

Preliminary Findings: Study in Progress – Final Results Pending

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BACKGROUND

HEM is a parasitic infection of the CNS, mainly caused by *Angiostrongylus cantonensis*, *Gnathostoma spinigerum*, and *Baylisascaris procyonis*. Refugees, migrants, and travellers from endemic areas are at increased risk due to contaminated food and water and may experience delays in diagnosis and treatment, leading to severe complications. There is currently no standardized treatment for HEM, resulting in varying outcomes. This systematic review assesses the effectiveness of targeted therapies for HEM.

OBJECTIVE

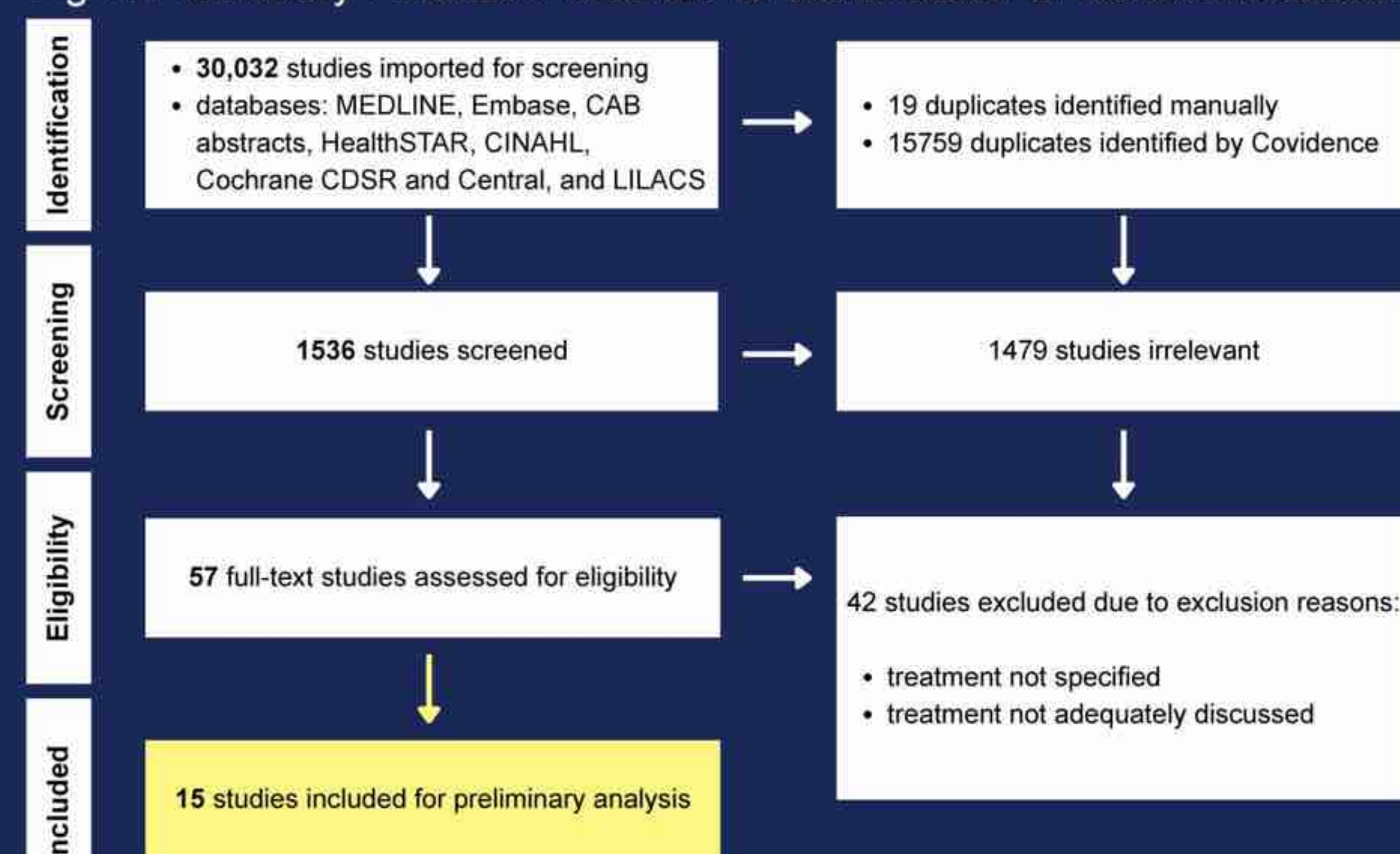
To systematically review and synthesize available literature on the use of targeted therapies for HEM and their relevance to migrant and traveller populations. Findings aim to support clinical decision-making across diverse global settings.

METHODOLOGY

Following PRISMA guidelines, we conducted a systematic search of relevant databases for studies on HEM treatment outcomes. We aim to assess the risk of bias and evidence quality and then perform narrative and subgroup data analyses to evaluate treatment effectiveness.

RESULTS

Fig 1. Preliminary PRISMA Flowchart for Identification of Relevant Studies:



CONCLUSION

Effective management of HEM depends on early detection and targeted treatment. Evidence from the included studies suggests that a **multimodal approach, combining supportive care, corticosteroids, and anthelmintics, particularly albendazole**, yields the most favourable clinical outcomes.

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ANALYSIS

Study	Region of Helminth Acquisition	Region of Travel Origin	Region of Immigration / Presentation
1	China		
2	USA		
3	USA		
4	Cuba	Switzerland	
5	SE Asia	Mayotte Island	
6	Caribbean	USA	
7	SE Asia		
8	USA	Japan	
9	USA	Mexico	
10	USA	Ecuador	
11	Latin America	USA	
12	Syria		Turkey
13	Brazil		
14	Vietnam		
15	USA		
16	USA		
17	USA		
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21	USA		
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23	USA		
24	USA		
25	USA		

Fig 2. Geographic Distribution of Helminth Acquisition, Travel Origin, and Immigration/Presentation Sites in Included Studies (n = 15):



Table 1. Summary of six representative studies on HEM:

Study/ Design	Region	Causative Helminth	Transmission Mode	Intervention	Outcome
Bartschi 2004 ¹ case report	Switzerland; travel to: Cuba	<i>A. cantonensis</i>	possible ingestion of helminth larvae during vacation in Cuba	Analgesics + LP	symptom resolu within 3 wks
Cattaneo 2021 ² case report	Mayotte Island	<i>A. cantonensis</i>	interaction or playing with snails	Albendazole + Analgesics + LP + Methyl-prednisolone + Prednisone	symptom resolu within a mo, normal neuro exam at 1 mo follow-up
Diaz 2009 ³ review	travel to: SE Asia, Caribbean, USA	<i>A. cantonensis</i>	third-stage larvae in snail/slug intermediate hosts; ingestion of raw amphibians, fish, and mollusks reported in many cases	Albendazole + Praziquantel + LP + Corticosteroids	symptom resolu within a mo, spontaneous resolu of most cases with only supportive and nonspecific treatment
	travel to: USA	<i>B. procyonis</i>	embryonated eggs in raccoon feces, interaction with raccoons and their latrines reported in many cases	Albendazole + Corticosteroids + LP + Mannitol	usually partial symptom resolu; high mortality and morbidity; complete neuro recovery not possible in most cases
	travel to: SE Asia, Japan, Mexico, Ecuador	<i>G. spinigerum</i>	third-stage muscle encysted larvae in intermediate hosts; ingestion of raw freshwater fish in one case; ingestion of raw or undercooked fish, shrimp, crayfish, frogs, crabs, and chicken reported in many cases	Albendazole + Ivermectin + Analgesics + LP + Prednisolone	longer symptom resolu period; clinicians consider lack of migratory symptom recurrence within a median 12 m incubation period and resolu of PB and CSF EO presumptive evidence of cure; relapses have been reported requiring 2nd or 3rd courses of albendazole treatments
Elvan-Tuz 2021 ⁴ case series	Turkey, migrated from: Syria	<i>Echinococcus</i> species	ova (eggs) excreted by a human pork tapeworm carrier; ingestion of contaminated or inadequately cooked pork meat reported in many cases	Albendazole + Praziquantel + Analgesics + Anticonvulsants + LP	risk of seizures in Hem caused by <i>T. spiralis</i> poses greater danger of patient health or recovery, neurosurgery may be required if medical treatments fail especially when large cysts are present
			case 1: migrated from rural region of Syria	case 1: Neurosurgery + Albendazole + Analgesics + LP	case 1: partial symptom resolu at 1 mo follow-up; elimination of HEM causing helminth
			case 2: prior lung and liver echinococcosis (3 yrs ago) and 3 cerebellar echinococcosis operations, lived in rural area with bovine animals	case 2: Neurosurgery + Albendazole + Analgesics + LP	case 2: patient was discharged 15 d after admission; at the 11th month follow-up no recurrence noticed
Hughes 2020 ⁵ case report	UK; migrated from: Iraq	<i>Fasciola</i> species	frequent consumption of watercress from local river in Iraq before immigration to UK	LP + Antibiotics + Antituberculosis therapy + Prednisolone + Pyridoxine + Triclabendazole	case 3: cerebral abscess resolu after 56 d; partial resolu of rest of the symptoms
Re 2002 ⁶ case report	Philadelphia, USA; travel to: Korea	<i>G. spinigerum</i>	ate raw fish during Korea trip	LP + Amphotericin B + Antituberculosis therapy + Itraconazole + Fluconazole	symptom resolu within a mo; inappropriate antibiotics and antituberculosis therapies administered

Abbreviations: retro, retrospective; SE, Southeast; y, years; -ve, negative; *A. cantonensis*, *Angiostrongylus cantonensis*; PB, peripheral blood; CSF, cerebrospinal fluid; EO, eosinophil; d, day(s); wks, weeks; mo, month; resolu, resolution; LP, lumbar puncture; *B. procyonis*, *Baylisascaris procyonis*; *G. spinigerum*, *Gnathostoma spinigerum*; *T. spiralis*, *Taenia spiralis*; neuro, neurologic.

Fig 3. Interventions reported across 15 HEM studies:

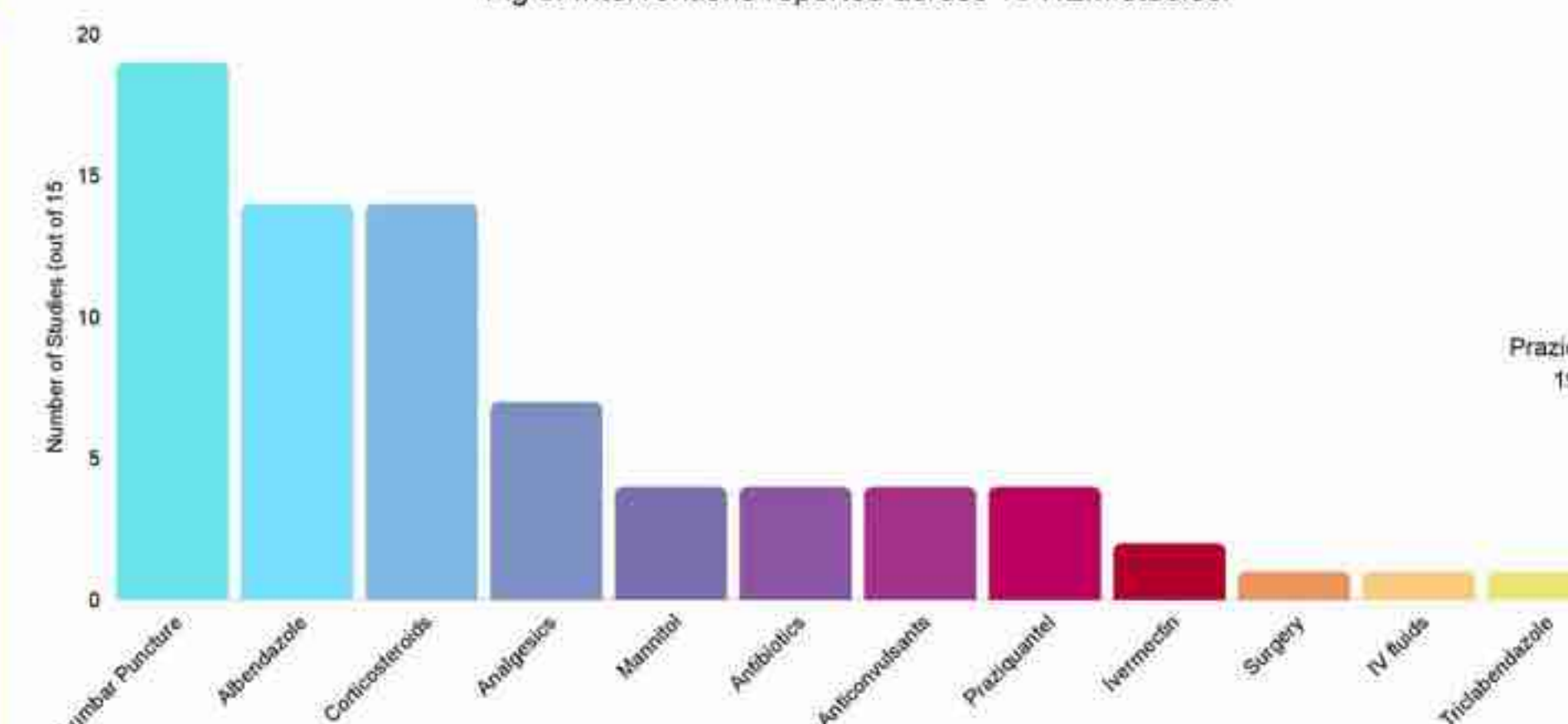


Fig 4. Proportion of Anthelmintic Use:

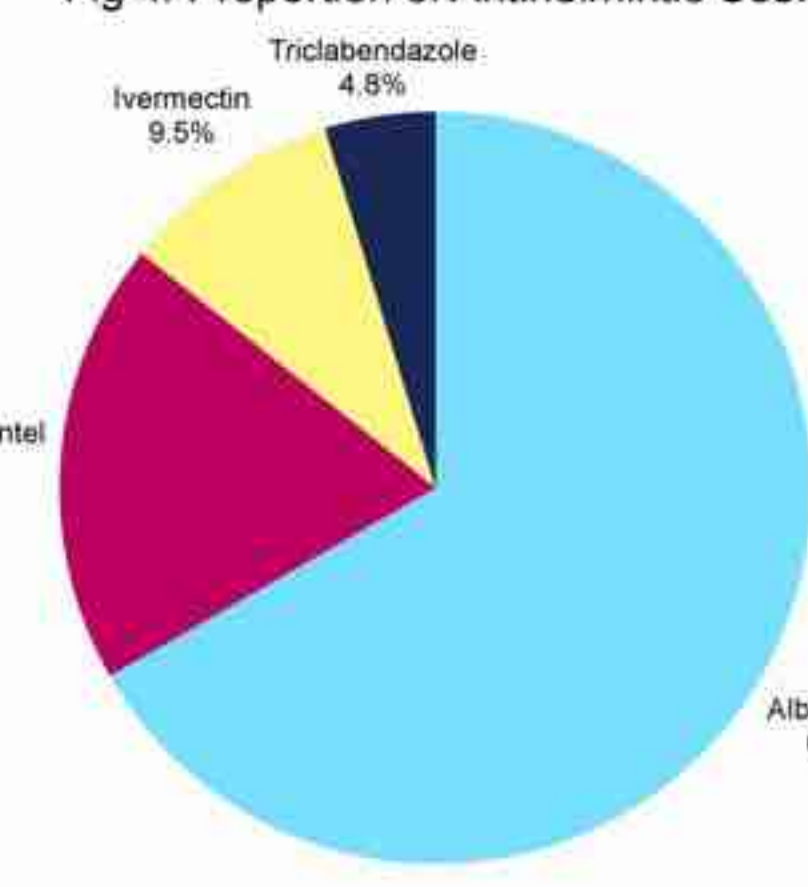
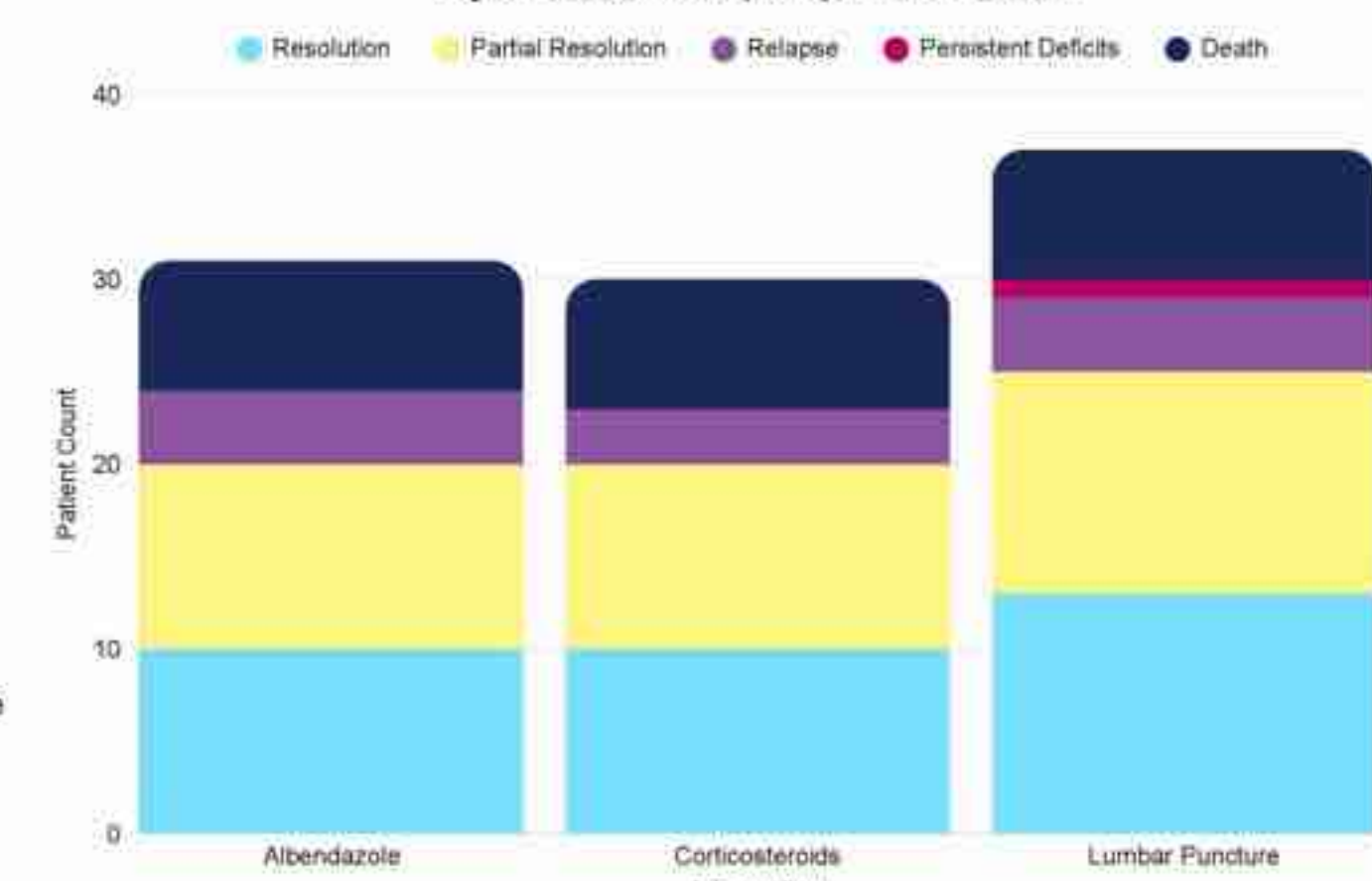


Fig 5. Outcomes by Major Intervention:



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