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Implementation Of A Guideline-Based Nontuberculous Mycobacteria Management Algorithm

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Background

- Nontuberculous mycobacterial (NTM) disease is a challenge to manage in patients with cystic fibrosis (CF).
- Diagnosis of NTM pulmonary disease is complex.
- Effective treatment requires long term, multi-drug therapy delivered by several routes.
- Consensus recommendations published in 2016 were developed to guide CF providers in NTM screening, diagnosis and management.

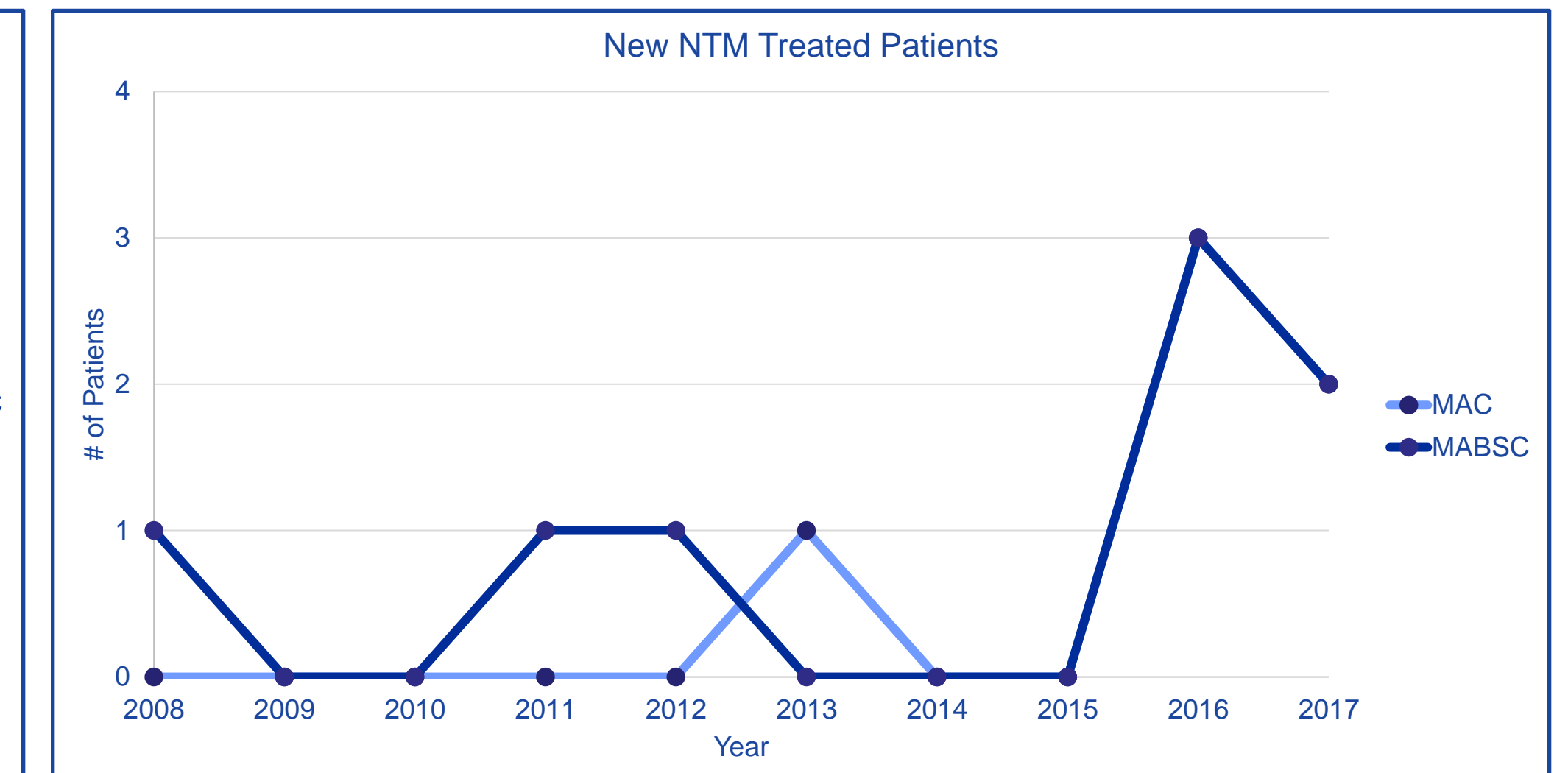
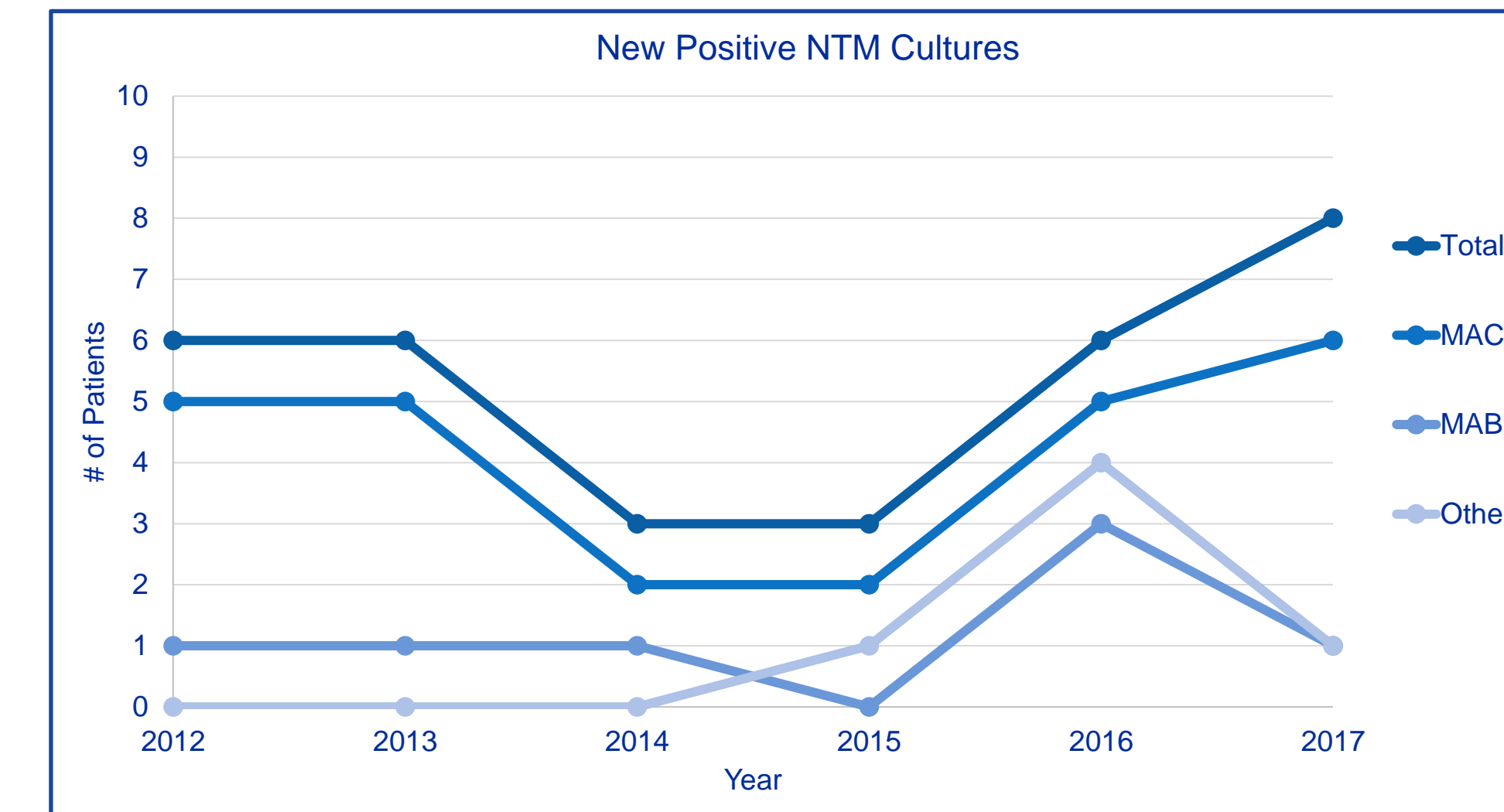
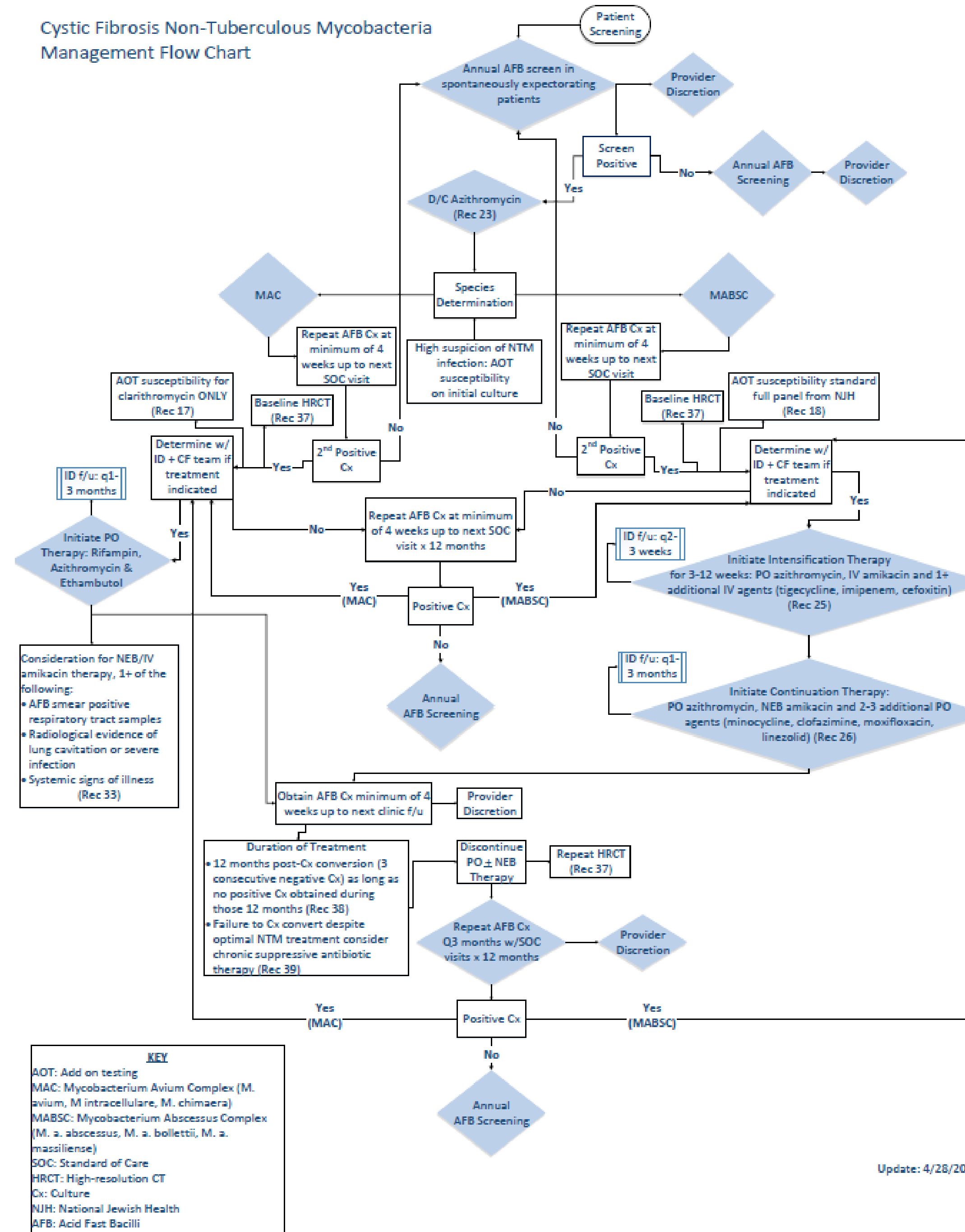
Primary Outcome

Children's Mercy – Kansas City (CMKC) developed an NTM working group to facilitate implementation of standardized NTM management.

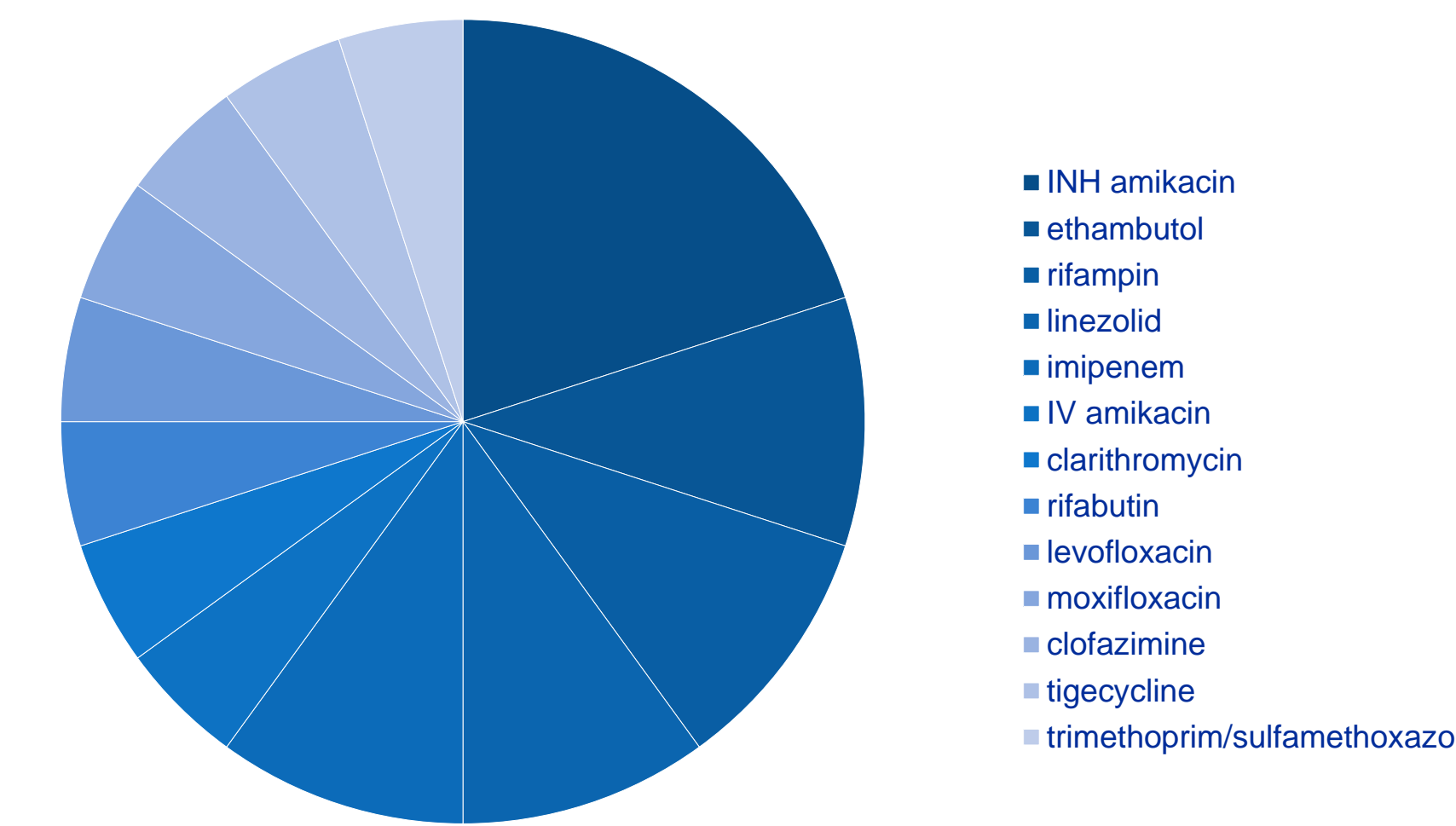
Methods

- NTM working group: Pulmonologist (CF Center Director), Infectious Diseases specialist, nurse practitioner (CF Center Coordinator), and pharmacist.
- Sought expertise from the Director of Microbiology Laboratory regarding susceptibility testing.
- Developed NTM Management Guide from guidelines and other available literature.
 - Diagnosis and management algorithm
 - Medication resource table

Diagnosis and Management Algorithm & Results



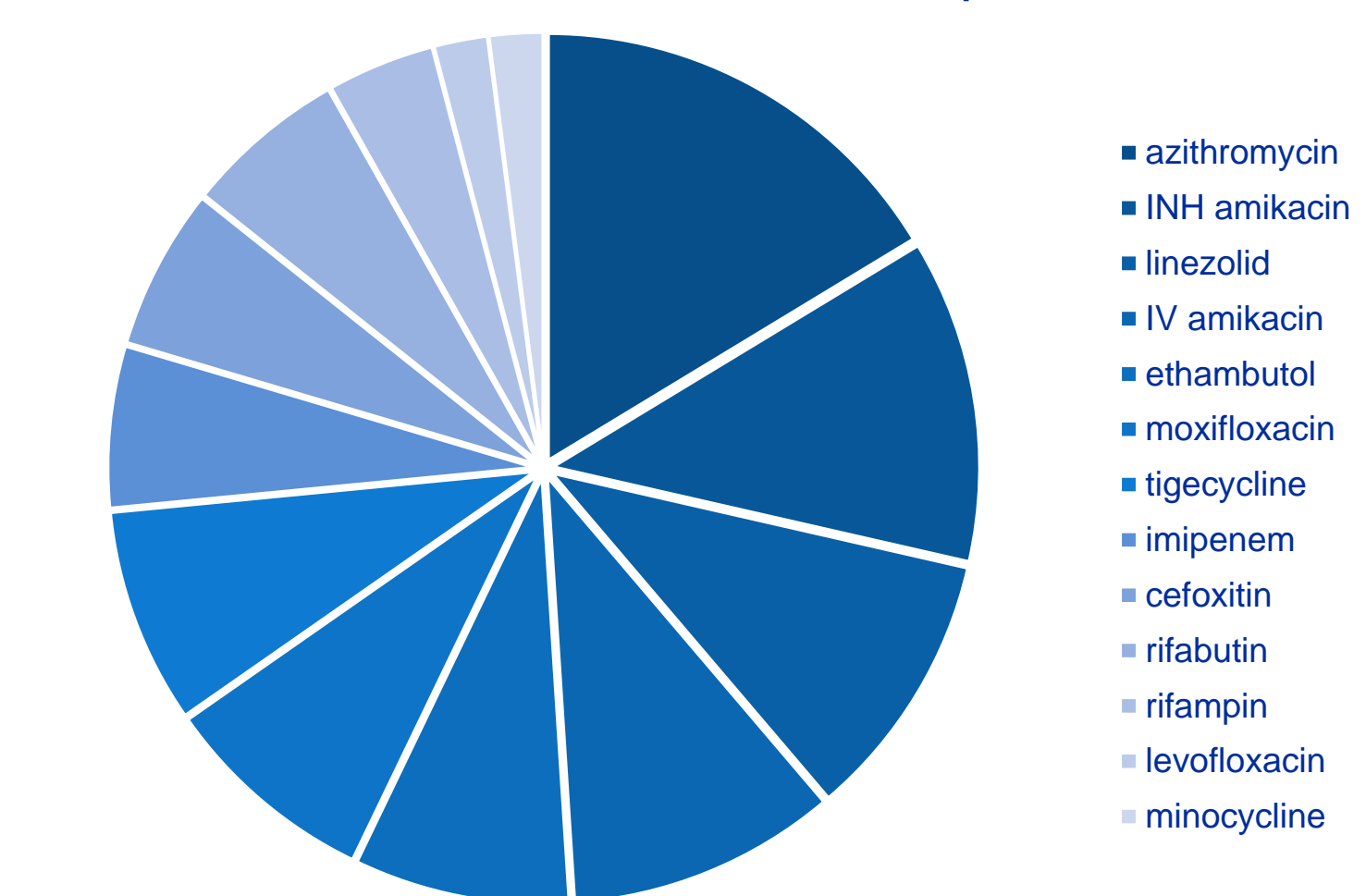
NTM Medications Utilized Pre-Implementation



Pre-Implementation Identified ADRs

- Laboratory abnormalities
- GI intolerance
- Peripheral neuropathy
- Ototoxicity
- Bronchospasm
- Musculoskeletal abnormalities
- Photosensitivity

NTM Medications Utilized Post-Implementation



Post-Implementation Identified ADRs

- Laboratory abnormalities
- GI intolerance
- Ototoxicity

Medication Resource Table

Agent	Indication	Dosing	Monitoring
Amikacin	MAC	NEB: 250 BID or 500 mg daily	Serum amikacin levels, BMPs: weekly
	MABSC	IV: 15-30 mg/kg/dose once daily; max dose: 1500 mg	Audiograms: IV: baseline, then monthly x 1 month post-IV discontinuation; NEB: baseline, then every 6 months
Azithromycin	MAC		EKG: baseline, then every 6 months
	MABSC	10-12 mg/kg/dose PO once daily; max dose: 500 mg	LFTs: baseline, every 6 months
Cefoxitin	MABSC	50 mg/kg/dose IV q 8 hours; max dose: 4000 mg/dose	CBC, BMP, LFTs: weekly
	MAC		Skin discoloration
Clotazimine	MAC		CBC, BMP, LFTs: baseline, then monthly
	MABSC	1-2 mg/kg/dose PO once daily; max dose: 100 mg	Ophthalmic exam: baseline, then monthly up to next clinic follow up; every 6 months complete
Ethambutol	MAC	Initial: 15 mg/kg/dose PO once daily; max dose: 1600 mg; Re-treatment (max): 25 mg/kg/dose	BMP, CBC, LFTs: baseline, then every 3 months x 2, then every 6 months
	MABSC	100 mg/kg/day IV every 6 hours; max dose: 1000 mg	CBC, BMP, LFTs: weekly
Imipenem/Cilastatin	MAC		CBC: baseline, weekly on IV therapy then every 2 weeks
	MABSC	< 12 years: 10 mg/kg/dose PO/IV q8 hours; >12 years: 10 mg/kg/dose PO/IV q 12 hours; max dose: 600 mg	BMP, LFTs: baseline, weekly on IV therapy then monthly
Linezolid	MAC		Ophthalmic exam: baseline, every 6 months
	MABSC	2 mg/kg/dose PO twice daily; max dose: 100 mg	CBC, BMP, LFTs: baseline, then every 3 months x 2, then every 6 months
Minocycline	MAC		EKG: baseline, then every 6 months
	MABSC		CBC, HFP: baseline, then every 3 months x 2, then every 6 months
Moxifloxacin	MAC		CBC, LFTs: baseline, then every 3 months x 2, then every 6 months
	MABSC	7.5-10 mg/kg/dose PO once daily; max dose: 400 mg	
Rifampin	MAC		CBC, LFTs: baseline, then every 3 months x 2, then every 6 months
	MABSC	10-20 mg/kg/dose PO once daily; max dose: 600 mg	
Sulfamethoxazole Trimethoprim	MAC		
	MABSC	TMP: 15-20 mg/kg/dose PO/IV q 6-12 hours; max: TMP 1920 mg/day	CBC, BMP, LFTs: baseline, then every 3 months x 2, then every 6 months
Tigecycline	MAC		
	MABSC	8-11 years: 1.2 mg/kg/dose IV q 12 hours; max dose: 50 mg; >12 years: 50 mg IV q 12 hours	CBC, BMP, LFTs: weekly

Treatment Duration (months)	Antibiotic Regimen			Toxicity Monitoring	Date	Ophthalmology Review	Date 2
	PO Azithromycin	PO Rifampin	PO Ethambutol				
0 X	X	X	X	EKG, BMP, CBC, LFTs	1/1/2018	Baseline	1/1/2018
1 X	X	X	X				
2 X	X	X	X				
3 X	X	X	X	BMP, CBC, LFTs	4/1/2018	Clinic Follow Up	4/1/2018
4 X	X	X	X				
5 X	X	X	X				
6 X	X	X	X	EKG, BMP, CBC, LFTs	6/30/2018	Complete	6/30/2018
7 X	X	X	X				
8 X	X	X	X				
9 X	X	X	X			Clinic Follow Up	9/28/2018
10 X	X	X	X				
11 X	X	X	X				
12 X	X	X	X	EKG, BMP, CBC, LFTs	1/1/2019	Complete	12/27/2018
13 X	X	X	X				
14 X	X	X	X				
15 X	X	X	X			Clinic Follow Up	3/27/2019
16 X	X	X	X				
17 X	X	X	X				
18 X	X	X	X	EKG, BMP, CBC, LFTs	6/30/2019	Complete	6/25/2019
19 X	X	X	X				
20 X	X	X	X				
21 X	X	X	X			Clinic Follow Up	9/23/2019
22 X	X	X	X				
23 X	X	X	X				
24 X	X	X	X	EKG, BMP, CBC, LFTs	12/27/2019	Complete	12/22/2019

Conclusion

- Post-implementation results demonstrate improved consistency in selection of medications and fewer adverse drug reactions despite treating more patients.
- The Medication Resource Table provides consistency in monitoring among pulmonary providers and helps families and ancillary disciplines plan monitoring visits and coordination of care.
- The NTM Management Guide allows implementation of NTM guidelines into clinical practice, standardization of our NTM management and improvement of patient care.

The authors of have no relevant disclosures.





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