DESCRIBING THE LANDSCAPE OF LYMPHATIC FILARIASIS RESEARCH IN INDIA

Helena Archer, Mohamed Albirair, Alison Wiyeh, Barclay Stewart January 28, 2020



START CENTER

STRATEGIC ANALYSIS,
RESEARCH & TRAINING CENTER

MEETING AGENDA

- Project Review
- Review of Literature Database
- Review of Dashboard
- Review of Directory
- Main Findings
- Next Steps
- Questions and Discussion



PROJECT TEAM



Helena Archer

MPH Student, Epidemiology

Project Manager



Mohamed Albirair, MBBS, MPH
PhD Student, Global Health
Research Assistant



Alison Wiyeh, MD, MSc
PhD Student, Epidemiology
Research Assistant



Barclay Stewart, MD, PhD, MPH
Surgery, Public Health
Faculty Lead

PROJECT REVIEW

OBJECTIVE: To describe the landscape of Indian research directly related to lymphatic filariasis, and to identify key Indian organizations and experts on the topic.

KEY RESEARCH OBJECTIVES



To systematically search published and grey literature on lymphatic filariasis research conducted in India.



To map and describe the current landscape of lymphatic filariasis research, with emphasis on foundation priority areas.



To identify Indian researchers and organizations currently working on lymphatic filariasis in India.



PROJECT DELIVERABLES

Indexed database of literature on LF research conducted in India organized by date, authors, geographic location and "bucket."

Visualizations of the research landscape that highlights the results of the published literature review.

Directory of key actors and organizations currently active in LF in India, based on grey literature review.





SEARCH STRATEGY

WORD	TERMS
Filariasis	Lymphatic Filariasis, Elephantiasis, Wuchereria bancrofti, Brugia malayi, Bancroftian Filariasis, Filariasis Malayi, Wuchereriasis, Malayi Tropical Eosinophilia, Brugia timori
India	India, Hindustan, Bharat

DATABASE	RESULTS
PubMed	1429
EmBase	81
CENTRAL	392
Total Articles	2,016 after de-duplication
Reviewed	881 Reviewed, 736 included (84%) from Jan. 1 st , 2009- Oct 25, 2019

INCLUSION CRITERIA:

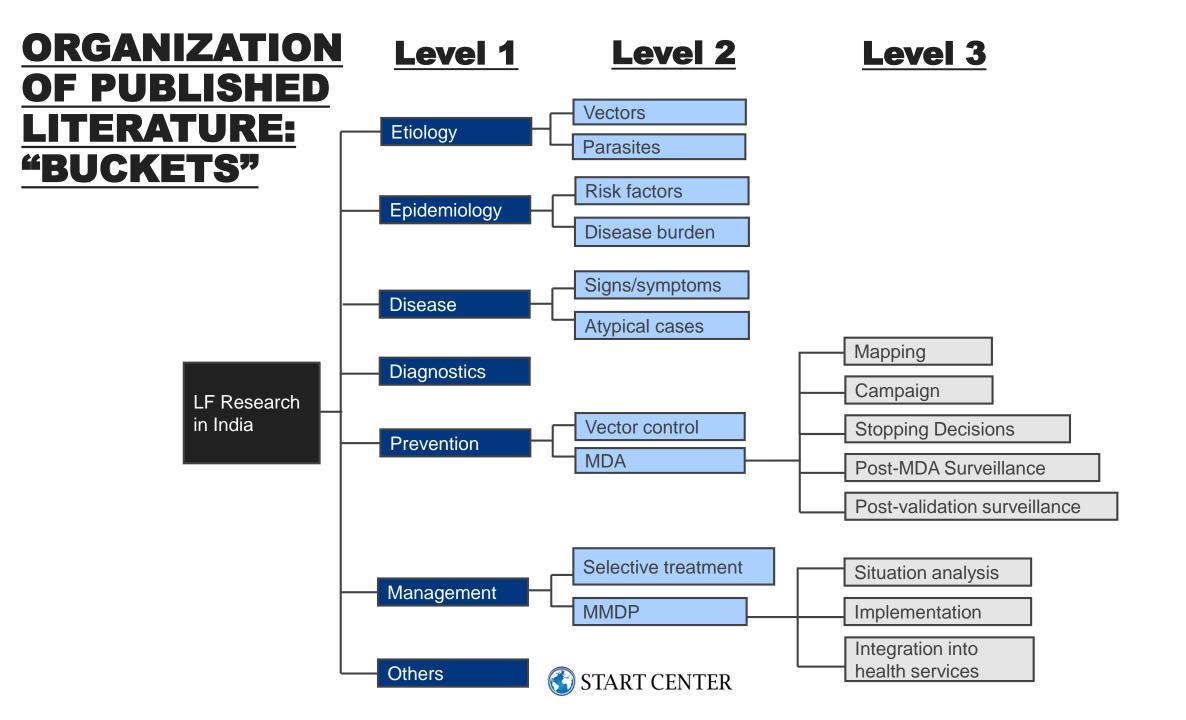
- Published after 1970*
 - AND
- Research conducted in India, or by Indian institutions
 - AND
- Research on lymphatic filariasis specifically

AUTHOR MATCHING STRATEGY:

- To get additional information on authors using profiles from SCOPUS, included articles were matched on title and digital object identifier (DOI).
 - 575 (78%) of articles matched successfully

*reviewed after 2009





ORGANIZATION OF LITERATURE, CTD.

Implementation Categories (for MDA and MMDP only)

Drug/treatment efficacy Feasibility Acceptability Cost analysis Enablers/barriers Coverage/Compliance Community mobilization Human resources

ADDITIONAL TAGS FOR AREAS OF SPECIAL INTEREST:

- Ayurvedic medicine
- TAS/Pre-TAS
- Coverage validation surveys
- Filarial control units
- Entomology
- Triple drug therapy
- Review articles

GEOGRAPHY (STATE/TERRITORY):

If stated in the title/abstract review, the province in which the research took place* was noted. National or multiple province-level studies were noted as such.

^{*}Location of institution is captured in the author supplement.

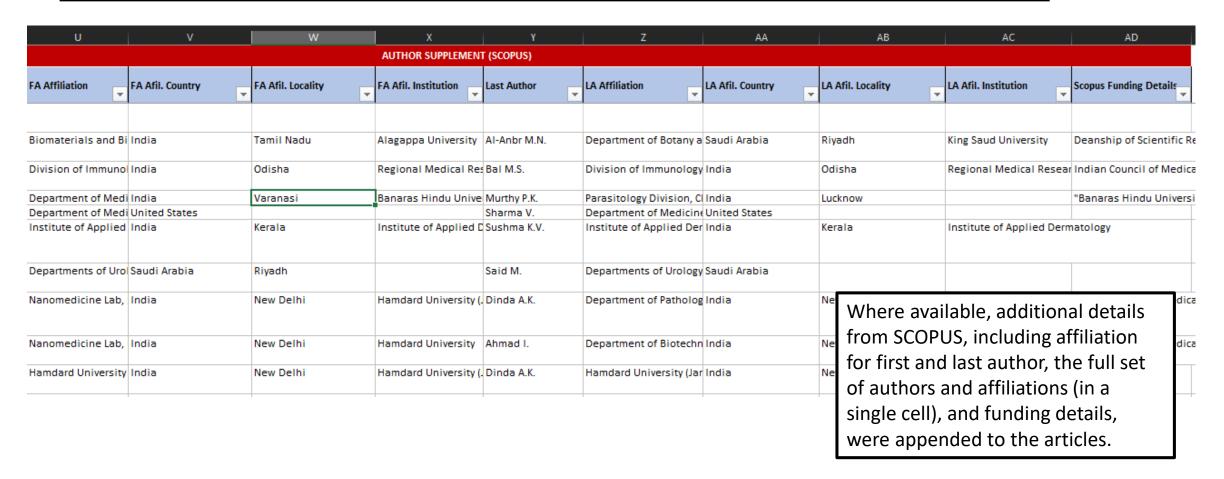




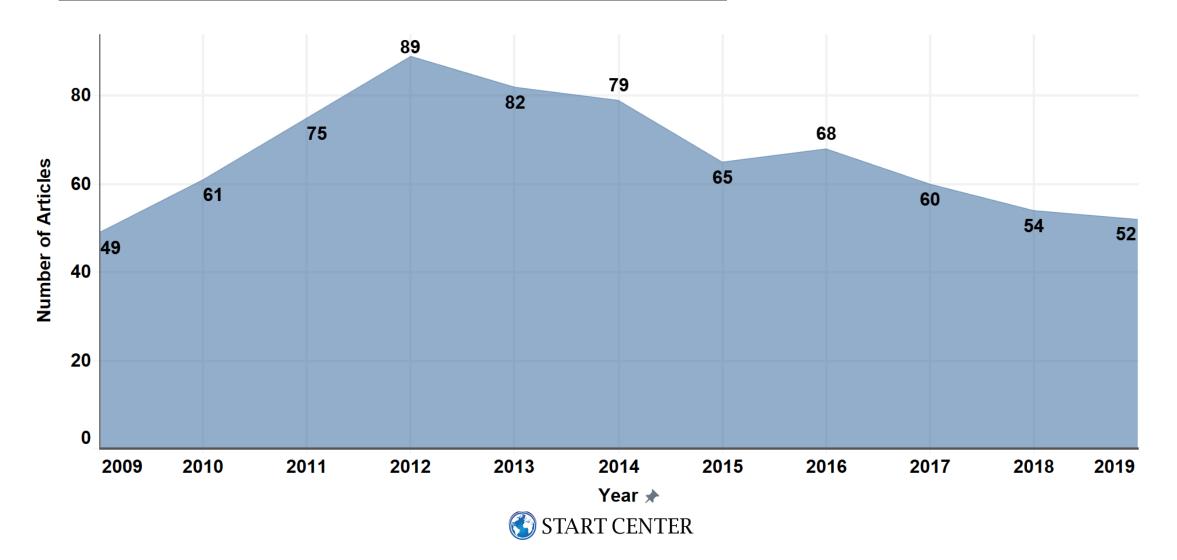
DELIVERABLE 1: INDEXED LITERATURE DATABASE

В	С	D	I	J	K	L	P	Q	
	PUBLICATION DETAILS					CATEGORIZATION			
Year	Title	Author List	State/Territory	Bucket Level 1	Bucket Level 2	Bucket Level 3	Implementation categories	Special Tags	~
2014	Incidental detection microfilaria in subcutaneous breast nodule of lactating female Fnac: A rare case report	A.K.R., Singh, ; Gupta, F	. Uttar Pradesh - U	Disease	Atypical cases				
2019	Microbial exopolymer-capped selenium nanowires – Towards new antibacterial, antibiofilm and arbovirus	Abinaya, Muthukumar	, Not Available	Others	Pharmacology				
2014	<i>In utero</i> sensitization modulates IgG isotype, IFN-? and IL-10 responses of neonates in bancroftian filariasis In vivo antifilarial activity of some cyclic and acylic	Achary, K., G.; Mandal, Agarwal, A., ; Awasthi,		Others Etiology	Immunology Parasite				
2011	An uncommon infectious cause of pleural effusion Self care integrative treatment demonstrated in rural	Aggarwal, Amitesh, ; R		Disease	Atypical cases				_
	community setting improves health related quality of life of lymphatic filariasis patients in endemic villages	Aggithaya, Madhur, Gu	ıı Kerala - KL	Management	MMDP	Integration into heal	tl Implementation; ef	f Ayurvedic data	
2015	Scroto-perineal hidradenitis suppurativa complicated by giant scrotal elephantiasis	Alharbi, B., ; Shlash, A	, Not Available	Disease	Atypical cases		1 6	•1, 11	
	Improved antifilarial activity of ivermectin in chitosan- alginate nanoparticles against human lymphatic filarial parasite, Brugia malayi	Ali Afzal, M., ; Ali Afzal	I, Not Available	Management	Selective treatment		pase may be f on details or b	•	
	Nanocurcumin: a novel antifilarial agent with DNA topoisomerase II inhibitory activity	Ali, Mohammad, ; Afza		Management	Selective treatment	J ,,	correspondin	g to graphi	ics
2013	Nanopharmaceuticals to target antifilarials: a comprehensive review	Ali, Mohammad, ; Afza	Not Available	Management	Selective treatment	on slides 9	9 and 10.		_
2014	Perceptive solutions to anti-filarial chemotherapy of lymphatic filariasis from the plethora of nanomedical	Ali, Mohammad, ; Afza	Not Available	Management	Selective treatment		Drug/treatment effi	с	
	Therapeutic efficacy of poly (lactic-co-glycolic acid) nanoparticles encapsulated ivermectin (nano-ivermectin) against brugian filariasis in experimental rodent model	Ali, Mohammad, ; Afza	I Not Available	Management	Selective treatment		Drug/treatment effi	c	

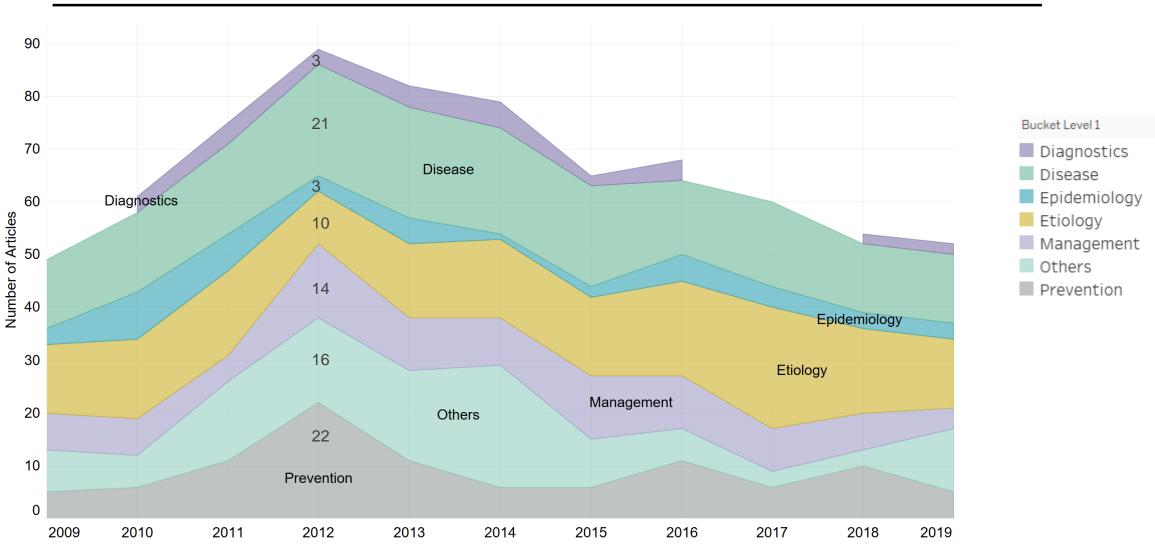
DELIVERABLE 1: INDEXED LITERATURE DATABASE



DELIVERABLE 2: VISUALIZATIONS RECORDS COUNT PER YEAR



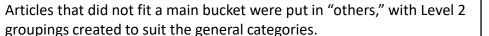
DELIVERABLE 2: VISUALIZATIONS RECORDS COUNT PER BUCKET PER YEAR



Year

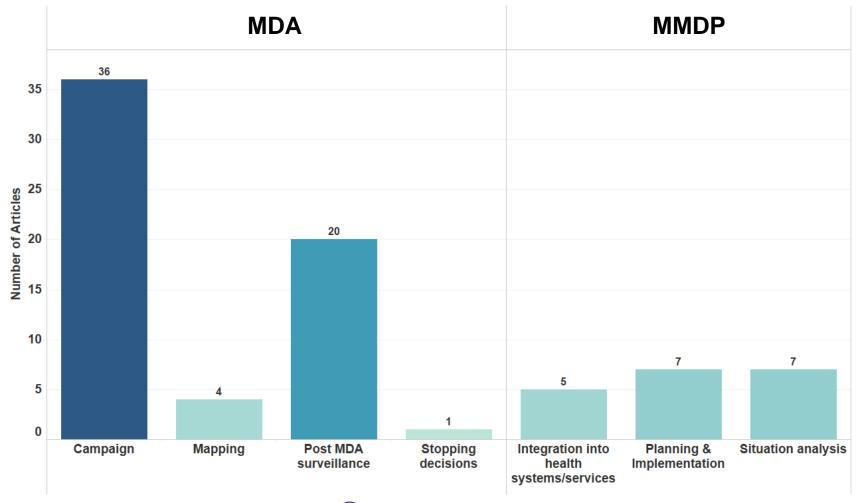
DELIVERABLE 2: VISUALIZATIONS BREAKDOWN OF BUCKET LEVELS 1 AND 2

Burdent availa	Develop to the second of		2212	2211			Year	2245				2012
	Bucket Level 2	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diagnostics	Cytology						2					
	Microscopy			1	2						1	
	Serology		2	2	1	1		1	2		1	2
Disease	Atypical cases	10	11	13	15	20	14	17	14	13	13	12
	Signs & Symptoms	3	4	4	6	1	6	2		3		
Epidemiology	Disease burden	3	7	6	3	4	1	2	2	3	2	3
	Reviews					1						
	Risk factors		2	1					3	1	1	
Etiology	Parasite	12	14	14	9	13	14	7	16	22	13	11
	Vector	1	1	2	1	1	1	8	2	1	3	2
Management	MMDP		2	2	5	5		1	2	3	1	4
	Selective treatment	7	5	3	9	5	9	11	8	5	6	
Others	Biochemistry				1	1						
	Commentary		1	1				1	2			
	Immunology		2	2	3	3	6	4	1			4
	Modelling studies							1	1	1		
	Pharmacology	2	2	5	7	7	8	3	1			8
	Reviews	5	1	7	3	5	9		1	2	3	
Prevention	MDA	3	3	6	12	8	5	5	2	6	9	5
	Vector control	2	3	5	9	3	1	1	9		1	





DELIVERABLE 2: VISUALIZATIONS BREAKDOWN OF BUCKET LEVEL 3



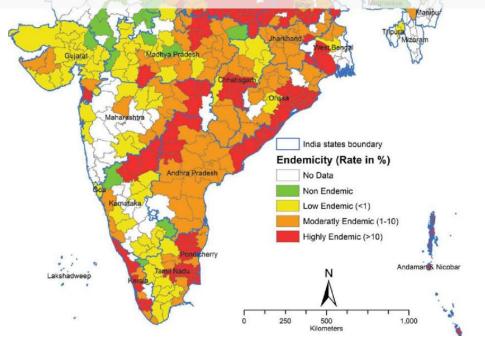


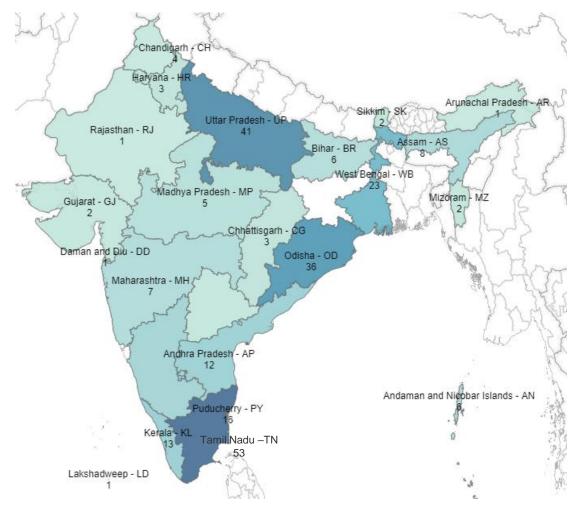
DISTRIBUTION OF RESEARCH BY PROVINCE

Lymphatic Filariasis Transmission Risk Map of India, Based on a Geo-Environmental Risk Model

Sabesan et al, 2013

DOI: 10.1089/vbz.2012.1238



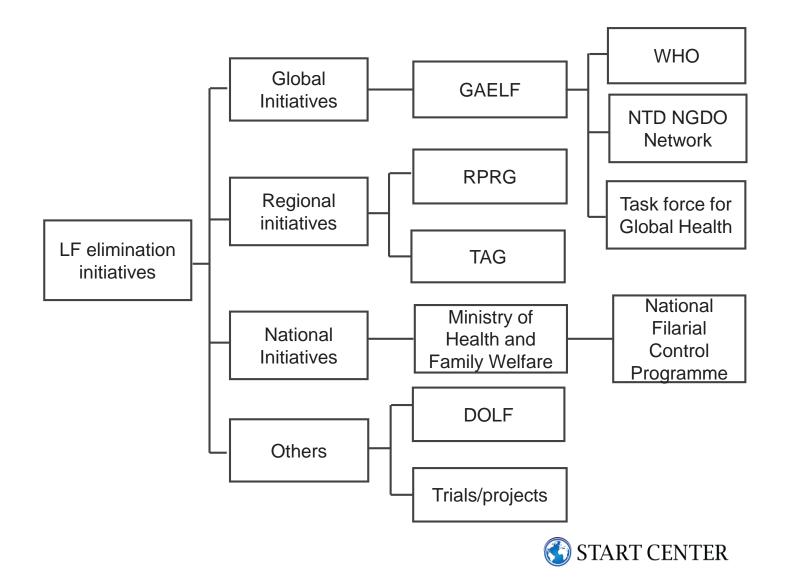






REVIEW OF METHODS

GREY LITERATURE



Key actors identified from:

- Websites
- Meeting reports
- Guidelines
- Key publications
- Annual reports
- Progress reports
- Workshop reports
- Informal consultations
- Expert missions

GAELF: Global alliance for the elimination of lymphatic filariasis

RPRG: Regional programme review group

TAG: Technical advisory group (LF)

DOLF: Death to Onchocerciasis and Lymphatic Filariasis

NTD NGDO Network: Neglected Tropical Diseases Non-Governmental

Development Organisation

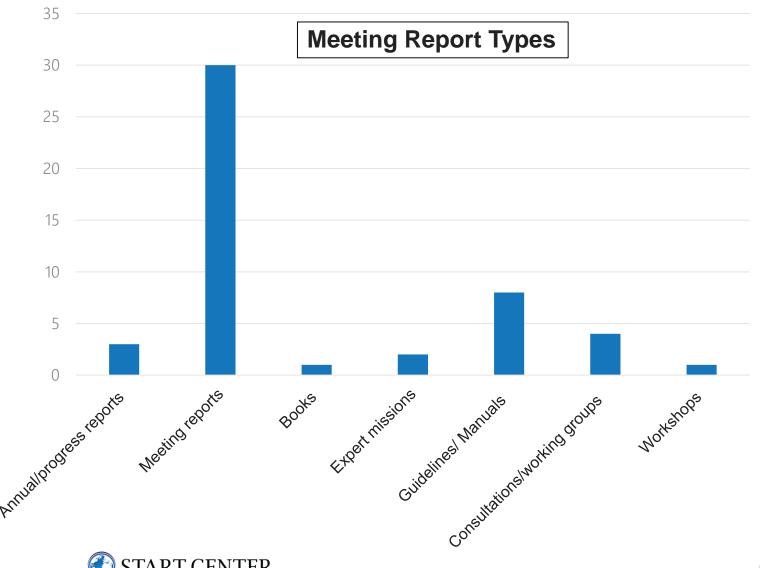
REVIEW OF METHODS

RESULTS:

49 reports found

30 meeting reports from:

- GAELF: Global alliance for the elimination of lymphatic filariasis
- RPRG: Regional programme review group
- TAG: Technical advisory group (LF)
- STAG (NTD): Strategic and Technical Advisory Group for Neglected **Tropical Diseases**



DELIVERABLE 3: DIRECTORY KEY INSTITUTIONS

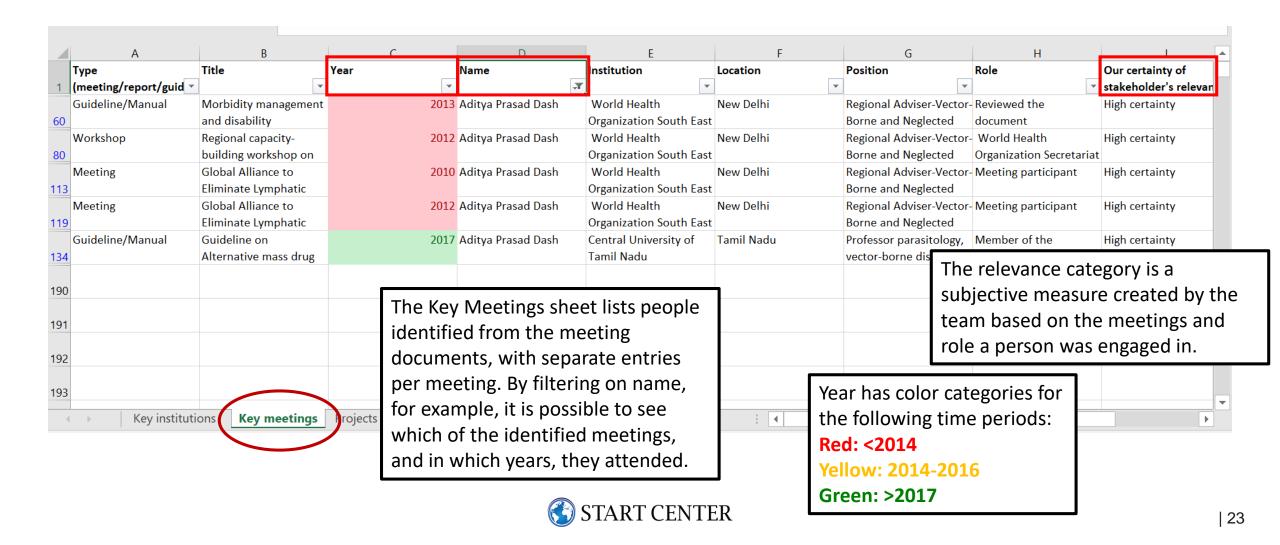
_	A	В	С	D
1	Institution	Name	Position	
2	Ministry of Health and Familiy Welfare	Dr (Smt) Nupur Roy	Additional Director, Head of Kala-Azar &	
3		Dr. Bipin Sinha	Additional director and Bihar state LF	
4		Dr. Dinkar Raval	Joint Director (Mal. & Fil.), Gujarat	
5		Dr. Prakash B. Bhoi	Joint Director (Mal & Fil & WBD), Maharashta	
6	Government TD Medical College, Kerala,	Dr. Pushpalatha. M	Principal	
7	India	Prof Suma Krishnasastry	(lead for WHO LF MMDP collaborating	
8	Indian Council of Medical Research	Kasinathan Gunasekaran	(Scientist G)	
9		S L Hoti	(Scientist G & Director I/C)	
4	Key institution	Dr Ashwani Kumar Ney meetings Pro	Director - Vector Directs Published Literat	ture Results (+)

6 Key institutions identified

The Key Institutions sheet lists organizations identified during the grey literature review, with leadership figures in LF and NTDs identified..



DELIVERABLE 3: DIRECTORY KEY MEETINGS—FILTERING BY NAME



DELIVERABLE 3: DIRECTORY CURRENT LF PROJECTS

	А	В	С	D			
1	Project / Trial	Institution	Funder	Status			
	m&e study to guide a triple drug						
2	stopping decision for lymphatic	India VCRC - ICMR	BMGF	in progress			
3	IDA acceptability study	Bruyere Research Institute	BMGF	in progress	The Project	ts sheet lists o	ongoing LF
	management of filarial lymphedema	Government td medical college	USAID	in progress	•	rojects identii	•
5	Triple drug therapy	Vector Control Research Center	BMGF	in progress	the review, and epidem		
	sampling strategies for xenomonitoring of infection in culex	Neglected Tropical Disease Support Center	BMGF	Completed			
	for the clearence of w.bancrofti infection:double blind rct to study	Dr Lourduaj John De Britto, Vector Control Research Centre	Indian Council of Medical Research	Completed			
	Trial of Predefined Homeopathic Medicines on Acute	Dr Alok Kumar, Central Council for Research in Homoeopathy	Central Council for Research in Homoeopathy	Open to Recruitment	t		
	Filariasis using self care Ayurveda &	Dr S R Narahari, Institute of Applied	Central Council for Research in	·			
	Yoga therapy as pilot in two	Dermatology	Ayurvedic Sciences	Completed			
4		Medical research Centre ICMR eetings Projects Published Liter	ature Results +	: •			



DELIVERABLE 3: DIRECTORY PUBLISHED LITERATURE AUTHORS

Α	В	С	D	Е	F		G
Author	▼ Role	▼ Affiliations ▼	Affiliation Country	Affiliation Locality	▼ Affiliation In	stitut 🔻	Publication Year 🔻
Abdul Khader M.S.M.	Last Author	Institute of Vector Borne Diseases and	Z India	Tamil Nadu	Institute of \	Vector B	2016
Abera B.	Last Author	Department of Microbiology, Immunol	Ethiopia	Bahir Dar University	College of N	ledicine	2016
Aberdour S.	First Author	Lymphoedema Research Unit, Departm	e Australia	SA	School of Me	edicine	2015
Abinaya M.	First Author	Biomaterials and Biotechnology in Anin	n India	Tamil Nadu	Alagappa Un	iversity	2019
Achary K.G.	First Author	Division of Immunology, Regional Med	i India	Odisha	Regional Me	dical Re	2014
Adhikari A.	Last Author	Department of Pathology, Bankura Sam	rIndia	West Bengal	Bankura Sar		204.4
Adhikari U.	First Author	Mosquito, Microbiology and Nanotechr	India	West Bengal		Year	has color catego
Agarwal A.	First Author	Department of Medicinal Chemistry, In	s India	Varanasi	Banaras Hin	the f	ollowing time pe
Agbo O.E.	First Author	Department of Biological Sciences, Ben	ι Nigeria	Makurdi	Benue State		
Aggarwal A.	First Author	Department of Medicine and, United St	a United States			Red:	<2014
Aggithaya G.M.	Last Author	Institute of Applied Dermatology, Kera	la India	Kerala	Institute of	Yello	w: 2014-2016
sheet lists the authors		Institute of Applied Dermatology, IAD J	ιIndia	Kerala	Institute of		
		Army Hospital (RandR), Delhi Cantt, Ind	i India	Delhi Cantt	Army Hospi	Gree	n: >2017
tified in SCOPUS from the		Department of Biotechnology, Jamia M	i India	New Delhi	•		2014
shed literature revi	ow Thic	Department of Clinical Laboratory Scier	Saudi Arabia	Abha	King Khalid I	Jniversit	2018
		Department of Biochemistry, Faculty of	India	Uttar Pradesh	Department	of Bioch	2017
at allows for easier	filtering by	Department of Diagnostic Radiology an	d Hong Kong	Hong Kong	Chinese Uni	versity o	2011
or and institution.		Dept of Botany and Microbiology, Addi	ri Saudi Arabia	Riyadh	College of So	cience	2016
n and mistitution:		Department of Botany and Microbiolog	y Saudi Arabia	Riyadh	King Saud Ur	niversity	2019
Alharbi B.	First Author	Departments of Urology and Plastic Sur	g Saudi Arabia	Riyadh			2015
Ali M.	First Author	Nanomedicine Lab, Faculty of Engineer	i India	New Delhi	Hamdard Un	iversity	2013
Ali M.	First Author	Nanomedicine Lab, Faculty of Engineer	i India	New Delhi	Hamdard Un	iversity	2014
Ali M.	First Author	Hamdard University (Jamia Hamdard), F	India	New Delhi	Hamdard Un	iversity	2013
Ali M.	First Author	Nanomedicine Lab, Hamdard Nanobiot	e India	New Delhi	Hamdard Un	iversity	2014
Ali M.	First Author	Nanomedicine Lab, Faculty of Engineer	i India	New Delhi	Hamdard Un	iversity	2014
Amala M.	First Author	Department of Bioinformatics, Alagapp	aIndia	Karaikudi	Alagappa Un	iversity	2019
Ambily V.R.	First Author	Department of Clinical Veterinary Med	i India	Trichur	College of V	eterinar	2011
Amdare N.	First Author	Department of Biochemistry, JB Tropica	Undia	Maharashtra	Mahatma Ga	ndhi Inc	2015

ADDITIONAL GREY LITERATURE: BOOK

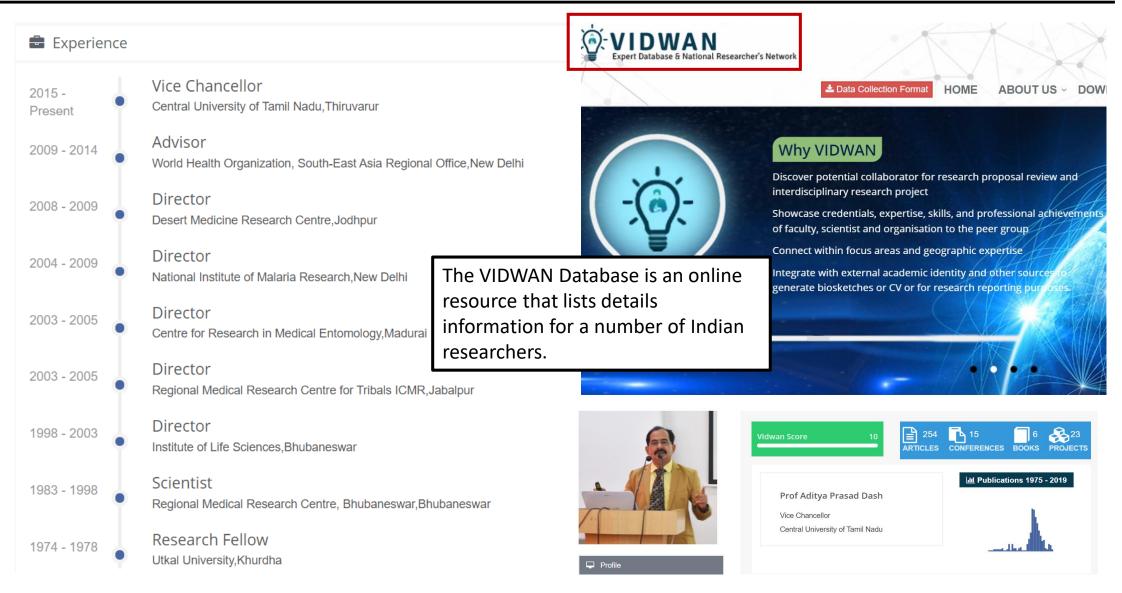
11	Prevalence of Lymphatic Filariasis in the Northeastern States of India, with Particular Reference to Assam and Prospects of Elimination	149
12	An Overview of Lymphatic Filariasis Control in Puducherry, Union Territory, India	165
13	Sporadic Incidence of Lymphatic Filariasis in Nonendemic State of Rajasthan and Control of the Vector (Culex quinquefasciatus Say, 1823), with Innovative Botanicals and a Possible Hypothesis on the Spread of 'Disease Endemism' Arti Prasad and Girima Nagda	171
14	Integrated Vector Control for the Elimination of Bancroftian Filariasis in the Villages of Tirukoilur, South India. 1. P. Sunish, M. Kalimuth, Ishok Kumar, R. Rajendran, A. Munirathinam, N. Nagara, N. Arunachalam, and B. K. Tyagi	185
15	The Indian Lymphatic Filariasis Elimination Programme: The Success to Surtain P. K. Srivastava, A. Dhariwal, and B. K. Tyagi	193
16	Bioecology, Insecticide Susceptibility and Management of Culex quinquefasciatus Say, 1823: A Major Vector of Lymphatic Filariasis in India. Reji Gopalakrishnan and Vijay Veer	199
17	Ecology and Biology of Culex quinquefasciatus Say, 1823, in Two Physiographically Different Ecosystems with Special Reference to Human Lymphatic Filariasis in West Bengal, India Sajal Bhattacharya and Probal Basu	211
18	Actinobacteria: A Promising Biocontrol Agent for Filariasis Vector, Culex quinquefasciatus Say, 1823 (Insecta: Diptera: Culicidae) K. Rajesh and D. Dhanasekaran	227
19	Nanopesticides: A Boon Towards the Control of Dreadful Vectors of Lymphatic Filariasis. Prabhakar Mishra, A. P. B. Balaji, B. K. Tyagi, Amitava Mukherjee, and N. Chandrasekaran	247

Brij Kishore Tyagi Editor Lymphatic Filariasis Epidemiology, Treatment and Prevention - The Indian Perspective
<u>∳</u> Springer

1	Epidemiology of Lymphatic Filariasis	1
2	Lymphatic Filariasis Elimination: Update for Mission Possible P. K. Srivastava and A. C. Dhariwai	15
3	Next Step Lymphatic Filariasis Eradication: Current Status in the Development of a Vaccine Against Lymphatic Filariasis Ramaswamy Kalyanasundaram	33
4	Progress in the Treatment and Control of Lymphatic Filariasis Shailja Misra-Bhattacharya and Mohd. Shahab	47
5	Immunotechnological Advancements in Developing Vaccines for Lymphatic Filariasis Prince R. Prabhu, Jayaprakasam Madhumathi, and Perumal Kaliraj	59
6	Recombinant Filarial, Wolbachia Antigens and their Role in the Immunopathogenesis of Human Lymphatic Filariasis Kirthika Sreenivas, Kamalakannan Vijayan, and Rangarajan Badri Narayanan	81
7	Transmission Potential of Wuchereria bancrofti by Culex quinquefasciatus in Malaysia and Its Global Significance	99
8	Genetic Diversity, Molecular Markers, and Population Genetics of Human Lymphatic Filarial Parasites	107
9	Transmission Dynamics of Diurnally Subperiodic Lymphatic Filariasis in the Andaman and Nicobar Islands. A. N. Shriram, Krishnamoorthy, and P. Vijayachari	129
10	Success Story and Challenges Faced to Achieve 'Elimination of Lymphatic Filariasis' Status in Tamil Nadu	139



ADDITIONAL GREY LITERATURE: DATABASE







KEY FINDINGS AND LIMITATIONS

KEY FINDINGS

- In past 10 years, there has been minimal research regarding BMGF priorities, particularly regarding MDA implementation, MDA stopping decisions and post-MDA surveillance.
- The published literature is dominated by case reports that do not add to elimination evidence.
- LF-related publications increased around 2012 likely related to WHO GPELF report, and have generally decreased since

LIMITATIONS

- Subjectivity of categorization (single review)
- Limited ability to match all authors to institutions
- Quality of research and publications not assessed



NEXT STEPS

Use of literature database and directory to identify opportunities for partnership and organizing technical working groups aligned with BMGF priorities.

Incentivize research and programming to fill evidence gaps related to elimination.

Consider Indian and other exemplars for improving evidence and implementation around LF elimination programming.



