

# 6<sup>th</sup> SOUTHERN CROSS TRAVEL MEDICINE CONFERENCE & the 2<sup>nd</sup> SOUTHERN CROSS TROPICAL MEDICINE CONFERENCE

Hilton Hotel, Sydney. September 1-3, 2023

**Please Note:** There may be changes to the program to accommodate the requests and needs of the presenters and participants.

#### FRIDAY 1<sup>st</sup> SEPTEMBER, 2023

08:00 - 08:45	REGISTRATION & COFFEE							
08:45 – 09:00 (State Room)	OPENING - TROPICAL MEDICINE Conference welcome  • Prof Colleen Lau, The University of Queensland. ACTM President and Conference Chair Acknowledgement of Country  • Prof Maree Toombs, University of Sydney							
09:00 - 10:30 (State Room)	NEGLECTED TROPICAL DISEASES (State Room)  Chairs: Prof Colleen Lau, The University of Queensland & Prof Andrew Steer, Murdoch Children's Research Institute  O9:00 – 10.30 (Room 2)  WORKSHOP 1 (Session 1): TRAVEL CONSULT MASTERCLASS – for practitioners working in travel health							
09:00 - 09:30	2023 ACTM Ashdown Oration Schistosomiasis Elimination and Public Health Response to the Worldwide Disease Burden Prof Christoph Hatz, Swiss Tropical Public Health Institute		Speakers:  Danielle Peel (NP),  Catherine Keil (NP),  Tonia Buzzolini (RN),  Caroline Nash (RN)					
09:30 – 10:30	<ul> <li>FREE COMMUNICATIONS on NTDs</li> <li>Benefits of snowball sampling for lymphatic filariasis surveillance in Samoa. <i>Dr Helen Mayfield, The University of Queensland</i></li> <li>Community and stakeholder perspectives on scabies and the acceptability of mass drug administration for scabies control in Fiji. <i>Dr Elke Mitchell, Kirby Institute</i></li> <li>Nearing Elimination of Trachoma as a Public Health Problem in Australia. <i>Dr Carleigh Cowling, Kirby Institute</i></li> </ul>	09:00 – 10:30	<ul> <li>Get ready: Establishing a travel clinic (model of care)</li> <li>Get set: Managing a pre-travel consultation</li> <li>Go: Resources for travel health consultations</li> </ul>					
10:30 - 11:00	MORNING TEA & Poster Viewing (see below for list of posters)							

# FRIDAY 1<sup>st</sup> SEPTEMBER, 2023

11:00 – 12:30 (State Room)	MALARIA Chairs: Prof Patricia Graves, James Cook University & Prof Leanne Robinson, Burnet Institute	11:00 – 12:30 (Room 2)	WORKSHOP 1 (Session 2): TRAVEL CONSULT MASTERCLASS – for practitioners working in travel health	
11:00 – 11:30	Malaria Atlas Project – Applications in Public Health and Travel Medicine <b>Prof Peter Gething</b> , Curtin University		Speakers: Danielle Peel (NP),	
11:30 – 12:30	FREE COMMUNICATIONS on Malaria  Evidence based optimal dosing of intravenous artesunate in children with severe falciparum malaria.  Prof Julie Simpson, University of Melbourne  Efficacy, safety and tolerability of primaquine radical cure for Plasmodium vivax in paediatric patients: an individual patient data meta-analysis.  Dr Megha Rajasekhar, The University of Melbourne  Appropriate Use of Tafenoquine for Malaria Chemoprophylaxis in Travel Medicine?  Prof Dennis Shanks, Australian Defence Force Malaria and Infectious Diseases Institute	11:00 – 12:30	Catherine Keil (NP), Tonia Buzzolini (RN), Caroline Nash (RN)  The Travel Consult Case studies	
12:30 - 13:30	LUNCH & Poster Viewing (see below for list of posters)			
13:30 – 15:00 (State Room)	VECTOR-BORNE DISEASES Chairs: Prof Tom Burkot, James Cook University & Lt Col Brady McPherson, Australian Defence Force Malaria & Infectious Diseases Institute	13:30 – 15:00 (Room 2)	WORKSHOP 2 (Session 1): YELLOW FEVER	
13:30 – 14:00	Arboviruses in the Pacific Region, what's up? Example of New Caledonia  Dr Myrielle Dupont-Rouzeyrol, Institute Pasteur New Caledonia		Speakers:  Dr Jenny Sisson, Travel Doctor TMVC,  Prof Marc Shaw, WorldWise,  Catherine Keil (NP)	
14:00 – 15:00	<ul> <li>FREE COMMUNICATIONS on Vector-borne Diseases</li> <li>Citizen science as a tool for enhancing arboviral vector surveillance in a resourced-constrained setting: results of a study in Honiara, Solomon Islands, 2019-2023.         Dr Adam Craig, University of Queensland     </li> <li>Efficient Designs for Molecular Xenomonitoring Surveys.         Dr Angus McLure, Australian National University     </li> <li>The Epidemiology of Dengue In Australia, 2012-2022.         Dr Asma Sohail, Monash University     </li> </ul>	13:30 – 15:00	<ul> <li>What is Yellow Fever?</li> <li>Legal requirements for Yellow Fever vaccination</li> <li>International Health Regulations</li> <li>Australian and NZ requirements</li> <li>Accreditation</li> </ul>	
15:00 – 15:30	AFTERNOON TEA & Poster viewing (see below for list of posters)	)		

# FRIDAY 1<sup>st</sup> SEPTEMBER, 2023

15:30 - 16:45 (State Room)	VACCINE PREVENTABLE DISEASES Chairs: Dr Sarah Sheridan, NCIRS & Dr Harunor Rashid, University of Sydney	15:30 – 16:45 (Room 2)	WORKSHOP 2 (Session 2): YELLOW FEVER	15:15 – 16:45 (Room 4)	WORKSHOP 3 (Session 1): ONE HEALTH & ALLERGIES Chair: Prof Richard Franklin & Prof Andreas Lopata, James Cook University				
15:30 – 16:00	Vaccine Preventable Diseases in the Asia-Pacific Region: Responding to existing and emerging issues with immunisation programs Prof Kristine Macartney, NCIRS		Speakers: Dr Jenny Sisson, Travel Doctor TMVC, Prof Marc Shaw, WorldWise, Catherine Keil (NP)		Overview of allergic diseases in temperate and tropical regions – from thunderstorm asthma to tropical mites     A/Prof N Alice Lee, University of New				
16:00 – 16:45	FREE COMMUNICATIONS on Vaccine Preventable Diseases  Travel vaccine comes home to roost: The distribution and safety of Japanese encephalitis vaccination in Victoria, Australia.  Dr Hazel Clothier, The University of Melbourne  Spatial Predictive Mapping of COVID-19 immunity using socioeconomic and environmental factors in the Dominican Republic.  Dr Angela Cadavid Restrepo, The University of Queensland  A Bayesian network model and decision support tool for estimating risk of long COVID.  Jane Sinclair, The University of Queensland	15:30 – 16:45	Yellow Fever vaccine:  Indications, contraindications, adverse events  Special travellers: pregnant, children, immunocompromised  Case studies  Short MCQ paper	15:15 – 16:45	South Wales  Importance of clinically relevant allergies for Component Resolved Diagnosis with focus on tropomyosin in ingested shellfish and inhaled insects  Prof Andreas Lopata, James Cook University  Prevalence and characteristics of stinging insect allergy with focus on tick bites and cross-reactive carbohydrates  Prof Sheryl van Nunen, Macquarie University				
16:45 – 17:30 (State Room)	A VIRTUAL WARD ROUND IN MALAWI Speaker: Dr Camilla Rothe, Ludwig Maximilian University,	A VIRTUAL WARD ROUND IN MALAWI Speaker: Dr Camilla Rothe, Ludwig Maximilian University, Munich, Germany							
17:30 – 17:45	CLOSING	CLOSING							
17:45 – 19:00	Welcome drinks and canapes. Level 2, Hilton Hotel (all delegates welcome)								
From 19:00	Networking dinner for Early Career Researchers and Stud	lents (Spons	ored by Sydney Infectious Diseases I	nstitute)					

# SATURDAY 2<sup>nd</sup> SEPTEMBER, 2023

08:00 - 08:45	REGISTRATION								
08:45 - 09:00 (State Room)	OPENING - TRAVEL MEDICINE  Welcome and Acknowledgement of Country  Dean of ACTM Faculty of Travel Medicine: Dr Jenny Sisson, Travel Doctor - TMVC								
09:00 - 10:30 (State Room)	EMERGING INFECTIOUS DISEASES Chairs: Prof Colleen Lau, The University of Queensland. Prof Peter Leggat, James Cook University	WORKSHOP 5 (Session 1): LYMPHATIC FILARIASIS – Morbidity Management and Disability Prevention (MMDP) (Room 4)							
09:00 - 09:30	2023 Robert Steffen Lecture From Monkeypox to MPOX – a tropical disease goes viral Dr Camilla Rothe, Ludwig Maximilian University, Germany		Speakers: A/Prof Benn Sartorius & Dr Angela Cadavid Restrepo, The University of Queensland Introduction to spatial data and spatial	Speaker: Dr Jan Douglass, LKN Foundation  Lymphatic pathogenesis including hydrocoele					
09:30 – 10:00	Emergence of Japanese encephalitis in Australia and implications for a national vaccination strategy <b>Prof Nick Wood</b> , NCIRS	09:00 – 10:30		<ul> <li>epidemiology</li> <li>Mapping, visualisation and exploration of spatial data (including spatial dependence and clustering/hotspots)</li> </ul>	<ul> <li>Techniques for hygiene and enhanced self-care</li> <li>Evidence for enhanced hygiene</li> </ul>				
10:00 – 10:30	Global emergence of melioidosis and implications for travellers <b>Prof Bart Currie</b> , Menzies School of Health Research		<ul> <li>Spatial modelling: small-area and geostatistical</li> <li>How to select the best spatial epidemiological approach?</li> </ul>	and self-care for reducing disease progression					
10:30 - 11:00	MORNING TEA & Poster Viewing								
11:00 – 12:30 (State Room)	CLINICAL GUIDELINES for TRAVEL MEDICINE Chairs: Dr Jenny Sisson, Travel Doctor TMVC & Dr Deborah Mills, Dr Deb The Travel Doctor	11:00 - 12:30	WORKSHOP 4 (Session 2): SPATIAL EPIDEMIOLOGY	WORKSHOP 5 (Session 2): LYMPHATIC FILARIASIS — Morbidity Management and Disability Prevention (MMDP)					
11:00 – 11:30	The runs on the road: travellers' diarrhoea prevention and management  Prof Karin Leder, Monash University		Modernising the design and analysis of prevalence surveys for Neglected Tropical Diseases. <i>Prof Peter Diggle</i> ,	Speaker: <b>Dr Jan Douglass</b> , LKN Foundation  WHO Essential Package of Care					
11:30 – 12:00	Guidelines for rabies Immunisation in travellers  Dr Anny Huang, NCIRS	11:00 – 12:30	<ul> <li>Lancaster University, UK</li> <li>Lymphatic filariasis elimination – machine learning and geostatistics – Samoa. Dr Helen Mayfield, UQ</li> </ul>	WHO MMDP criteria for Validation of LF Elimination as a Public Health Problem  Output  Ou					
12:00 – 12:30	Strategies for malaria prevention: the European approach <b>Prof Christoph</b> Hatz, Swiss Tropical Public Health Institute		COVID-19 – spatiotemporal visualization     Iran. <i>Dr Behzad Kiani</i> , <i>UQ</i>	Supporting MMDP activities					

# SATURDAY 2<sup>nd</sup> SEPTEMBER, 2023

12:30 - 13:30	LUNCH	12:45 – 13:30	•		
13:30 – 15:00 (State Room)	TRAVEL VACCINES: Prioritisation, Communication, and Decision-making Chair: Dr Sarah McGuinness, Monash University Dr Jonathan Cohen, Travel Clinics Australia	13:30 – 15:00	WORKSHOP 6 (Session 1): MATHEMATICAL MODELLING (Room 2)		
13:30 – 14:00	Travel vaccine prioritisation  Prof Robert Steffen, University of Zurich		Speakers: <b>Dr Nicolas Smoll</b> , Queensland Health; <b>Dr Angus McLure</b> , The Australian National University; and <b>Dr Trish Campbell</b> , University of Melbourne		
14:00 – 14:30	The art and science of effective vaccine communication <b>Prof Margie Danchin</b> , The University of Melbourne	13:30 – 15:00	An equation-free introduction to math modelling of infectious diseases:  How math modelling is different  When math models are (and aren't) useful		
14:30 – 15:00	Decision support tools for risk-benefit analysis of vaccines  *Dr Luis Furuya-Kanamori, The University of Queensland*		<ul> <li>The SIR model and some variants</li> <li>Common modelling frameworks</li> <li>Reproduction numbers, outbreak size, and minimum vaccine coverage</li> </ul>		
15:00 – 15:30	AFTERNOON TEA & Poster Viewing (see below for list of posters	)			
15:30 – 17:00 (State Room)	CLINICAL CASE STUDIES – Environmental Risks Chairs: Prof Richard Franklin, James Cook University & Prof Marc Shaw, WorldWise, New Zealand		WORKSHOP 6 (Session 2): MATHEMATICAL MODELLING (Room 2)	WORKSHOP 7: LYMPHATIC FILARIASIS – Clinical Guidelines for Treatment and Follow-up of Cases (Room 4) Chairs: Dr Myra Hardy, Murdoch Children's Research Institute; Dr Kimberly Won, US CDC	
15:30 – 16:00	Snakebites: vignettes from Australia's tropical north <b>Prof Bart Currie</b> , Menzies School of Health Research		Timely decisions under uncertainty during outbreaks of COVID-19 and Hepatitis A. Dr. Nicolas Small, Queensland Health  Desdiction of fact of the search	Treatment and follow up of antigen-positive and microfilaria-positive individuals and household members:	
16:00 – 16:30	Extreme and remote environments: high altitude and polar travel <b>Dr Jenny Visser</b> , University of Otago	15:30 – 17:00	<ul> <li>Predicting effect of mass drug and alternative strategies for eliminating lymphatic filariasis. Dr. Angus McLure, The Australian National University</li> </ul>	Review evidence and identify knowledge gaps     Review existing clinical guidelines and	
16:30 – 17:00	Repatriation of injured travellers <b>Dr Mauro Zambon</b> , International SOS		<ul> <li>Evaluating mass drug administration regimes for scabies. Dr Patricia Campbell, University of Melbourne</li> </ul>	<ul><li>identify gaps</li><li>Next steps to developing evidence-based guidelines</li></ul>	
17:30 – 18:00 (State Room)	ACTM Annual General Meeting (ACTM Members, face-to-face a	nd Zoom)			

# **SUNDAY 3<sup>rd</sup> SEPTEMBER 2023**

08:00 - 08:30	REGISTRATION							
08:30 – 08:35 (State Room)	Welcome and Acknowledgement of Country Prof Marc Shaw, WorldWise, New Zealand							
08:35 – 10:00 (State Room)	The (In)Famous 'WISEwords' Talks Chairs: Prof Marc Shaw, WorldWise, New Zealand & Dr Sarah Chu, Turbot St Medical Centre	08:30 - 10:00	POSTER TOURS for Lymphatic Filariasis, NTD Surveillance, Malaria & Vector-borne Diseases					
08:30 – 10:00	<ul> <li>Children and injuries during travel.         <i>Prof Richard Franklin, James Cook University</i></li> <li>Graded dosing of Yellow Fever vaccination for people with egg allergy/anaphylaxis.         <i>Dr Ketaki Sharma, NCIRS</i></li> <li>Where do new diagnostics fit in the evaluation of illness in the returned traveller?         <i>Prof Bernie Hudson, The University of Sydney</i></li> <li>Doing impactful research at a busy travel medicine clinic.         <i>Dr Deborah Mills, Dr Deb The Travel Doctor</i></li> <li>TOURIST, an obvious revolution in travel medicine.         <i>Prof Christoph Hatz, Swiss Tropical Public Health Institute</i></li> <li>Diagnosis and management of rickettsial infections in returned travellers.         <i>Prof Stephen Graves, Australian Rickettsial Reference Laboratory</i></li> <li>Bites and Stings – how to avoid them.         <i>Dr Sarah McGuinness, Monash University</i></li> <li>Genetics and Travel Health.         <i>Dr Jonathan Cohen, Travel Clinics Australia</i></li> </ul>	08:30 - 09:10	<ul> <li>Poster tour 2 – Lymphatic Filariasis (Meet at poster NTD1)         Tour leader: Dr Patrick Lammie, COR-NTD     </li> <li>Poster tour 3 – NTD Surveillance (Meet at poster NTD7)         Tour leader: Dr Katie Gass, COR-NTD     </li> <li>Poster tour 4 – Malaria &amp; Vector-borne Diseases (Meet at poster MV1)         Tour leader: Prof Patricia Graves, James Cook University     </li> </ul>					
10:00 – 10:30	MORNING TEA and Poster viewing (see below for list of posters)							

10:30 – 12:00 (State Room)	CLOSING PLENARY: CASES STUDIES in CLINICAL INFECTIOUS DISEASES  Chairs: Prof Karin Leder, Monash University & Dr Stephen Muhi, The University of Melbourne
10:30 – 11.00	Acute neurological disease in travelling children  A/Prof Philip Britton, The University of Sydney
11:00 – 11:30	Eosinophilia in returned travellers and migrants <b>Dr Camilla</b> Rothe, Ludwig Maximilian University, Germany
11:30 – 12:00	Schistosomiasis in endemic populations, migrants, and returning travellers  Prof Christoph Hatz, Swiss Tropical Public Health Institute
12:00 – 12:20 (State Room)	TROPICAL MEDICINE QUIZ – Win a registration for next year's conference!  Chair: Prof Marc Shaw, WorldWise, New Zealand
12:20 – 12:30 (State Room)	Prizes for best oral and poster presentations by early career researchers and students (Sponsored by the Tropical Medicine and Infectious Disease Journal)  CLOSING - Chair, Scientific Programme Committee
	Prof Colleen Lau, University of Queensland.

Please Note: This program could be subject to further late changes due to unforeseen circumstances.

#### **POSTER PRESENTATIONS**

**Poster display:** All posters will be displayed during the whole conference.

**Poster tours:** Some posters have been selected for poster tours, which will be led by an expert in the field. At each poster, there will be a 3-minute presentation followed by a 5-minute discussion.

Poster tour topics	Tour leader	Time	Meet at
Poster tour 1: Travel Medicine & Vaccine-preventable Diseases	Dr Luis Furuya-Kanamori, UQ	Saturday 12:45pm (lunch available in poster room)	Poster TV1
Poster tour 2: Lymphatic Filariasis	Dr Patrick Lammie, COR-NTD	Sunday 8:30am	Poster NTD1
Poster tour 3: NTD Surveillance	Dr Katie Gass, COR-NTD	Sunday 9:20am	Poster NTD7
Poster tour 4: Malaria & Vector-borne Diseases	Prof Patricia Graves, JCU	Sunday 9:20am	Poster MV1

Category	Poster ID	Presenter	Affiliation	Title	Poster Tours
Travel Medicine & Vaccine-preventable Diseases	TV1	Wondimeneh Shiferaw	The University of Queensland	Sexually transmitted infections and blood-borne viruses among international travellers: A systematic review	1
Travel Medicine & Vaccine-preventable Diseases	TV2	Hazel Clothier	Murdoch Children's Research Institute, Melbourne	Enter stage right: Establishing the Australian Childhood Travel Outcomes Registry (ACTOR)	1
Travel Medicine & Vaccine-preventable Diseases	TV3	Philippa McDermid	University of New South Wales	Stranded abroad during a pandemic: Examining the impact of COVID-19 related border restrictions	1
Travel Medicine & Vaccine-preventable Diseases	TV4	Maxwell Braddick	Victoria Department of Health	Absence of transmission of MPOX infection on long international flights	1
Travel Medicine & Vaccine-preventable Diseases	TV5	Beatris Mario Martin	The University of Queensland	Using sero-epidemiology of SARS-CoV-2 anti-S antibodies in the Dominican Republic to inform regional public health response	1
Travel Medicine & Vaccine-preventable Diseases	TV6	Hongen Lu	The University of Queensland	Use of machine learning for assessing adverse event in concomitant administration of vaccines	1
Travel Medicine & Vaccine-preventable Diseases	TV7	Yan Zhu	The University of Queensland	Dengvaxia in Australian Travellers: A Case Series	
Travel Medicine & Vaccine-preventable Diseases	TV8	Deborah Neucom	Sunshine Coast Hospital and Health Service, Queensland	Lack of measles transmission to susceptible contacts from a childcare worker with secondary vaccine failure	
Travel Medicine & Vaccine-preventable Diseases	TV9	Nicola Foxlee	Australian National University	Ni-Vanuatu health workers knowledge, beliefs, and practices regarding antibiotic prescribing and awareness of antibiotic resistance and the impact of COVID-19, 2018 and 2022: a mixed methods study	

Neglected Tropical Diseases	NTD1	Jessica Scott	James Cook University	Field comparison of STANDARDTM Q Filariasis Antigen Test (QFAT) with Bioline Filariasis Test Strip (FTS) in Samoa	2
Neglected Tropical Diseases	NTD2	Ramona Muttucumaru	Australian National University and The University of Queensland	Persistence of circulating filarial antigen and microfilaria after triple drug treatment (ivermectin, diethycarbamazine and albendazole) – findings from a community survey in Samoa	2
Neglected Tropical Diseases	NTD3	Harriet Lawford	The University of Queensland	Serological surveillance of lymphatic filariasis in Samoa: the epidemiology and sensitivity of anti-filarial antigen compared to antibody	2
Neglected Tropical Diseases	NTD4	Masato Yamauchi	Japan International Cooperation Agency	JICA Project for Elimination of Lymphatic Filariasis in the Pacific Region – Progress on Elimination of Lymphatic Filariasis in Papua New Guinea	2
Neglected Tropical Diseases	NTD5	Beatris Mario Martin	The University of Queensland	Towards global elimination of Lymphatic Filariasis – A Systematic Review of the Application of Spatial Epidemiology Methods to Understand Disease Burden and the Impact of Intervention Strategies	
Neglected Tropical Diseases	NTD6	Helen Mayfield	The University of Queensland	Lymphatic filariasis prevalence in human surveys five-years post mass drug administration in Samoa	
Neglected Tropical Diseases	NTD7	Adam Bartlett	University of New South Wales	Molecular analysis of soil-transmitted helminths in Huambo, Uige and Zaire provinces, Angola	3
Neglected Tropical Diseases	NTD8	Carleigh Cowling	University of New South Wales	Utilising molecular diagnostics to support trachoma survey and control programs in Choiseul, Solomon Islands.	3
Neglected Tropical Diseases	NTD9	Md Saiful Islam	University of New South Wales	Acceptability of integrated neglected tropical diseases surveys and mass drug administration in Tafea, Vanuatu	3
Neglected Tropical Diseases	NTD10	Elizabeth Nguyen	University of New South Wales	Utilising integrated neglected tropical diseases (NTDs) surveys to monitor and evaluate mass drug administration (MDA) in Vanuatu	3
Neglected Tropical Diseases	NTD11	Angela Cadavid Restrepo	The University of Queensland	Interactive Dashboard for Elimination and Surveillance (IDEAS): A dashboard for visualization of lymphatic filariasis surveillance data in American Samoa	
Neglected Tropical Diseases	NTD12	Harriet Lawford	The University of Queensland	Serological surveillance and risk-factors of arboviruses, neglected tropical diseases, and vaccine-preventable diseases in Samoa	
Neglected Tropical Diseases	NTD13	Susana Vaz Nery	University of New South Wales	Integrated serological surveillance using dried blood spot analysis to determine prevalence of multiple infectious diseases in Vanuatu	
Neglected Tropical Diseases	NTD14	Vibooshini Ganeshalingam	Townsville University Hospital & The University of Queensland	The effect of climate on melioidosis incidence in Townsville, Australia: a dry tropical region	

Malaria & Vector-borne Diseases	MV1	Tammy Allen	James Cook University	Aedes mosquito management in the Torres Strait - what is impeding a community-based model of practice?	4
Malaria & Vector-borne Diseases	MV2	Maddison Howlett	The University of Queensland	Molecular xenomonitoring (MX) as a complement to human microfilaraemia (Mf) for lymphatic filariasis surveillance in Samoa	4
Malaria & Vector-borne Diseases	MV3	Yan Zhu	The University of Queensland	Trend in malaria cases in China: New challenges following malaria elimination and the need to enhance travel medicine services	4
Malaria & Vector-borne Diseases	MV4	Suho Kim	SD Biosensor, Korea	Towards a More Effective Malaria Elimination: G6PD and Next-Generation Malaria RDTs	4
Malaria & Vector-borne Diseases	MV5	Tom Burkot	James Cook University	Impacts of changing landscapes and vector control on malaria vector behaviours and their distributions	