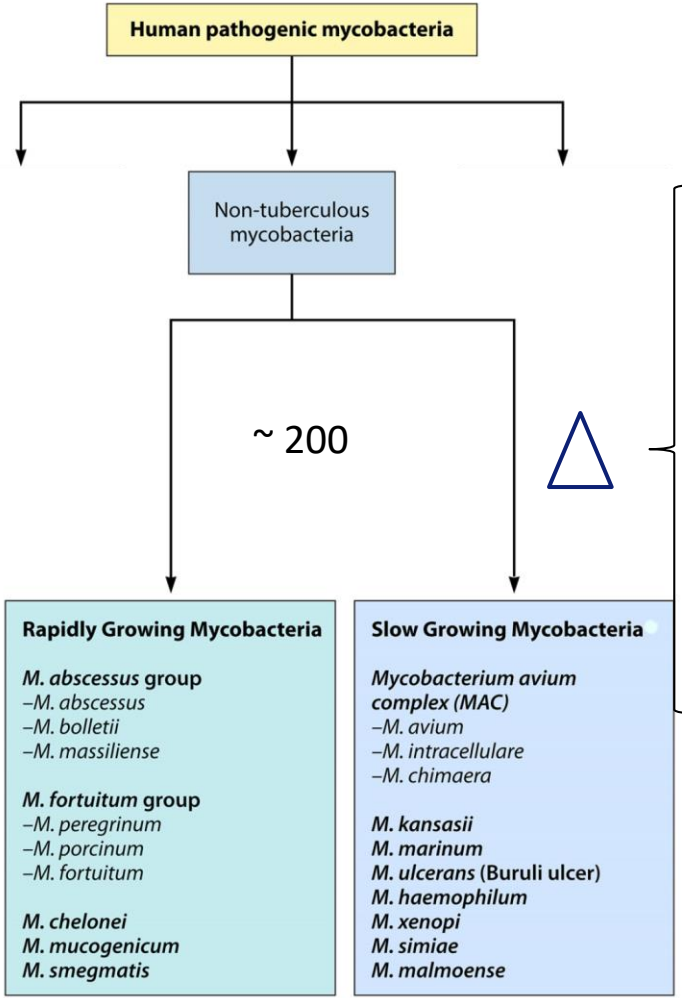
Non-Tuberculeuze Mycobacteriele infecties

Hannelore Bax, 17 januari 2024

Masterclass Infectieziekten

Erasmus MC
Universitair Medisch Centrum Rotterdam



geografie

pathogeniciteit

klinisch beeld

behandeling

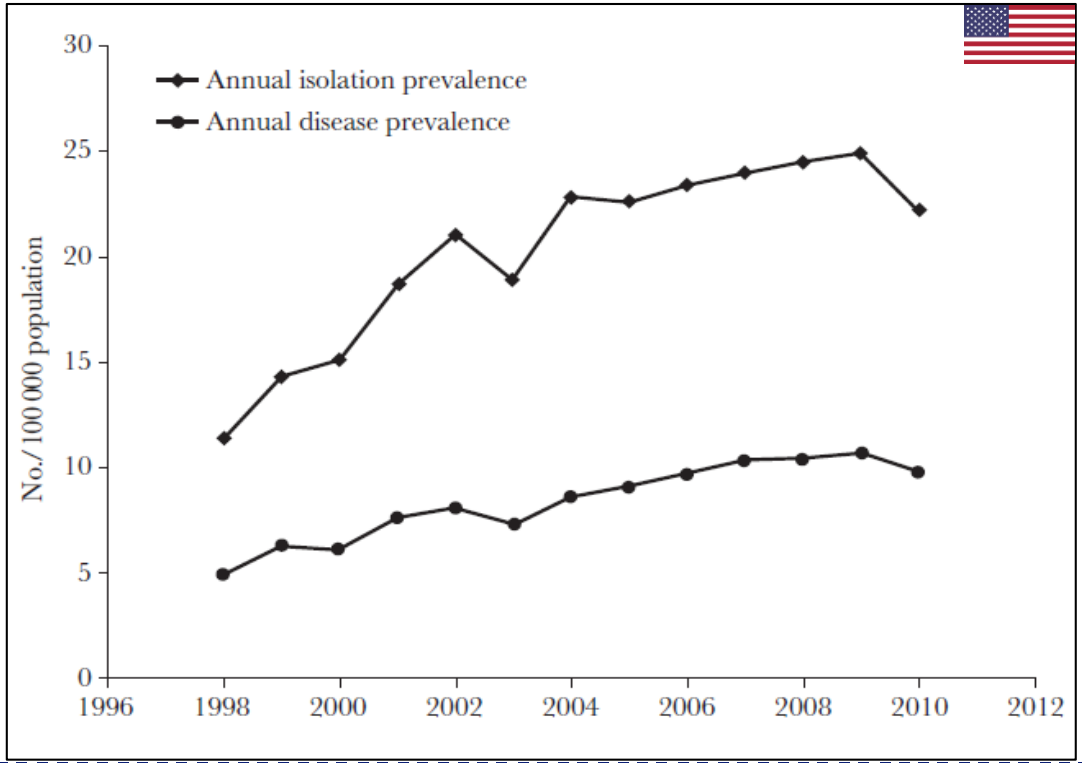
prognose

Franco-Paredes et al., Clin Microbiol Rev. 2019

Erasmus MC

NTM prevalentie neemt toe

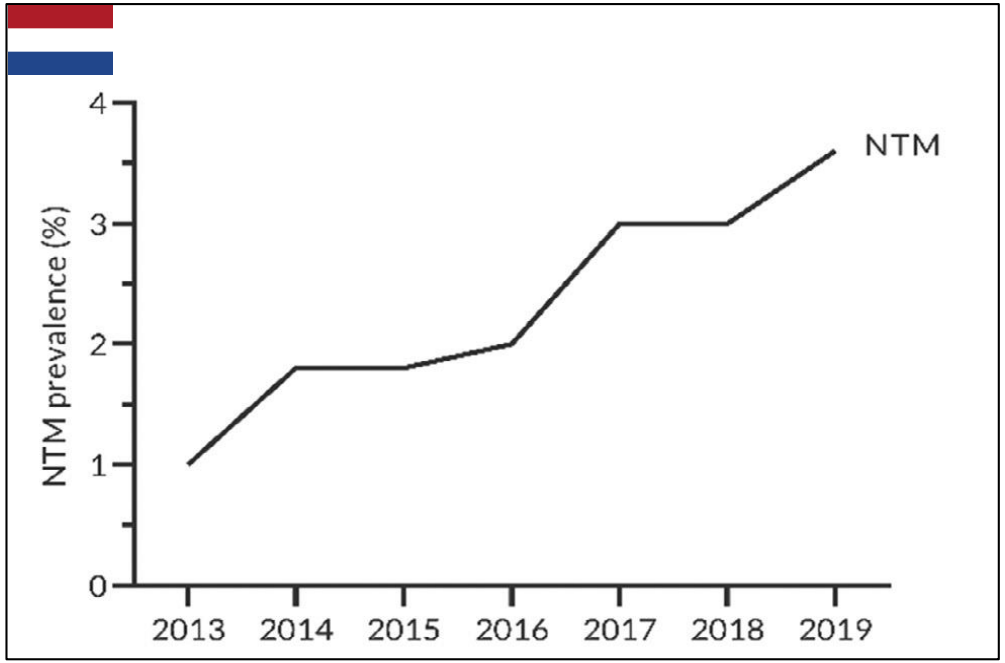
pulmonaal



Daley et al. J Infect Dis. 2020

NTM prevalentie neemt toe

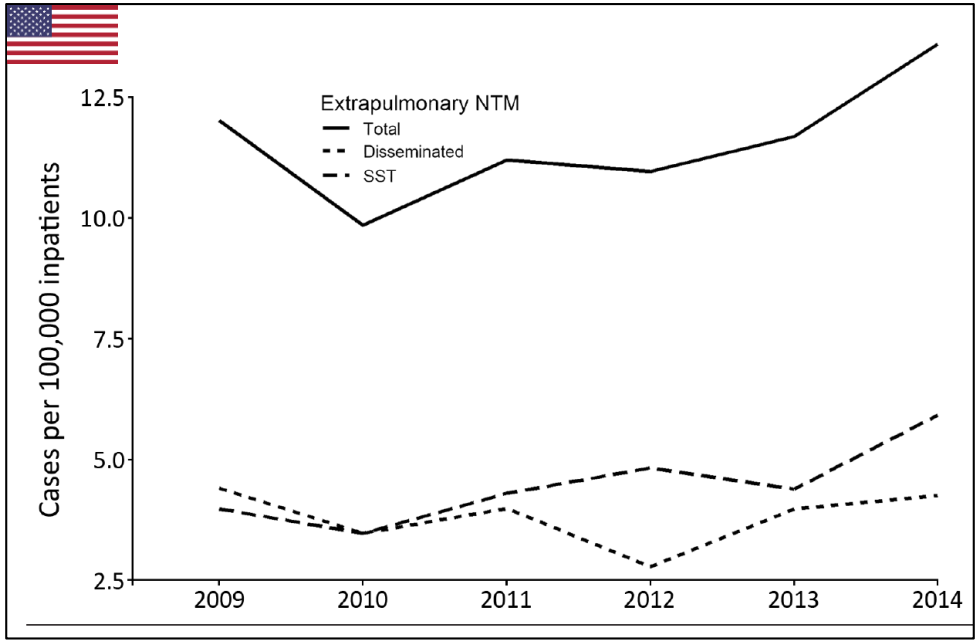
pulmonaal, CF



Zomer et al., J Cyst Fibros. 2022

NTM prevalentie neemt toe

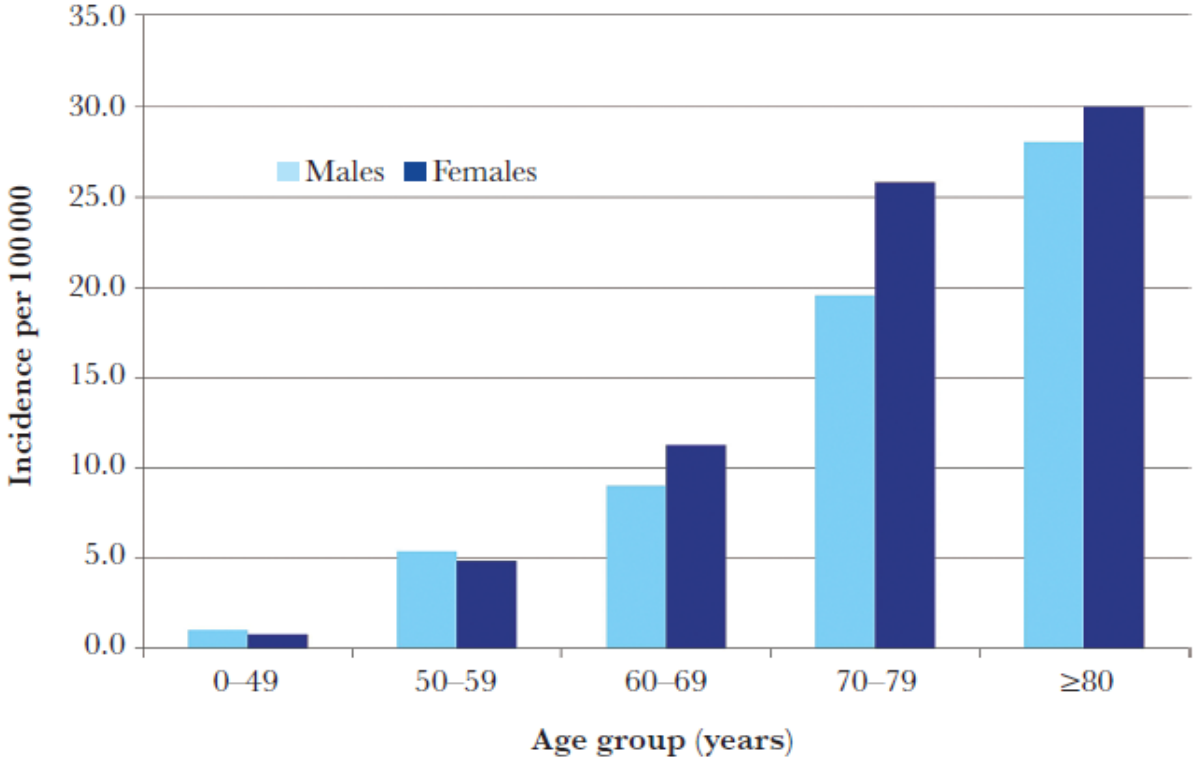
extrapulmonaal



Ricotta et al., Emerg Infect Dis. 2021

NTM prevalentie neemt toe met de leeftijd

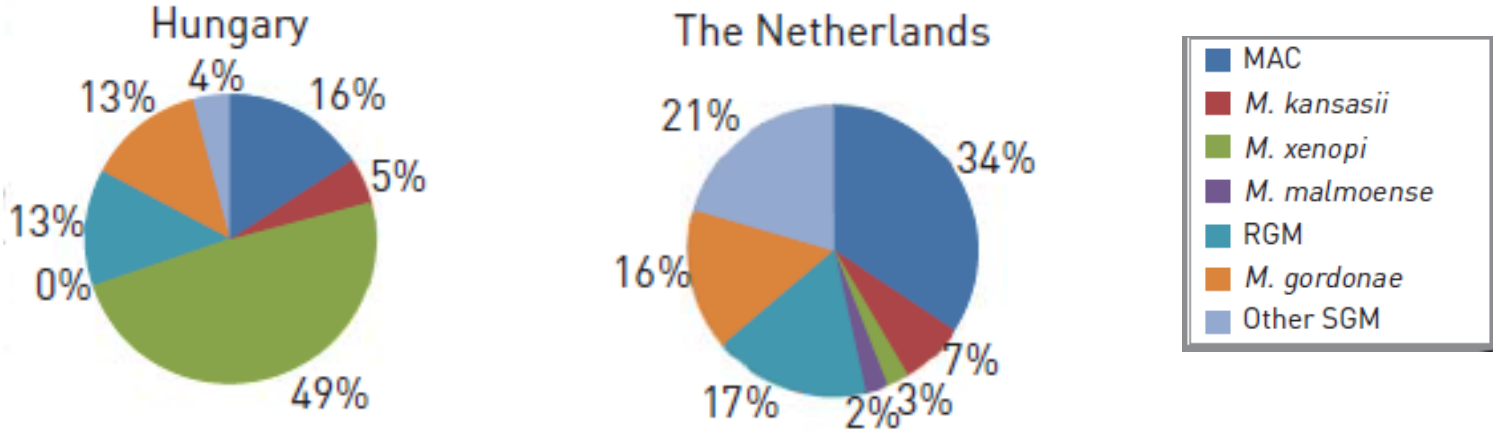
pulmonaal



Daley et al. J Infect Dis. 2020

Species distributie verschilt per regio

continenten – landen -- behandelcentra



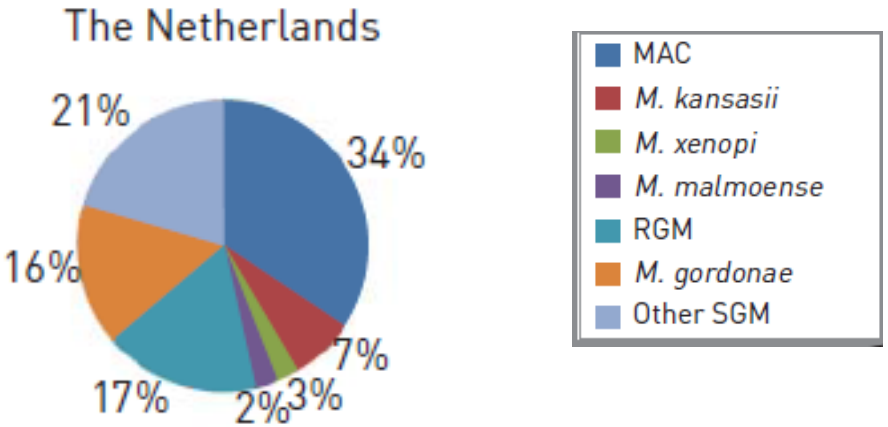
Hoefsloot et al., Eur Resp J. 2013

Erasmus MC

Species distributie verschilt per regio

continenten – landen -- behandelcentra

1. MAC
2. *M. kansasii*
3. *M. malmoense*

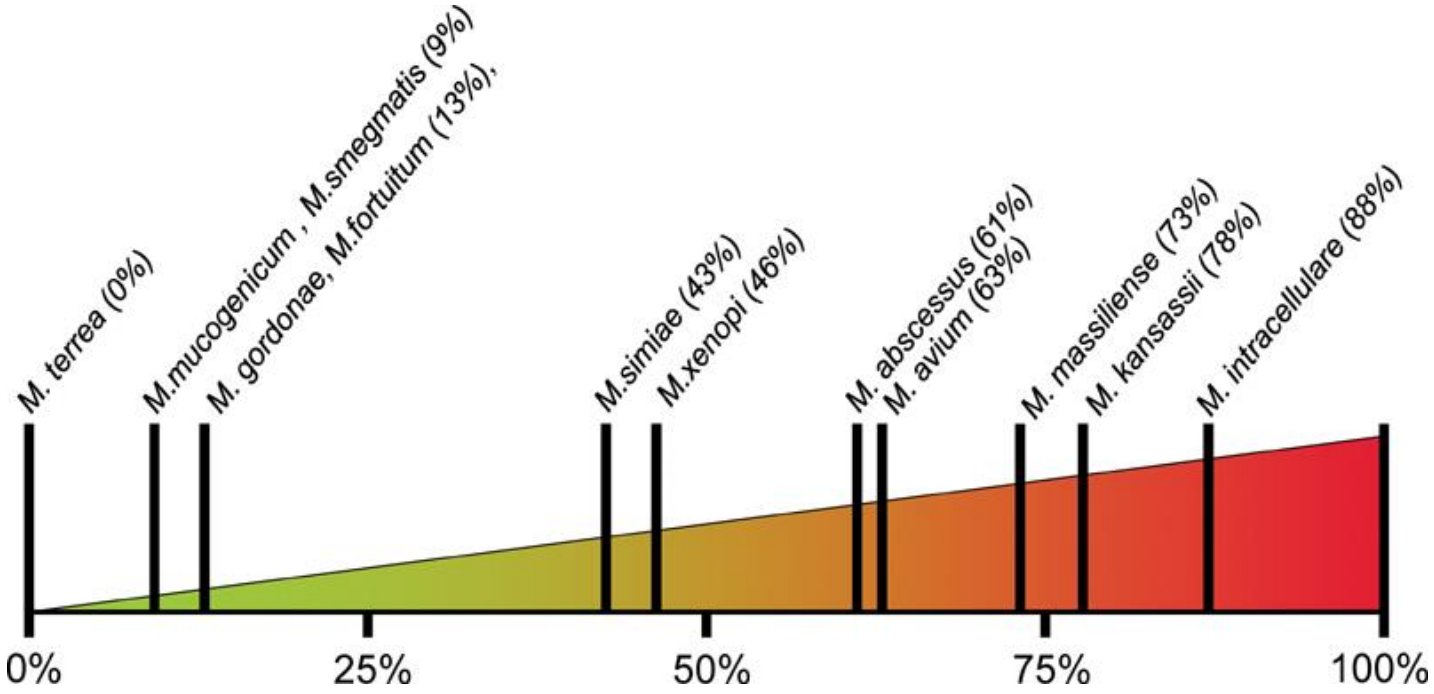


NTM disease

all cultures

Zweijpfenning et al. Respir Med. 2017

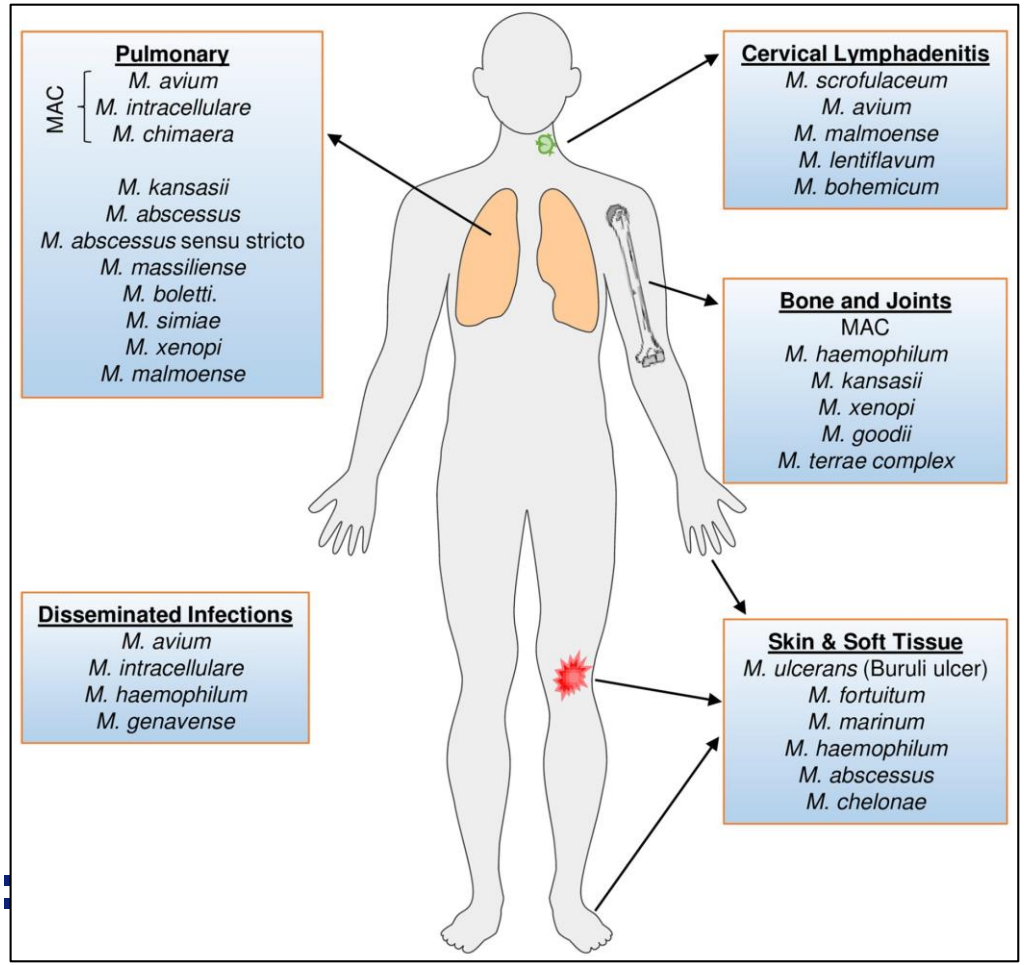
Pathogeniciteit verschilt per species



Zweijpfenning et al., Semin Respir Crit Care Med. 2018

Erasmus MC

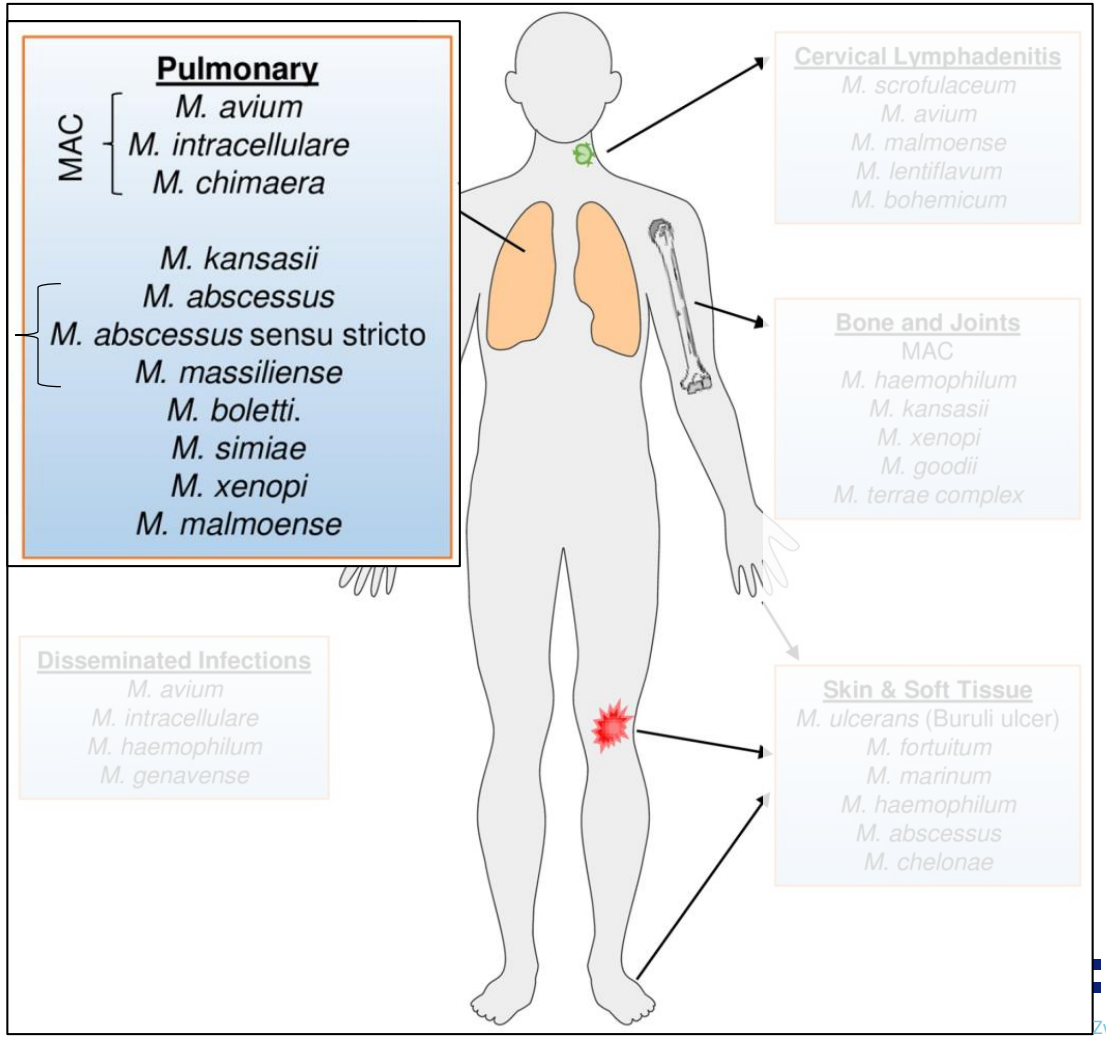
Species distributie verschilt per klinisch beeld



Baldwin et al., PloS Negl Trop Dis. 2019

Erasmus MC

Kliniek

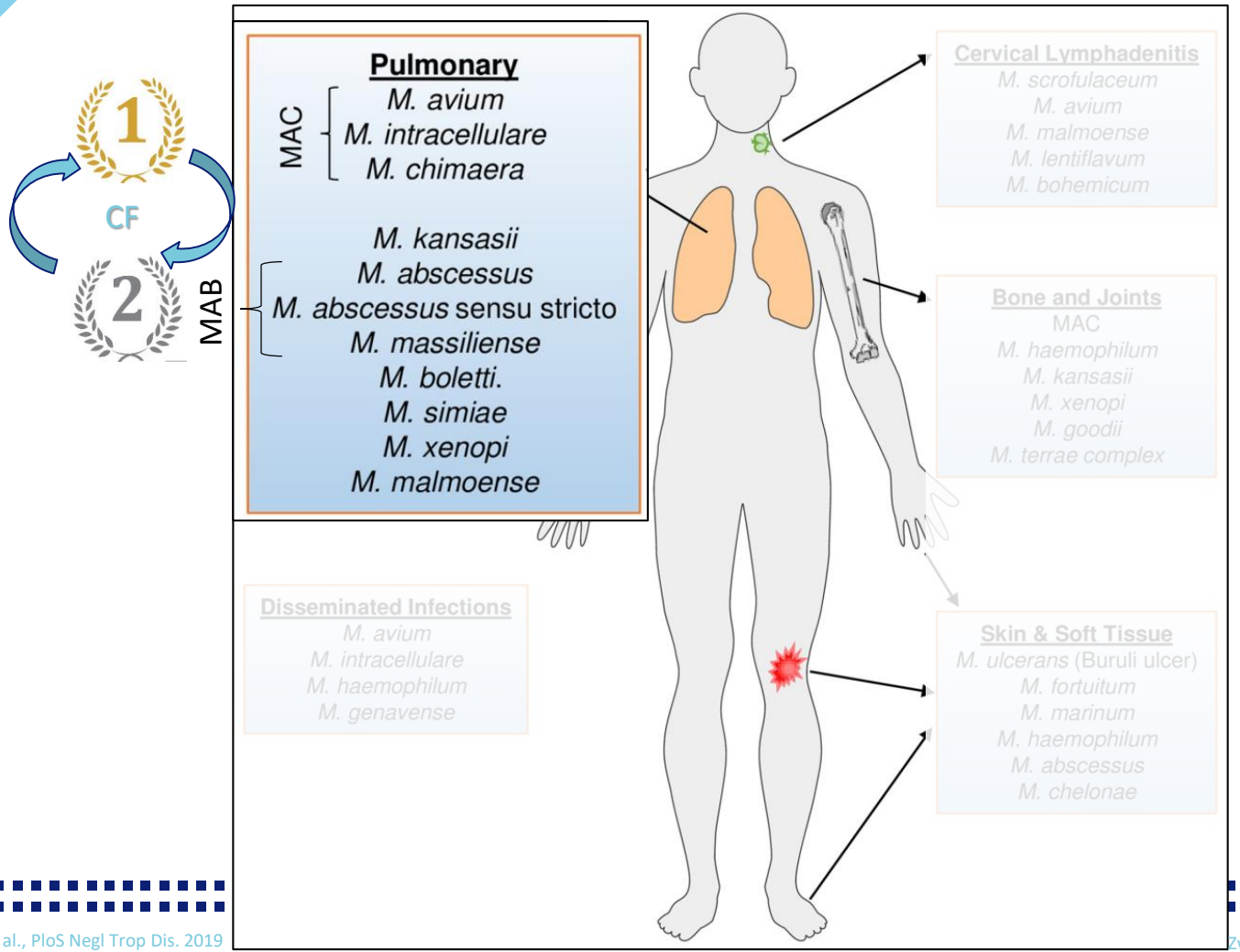


Baldwin et al., PloS Negl Trop Dis. 2019

Zweijpfenning et al., Semin Resp Crit Care Med. 2018

Erasmus MC

Kliniek

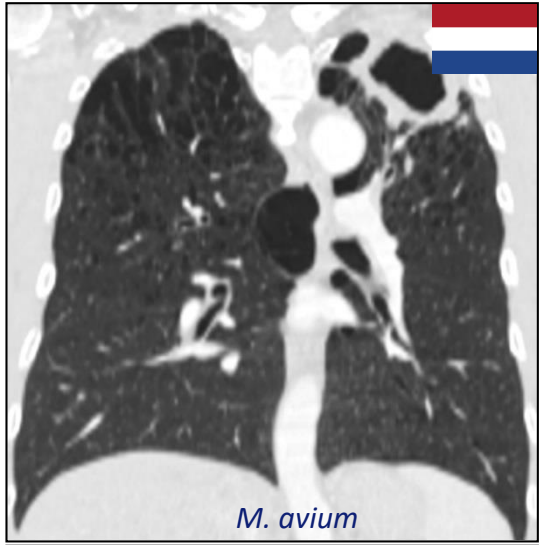


Baldwin et al., PloS Negl Trop Dis. 2019

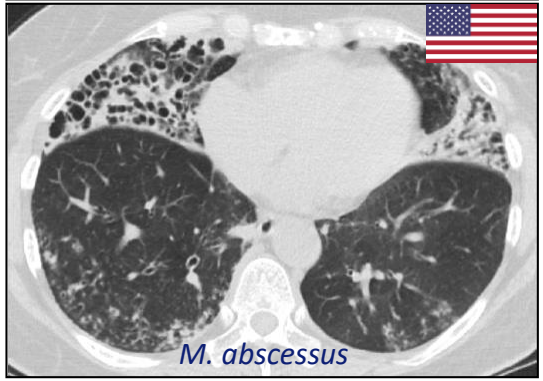
Zweijpfenning et al., Semin Resp Crit Care Med. 2018

Erasmus MC

NTM-pulmonary disease (PD)



patiënten met structurele longafwijkingen

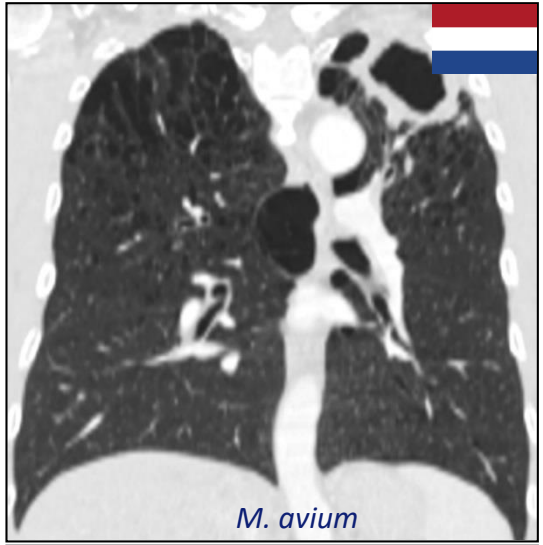


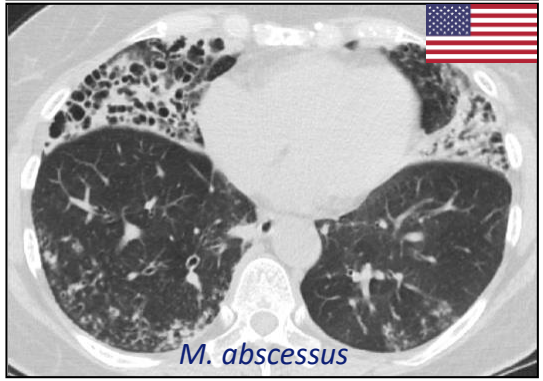
blanke, postmenopauzale vrouwen

Stout et al. Int J Infect Dis. 2016

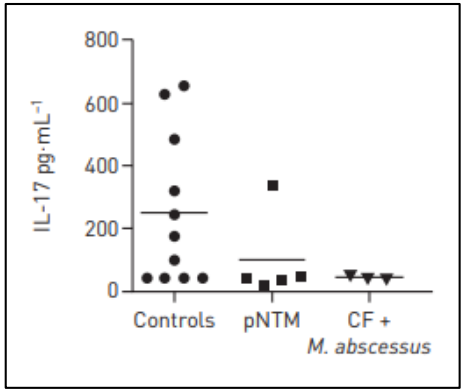
Erasmus MC

NTM-pulmonary disease (PD)





IL-17 ↓



multigenetisch

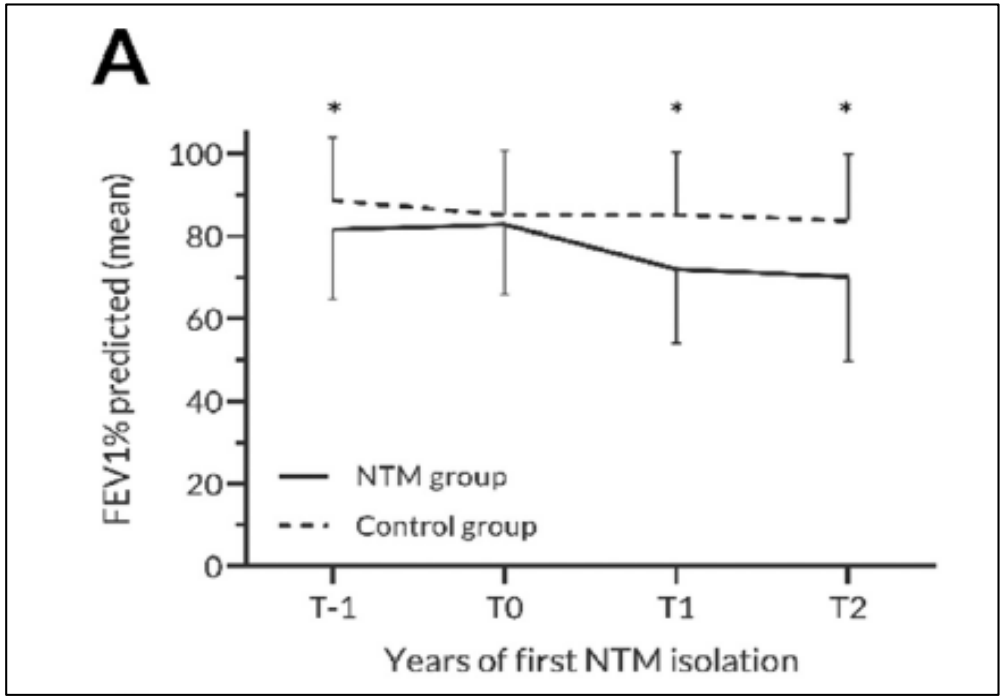
CFTR
immuun systeem
bindweefsel
trilharen

Szymanski et al. Am J Resp Crit Care Med. 2015

Erasmus MC

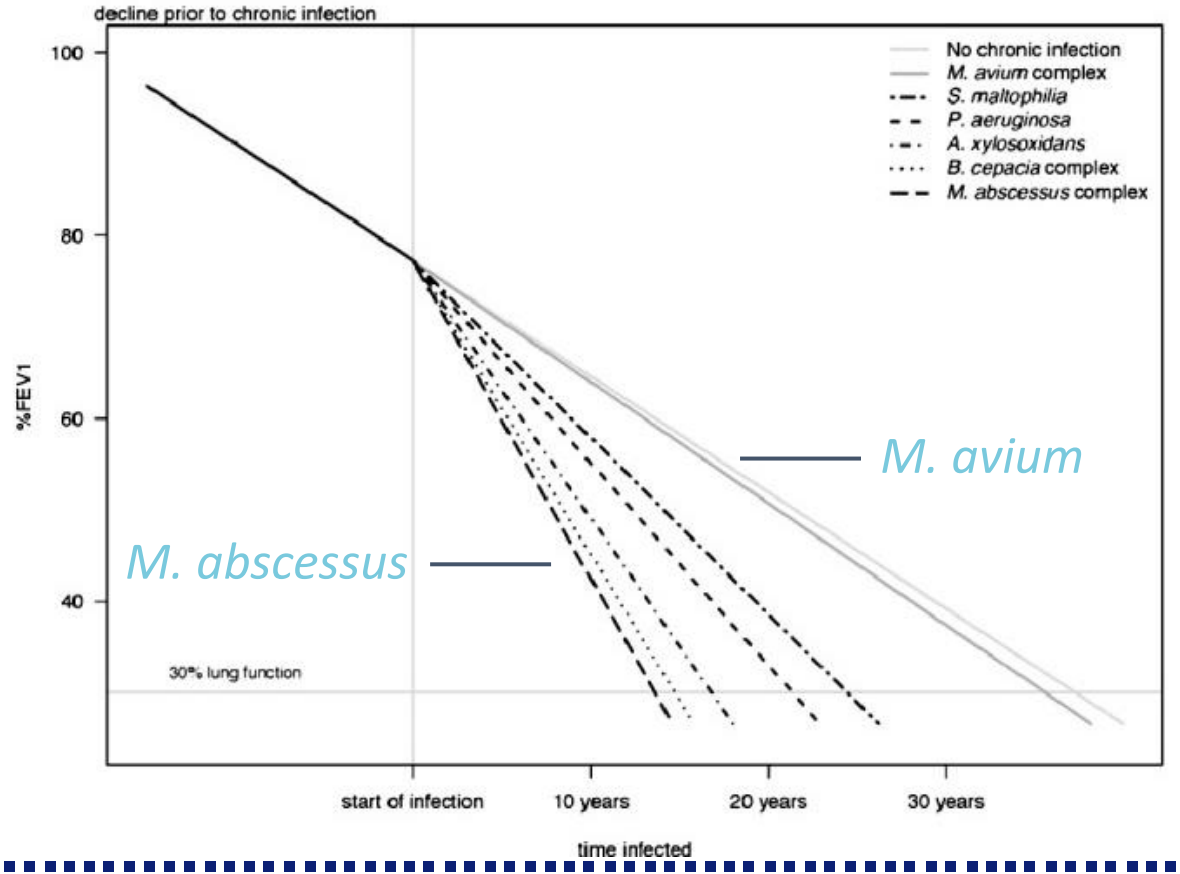
Invloed NTM op longfunctie

kinderen



Zomer et al., J Cyst Fibros. 2022

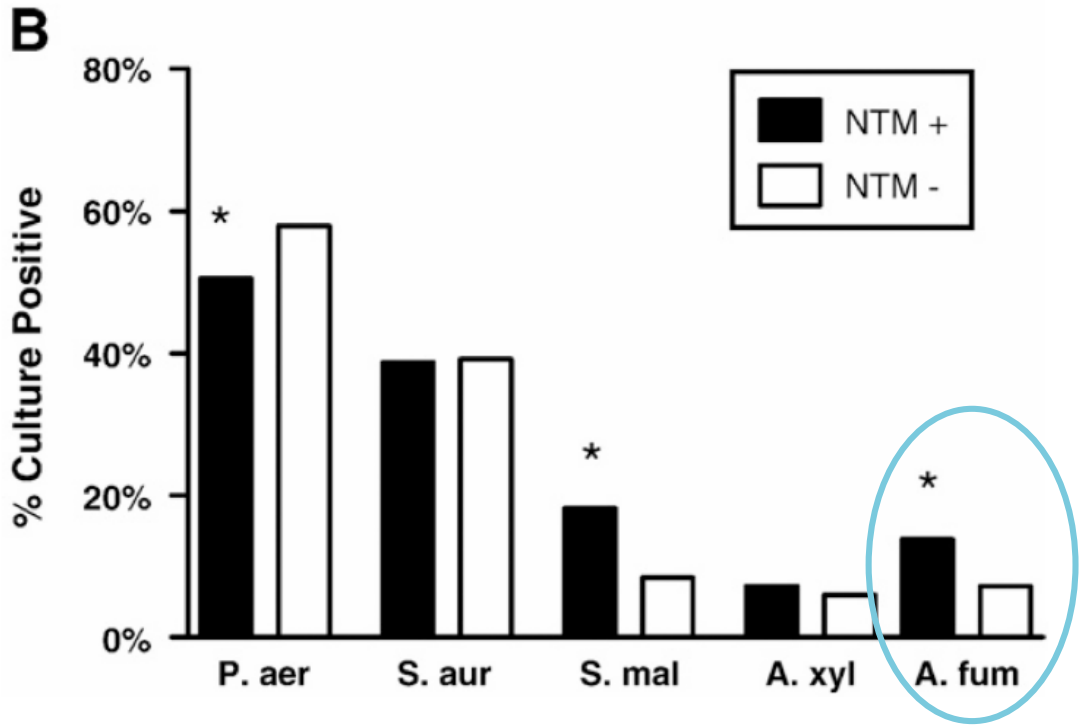
Invloed NTM op longfunctie is species afhankelijk



Qvist et al., J Cyst Fibros. 2016

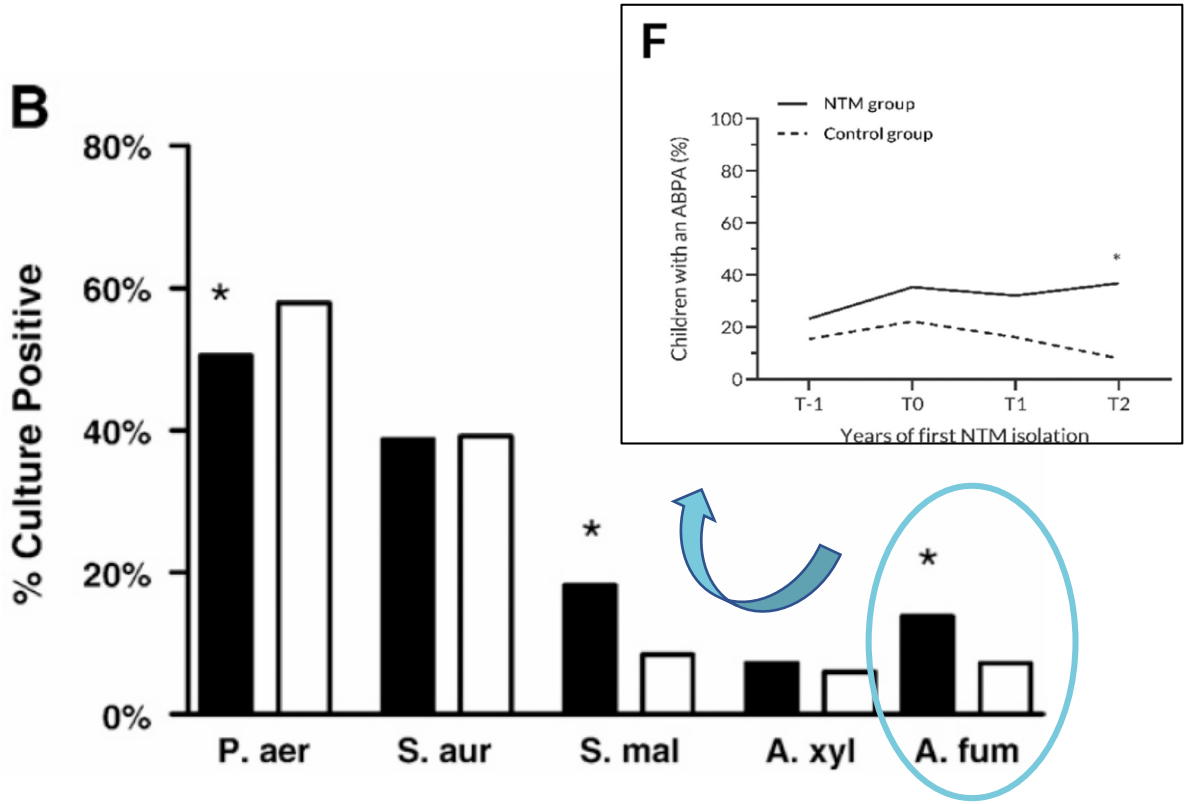
Erasmus MC

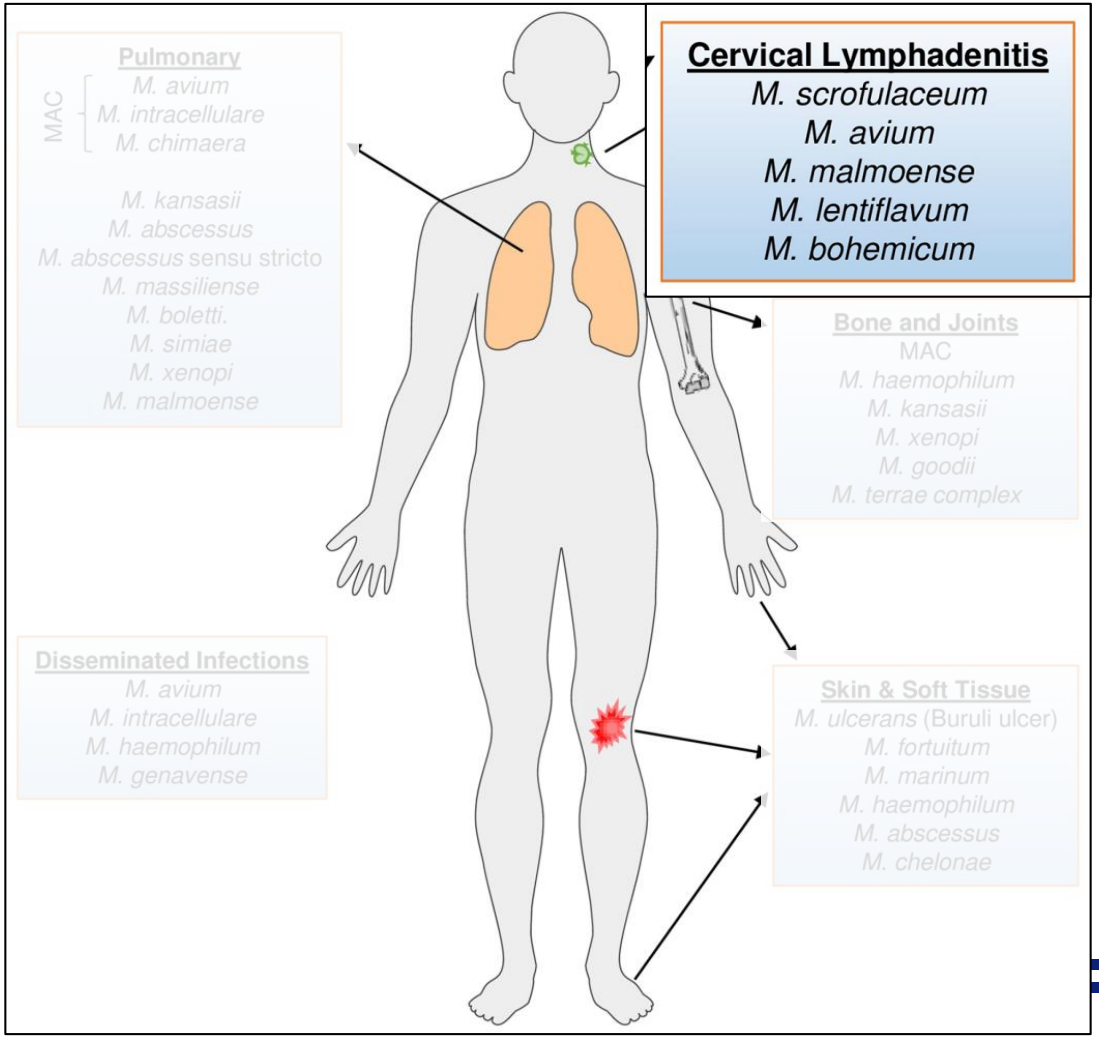
Co-infecties bij CF en NTM



Esther et al., J Cyst Fibros. 2010

Co-infecties bij CF en NTM




Pulmonary
MAC
M. avium
M. intracellulare
M. chimaera
M. kansasii
M. abscessus
M. abscessus sensu stricto
M. massiliense
M. boletti.
M. simiae
M. xenopi
M. malmoense
Cervical Lymphadenitis
M. scrofulaceum
M. avium
M. malmoense
M. lentiflavum
M. bohemicum
Bone and Joints
MAC
M. haemophilum
M. kansasii
M. xenopi
M. goodii
M. terrae complex
Disseminated Infections
M. avium
M. intracellulare
M. haemophilum
M. genavense
Skin & Soft Tissue
M. ulcerans (Buruli ulcer)
M. fortuitum
M. marinum
M. haemophilum
M. abscessus
M. chelonae

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Cervicale lymfadenitis

met name bij kinderen

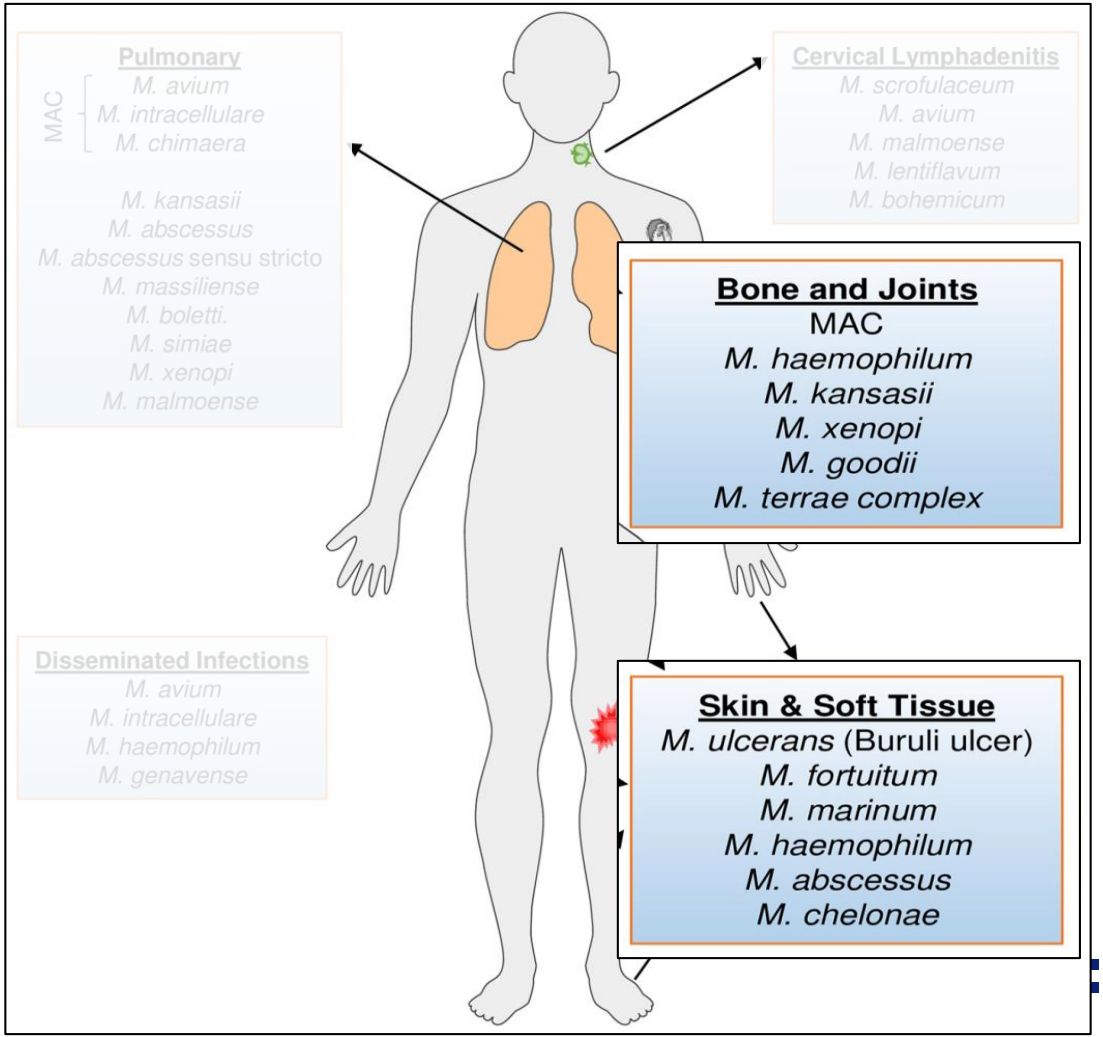
X

X

soms bij volwassenen

Lindeboom, Clin Microbiol Rev, 2011

Kliniek



Baldwin et al., PloS Negl Trop Dis. 2019

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Huid- en weke delen, *M. marinum*

diverse klinische presentaties

X X X

X X X

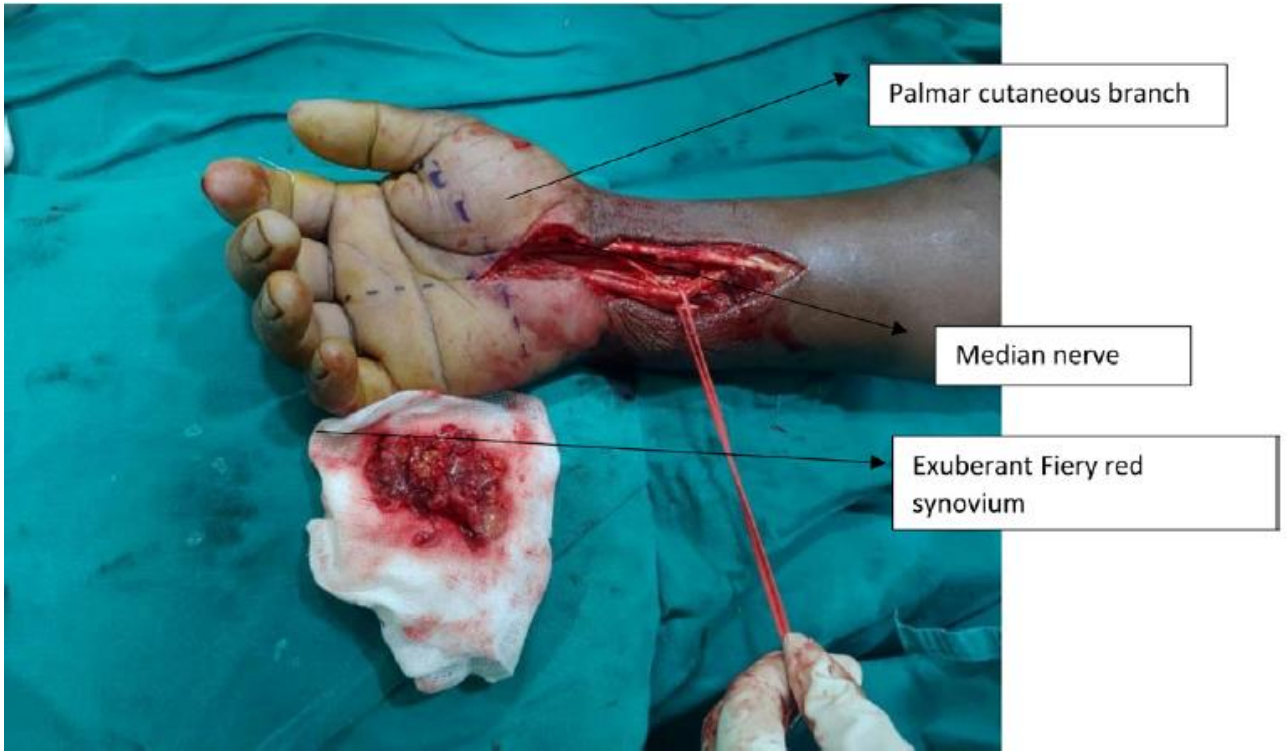
Huid en weke delen, *M. marinum*
MDS

X

kan fulminant verlopen bij immuungecompromitteerde status!

Huid- en weke delen, *M. marinum*

50 jaar oude visser met “carpaal tunnel syndroom”



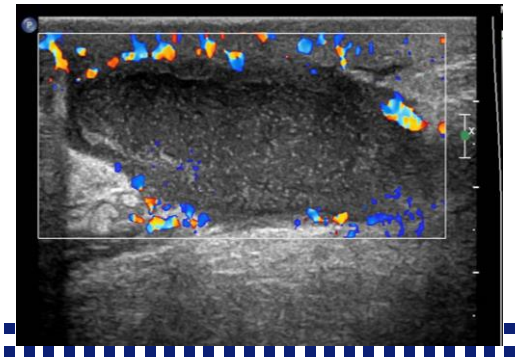
Pai G et al. BMJ Case Rep. 2022

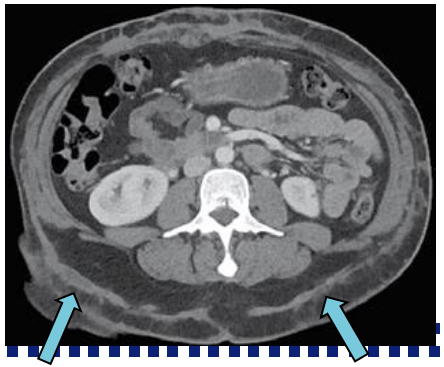
Huid en weke delen, nosocomiaal

met name snele groeiers

subcutane abcessen na liposuctie Colombia

M. abscessus





Wonddehiscentie 1,5 week post OK
Geen reactie op conventionele ABs
Kweek negatief

➔ Diagnose 1,5 jaar later

Erasmus MC

Furuya et al. Clin Infect Dis. 2008; Bax et al. Ned Tijdschr Geneeskd. 2014

Huid en weke delen, nosocomiaal

met name snele groeiers

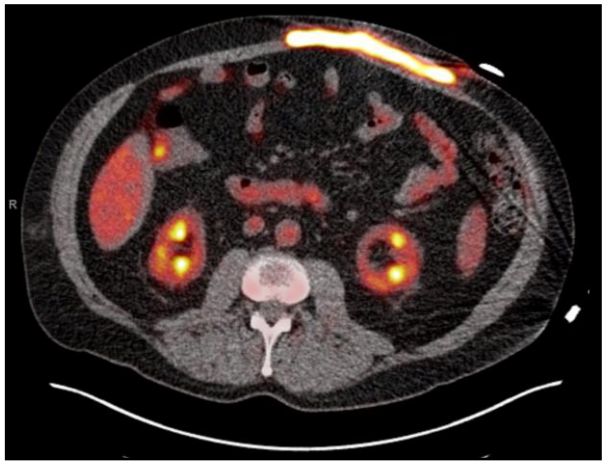
2 x cellulitis en osteomyelitis na neusseptumoperatie
M. chelonae

X X

Huid en weke delen, nosocomiaal

met name snele groeiers

diepe LVAD driveline infectie
M. chelonae (EMC)

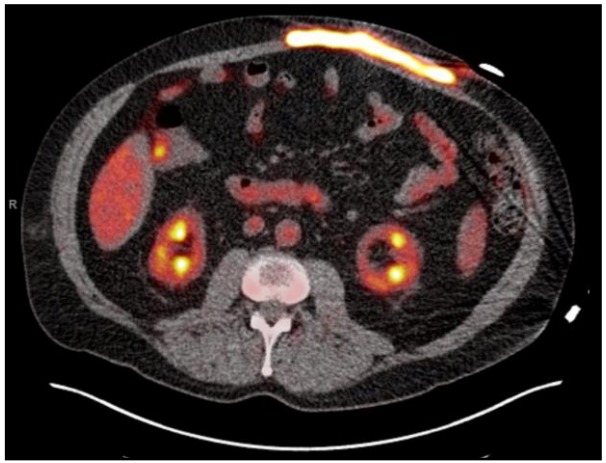


Roest et al., Int J Infect Dis. 2020

Huid en weke delen, nosocomiaal

met name snele groeiers

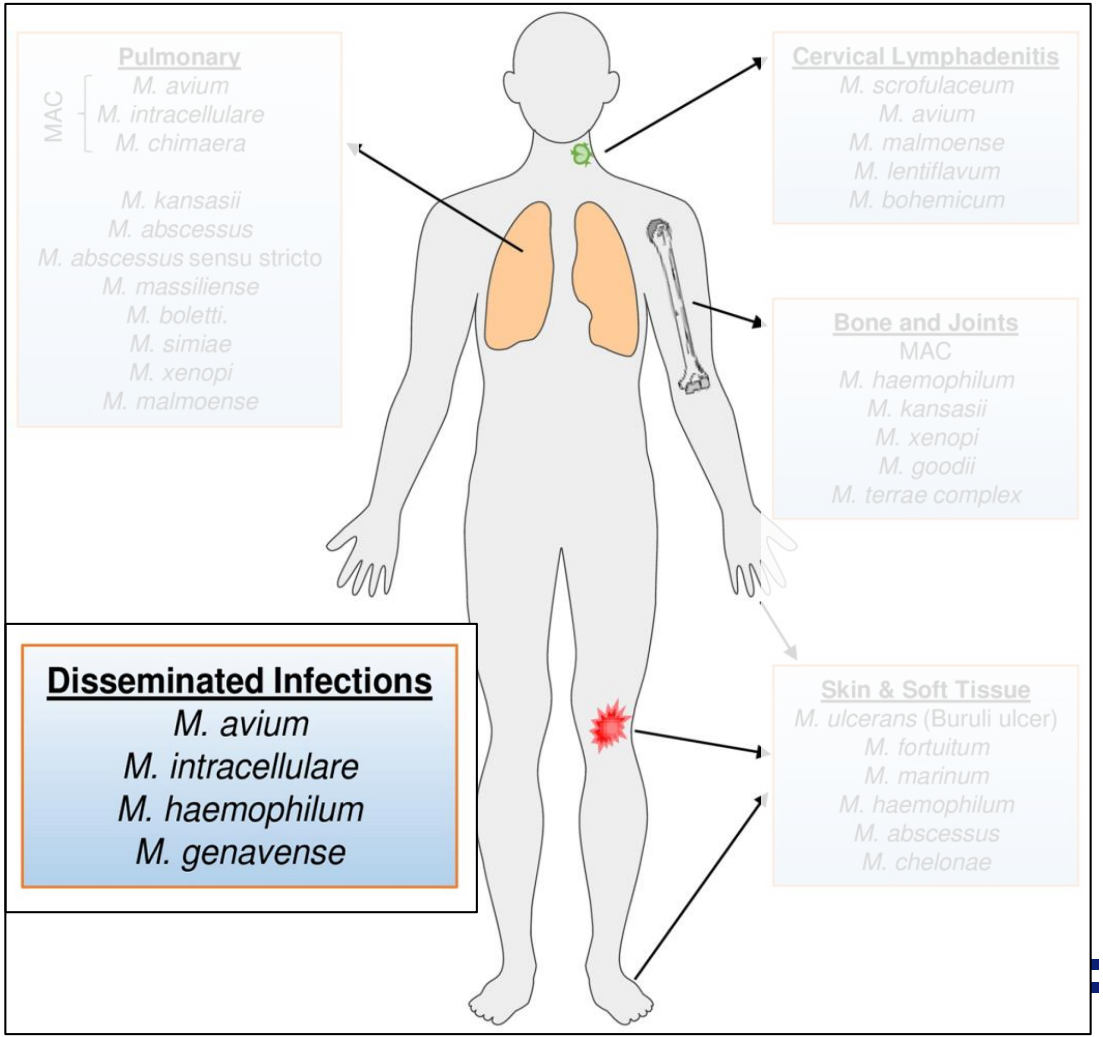
diepe LVAD driveline infectie
M. chelonae (EMC)



3,5 jaar na OK
Persisterende pussige uitvloed
Geen reactie op conventionele ABs
Kweek negatief

Roest et al. Int J Infect Dis. 2020

Kliniek



Baldwin et al., PloS Negl Trop Dis. 2019

Erasmus MC

Gedissemineerde Infecties

Wie?

Immuungecompromitteerde patiënten

- HIV patiënten (AIDS)
- Immuunsuppressieve medicatie inclusief biologicals
  - solide orgaan- en stamceltransplantatie
  - ander onderliggend lijden (RA, M Crohn: anti-TNF)
- Stoornissen in de interferon gamma signalering

Kunstmateriaal geasscocieerde infecties

- vaatprothesen, kunstkleppen, pacemakers

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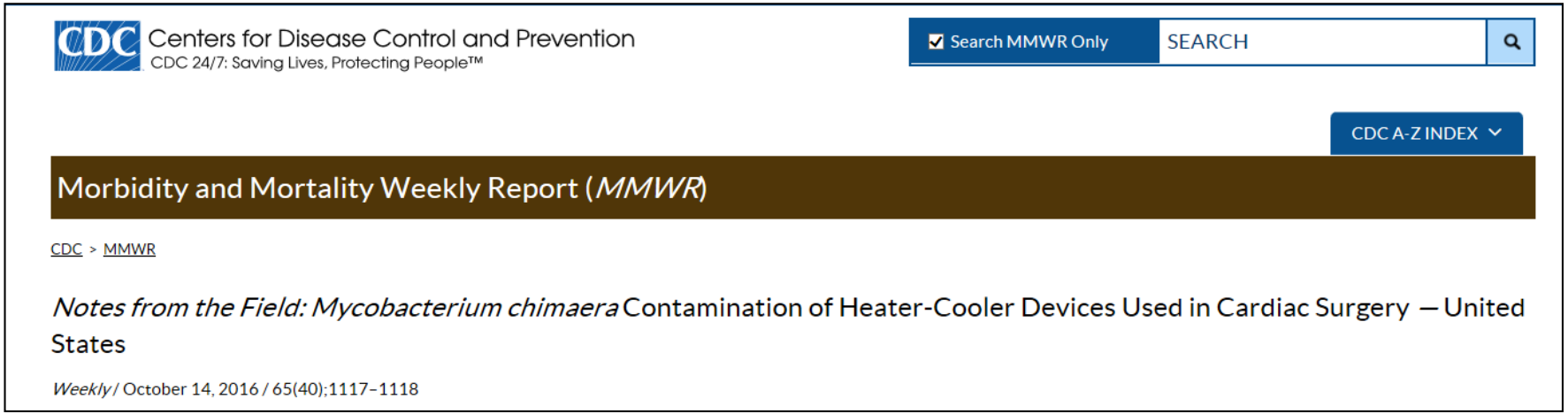
Gedissemineerde Infecties



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Search MMWR Only SEARCH

CDC A-Z INDEX

Morbidity and Mortality Weekly Report (*MMWR*)

CDC > MMWR

Notes from the Field: Mycobacterium chimaera Contamination of Heater-Cooler Devices Used in Cardiac Surgery — United States

Weekly / October 14, 2016 / 65(40);1117–1118

Gedissemineerde Infecties

Table 1. Published Cases of *Mycobacterium chimaera* Infection Related to the Heater–Cooler Unit

N > 100

Outbreak Location/N/Citation	Latency		Mortality (%)
	Surgery to Symptoms	Symptoms to Diagnosis	
Europe/10/[7]	Median, 18 months	Median, 21 (5–40 months)	5/10 (50)
United Kingdom/30/[28]	Median, 14.5 months (range, 1.5–60 months)	Median, 7 weeks	18/30 (60)
Germany/5/[17]	Range, 5–60 months	NR	1/5 (20)
Pennsylvania/8/[26]	NR	Median, 1.2 years (1–27 months)	5/8 (63)
United States/24/[25]	NR	Mean, 1.6 years (range, 0.1–6.3 years)	11/24 (46)
New York/2/[31]	NR	Mean, 14.5 months (range, 12–17 months)	0
Montreal, Canada/2/[21]	Range, 13–16 months	Additional 2–3 months from presentation	0
Florida/1/[24]	72 months	NR	0
Minnesota/3/[22]	Range, 16–26 months	NR	2/3 (67)
Italy/1/[27]	14 months	12 months	0

Kasperbauer et al. Clin Infect Dis 2019

Gedissemineerde Infecties

Table 1. Published Cases of *Mycobacterium chimaera* Infection Related to the Heater–Cooler Unit

N > 100

koorts, malaise, gewichtsverlies, hoesten, dyspnoe

hepatitis, nefritis, pneumonie, mycocarditis, osteomyelitis, myositis, chorioretinitis

Outbreak Location/N/Cita			Mortality (%)
Europe/10/[7]			5/10 (50)
United Kingdom/30/[28]			18/30 (60)
Germany/5/[17]			1/5 (20)
Pennsylvania/8/[26]			5/8 (63)
United States/24/[25]			11/24 (46)
New York/2/[31]			0
Montreal, Canada/2/[21]			0
Florida/1/[24]	72 months	NR	0
Minnesota/3/[22]	Range, 16–26 months	NR	2/3 (67)
Italy/1/[27]	14 months	12 months	0

Kasperbauer et al. Clin Infect Dis 2019

Annals of Internal Medicine

ORIGINAL RESEARCH

Mycobacterium abscessus Cluster in Cardiac Surgery Patients Potentially Attributable to a Commercial Water Purification System

Michael Klompas, MD, MPH; Chidiebere Akusobi, MD, PhD; Jon Boyer, ScD, CIH; Ann Woolley, MD; Ian D. Wolf; Robert Tucker, MPH, CIC; Chanu Rhee, MD, MPH; Karen Fiumara, PharmD; Madelyn Pearson, DNP; Charles A. Morris, MD, MPH; Eric Rubin, MD, PhD; and Meghan A. Baker, MD, ScD

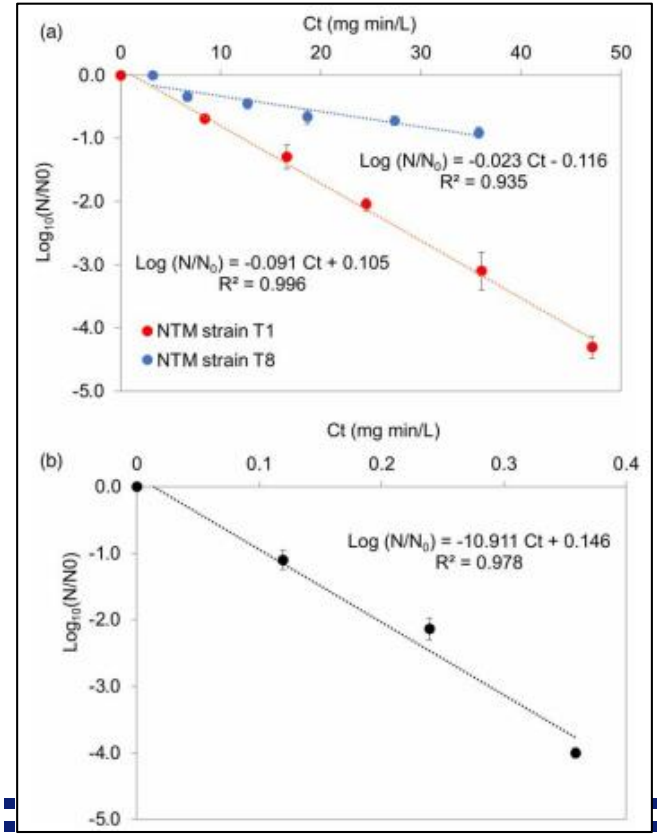
Gedissemineerde Infecties

biofilm formatie in waterslangen en ijs reservoirs

Klompas et al. Ann Intern Med. 2023

Gedissemineerde Infecties

veel NTM zijn minder gevoelig voor chloor desinfectie

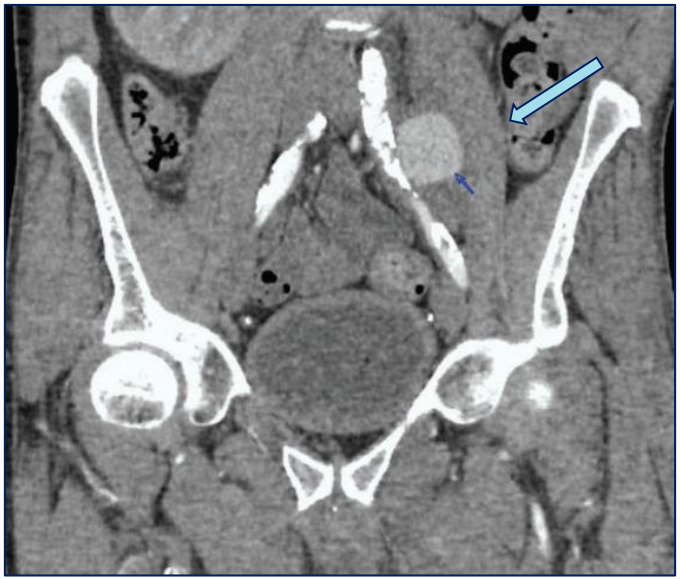


Wallace et al. Annu Rev Microbiol. 1998; Rahmatica et al. Water suppl. 2023;

Erasmus MC

Gedissemineerde Infecties

pijn/zwelling knie, petechiën in een patiënt met een vaatprothese en iv drugs gebruik



gedissemineerde *M. abscessus (endocarditis)*

Tejura et al. Open Forum Infect Dis 2018

Gedissemineerde Infecties

Table 1. Clinical Characteristics of Patients With Reported Mycobacterium *abscessus* Endovascular Infection

Reference	Age/Sex	Comorbidities	Symptoms	Site of Infection	Time to Presentation	Imaging Modality	Surgical Treatment	Abx	Duration of Therapy	Bacteremia Clearance	Outcome
Marion et al [1]	75/F	DM, CKD	Fever, LLE rash	Left fem-pop	5 months	PET-CT	Y	C/M	12 months	Y	Improved
Kang et al [2]	79/M	DM, CKD, dementia	RUE erythema/ swelling	Right brach-ax	1 year	DUS	Y	C/I	8 weeks	Y	Death
Umer et al [3]	69/M	CAD, MS	Fever, RLE rash	Right-left fem-fem	2.5 years	PET-CT	Y	A/I/T	14 weeks	Y	Improved
Present case	61/M	DM, IVDU	Fever, LLE rash	Left CIA stent	2 years	CT	Y	A/L	6 months	Y	Improved

Tejura et al. Open Forum Infect Dis 2018

Gedissemineerde Infecties

Wie?

Immuungecompromitteerde patiënten

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Kunstmateriaal geasscocieerde infecties

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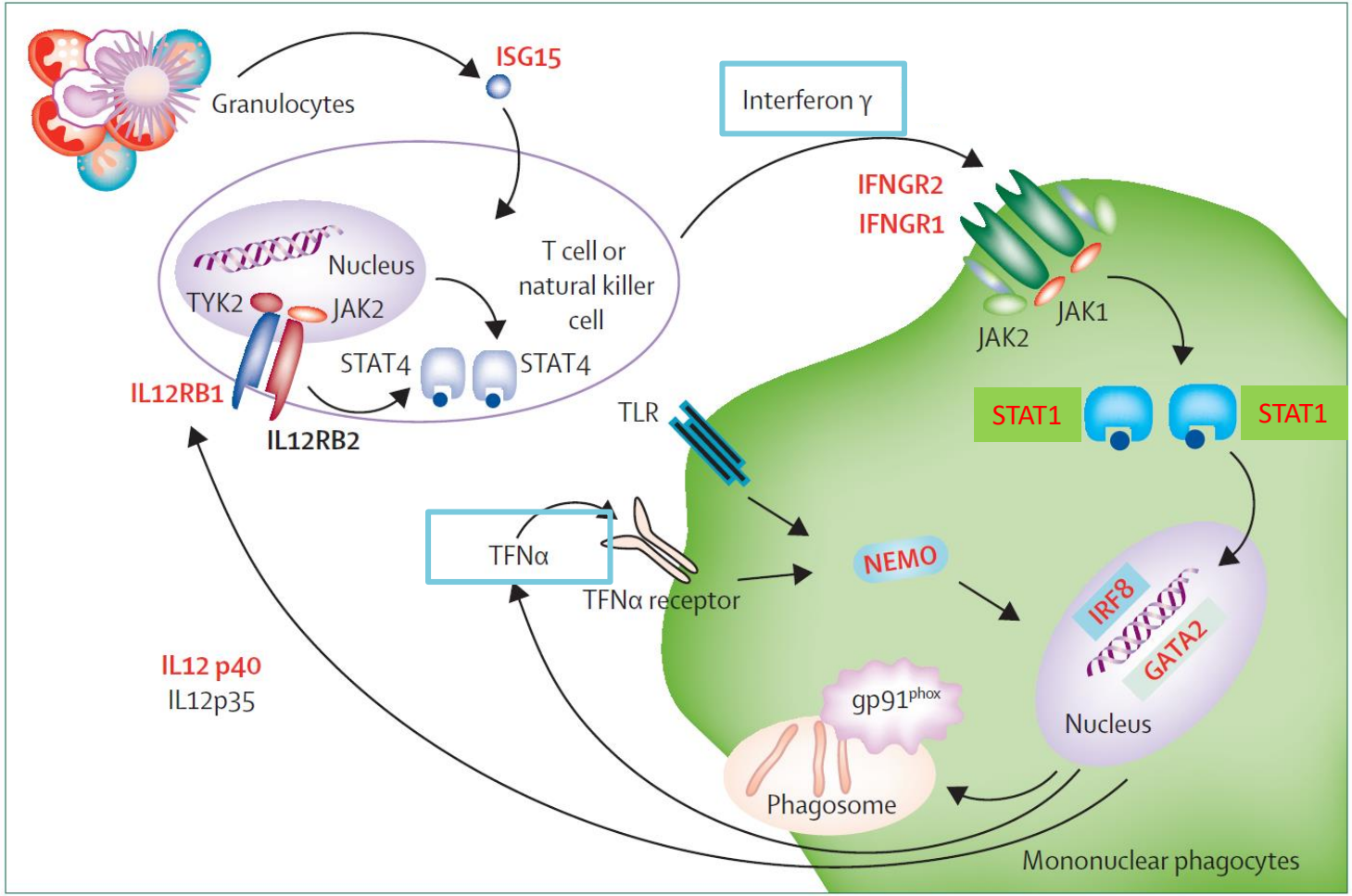
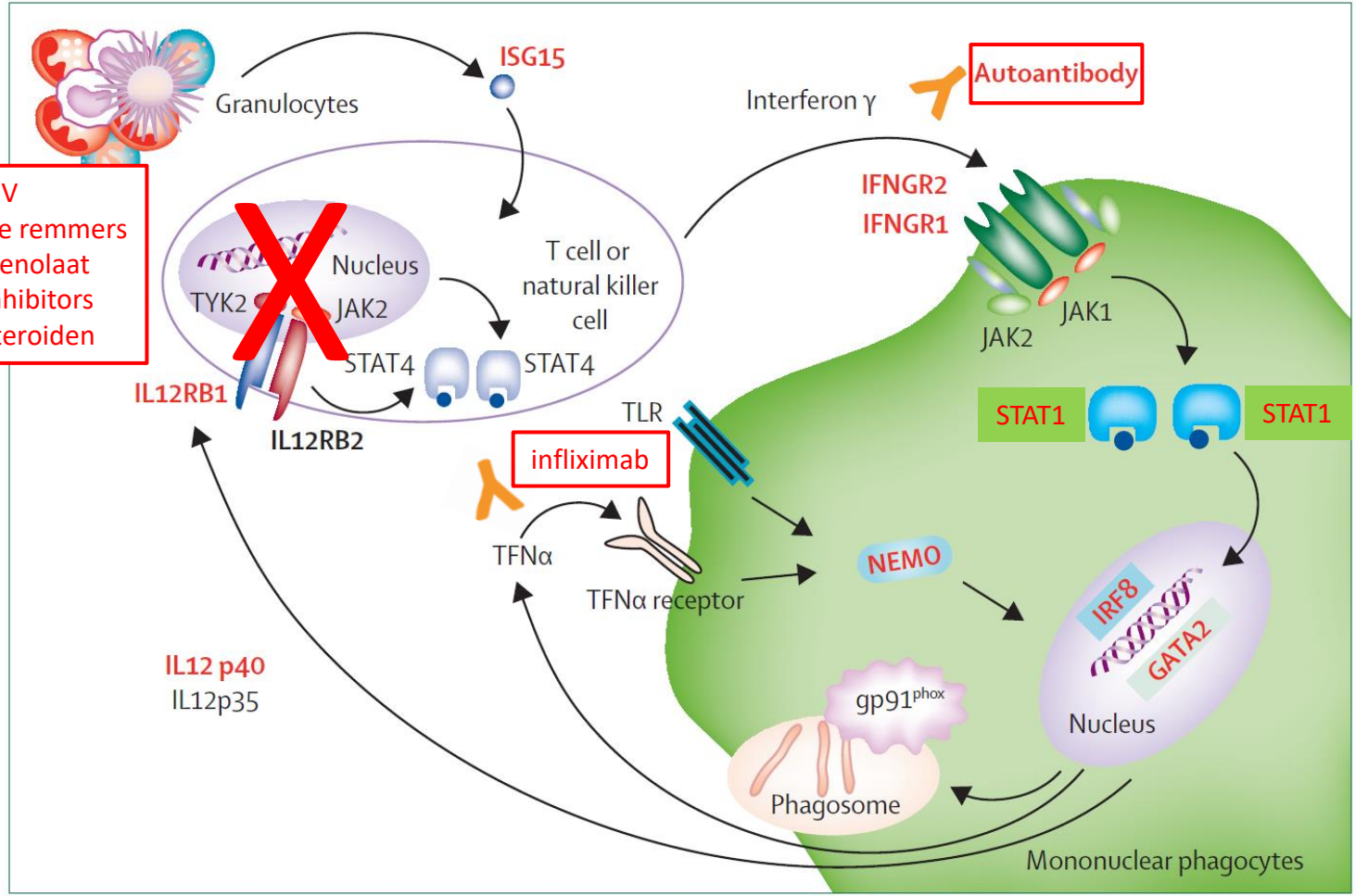


adapted from: Wu et al., Lancet Infect Dis. 2015

HIV
calcineurine remmers
mycophenolaat
mTOR inhibitors
corticosteroiden



adapted from: Wu et al. Lancet Infect Dis. 2015

Gedisseminеerde Infecties

Transplantatie

Prevalentie stijgt

aantal transplantaties ↑
levensverwachting ↑
immuunsuppressieve medicatie ↑
microbiologische detectie technieken ↑

Gedisseminеerde Infecties

Transplantatie

Geschatte prevalentie 0,16 – 8%

Prevalentie verschilt per transplantatie:

stamcel > hart = long > nier > lever (?)

Kliniek verschilt tussen stamcel- en solide orgaantransplantatie

Species distributie kan verschillen tussen SCT en SOT

Doucette et al., Clin infect Dis. 2017

Table 1. Clinic

Transplantation type	Median time to onset, months[a]	Type(s) of infection, no. of patients
HSCT	4.2	Catheter-related, 34[b]; pulmonary, 28; cutaneous, 17; disseminated, 11; osteomyelitis, 3; lymphadenitis, 1
Kidney	23.5	Local cutaneous, 32; disseminated, 18; disseminated cutaneous, 11; osteoarticular or tenosinovitis, 10; pleuropulmonary, 10; ileitis or colitis, 3; urinary tract, 2; allograft, 1; transplant wound, 1; psoas abscess, 1
Heart	30	Pleuropulmonary, 9; disseminated, 8; disseminated cutaneous, 6; local cutaneous, 4; osteomyelitis, 2; LVAD wound, 1; sternotomy wound, 1; prosthetic hip, 1; lymphangitis, 1; bursitis, 1
Lung	14.8	Pleuropulmonary, 12; local cutaneous, 6; disseminated, 2; thoracotomy wound/empyema, 1; thoracotomy wound or disseminated cutaneous, 1
Liver	10	Disseminated, 4; pulmonary, 2; septic arthritis, 1; cutaneous, 1

nd solid organ transplants.

Transplantation type	
HSCT	[11
Kidney	[1,
Heart	[12
Lung	[13
Liver	[21

f infection, patients

ary, 28; cutaneous, 17; dissemi- lymphadenitis, 1

nated, 18; disseminated cutane- nosinovitis, 10; pleuropulmon- urinary tract, 2; allograft, 1; abscess, 1

ated, 8; disseminated cutane- osteomyelitis, 2; LVAD wound, osthetic hip, 1; lymphangitis, 1;

taneous, 6; disseminated, 2; ema, 1; thoracotomy wound or

2; septic arthritis, 1;

Doucette et al., Clin infect Dis. 2017

Doucette, Clin infect Dis, 2017

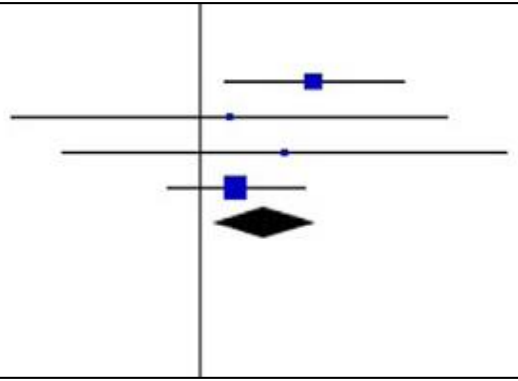
Gedissemineerde Infecties

relatie NTM kolonisatie en – ziekte na lotx

1.1.5 Pre-Transplant NTM Isolation						
Friedman 2020	4	26	13	349	33.7%	4.70 [1.41, 15.61]
Huang 2011	0	6	9	195	5.6%	1.51 [0.08, 28.83]
Knoll 2012	0	5	6	232	5.4%	3.17 [0.16, 63.51]
Shah 2016	7	35	23	173	55.3%	1.63 [0.64, 4.16]
Subtotal (95% CI)		**72**		**949**	**100.0%**	**2.40 [1.20, 4.83]**
Total events	11		51			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.04$, $df = 3$ ($P = 0.57$); $I^2 = 0\%$

Test for overall effect: $Z = 2.47$ ($P = 0.01$)



Marty et al. J Heart Lung Transplant. 2022

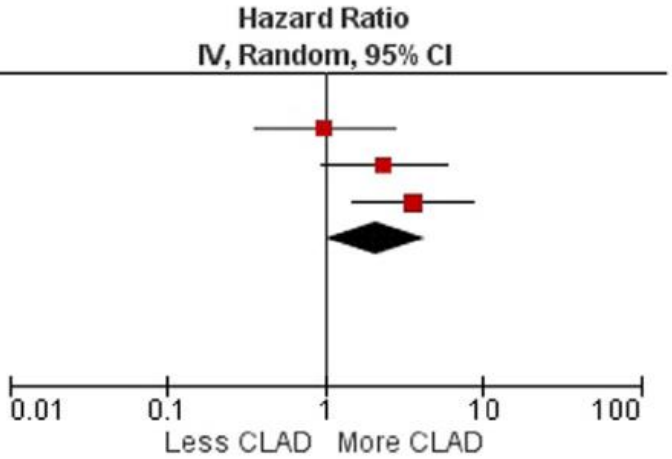
Gedissemineerde Infecties

relatie NTM ziekte en chronische rejectie na lotx

Study or Subgroup	log[Hazard Ratio]	SE	Weight	Hazard Ratio IV, Random, 95% CI
1.4.1 NTM Disease				
Friedman 2020	0.001	0.5133	30.6%	1.00 [0.37, 2.74]
Huang 2011	0.8629	0.4718	33.7%	2.37 [0.94, 5.98]
Shah 2016	1.2809	0.4467	35.7%	3.60 [1.50, 8.64]
Subtotal (95% CI)			**100.0%**	**2.11 [1.03, 4.35]**

Heterogeneity: Tau² = 0.18; Chi² = 3.59, df = 2 (P = 0.17); I² = 44%

Test for overall effect: Z = 2.03 (P = 0.04)



Marty et al. J Heart Lung Transplant. 2022

Erasmus MC

Gedissemineerde Infecties

HIV-AIDS

B-symptomen, buikpijn, necrotische abdominale klieren

X

gedissemineerde *M. genavense*

Gedisseminеerde Infecties

levertransplantatie

huid ulcera, tacrolimus en cellcept

X X

gedissemineerde cutane *M. haemophilum*

Gedisseminеerde Infecties

auto-immuun ziekte

huid ulcera, hoge dosis steroiden

X X

PA neusseptum:
necrotizerende granulomateuze ontsteking
zuurvaste staven +

gedissemineerde (cutane) *M. chelonae*

Gedisseminеerde Infecties

auto-immuun ziekte

huid ulcera, tenosynovitis, koorts, TNF-α inhibitie

X X

gedissemineerde *M. haemophilum*

Gedissemineerde Infecties

Ziekte van Cushing

huidulcera en subcutane abscessen

X

X

gedissemineerde cutane *M. chelonae*

Opportunistische Infecties en Cushing = zeldzaam

Cause of Cushing's syndrome	number of patients
ACTH-dependent	
ectopic	15
pituitary	8
unknown	3
total	26
ACTH-independent	
adrenal carcinoma	3
adrenal adenoma	1
bilateral nodular adrenal hyperplasia	1
adrenal tumor, not specified	1
total	6
Unknown	4
Infectious agents	
Aspergillus*	9
Pneumocystis carinii	9
Cryptococcus neoformans	8
Nocardia asteroides	8
Listeria monocytogenes	2
Candida albicans	1
Candida tropicalis	1
Pseudallescheria Boydii	1
Cytomegalovirus	1

Bakker et al., J Endocrinol Invest. 1998

Erasmus MC

Opportunistische Infecties en Cushing = zeldzaam

Cause of Cushing's syndrome	number of patients
ACTH-dependent	
ectopic	15
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Pneumocystis carinii	9
Cryptococcus neoformans	8
Nocardia asteroides	8
Listeria monocytogenes	2
Candida albicans	1
Candida tropicalis	1
Pseudallescheria Boydii	1
Cytomegalovirus	1

2 casus gedissemineerde NTM en Cushing, ACTH-onafhankelijk

Bakker et al., J Endocrinol Invest. 1998

Erasmus MC

Behandeling

Clinical Infectious Diseases

IDSA FEATURES

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Treatment of Nontuberculous Mycobacterial Pulmonary Disease: An Official ATS/ERS/ESCMID/IDSA Clinical Practice Guideline

Consensus management recommendations for less common non-tuberculous mycobacterial pulmonary diseases

CrossMark

Erasmus MC

Daley et al. Clin Infect Dis. 2020; Lange C et al., Lancet Infect Dis, 2022

Behandeling, *M avium* Complex

macroliden --- rifamycines --- ethambutol

Daley et al., Clin Infect Dis. 2020

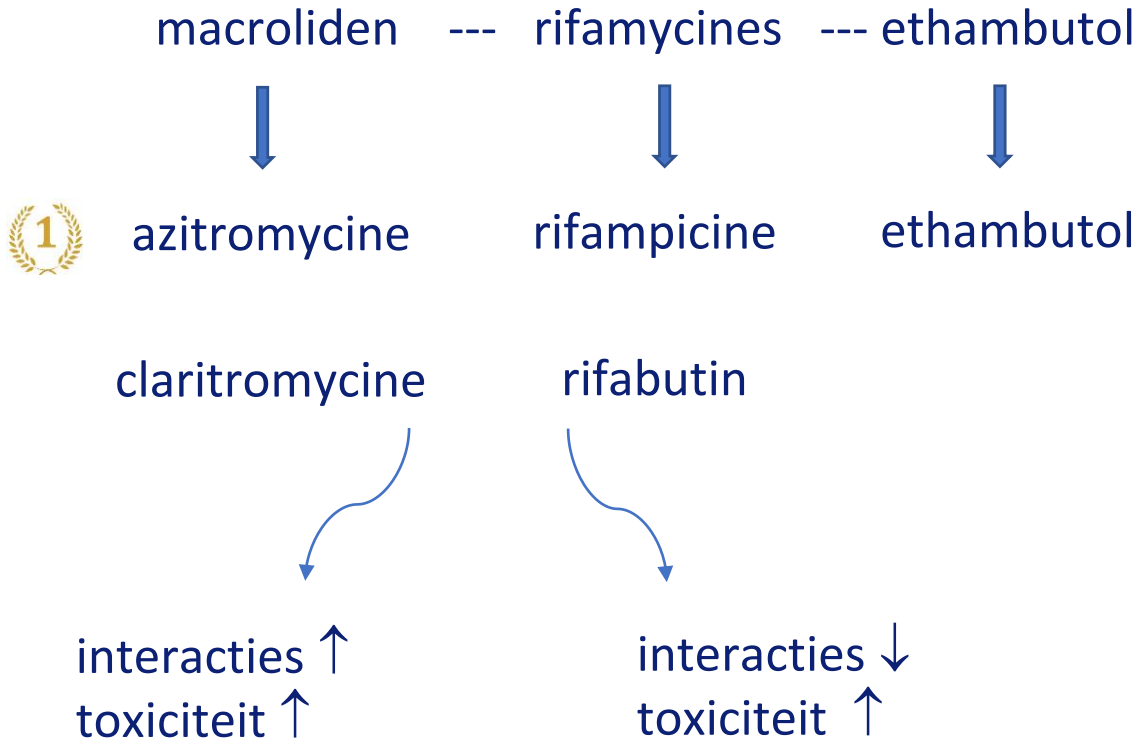
Erasmus MC

Behandeling, *M avium* Complex

macroliden	---	rifamycines	---	ethambutol
↓		↓		↓
(1) azitromycine		rifampicine		ethambutol

Daley et al., Clin Infect Dis. 2020

Behandeling, *M avium* Complex



Daley et al., Clin Infect Dis, 2020

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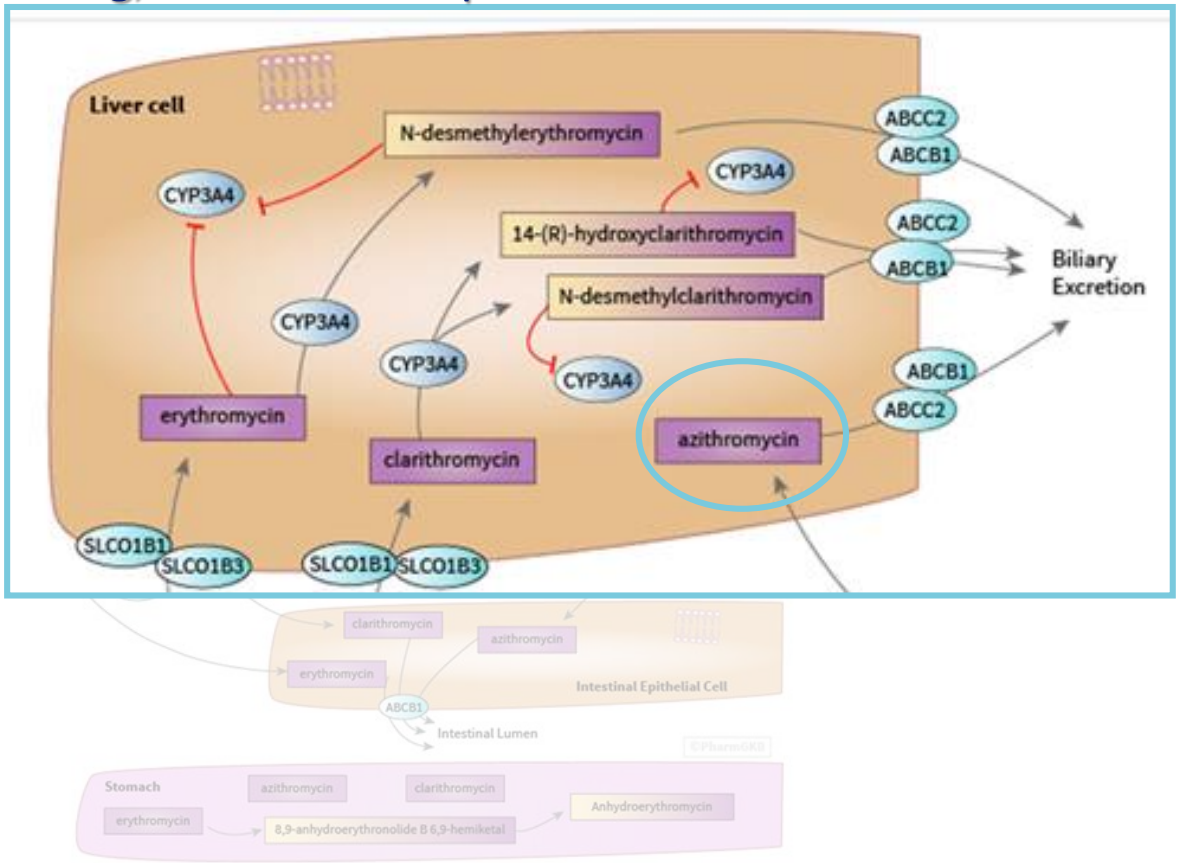
Behandeling, *M avium* Complex

macroliden

azitromycine

claritromycine

interacties ↑
toxiciteit ↑

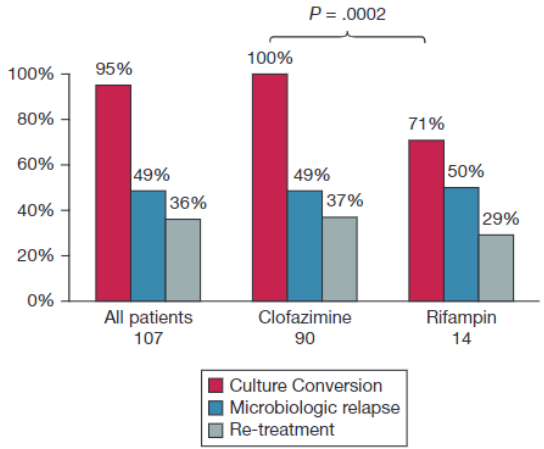


Daley et al., Clin Infect Dis, 2020; https://www.pharmgkb.org/pathway/PA166160731

Behandeling, *M avium* Complex

macroliden --- rifamycines --- ethambutol

2 azitromycine clofazimine ethambutol



Jarand et al., Chest. 2016

Behandeling, *M avium* Complex

macroliden	--- rifamycines	--- ethambutol
 azitromycine	quinolonen	ethambutol
 azitromycine	rifamycines	quinolonen

over het algemeen doen quinolonen bevattende regimes het minder goed

Shuto et al., PlosOne. 2020; Fukushima et al., J Clin Med. 2020; Lee et al., Antimicrob Agents Chemother. 2022

Erasmus MC

Behandeling, *M avium* Complex

macroliden --- rifamycines --- ethambutol

70% bijwerkingen

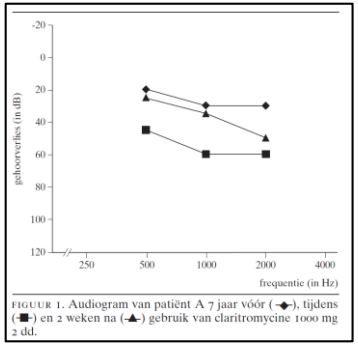
30-70% stopt ≥ 1 van de middelen van het initiële regime

Van Ingen et al., Clin Infect Dis. 2021

Erasmus MC

Behandeling, *M avium* Complex

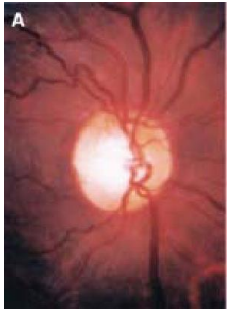
macroliden --- rifamycines --- ethambutol

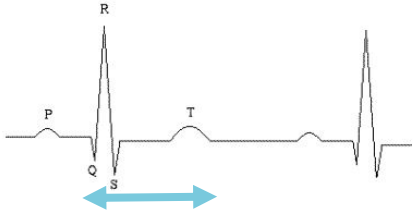


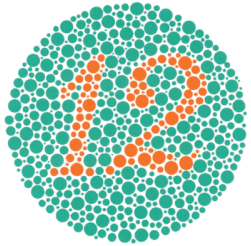
FIGUUR 1. Audiogram van patiënt A 7 jaar vóór (-◆-), tijdens (-■-) en 2 weken na (-▲-) gebruik van claritromycine 1000 mg 2 dd.

hepatotoxiciteit

cytopenie





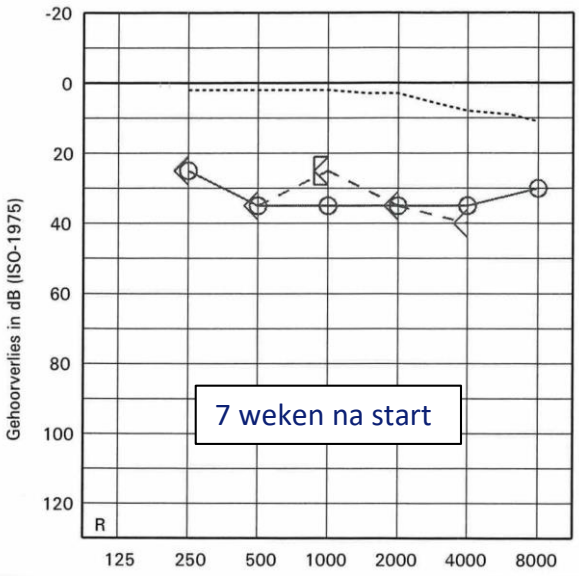


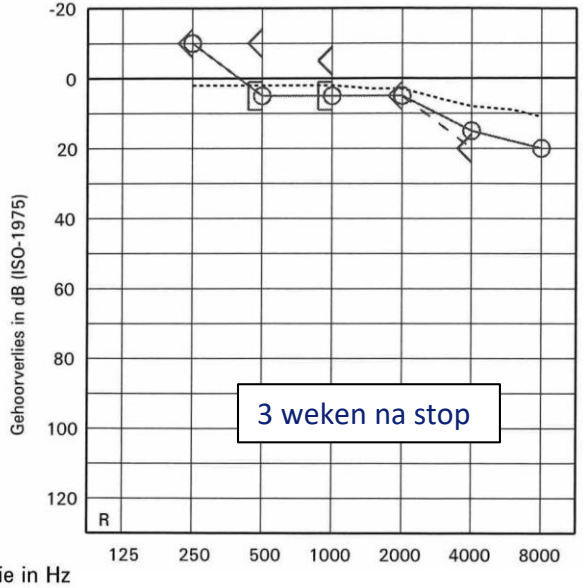
Kolkman et al., Ned Tijdschr Geneeskd. 2002; Melamud et al., Mayo Clinic Proceed. 2003; Mustak et al., Int J Ophthalmol. 2013

Erasmus MC

Behandeling, *M avium* Complex

macroliden --- rifamycines --- ethambutol





Behandeling, *M avium* Complex

minder antibiotica ?

~~rifampicine~~

Onvoldoende evidence voor effectiviteit van macroliden -- ethambutol!

Trials onderweg voor milde pulmonale NTM ziekte

Behandeling, *M avium* Complex

meer antibiotica ?

amikacine

1. For patients with cavitary or advanced/severe bronchiectatic or macrolide-resistant MAC pulmonary disease, we suggest that parenteral amikacin or streptomycin be included in the initial treatment regimen (conditional recommendation, moderate certainty in estimates of effect).

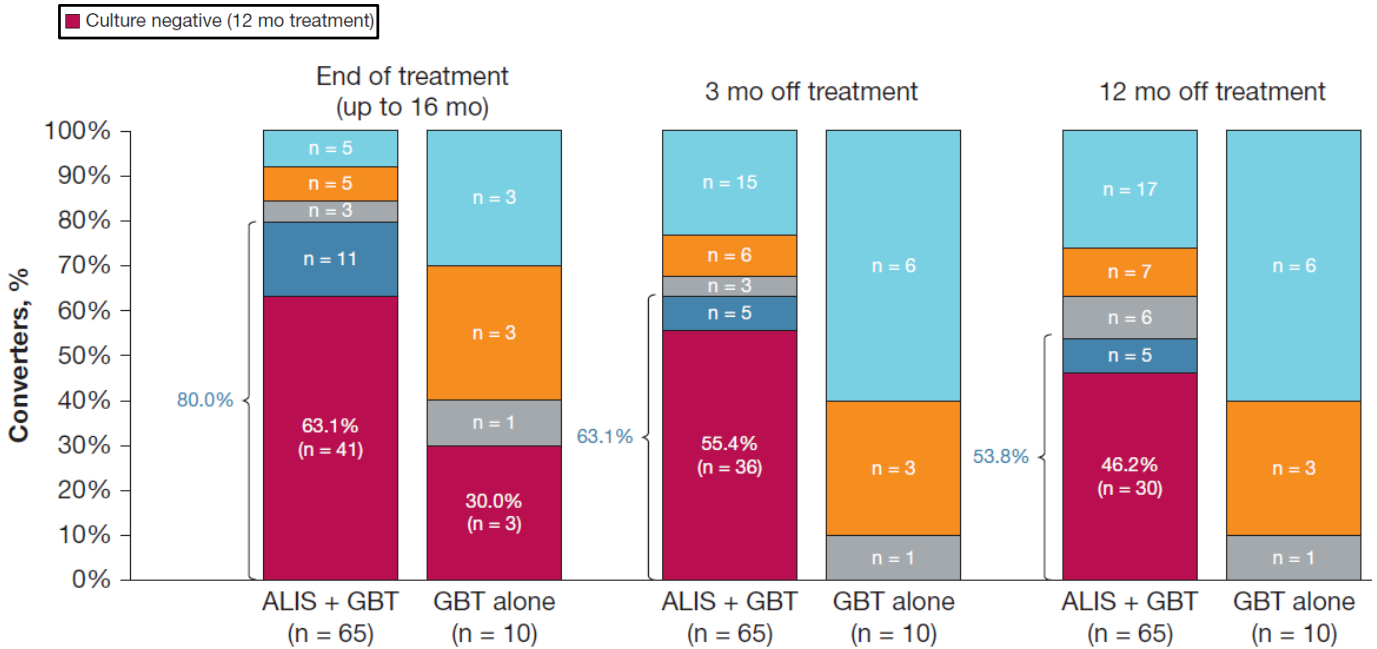
Daley et al., Clin Infect Dis. 2020

Erasmus MC

Behandeling, *M avium* Complex

meer antibiotica ?

liposomaal amikacine inhalaties bij therapie resistente MAC



Griffith et al., Chest, 2021

Erasmus MC

Huidige antibiotica, *M. abscessus*

J Antimicrob Chemother 2012; **67**: 810–818
doi:10.1093/jac/dkr578 Advance Access publication 30 January 2012

Journal of Antimicrobial Chemotherapy

Mycobacterium abscessus: a new antibiotic nightmare

Rachid Nessar[1]†, Emmanuelle Cambau[2]†, Jean Marc Reyrat[1]‡, Alan Murray[3,4]† and Brigitte Gicquel[3]*†

Huidige antibiotica, *M. abscessus*

intensief

macroliden

amikacine --- imipenem --- tigecycline

clofazimine

minocycline --- moxifloxacine --- linezolid

liposomaal amikacine inhalatie

Daley et al. Clin Infect Dis. 2020

Erasmus MC

Huidige antibiotica, *M. abscessus*

consolidatie

macroliden

amikacine --- imipenem --- tigecycline

clofazimine

minocycline --- moxifloxacine --- linezolid

liposomaal amikacine inhalatie

Daley et al. Clin Infect Dis. 2020

Huidige antibiotica, *M. abscessus*

intensief

macroliden

amikacine --- imipenem --- tigecycline

TABLE 2 Treatment outcome within 12 months after treatment[a]

duur 2-4 weken

Outcome	Tigecycline group ($n = 28$)	Nontigecycline group ($n = 36$)	*P* value
AFB culture negativity			
At 1 mo of treatment	25 (89)	18 (50)	0.002
At 3 mo of treatment	12 (43)	13 (36)	0.771
At 6 mo of treatment	9 (32)	15 (42)	0.603
At 12 mo of treatment	7 (26)	14 (39)	0.418
Culture conversion within 12 mo	7 (26)	16 (44)	0.213
Time to conversion, mo	0.6 (0.5 to 3.1)	2.2 (0.9 to 8.2)	0.169

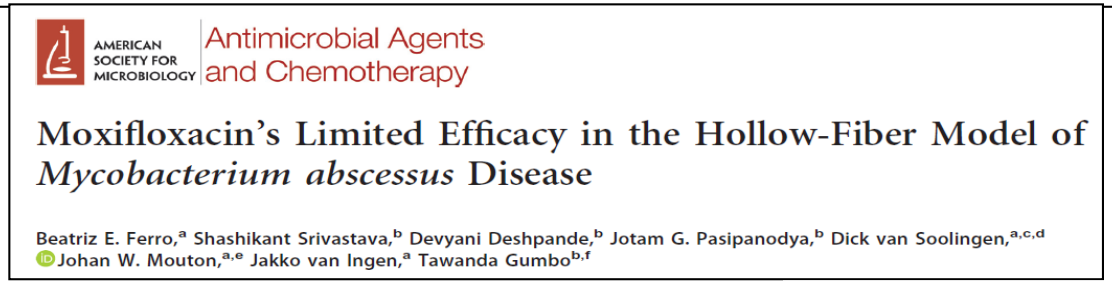
Rom Kim et al. Antimicrob Agents Chemother. 2022

Huidige antibiotica, *M. abscessus*

Minocycline has no clear role in the treatment of *Mycobacterium abscessus* disease

Mike M. Ruth, Jasper J.N. Sangen, Lian J. Pennings, Jodie A. Schildkraut, Wouter Hoefsloot, Cecile Magis-Escurra, Heiman F.L. Wertheim, Jakko van Ingen

DOI: 10.1128/AAC.01208-18



minocycline --- moxifloxacine --- linezolid

liposomaal amikacine inhalatie

Erasmus MC

Huidige antibiotica, *M. abscessus*

consolidatie

Safety and Outcomes of Amikacin Liposome Inhalation Suspension for *Mycobacterium abscessus* Pulmonary Disease

A NTM-NET study

Open-Label Trial of Amikacin Liposome Inhalation Suspension in *Mycobacterium abscessus* Lung Disease

--- imipenem --- tigecycline

clofazimine

minocycline --- moxifloxacine --- linezolid

liposomaal amikacine inhalatie

Siegel et al. Chest. 2023; Zweijpfenning et al. Chest. 2022

Erasmus MC

Huidige antibiotica, *M. abscessus*

consolidatie

Safety and Outcomes of Amikacin Liposome Inhalation Suspension for *Mycobacterium abscessus* Pulmonary Disease

A NTM-NET study

N = 41

44% sputumconversie

Open-Label Trial of Amikacin Liposome Inhalation Suspension in *Mycobacterium abscessus* Lung Disease

N = 30

33% sputumconversie na 12 maanden

17% sputumconversie na 15 maanden

--- imipenem --- tigecycline

clofazimine

minocycline --- moxifloxacine --- linezolid

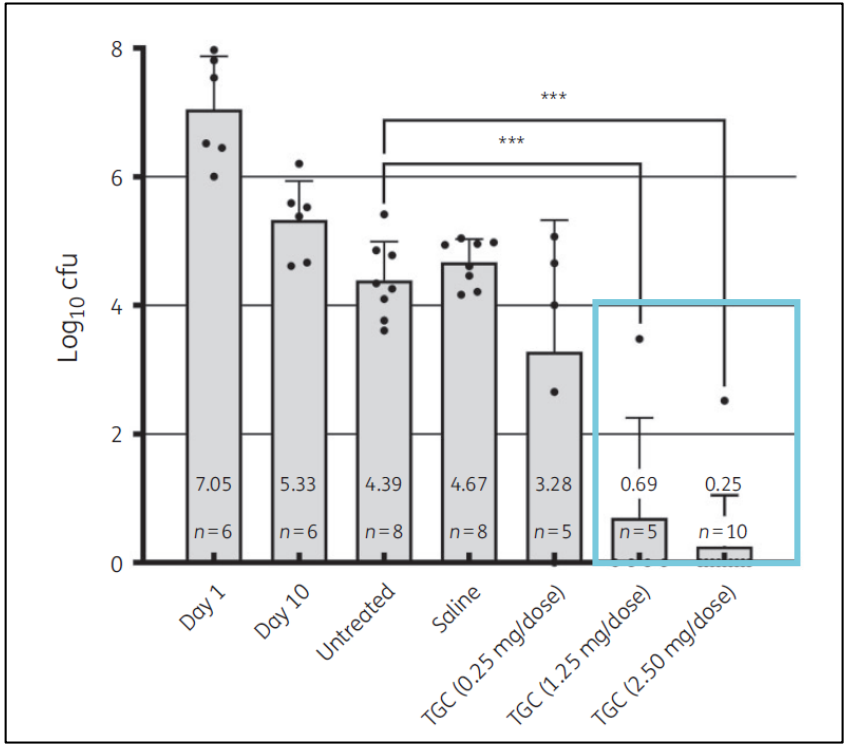
liposomaal amikacine inhalatie

Siegel et al. Chest. 2023; Zweijpfenning et al. Chest. 2022

Erasmus MC

What is new, *M. abscessus*

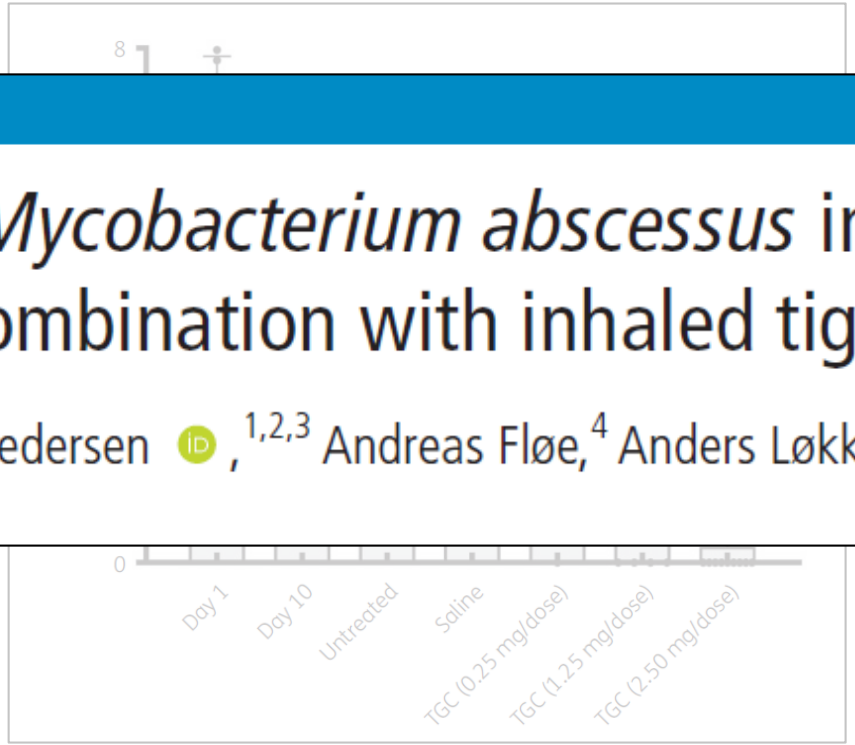
tigecycline per inhalatie, muizen



Pearce et al., J Antimicrob Chemother. 2020

What is new, *M. abscessus*

tigecycline per inhalatie, muizen



Case report

Pulmonary *Mycobacterium abscessus* infection treated in combination with inhaled tigecycline

Andreas Arnholdt Pedersen ,[1,2,3] Andreas Fløe,[4] Anders Løkke,[1,2] Ole Hilberg[1,2,3]

Erasmus MC

Pearce et al., J Antimicrob Chemother. 2020; Pedersen et al. BMJ Case Rep. 2023

What is new, *M. abscessus*

omadacycline = tigecycline, *in vitro*

3 case series, n = 19, meerderheid pulmonale infecties

klinisch succes: 79%

Duah et al., In J Infect Dis, 2022; Morrissette et al., Open Forum Infect Dis. 2021; Pearson et al., Open Forum Infect Dis. 2020

Erasmus MC

What is new, *M. abscessus*

bacteriofagen

Clinical Infectious Diseases
MAJOR ARTICLE

Phage Therapy of *Mycobacterium* Infections: Compassionate Use of Phages in 20 Patients With Drug-Resistant Mycobacterial Disease

16/20 pulmonale infecties
Klein repertoire bruikbare fagen
11/20 (partiële) klinische/microbiologische repons

Immuunreconstitutie (IRIS)

bij verbeteren van immuniteit

immuunsuppressieve medicatie

antiretrovirale therapie

Immuunreconstitutie (IRIS)

Interleukin-1 receptor antagonist anakinra as treatment for paradoxical responses in HIV-negative tuberculosis patients: A case series

Immune reconstitution inflammatory syndrome associated with disseminated histoplasmosis and TNF-alpha inhibition

A Paradoxical Treatment for a Paradoxical Condition: Infliximab Use in Three Cases of Mycobacterial IRIS

Erasmus MC

Van Arkel et al, Med. (NY) 2022; Wright et al. Med Mycol Case Rep. 2019; Hsu et al. Clin Infect Dis. 2015

Take Home Messages

NTM zeer heterogene groep met verschil in geografie, pathogeniciteit, klinisch beeld, behandeling en prognose

Juiste identificatie is essentieel voor juiste klinische context

Behandeling is zeer complex: langdurig met combinatie van antibiotica

cave geneesmiddelen interacties – intoleranties -- immuunreconstitutie