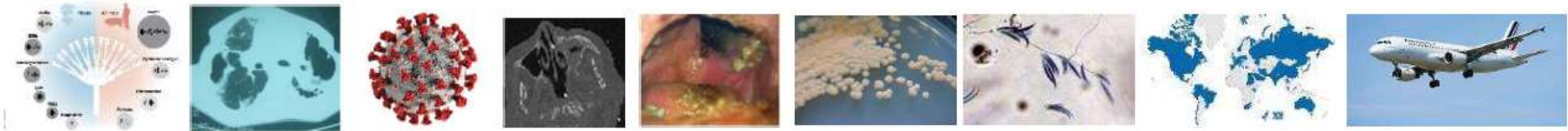


# Best-of IFI 2023



Hors nouveaux AF et diagnostic

**Dr. Fanny Vuotto**

Service de Maladies infectieuses  
Centre Hospitalier universitaire de Lille



# Dr. Fanny Vuotto

Service de Maladies infectieuses





Centre Hospitalier universitaire de Lille



Déclaration de liens d'intérêt avec les industries de santé en rapport avec le thème de la présentation (loi du 04/03/2002) :

**Date :**

**Titre :**

- |   |   |   |
|---|---|---|
|  Consultant ou membre d'un conseil scientifique  | <input type="checkbox"/> OUI            | <input checked="" type="checkbox"/> NON |
|  Conférencier ou auteur/rédacteur rémunéré d'articles ou documents   | <input type="checkbox"/> OUI            | <input checked="" type="checkbox"/> NON |
|  Prise en charge de frais de voyage, d'hébergement ou d'inscription à des congrès ou autres manifestations | <input checked="" type="checkbox"/> OUI | <input type="checkbox"/> NON            |
|  Investigateur principal d'une recherche ou d'une étude clinique   | <input type="checkbox"/> OUI            | <input checked="" type="checkbox"/> NON |

DPI en ligne sur [infectiologie.com](http://infectiologie.com)

# Best-of IFI 2023

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Un monde qui change !!!



**Dr. Fanny Vuotto**

Service de Maladies infectieuses

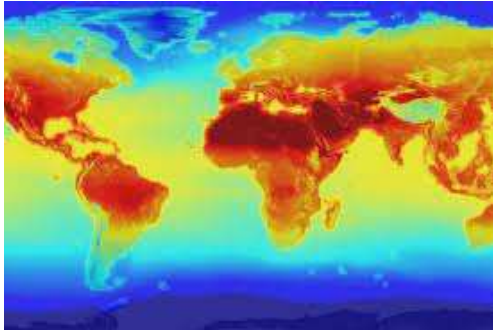
Centre Hospitalier universitaire de Lille



# Emergences

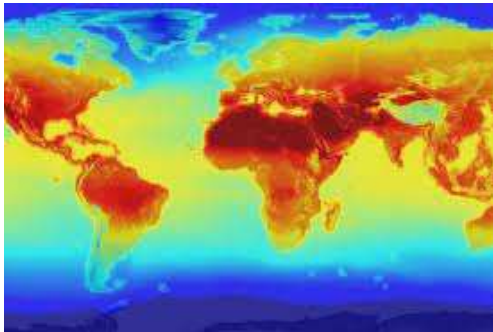
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## *Réchauffement climatique*

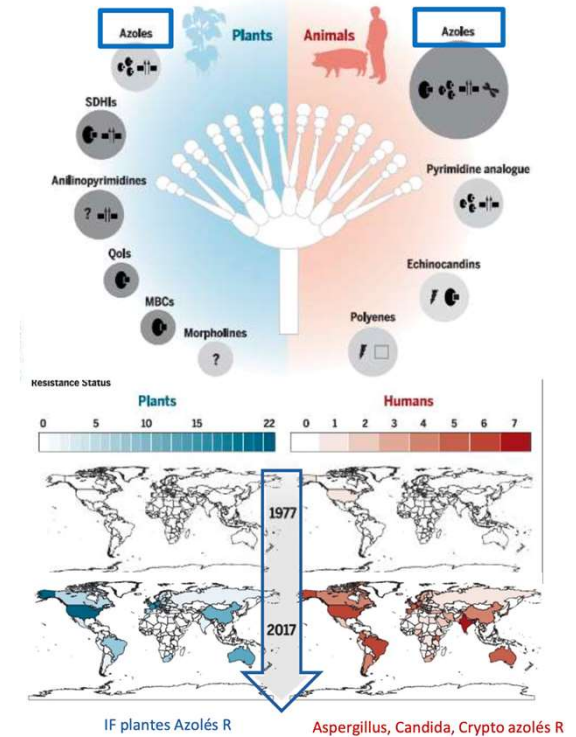


# Emergences

## Réchauffement climatique



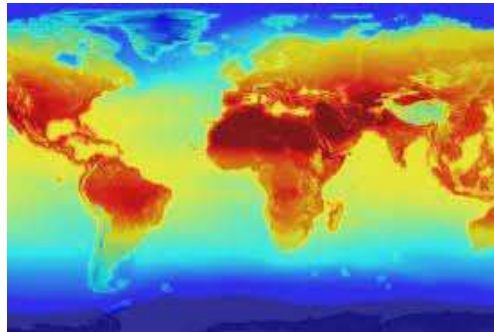
## Antifongiques agricoles



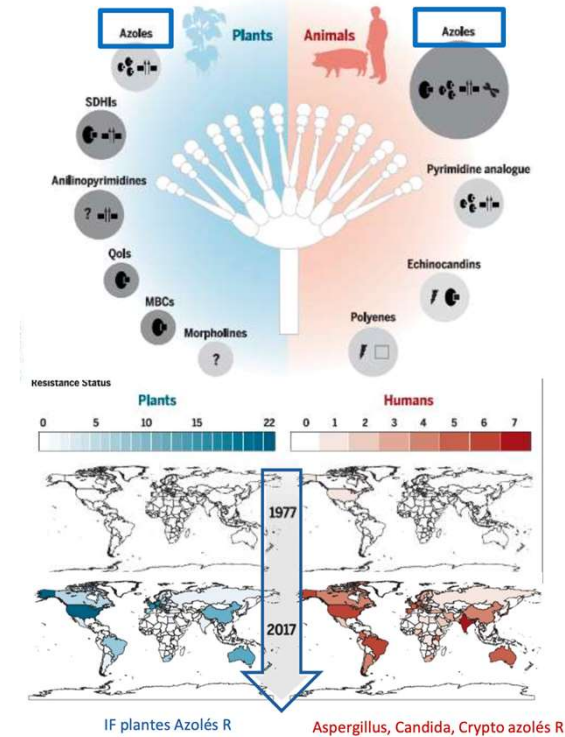


# Emergences

Réchauffement climatique



Antifongiques agricoles



Médecine humaine

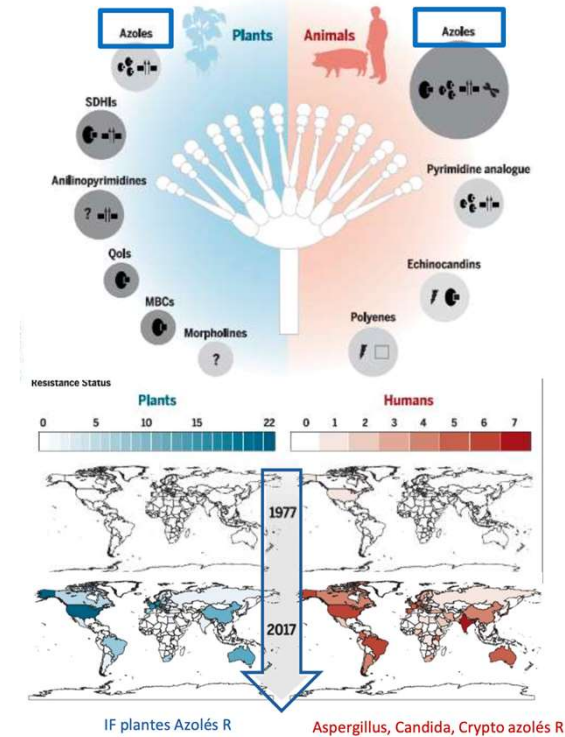
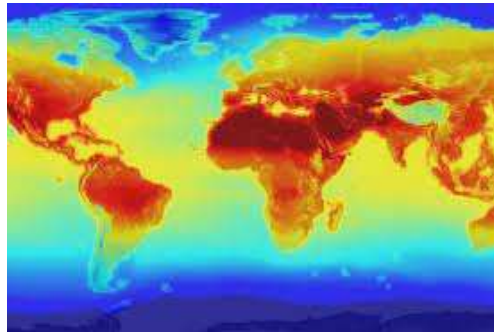
The Hidden Cost of Modern Medical Interventions:  
How Medical Advances Have Shaped the Prevalence  
of Human Fungal Disease

# Emergences

Réchauffement climatique



Antifongiques agricoles



Médecine humaine

The Hidden Cost of Modern Medical Interventions:  
How Medical Advances Have Shaped the Prevalence  
of Human Fungal Disease



# Nouvelles espèces

*Candida auris*

Clinical Infectious Diseases

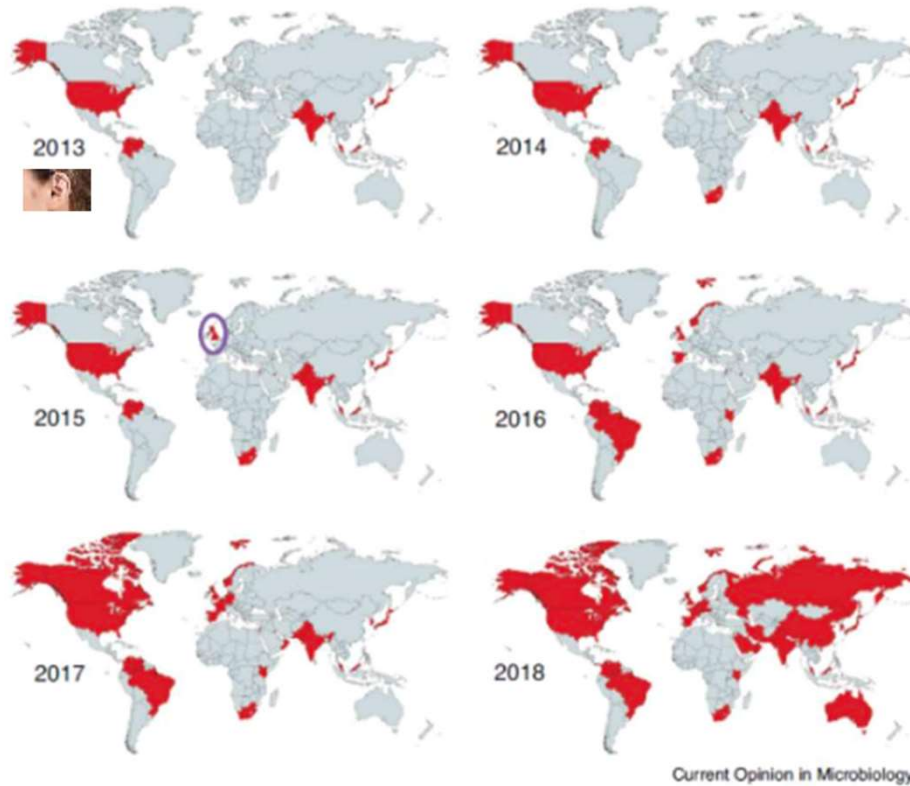
EDITORIAL COMMENTARY



## Emergence of *Candida auris*: An International Call to Arms

CID 2017:64

Cornelius J. Clancy<sup>1,2</sup> and M. Hong Nguyen<sup>1,3</sup>



Journal of Infection and Public Health 16 (2023) 1696–1702

Contents lists available at ScienceDirect

Journal of Infection and Public Health

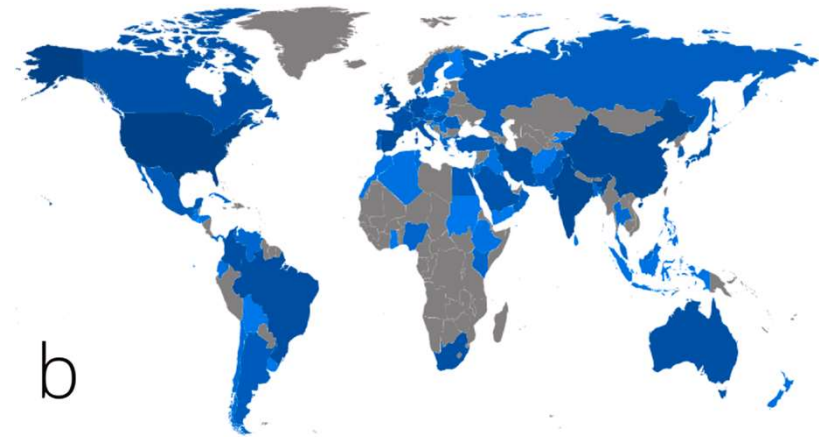
journal homepage: [www.elsevier.com/locate/jiph](http://www.elsevier.com/locate/jiph)



## *Candida auris*: A bibliometric analysis of an emerging global health threat

Paolo Ragusa

2023



b



# Nouvelles espèces

*Candida auris*

*FDR*

ICU

Nutrition parentérale

IRC

Diabète

Chir. abdominale

IOT

Sondage vésical

→ *Mortalité : idem Candida non auris ?*

# Nouvelles espèces

*Candida auris*

**FDR**

ICU

Nutrition parentérale

IRC

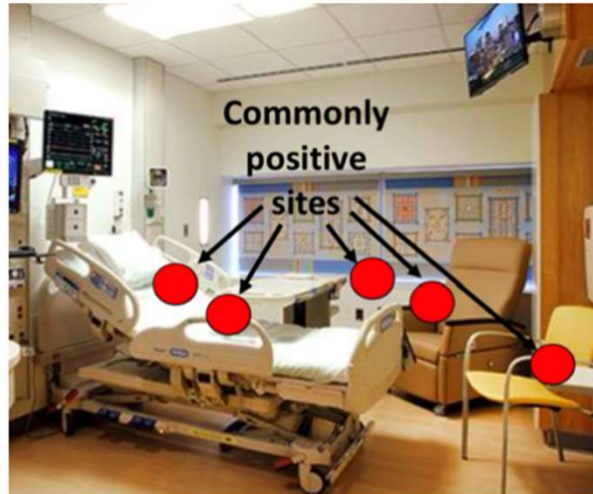
Diabète

Chir. abdominale

IOT

Sondage vésical

**Persistence +++**



*Persistence ≈ 1 mois*

*Détersion Javel*

*Manuportage +++ , matériels non à usage unique*

*Screening (EPC+++)*

***A*Candida auris-specific adhesin, Scf1, governs surface association, colonization, and virulence**

Science

September 29, 2023, Volume 381  
(6665), p 1461–1467

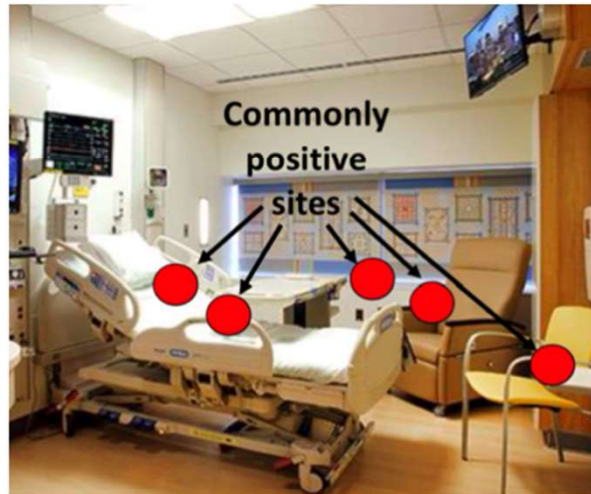
# Nouvelles espèces

## *Candida auris*

### FDR

ICU
Nutrition parentérale
IRC
Diabète
Chir. abdominale
IOT
Sondage vésical

### Persistence +++



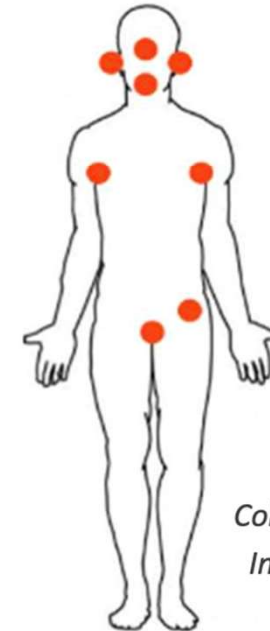
Persistence  $\approx$  1 mois

Détersion Javel

Manuportage +++, matériels non à usage unique

Screening (EPC+++)

### Diagnostic



Colonisation : aine/aisselle

Infection : fongémie +++)

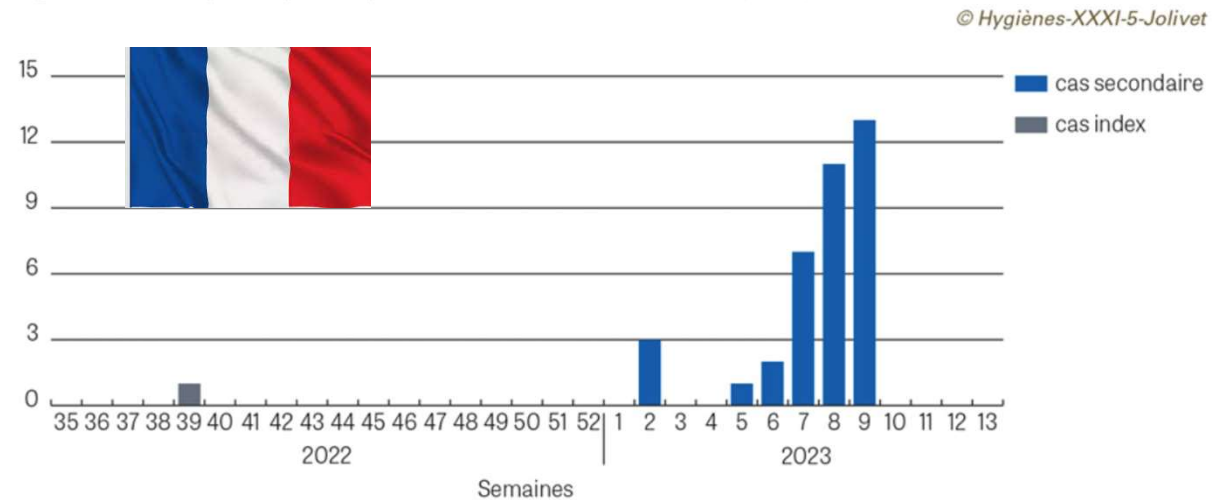
MALDI

1,3-BDG  $\ll$  *C. albicans*

# Nouvelles espèces

*Candida auris*

Figure 2 – Courbe épidémique de l'épidémie de *Candida auris*, 2022-2023 (n=38).



37 cas II

6 services

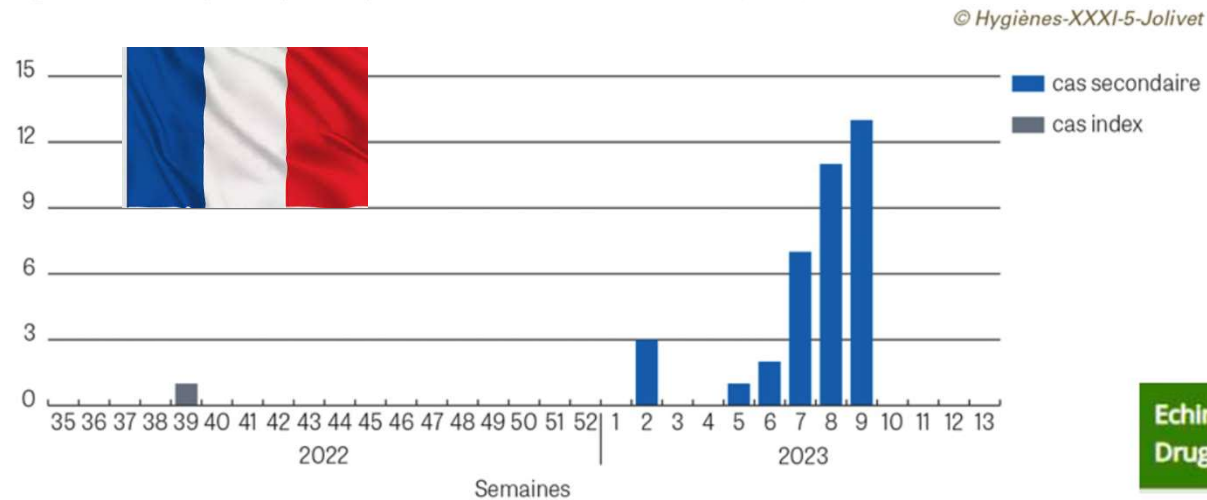
10% prlvts env +



# Nouvelles espèces

*Candida auris*

Figure 2 – Courbe épidémique de l'épidémie de *Candida auris*, 2022-2023 (n=38).




37 cas II

6 services

10% prlvts env +

Echinocandin Drug	Adult dosing
Anidulafungin	loading dose 200 mg IV, then 100 mg IV daily
Caspofungin	loading dose 70 mg IV, then 50 mg IV daily
Micafungin	100 mg IV daily



## AVIS

relatif aux mesures de prise en charge de patient infecté ou colonisé par *Candida auris* et au rapport bénéfice-risque d'une prescription d'antifongiques en prophylaxie.

14 juin 2019



→ Screening des patients hospitalisés en dehors de France

→ Protocole local de PEC

+ *C. haemulonii*

# Résistances

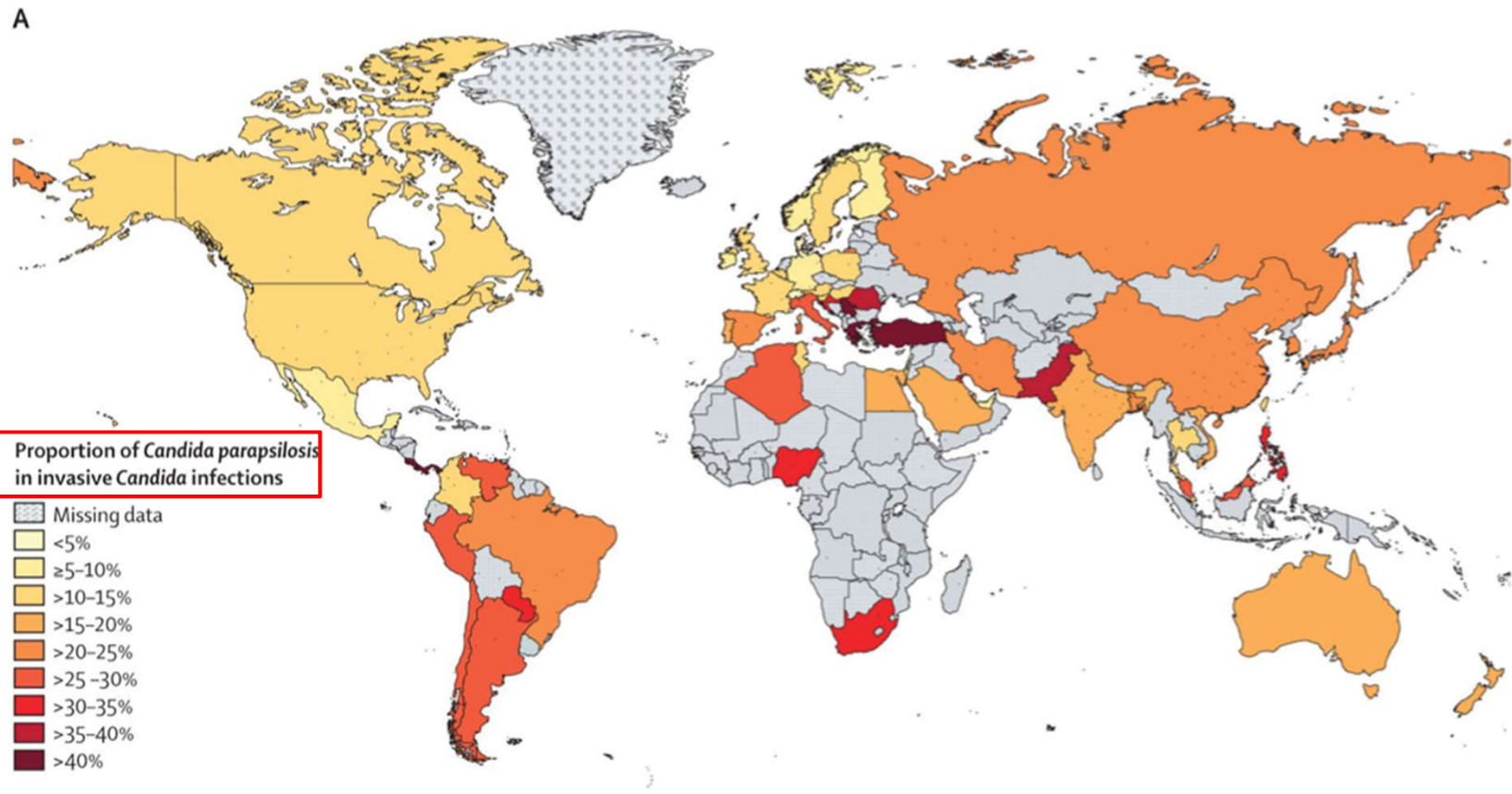
*C. parapsilosis*

**Worldwide emergence of fluconazole-resistant *Candida parapsilosis*: current framework and future research roadmap**

Farnaz Daneshnia\*

*Lancet Microbe*. 2023 June ; 4(6)

***C. parapsilosis* = 3<sup>ème</sup> place mondiale**



# Résistances

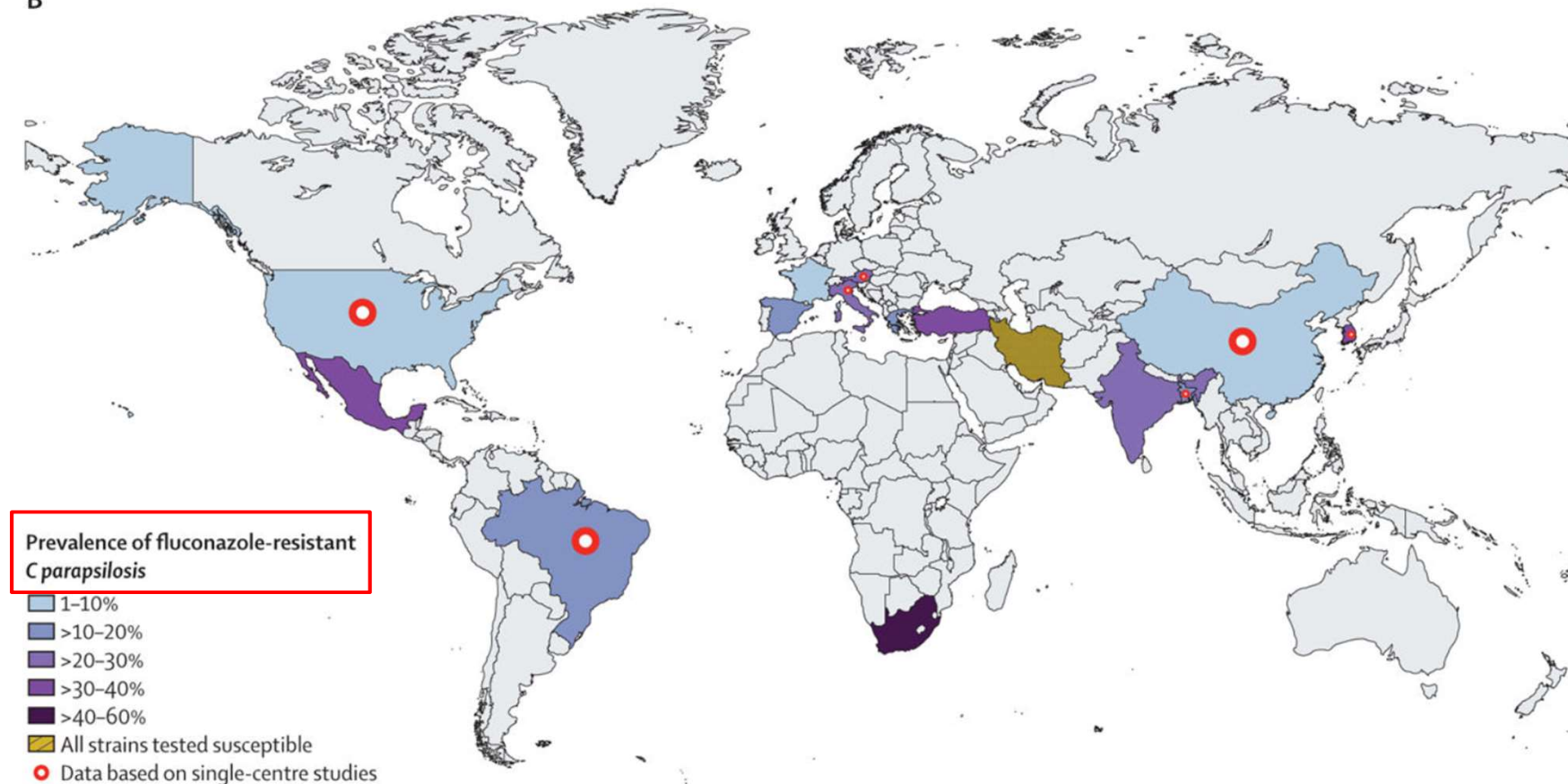
*C. parapsilosis* azolÉR

## Worldwide emergence of fluconazole-resistant *Candida parapsilosis*: current framework and future research roadmap

Farnaz Daneshnia\*

*Lancet Microbe*. 2023 June ; 4(6)

B



# Résistances

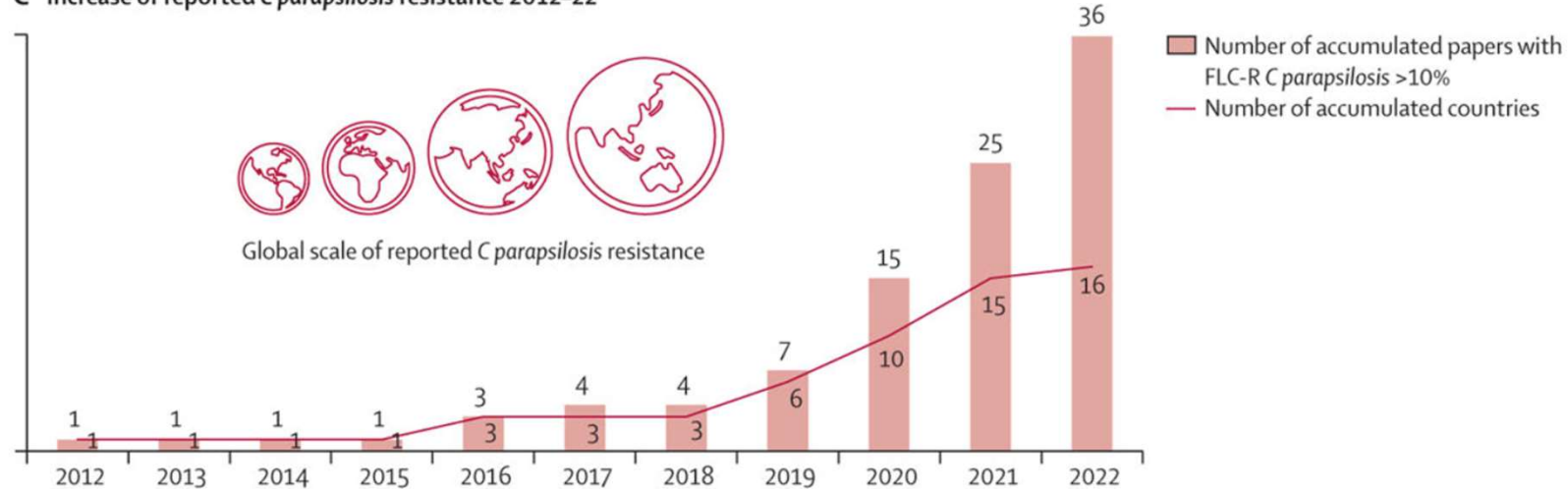
*C. parapsilosis* azoléR

## Worldwide emergence of fluconazole-resistant *Candida parapsilosis*: current framework and future research roadmap

Farnaz Daneshnia\*

*Lancet Microbe*. 2023 June ; 4(6)

C Increase of reported *C parapsilosis* resistance 2012–22



*C. parapsilosis* azoléR  
De 2 à 32% en 2 ans...



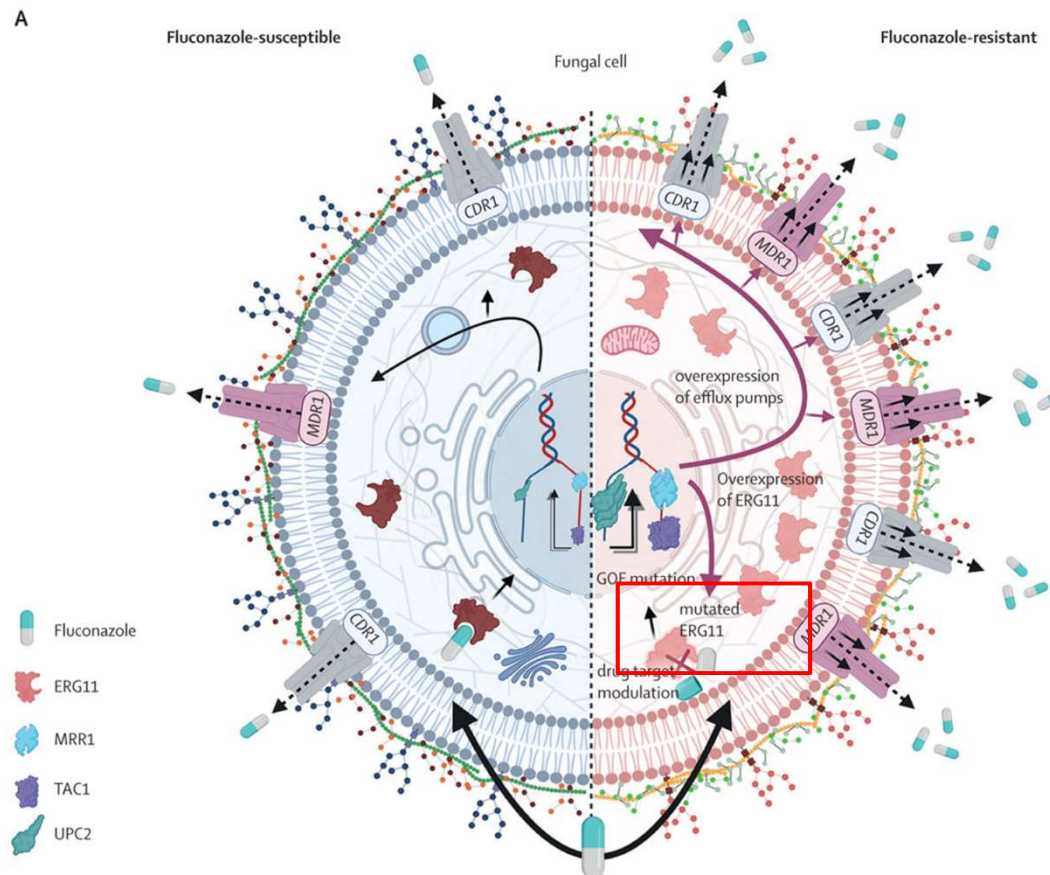
# Résistances

*C. parapsilosis* azoléR

**Worldwide emergence of fluconazole-resistant *Candida parapsilosis*: current framework and future research roadmap**

Farnaz Daneshnia\*

*Lancet Microbe*. 2023 June ; 4(6)



## Mutations dans ERG11

Y132

→ Biofilm (-)

→ **Pouvoir de dispersion (++)**

5 (+1) clades décrits

→ Epidémies

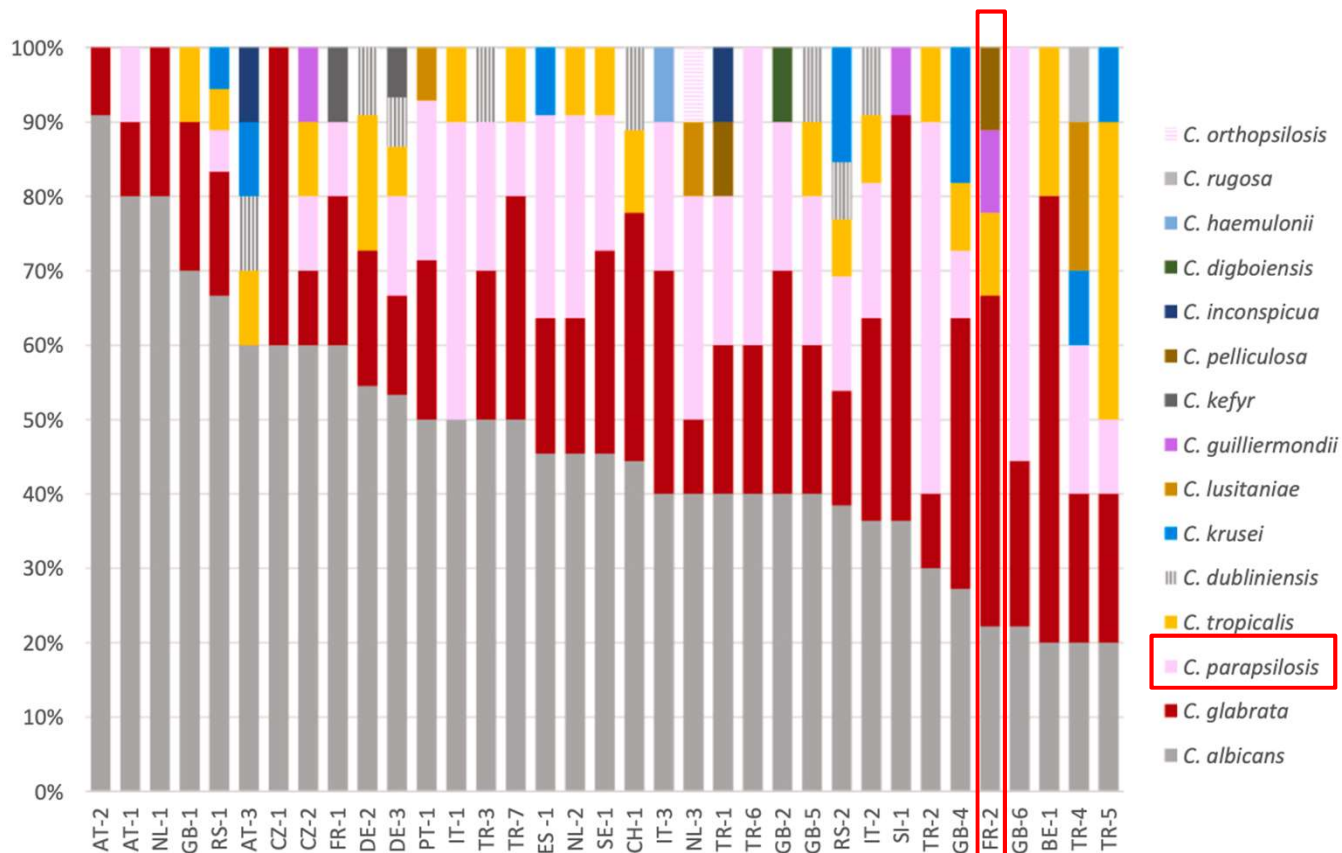
(A) Drug target modulation through acquisition of amino acid substitutions in ERG11.

# Résistances

*C. parapsilosis* azolÉR

European candidaemia is characterised by notable differential epidemiology and susceptibility pattern: Results from the ECMM *Candida* III study

Maiken Cavling Arendrup [Journal of Infection 87 \(2023\) 428–437](#)



*C. albicans* = *C. glablatra*

# Résistances

*C. parapsilosis* azoléR

European candidaemia is characterised by notable differential epidemiology and susceptibility pattern: Results from the ECMM *Candida* III study

Maiken Cavling Arendrup [Journal of Infection 87 \(2023\) 428–437](#)

**Table 1**

Susceptibility profile of the 399 European *Candida* blood-stream isolates for azoles and echinocandins.

Species (N)	Fluconazole						Voriconazole					
	S	% S	I	%I	R	%R	S/WT <sup>a</sup>	% S/WT	I	%I	R/NWT	% R/NWT
<i>C. albicans</i> (188)	188	100%	0	0%	0	0%	188	100%	0	0%	0	0%
<i>C. glabrata</i> (89)	0	0%	78	88%	11	12%	83	93%	na	na	6	7%
<i>C. parapsilosis</i> (60)	50	83%	0	0%	10	17%	50	83%	6	10%	4	7%
<i>C. tropicalis</i> (25)	24	96%	0	0%	1	4%	24	96%	0	0%	1	4%
<i>C. dubliniensis</i> (9)	9	100%	0	0%	0	0%	9	100%	0	0%	0	0%
<i>C. krusei</i> (9)	0	0%	0	0%	9	100%	9	100%	na	na	0	0%
Other <i>Candida</i> (19) <sup>b</sup>	10	53%	1	5%	8	42%	na	na	na	na	na	na

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16 centres français

Criblage systématique *C. parapsilosis*  
colonisation/infection

1265 souches dont 122 flucoR = 10%



# Résistances

*C. parapsilosis* azoléR

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16 centres français

Criblage systématique *C. parapsilosis* colonisation/infection

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PCC ?

Review

### ***Trichophyton indotineae*—An Emerging Pathogen Causing Recalcitrant Dermatophytoses in India and Worldwide—A Multidimensional Perspective**

*J. Fungi* 2022, 8, 757.

Silke Uhrlaß<sup>1</sup>, Shyam B. Verma<sup>2</sup> , Yvonne Gräser<sup>3</sup>, Ali Rezaei-Matehkolaei<sup>4</sup> , Maryam Hatami<sup>4</sup>, Martin Schaller<sup>5</sup> and Pietro Nenoff<sup>1,\*†</sup>



- Emergence en Inde depuis 5 ans
- Lésions extensives prurigineuses
- Aggravation  
par dermoC et diabète
- CMI élevées terbinafine/azolés
- Récidives +++

# Résistances

*Trichophyton indotinea* TerbiR

## Emergence of Difficult-to-Treat Tinea Corporis Caused by *Trichophyton mentagrophytes* Complex Isolates, Paris, France

Sarah Dellière,<sup>1</sup> Brune Joannard,<sup>1</sup> Mazouz Benderdouche, Anselme Mingui, Maud Gits-Muselli, Samia Hamane, Alexandre Alanio, Antoine Petit, Germaine Gabison, Martine Bagot, Stéphane Bretagne

Emerging Infectious Diseases •

Vol. 28, No. 1, January 2022



2282 dermatophytoses  
350 *T. mentagrophytes* = 15,3%  
7 TerbiR = 2% *T. indotinea*

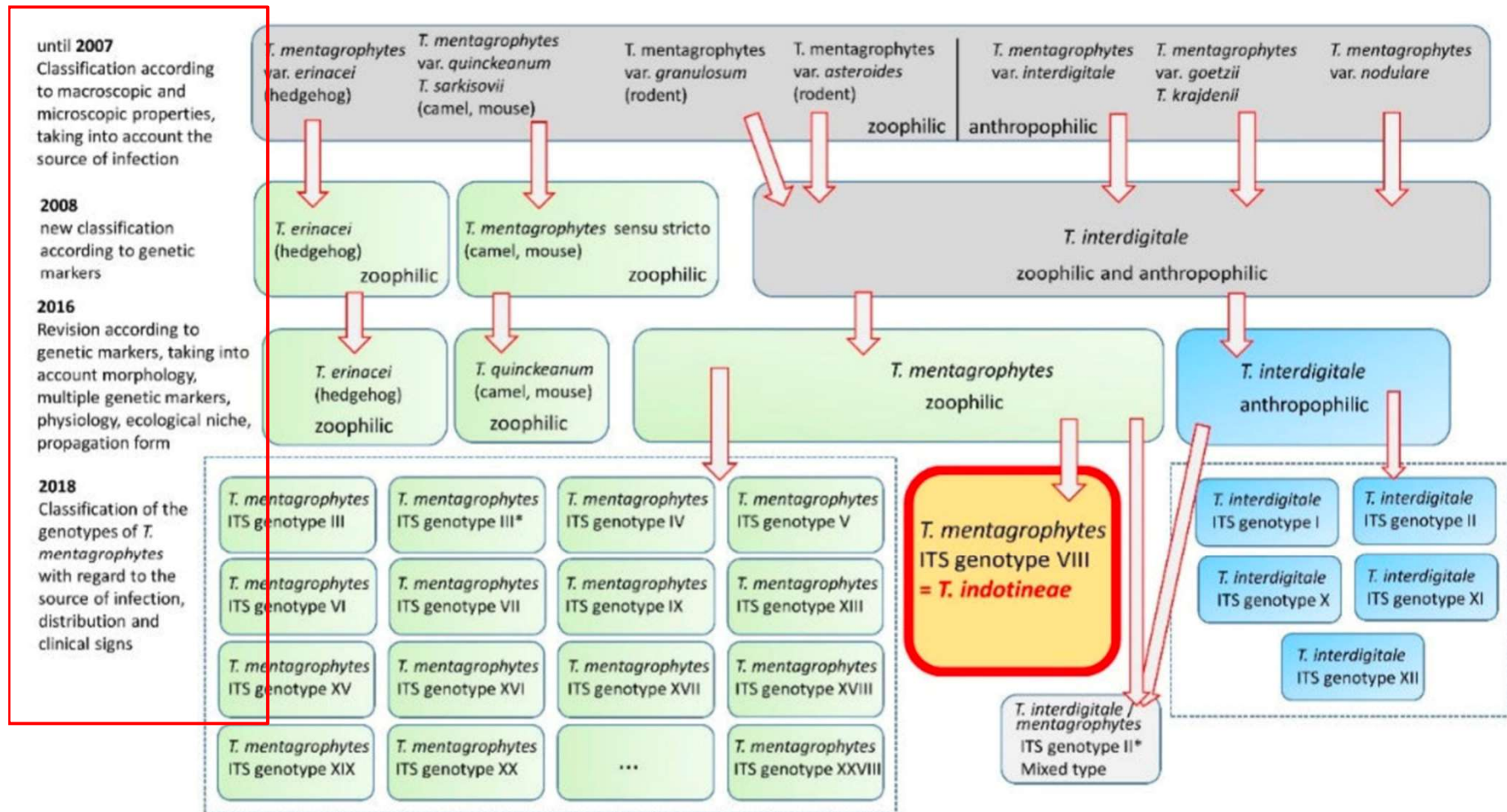
Patients originaire Inde avec  
voyages récents  
+ transmission familiale





# Biais diagnostic ?

*Trichophyton indotinea* TerbiR



**Figure 4.** Temporal course and changes in taxonomy and nomenclature of *Trichophyton mentagrophytes*

# Biais diagnostic ?

*Trichophyton indotinea* TerbiR

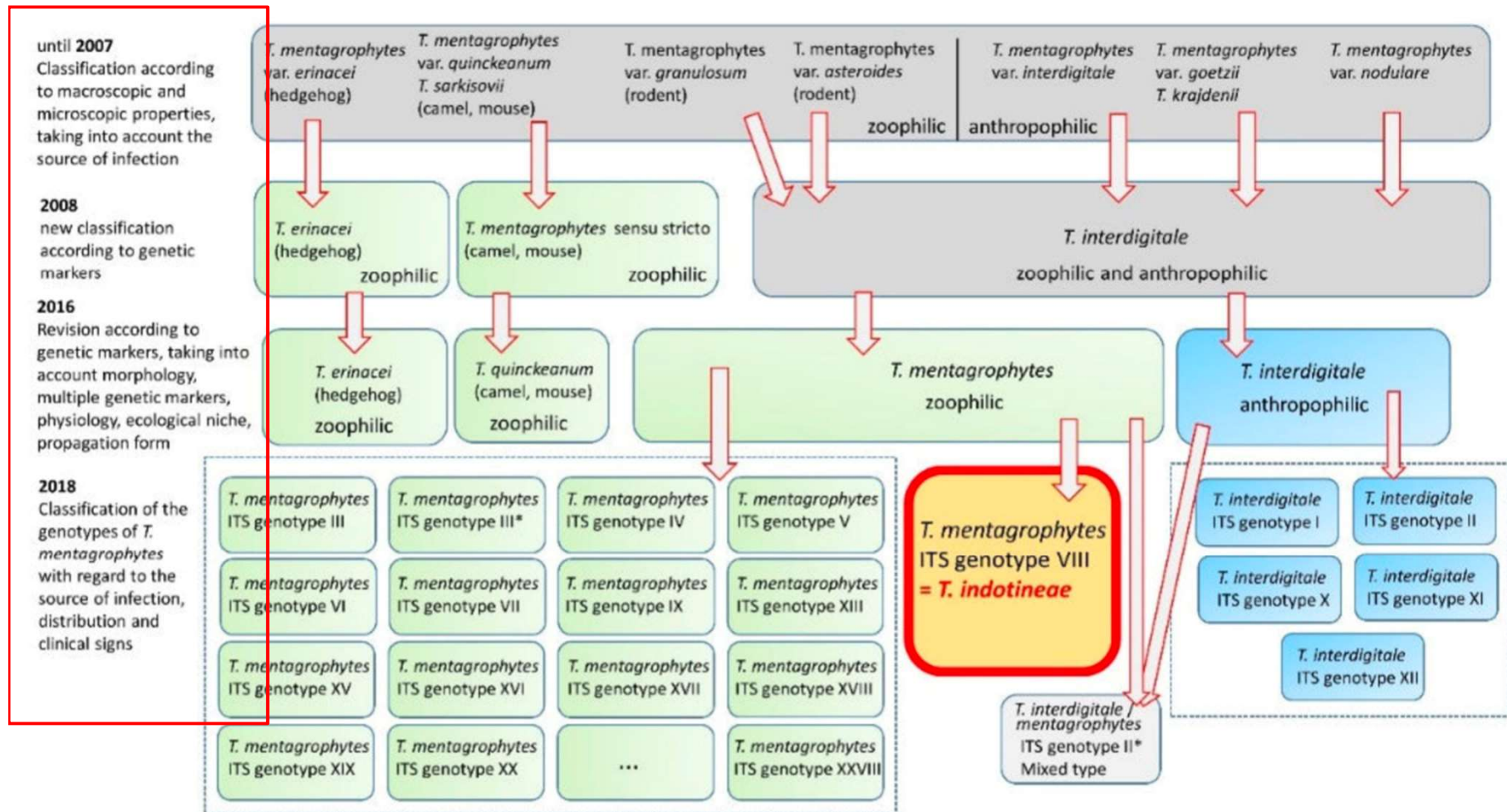


Figure 4. Temporal course and changes in taxonomy and nomenclature of *Trichophyton mentagrophytes*



*Candida glabrata*



*Nakaseomyces glabratus*



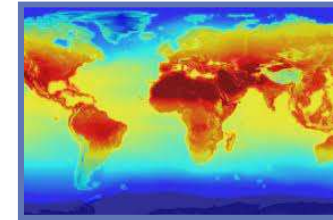
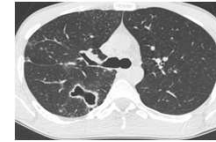
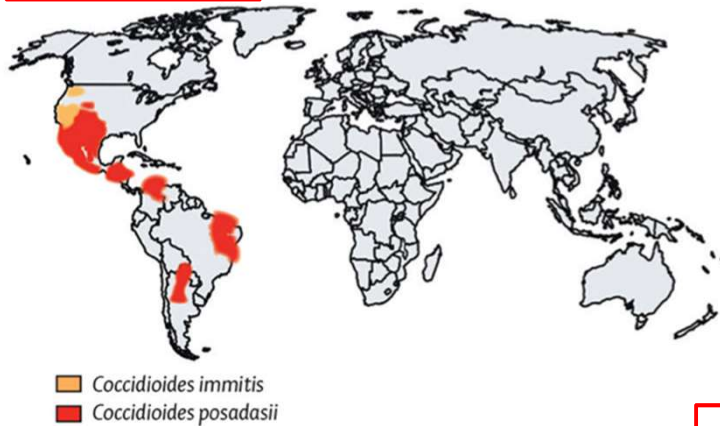
# Répartition géographique et vecteurs

**Global guideline for the diagnosis and management of the endemic mycoses: an initiative of the European Confederation of Medical Mycology in cooperation with the International Society for Human and Animal Mycology**

George R Thompson III,

*Lancet Infect Dis.* 2021 December ; 21(12):

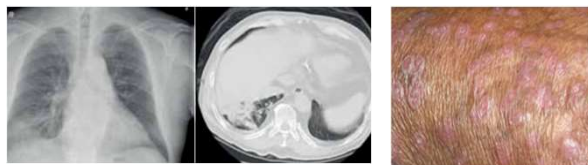
## B Coccidioidomycosis



## C Emergomycosis



- *Emergomycetes pasteurianus*
- *Emergomycetes canadensis*
- *Emergomycetes europaeus*
- *Emergomycetes orientalis*
- *Emergomycetes africanus*



Schwartz Plos Path 2019

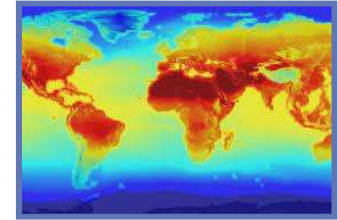
Chik Hong Kong Path 20202

# Répartition géographique et vecteurs

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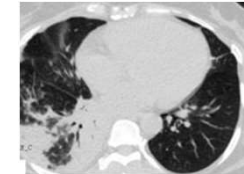


G Talaromycosis

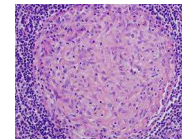


- Endemic areas
- Regions of highest incidence (>100 reported cases)
- Regions of imported or travel-associated cases

*Emergent chez non VIH*



*BMC ID 2020*



*Analyse mycobiome nasal  
3+ chez 73 volontaires sains*

*Matos Med Mycol 23*





# Médecine humaine

REVIEW

Blood Reviews 31 (2017) 17–29

## Risk stratification for invasive fungal infections in patients with hematological malignancies: SEIFEM recommendations



Livio Pagano <sup>a,\*</sup>, Alessandro Busca <sup>b</sup>, Anna Candoni <sup>c</sup>, Chiara Cattaneo <sup>d</sup>, Simone Cesaro <sup>e</sup>, Rosa Fanci <sup>f</sup>, Gianpaolo Nadali <sup>g</sup>, Leonardo Potenza <sup>h</sup>, Domenico Russo <sup>i</sup>, Mario Tumbarello <sup>j</sup>, Annamaria Nosari <sup>k</sup>, Franco Aversa <sup>l</sup>, on behalf of SEIFEM (Sorveglianza Epidemiologica Infezioni Fungine nelle Emopatie Maligne) Group. Other Authors:

**Table 4**

Risk stratification of HMs for diagnosis, phase and kind of treatment.

High risk	Intermediate risk	Low risk
<p>AML undergoing Induction CHT with any of the following Risk Factors: Neutropenia at baseline, low CR probability (Adverse K, secondary AML), age &gt;65 yrs., significant pulmonary dysfunction, high e-TRM score.</p> <p>AML with Prior IA</p> <p>AML undergoing salvage regimens for Relapsed/Refractory disease.</p> <p>Allogeneic Stem Cell transplantation (from donors other than a matched sibling donor, patients active HM, GVHD requiring high-dose steroids and history of previous IFI)</p> <p>MDS/AML receiving azacitidine as salvage therapy after intensive regimens</p> <p>Acute lymphoblastic leukemia: elderly patients (≥55 y); intensive pediatric regimens (induction); HD dexametazone; previously treated (relapsed/refractory)</p>	<p>AML not meeting criteria for High or Low Risk groups.</p> <p>Allogeneic Stem Cell transplantation (from matched sibling donors, patients in complete remission with no evidence of GVHD and no previous IFI)</p> <p>MDS with IPSS &gt;1.5 treated with azacitidine 75 mg/m<sup>2</sup> for 7 days</p> <p>MDS during the first 2–3 cycles of AZA/Decitabine</p> <p>Acute Lymphoblastic Leukemia: Adults (30–54 y); Standard induction chemotherapy; Intensive consolidation treatment; TKI + reduced cht (Ph + ALL)</p> <p>Autologous Stem Cell Transplantation: Previous IFI; &gt;3 lines of therapy (disease burden); Prolonged neutropenia (ANC &lt;500/mm<sup>3</sup> for more than 14 days); corticosteroid therapy; Colonization by <i>Candida</i> spp.; Previous Fludarabine treatment</p> <p>CLL treated with multiple lines of CTX Multiple myeloma in 3 or more lines or during ASCT DLBCL relapsed/refractory HD if treated with “escalating BEACOPP”</p>	<p>AML &lt;45 yrs.; Undergoing first remission-induction or consolidation CHT and without ANY Risk Factors for IFI</p> <p>APL treated with ATRA/ATO</p> <p>Acute Lymphoblastic Leukemia: Younger adults (30 y); Maintenance treatment (complete remission); TKI + steroids (Ph + ALL)</p> <p>MPN (Chronic Myeloid Leukemia, Essential Thrombocitemia, Idiopathic Thrombocytosis, Polycythemia Vera)</p> <p>Low or high grade NHL, CLL, MM, HD treated with conventional frontline chemotherapy</p>

AML: acute myeloid leukemia APL: acute promyelocytic leukemia MDS/AML: myelodysplastic syndromes/ acute myeloid leukemia MPN: myeloproliferative neoplasms CLL: chronic lymphocytic leukemia MM: multiple myeloma HD: Hodgkin's disease NHL: non-Hodgkin's lymphoma.

# Médecine humaine

REVIEW ARTICLE

Bone Marrow Transplantation (2022) 57:1477–1488;

## Infectious complications, immune reconstitution, and infection prophylaxis after CD19 chimeric antigen receptor T-cell therapy

Kitsada Wudhikarn<sup>1</sup> and Miguel-Angel Perales<sup>2,3</sup>

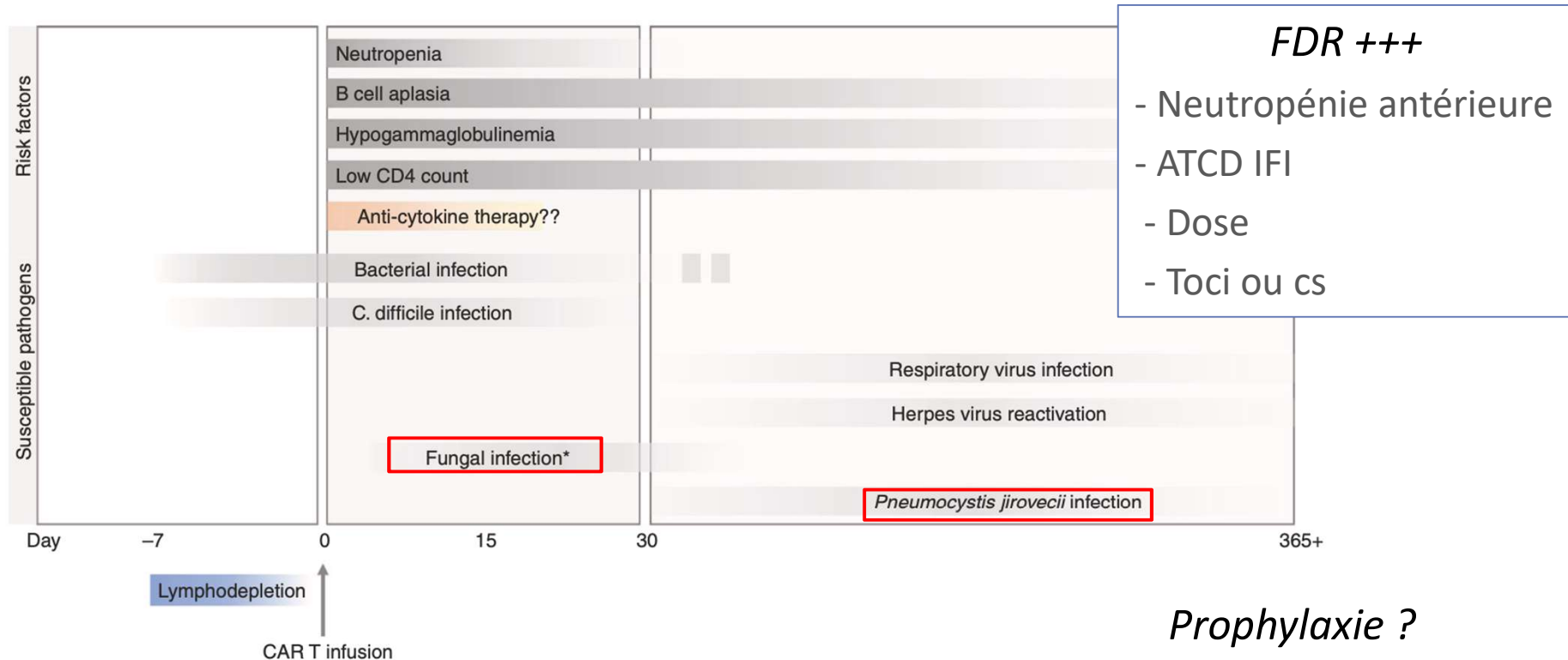


Fig. 1 Potential causative pathogens and immune suppression state by duration after chimeric antigen receptor T-cell therapy.

# Médecine humaine

Review

## Changing Epidemiology of Invasive Fungal Disease in Allogeneic Hematopoietic Stem Cell Transplantation

Pedro Puerta-Alcalde \*<sup>1</sup> and Carolina Garcia-Vidal

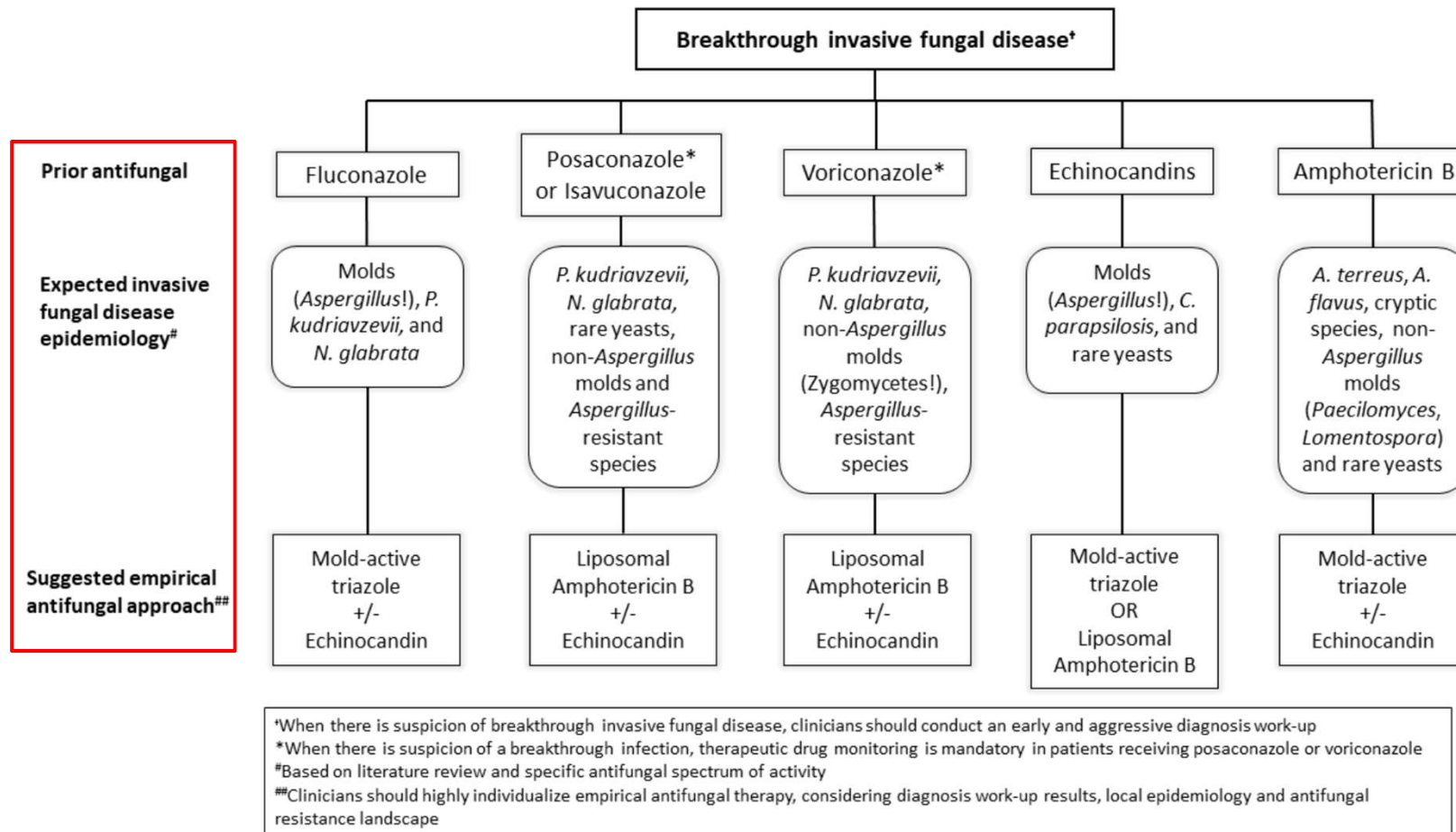


Figure 1. Algorithm of expected breakthrough invasive fungal disease epidemiology per prior antifungal therapy and suggested empirical treatment.



# Médecine humaine

## Algorithme décisionnel pour les IFI à moisissures émergentes sous azolés

**Patient**

*Profil ? FDR, type immunosuppression, CF, IRC, clinique, absorption...*

**AF initial**

*Posaconazole (ou Vorico/isa/itra)*

**1<sup>ère</sup> ligne switch**

*Amphotéricine B lip + prélèvements + levée IS*

**Galactomannane**

**Concentrations résiduelles azolé**

**Pathogènes**

<b>Positif</b>		<b>Négatif</b>	
<b>Basses</b>	<b>Adéquates</b>	<b>Basses</b>	<b>Adéquates</b>
<i>A. fumigatus</i> <i>A. flavus</i> <i>A. niger</i> <i>A. terreus...</i>	<i>A. fumigatus</i> (TR34/L98H) <i>Fusarium spp</i> <i>A. lentulus, ustus</i>	<b>Mucorales</b> <i>A. fumigatus</i> <i>Autres Aspergillii</i>	<b>Mucorales</b> <i>Scedosporium</i> <i>Filamenteux</i> <i>rare</i>

**AF adapté**

*Vorico/Isavuco*

*Amphotéricine B lip*

# Médecine humaine

## Algorithme décisionnel pour les IFI à moisissures émergentes sous AF non azolé

**Patient**

**AF initial**

**1<sup>ère</sup> ligne switch**

**Galactomannane**

**Pathogènes**

**AF adapté**

**Profil ? Exposition AF antérieure, FDR, immunosuppression, CF, IRC, clinique...**

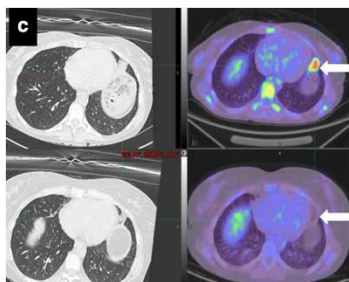
<b>Echinocandine</b>		<b>Ampho B lip</b>	
Azolé large spectre/Ampho B lip		Azolé large spectre	
<b>Positif</b>	<b>Négatif</b>	<b>Positif</b>	<b>Négatif</b>
<b>A. fumigatus</b>	<b>Mucorales</b>	<b>Aspergillus spp</b>	<i>Scedosporium</i>
<i>A. lentus, ustus</i>	<i>A. fumigatus</i>	<i>Fusarium spp</i>	<i>Filamenteux rares</i>
<i>Autres Aspergillii</i>	<i>Autres Aspergillii</i>		<i>Mucorales</i>
<i>Fusarium spp</i>	<i>Filamenteux rares</i>		
<b>Vorico/Isavuco</b>	<b>Amphotéricine B lip</b>	<b>Vorico/Isavuco</b>	

# Positionnement outils diagnostic

## FDG PET/CT imaging in detecting and guiding management of invasive fungal infections: a retrospective comparison to conventional CT imaging

European Journal of Nuclear Medicine and Molecular Imaging (2019) 46:166–173

A. P. Douglas<sup>1,2,3</sup>  · K. A. Thursky<sup>1,2,3,4,5</sup> · L. J. Worth<sup>1,2,3,5</sup> · E. Drummond<sup>6</sup> · A. Hogg<sup>6</sup> · R. J. Hicks<sup>2,6</sup> · M. A. Slavin<sup>1,2,3,4</sup>



*Evaluation réponse AF difficile par TDM thoracique*

**Table 4** Yield of FDG PET/CT and conventional CT

	PET/CT ( <i>n</i> = 40)	CT ( <i>n</i> = 40)	<i>p</i> value
Identification of clinically occult infection	17 (48%)	15 (38%)	0.765 <sup>b</sup>
Yield of CT vs. PET	–	15/17 (88%)	
Identification of dissemination	14 (35%)	2 (5%)	<0.001 <sup>b</sup>
Yield of CT vs. PET	–	2/14 (14%)	
Response to antifungal therapy on follow-up imaging <sup>a</sup>			
All scans	30/32 (94%)	14/25 (56%)	<0.001 <sup>b</sup>
PET and CT	18/18 (100%)	7/18 (39%)	<0.001 <sup>c</sup>
Discordance between PET and CT	–	11/18 (61%)	

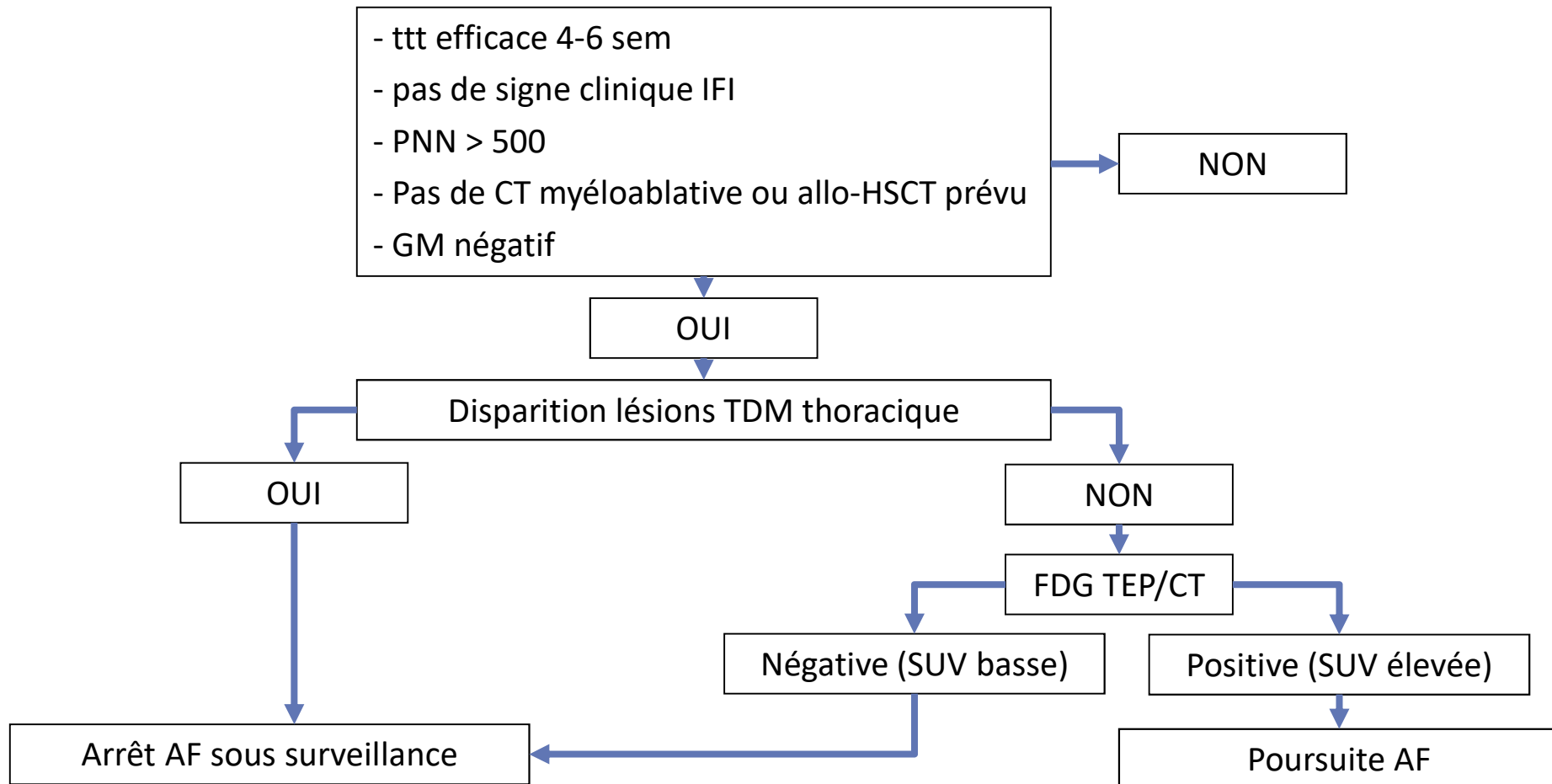
# Positionnement outils diagnostic

*Clinical Infectious Diseases*  
**INVITED ARTICLE**  
IMMUNOCOMPROMISED HOSTS: Section Editor, David R. Snyderman

**How Long Do We Need to Treat an Invasive Mold Disease in Hematology Patients? Factors Influencing Duration of Therapy and Future Questions**

Ana Fernández-Cruz,<sup>1</sup> Russell E. Lewis,<sup>2</sup> and Dimitrios P. Kontoyiannis<sup>3</sup>



Article

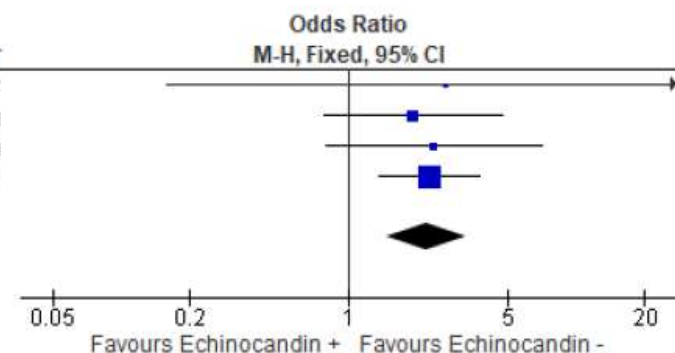
## Efficacy of Trimethoprim–Sulfamethoxazole in Combination with an Echinocandin as a First-Line Treatment Option for Pneumocystis Pneumonia: A Systematic Review and Meta-Analysis

Hideo Kato <sup>1,2,3</sup>, Mao Hagihara <sup>1,4</sup>, Nobuhiro Asai <sup>1</sup>, Takumi Umemura <sup>1</sup>, Yuichi Shibata <sup>1</sup>, Jun Hirai <sup>1</sup>, Yuka Yamagishi <sup>1</sup>, Takuya Iwamoto <sup>2,3</sup> and Hiroshige Mikamo <sup>1,\*</sup>

### Bithérapie TMP/SMX + CASPOFUNGINE dans la pneumocystose modérée à grave

- Méta-analyse de 4 études rétrospectives  
Asie, 2 chez VIH+, 2 chez VIH- dont 1 chez TOS,  
301 patients monothérapie TMP/SMX, 235 association à candine
- Mortalité : 35,2% monothérapie versus 20,9% association (OR = 2,2)

Study or Subgroup	Echinocandin -		Echinocandin +		Weight	Odds Ratio M-H, Fixed, 95% CI	Year
	Events	Total	Events	Total			
Lu Y	2	5	1	5	1.9%	2.67 [0.16, 45.14]	2017
Jin F	33	91	8	35	22.9%	1.92 [0.78, 4.71]	2019
Wang M	14	70	5	52	14.3%	2.35 [0.79, 7.01]	2019
Tian Q	57	135	35	143	61.0%	2.25 [1.35, 3.76]	2021
<b>Total (95% CI)</b>		<b>301</b>		<b>235</b>	<b>100.0%</b>	<b>2.20 [1.46, 3.31]</b>	
Total events	106		49				
Heterogeneity: Chi <sup>2</sup> = 0.13, df = 3 (P = 0.99); I <sup>2</sup> = 0%							
Test for overall effect: Z = 3.79 (P = 0.0002)							



- Bénéfice +++ chez les patients VIH+ et forme grave chez les patients VIH-



Article

## Efficacy of Trimethoprim–Sulfamethoxazole in Combination with an Echinocandin as a First-Line Treatment Option for Pneumocystis Pneumonia: A Systematic Review and Meta-Analysis

Hideo Kato <sup>1,2,3</sup>, Mao Hagihara <sup>1,4</sup>, Nobuhiro Asai <sup>1</sup>, Takumi Umemura <sup>1</sup>, Yuichi Shibata <sup>1</sup>, Jun Hirai <sup>1</sup>, Yuka Yamagishi <sup>1</sup>, Takuya Iwamoto <sup>2,3</sup> and Hiroshige Mikamo <sup>1,\*</sup>

### Bithérapie TMP/SMX + CASPOFUNGINE dans la pneumocystose modérée à grave

→ Which trial do we need? Combination treatment of *Pneumocystis jirovecii* pneumonia in non-HIV infected patients

Philipp Koehler <sup>1,2,a</sup>, Juergen Prattes <sup>1,2,a</sup>, Michaela Simon <sup>3</sup>, Luise Haensel <sup>1,2</sup>, Martin Hellmich <sup>4</sup>, Oliver A. Cornely <sup>1,2,5,6,\*</sup>



Clinical Microbiology and Infection 29 (2023) 1225–1228

→ Re: 'Which trial do we need? Combination treatment of *Pneumocystis jirovecii* pneumonia in non-HIV infected patients' by Cornely et al.

Guillaume Desoubeaux <sup>1,2,\*</sup>, Adrien Lemaigen <sup>3</sup>, Alexandre Alanio <sup>4,5</sup>, Stephan Ehrmann <sup>2,6</sup>

However, we believe that providing echinocandins directly into the lungs through an aerosolization process could be even more efficient. Indeed, high molecular weight (1093.31 g/mol) and

→ **CASPONEB : 27 centres français en 2024**

# Conclusion

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*Le pathogène X sera-t-il fongique ???*



# Conclusion

**WHO fungal priority pathogens list to guide research, development and public health action**

## Critical Priority Group



*Cryptococcus neoformans*



*Candida auris*



*Aspergillus fumigatus*



*Candida albicans*

## High Priority Group



*Nakaseomyces glabrata*  
(*Candida glabrata*)



*Histoplasma* spp.



Eumycetoma  
causative agents



Mucorales



*Fusarium* spp.



*Candida tropicalis*



*Candida parapsilosis*

# Conclusion

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*Candida parapsilosis*

*Merci !*