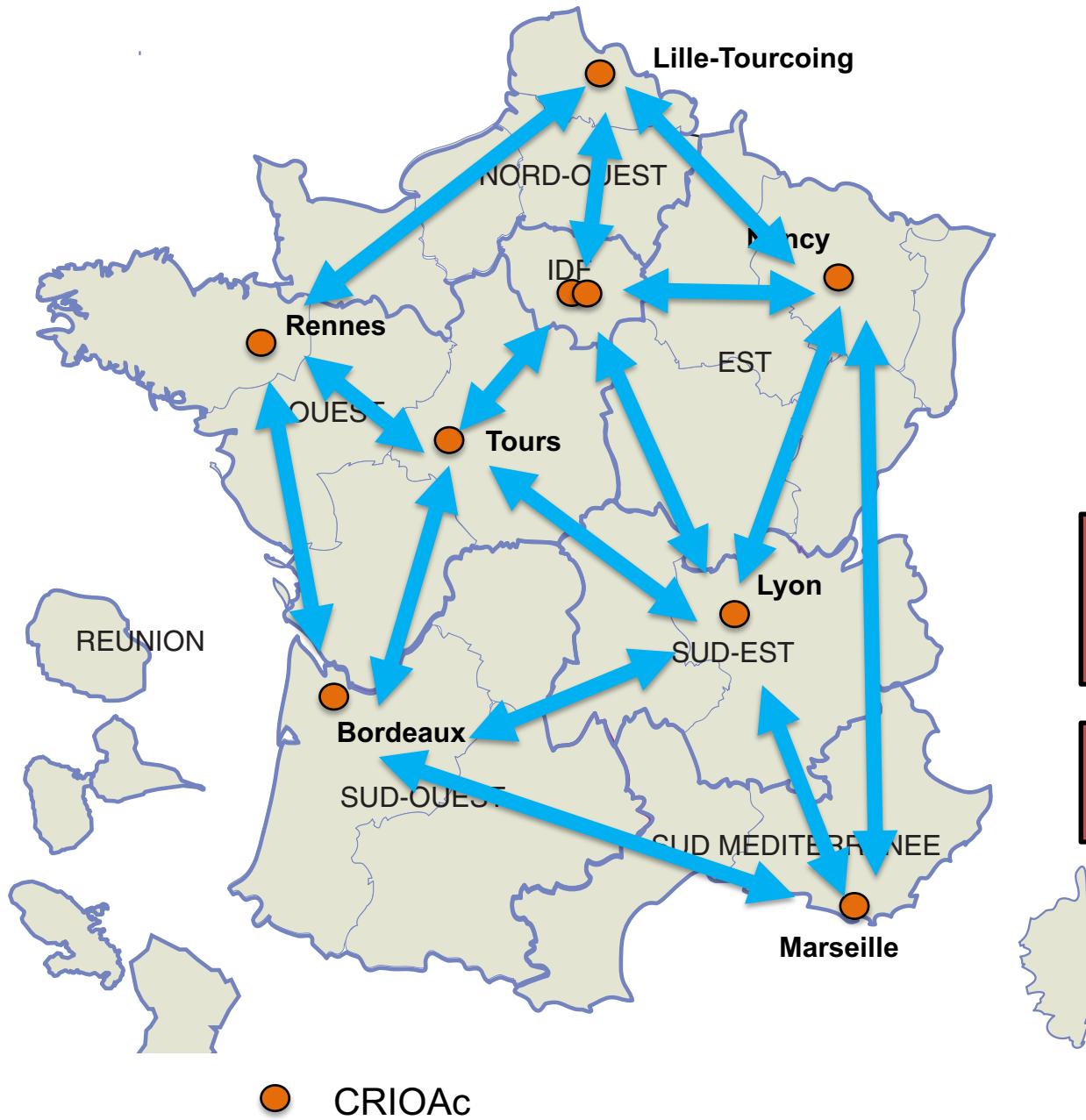
National scientific committee

9 members

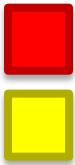
**Infectiologist
Surgeons
Microbiologists**

Real life epidemiology of complex BJI in France (web data extraction)

Promote innovative treatments in the network



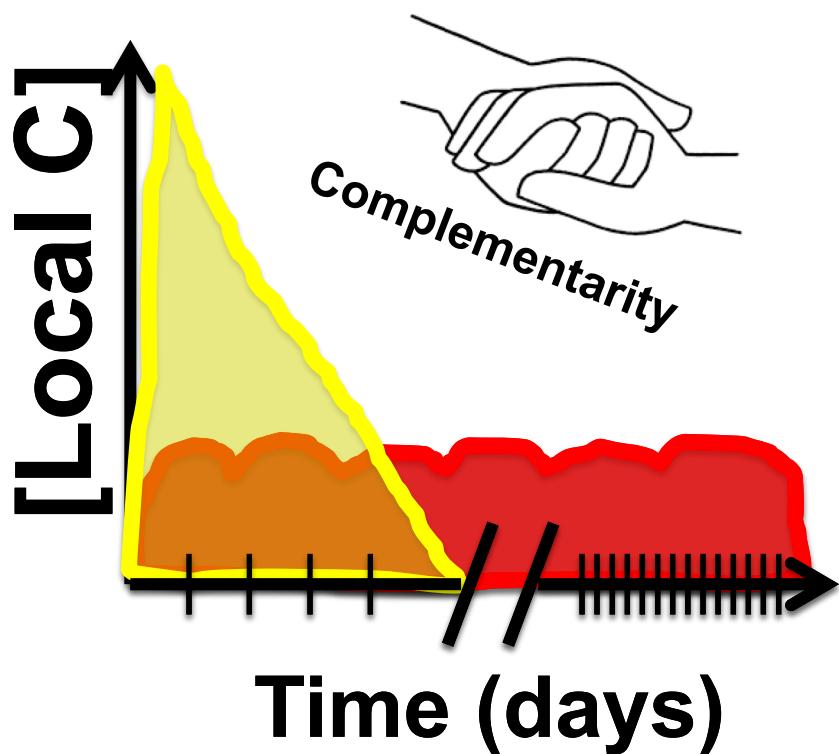
Innovation = local therapy



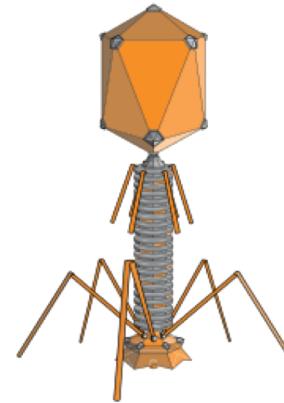
Antibiotics administered systemically



Antibiotics administered locally with particular carriers (ex. bone substitute)



Emergent anti-infectious agents
Bacteriophages



Specific viruses that potentially penetrate biofilm and kill bacteria

Medical history 39 yo male

Sept. 2016: Osteosynthesis for open and comminuted fracture of the right tibial plateau + proximal diaphysis

Dec. 2016: "DAIR". *P. aeruginosa* in culture

Jan. 2017: admission CRIOAc Lyon

Material removal and external fixation.

P. aeruginosa in culture (RELAPSE)

May 2017: Removal of the external fixation.

Favorable outcome. Consolidation.



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Multidisciplinary decision: surgical revision

1st step: bone resection + spacer + external fixator

2nd step: Gastrocnemius flap (soft tissue coverage) at 3 w.

3rd step: Osteosynthesis + Bone reconstruction with CERAMENT™ + bone graft



Medical history 39 yo male

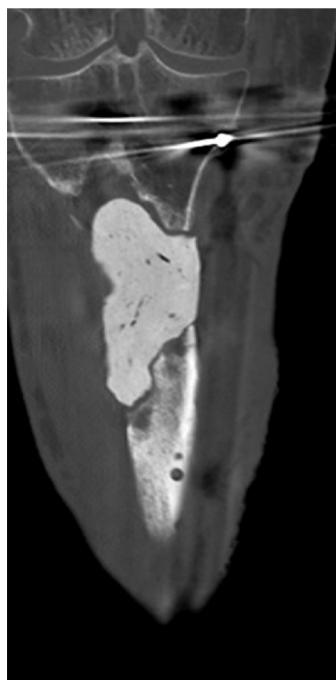


Multidisciplinary decision: surgical revision

1st step: bone resection + spacer + external fixator: *P. aeruginosa* still in culture

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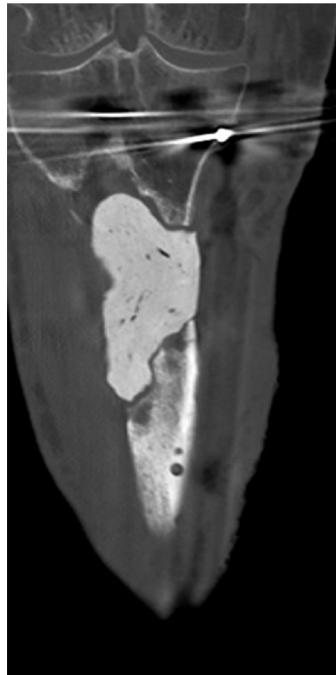


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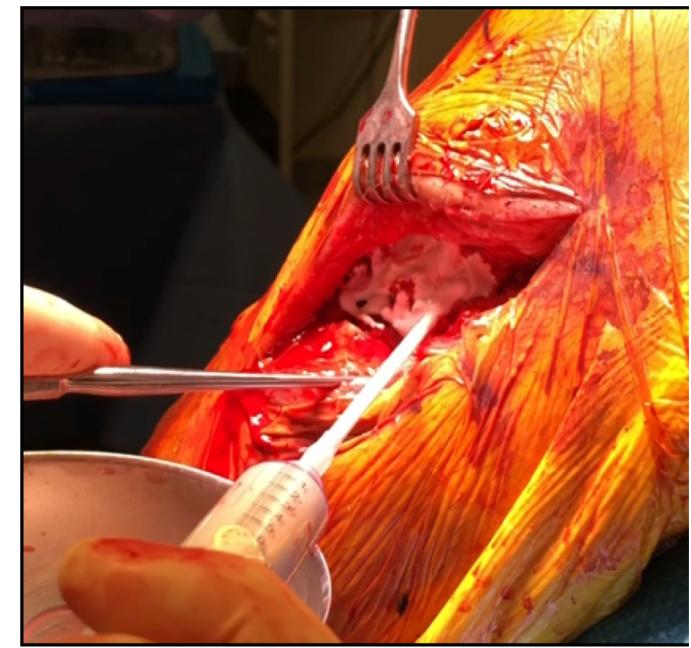
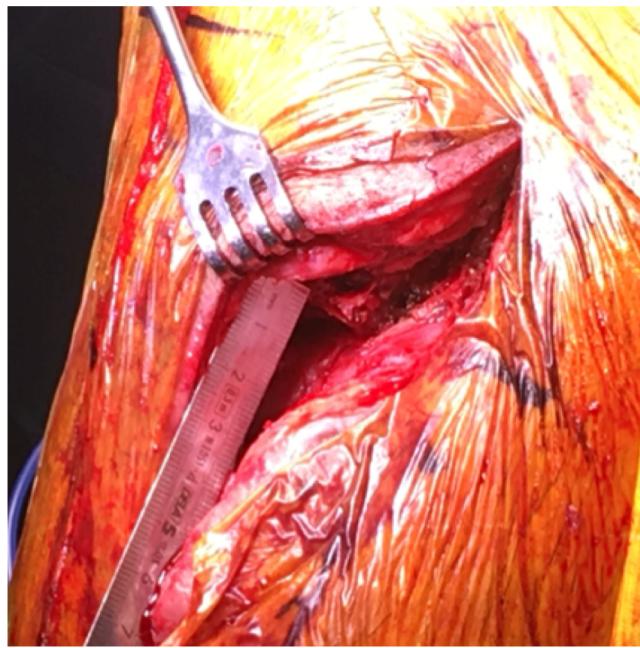
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AFTER ANTIBIOTIC WASH OUT 3 MONTHS

3rd step: Osteosynthesis (intramedullary nail) + Bone reconstruction with **CERAMENT G™ 10 mL** and **CERAMENT V™ 10 mL** + autograft + allograft



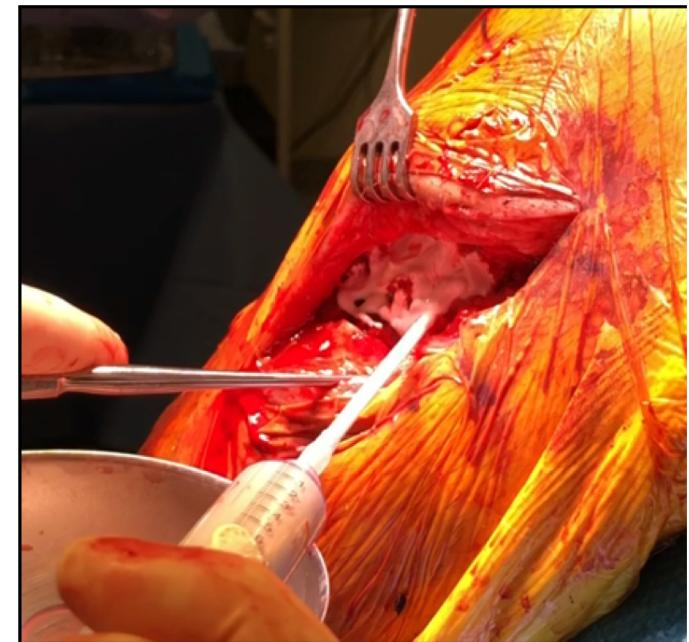
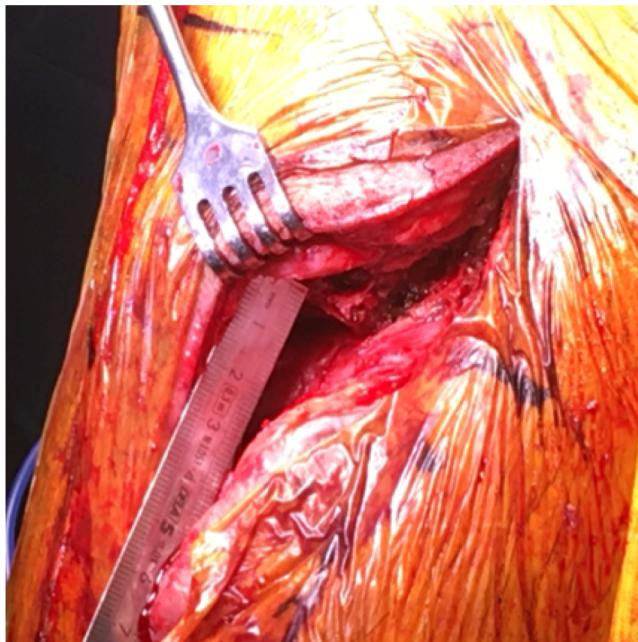


AFTER ANTIBIOTIC WASH OUT 3 MONTHS

3rd step: Osteosynthesis (intramedullary nail) + Bone reconstruction with **CERAMENT G™ 10 mL** and **CERAMENT V™ 10 mL** + autograft + allograft

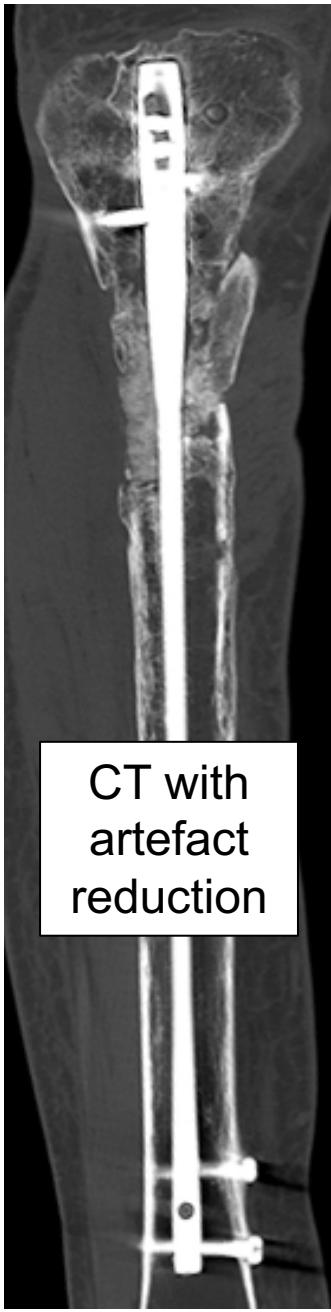
Cultures: no *P. aeruginosa*

P. acnes only in 2 samples (liquid media)
Amoxicillin orally during 3 months

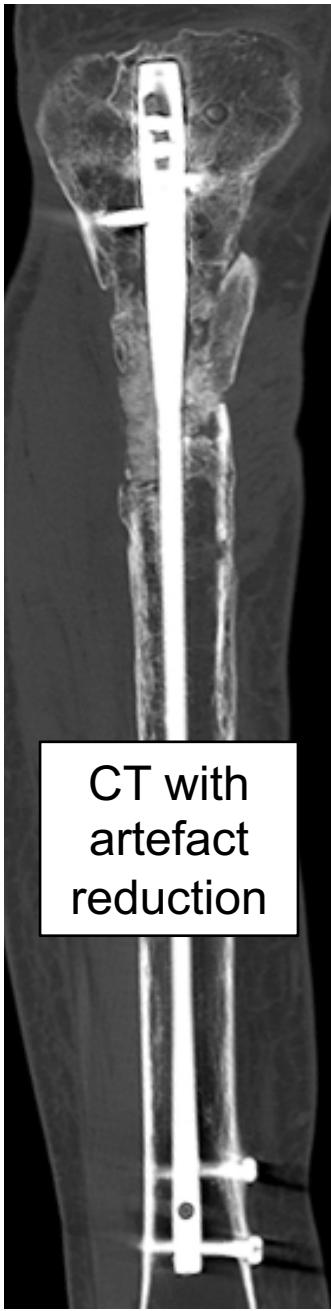




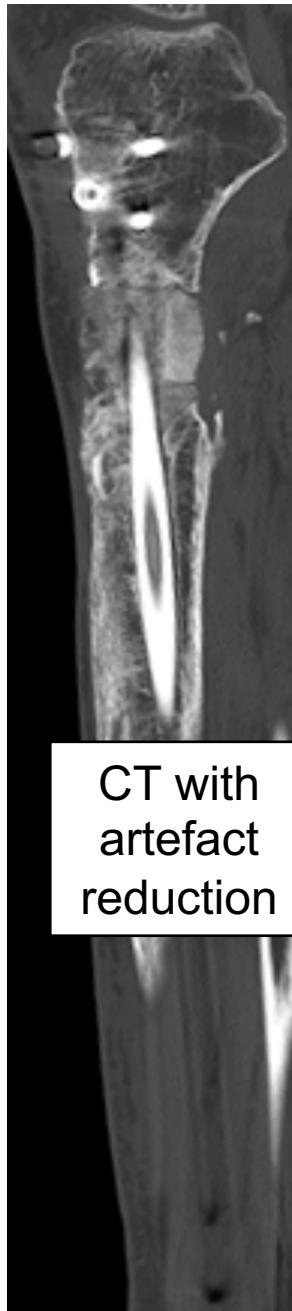
+ 9 months



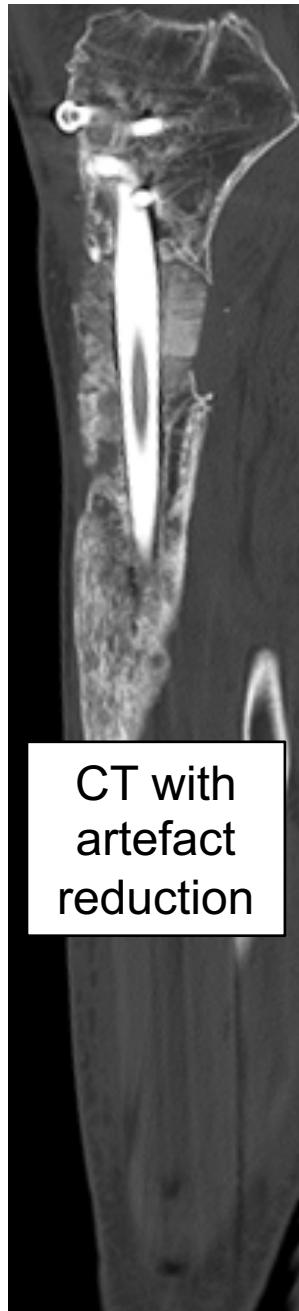
+ 9 months



CT with
artefact
reduction

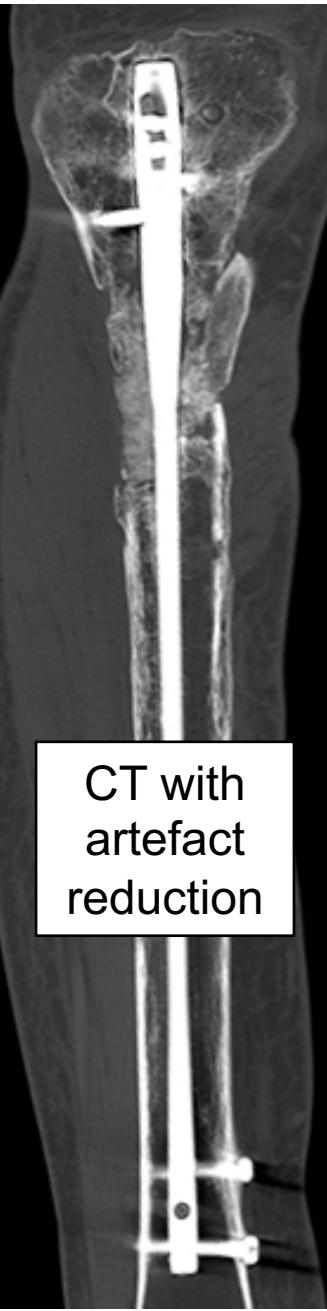


CT with
artefact
reduction



CT with
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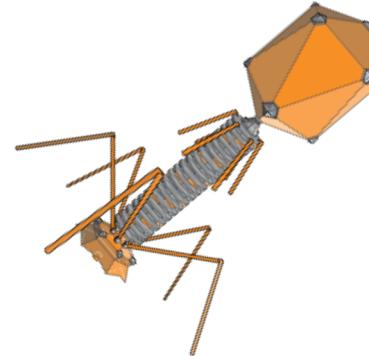
+ 9 months



Innovation in patient with recurrent prosthetic joint infections (after several revisions)

Open Forum Infectious Diseases

BRIEF REPORT

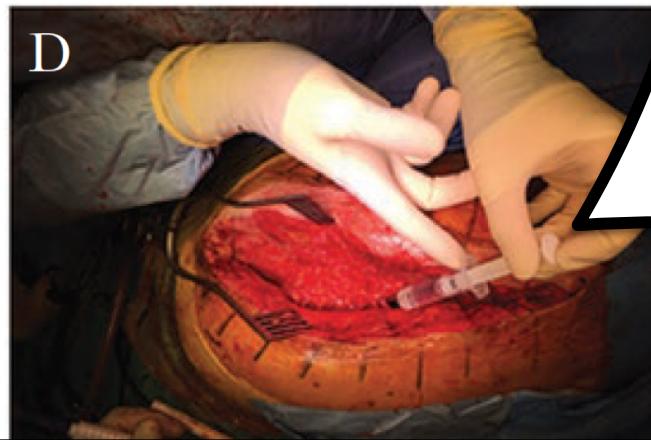
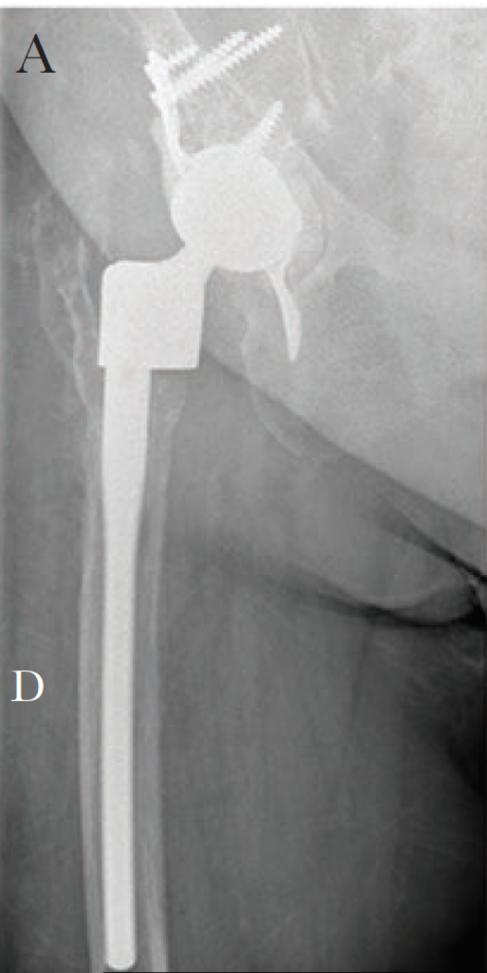


Salvage Debridement, Antibiotics and Implant Retention (“DAIR”) With Local Injection of a Selected Cocktail of Bacteriophages: Is It an Option for an Elderly Patient With Relapsing *Staphylococcus aureus* Prosthetic-Joint Infection?

Ferry T. 2018 In press

CRIoAc
LYON
Hôpital Cochin de Lyon

UFB
Lyon 1



Favorable outcome without antistaphylococcal antibiotics at month 18

Ferry T. 2018 In press

CRIOAc

National scientific committee

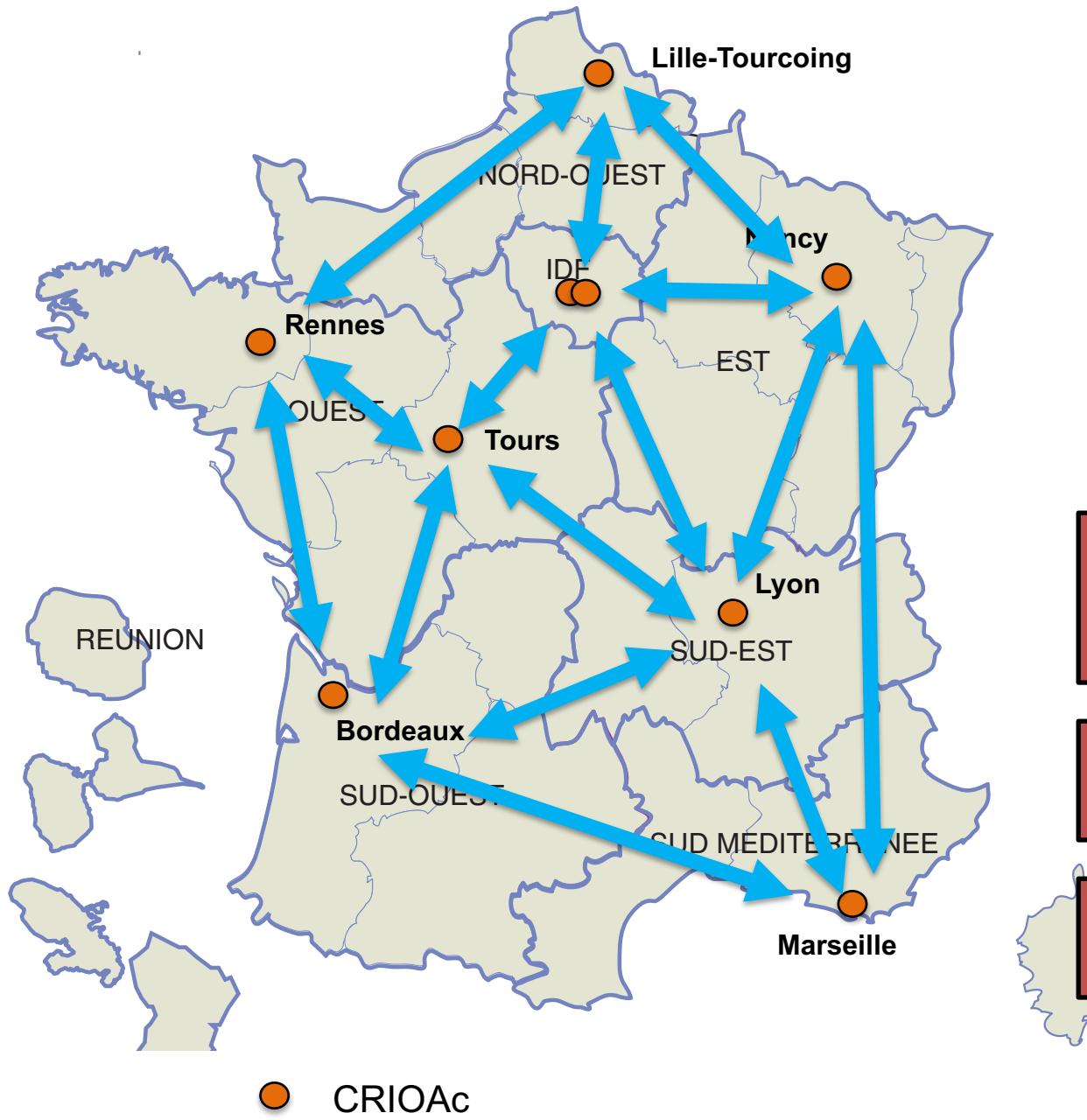
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Infectiologists
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Real life epidemiology of complex BJI in France (website data extraction)

Promote innovative treatments in the network

Preliminary feasibility analysis for future trials



CRIoAc

National scientific committee

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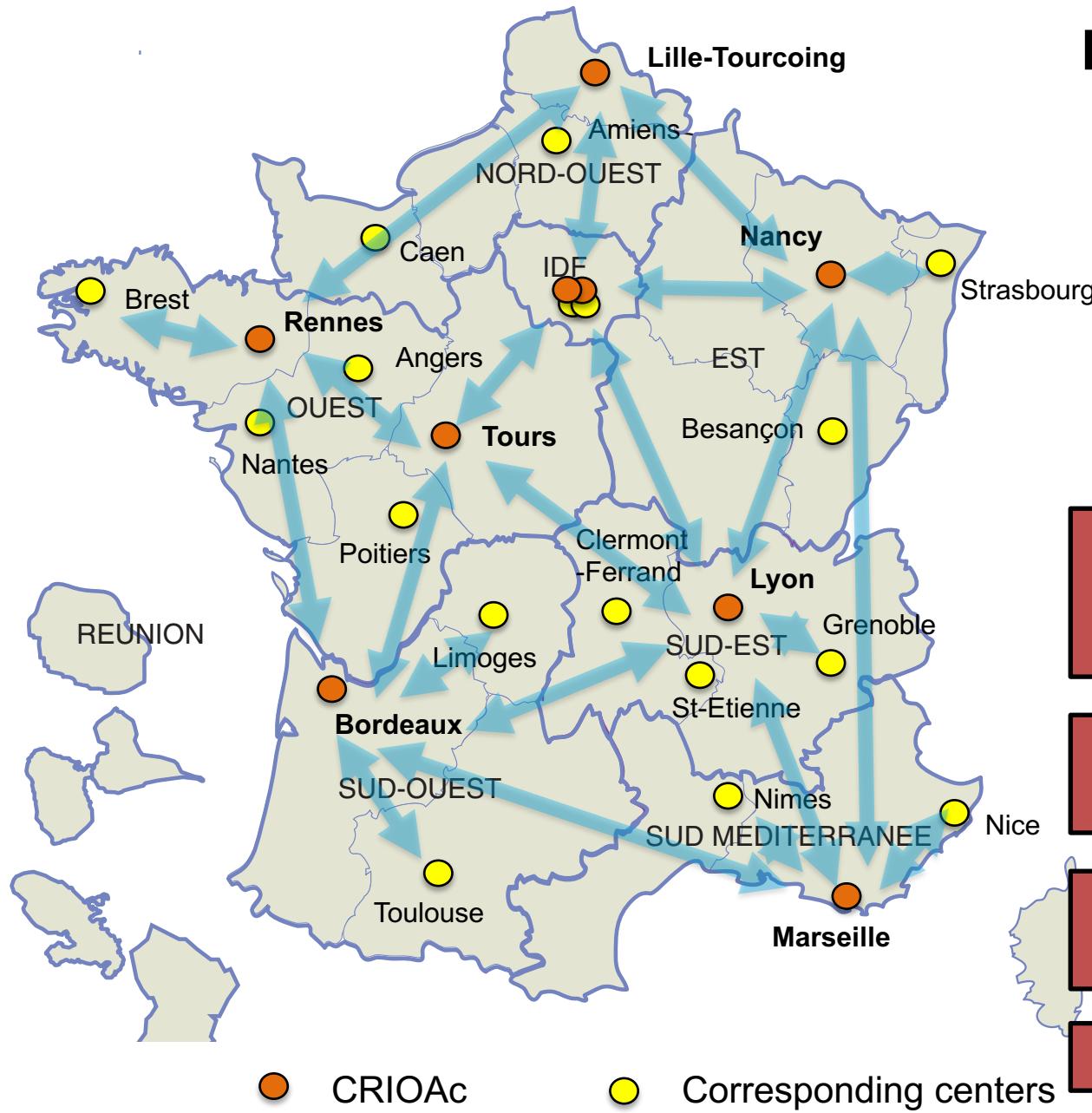
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Promote innovative treatments in the network

Preliminary feasibility analysis for future trials

Multicentric clinical trials



Conclusion

- **CRIOAc Network** dedicated to **complex BJI**
supported and funded by the health ministry
- Creation and use of a dedicated secured national **website for multidisciplinary meetings**
- Surgical stays in patients with complex BJI are **more paid** (+12%)
- Creation of a **scientific committee**
 - Real life epidemiology of complex BJI in France
 - Promotion of innovation (feasibility to trials)

Lyon BJI Study group

Coordinator: Tristan Ferry

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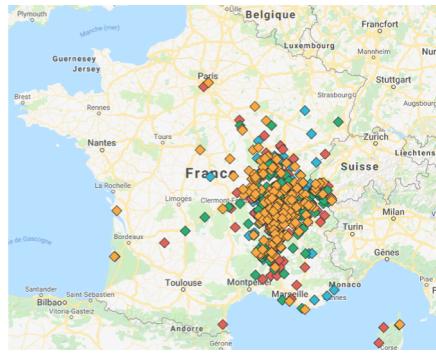
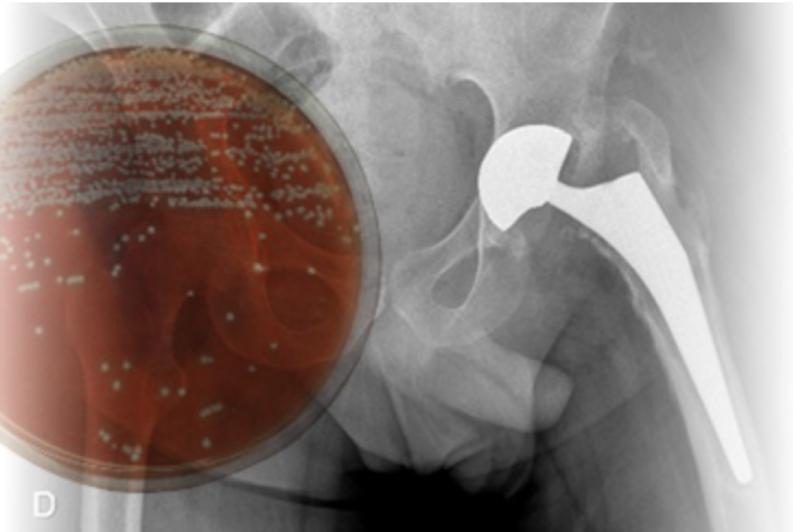
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