TICK-BORNE INFECTION AT RISK GROUPS – Targeting of Personal Protective Advice

Dr Z Husain, Dr J Cringean, Dr A Cruikshank, with thanks to Prof G Tudor-Williams

The following is a breakdown of potential at-risk groups and target markets for personal protective messaging. This a general guide and not exhaustive.

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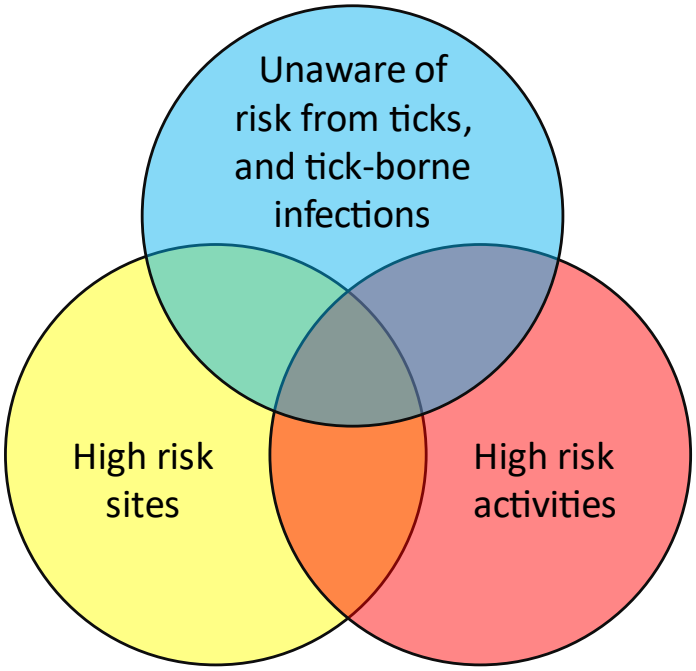
FRAMEWORKS FOR CONSIDERING POTENTIAL RISK

Risk features of target populations at risk of tick bites and tick-borne infection, and interplay of factors



Each element depicted in the diagram is an independent risk factor for contracting tick-borne infection. Potential risk to the individual increases with each additional element.

The greatest risk of serious disease is in those with low awareness of tick/tick-borne infection risk (i.e., occasional high-risk exposure in those coming from low-risk areas).

		Area risk for tick-borne infections	
		High risk area	Low risk area
Exposure frequency	Frequent exposure		
	Infrequent exposure		

Lack of awareness of tick, and tick-borne infections, places any category as high risk – i.e., lack of practical knowledge on how to reduce personal risk

INDIVIDUAL/PERSONAL 'TARGET MARKET'

Occasional high-risk exposure to people visiting from low-risk areas

This group are most likely to lack basic knowledge on ticks, preventative actions, and risk of tick-borne infections, potentially leaving them at higher risk of contracting serious tick-borne infections.

Potential circumstances of infection can include day trip/short trips by those local to high-risk areas, and visitors**.** Examples can include trips to the countryside/seaside for walks/ picnics/ activities/ mindfulness/ forest-bathing/ crafts/ retreats, etc.

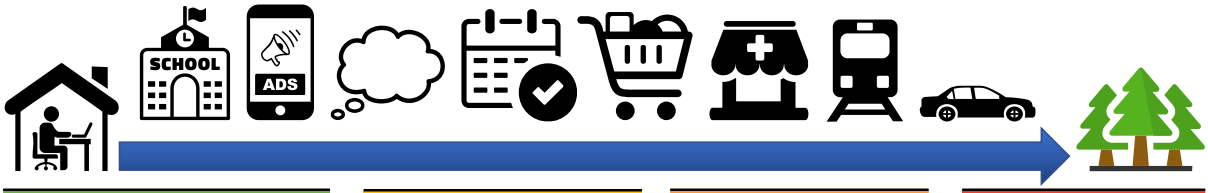
GROUP TYPE	EXAMPLES
Schools /youth organisations	• Children/teenagers on school trips to outdoor settings (e.g., Duke of Edinburgh, camping, field trips, outdoor activity centres (e.g., 'Go Ape')) • Teachers/group leaders/parents need to be educated – to pass on the information to those under their care

Informal groups	• Group of friends or family
	  ○ Walk for a day in the countryside/hills
	  ○ Camping for the weekend

Formal/organised groups e.g., community organisations (not outdoor orientated), that may arrange annual trips to the outdoors for their membership, who may have had minimal, if any, prior exposure to the outdoors.	• University/college societies • Religious community organisations • Ethnic minority community organisations • Urban residential organisations (e.g., Tenant Management Organisations in inner city council estates) • Mental health organisations

Messaging will need to consider the different needs of planned vs last-minute impromptu trips i.e., those who will pick up supplies from a pharmacy, buy maps and prepare preceding the trip, versus those who may pick up items and information opportunistically at a service station/train station/visitor centre/when they reach the site.

MESSAGING OPPORTUNITIES



General consciousness	Planning a trip	En route	High risk destination
Education Public health messaging	Research Booking Buying items for trip	Train station Service station Coach station Bus stops	Local shops Local advertising

Regular high-risk exposure in high-risk areas

This group is more likely to have some tick awareness but would still benefit from regular messaging.

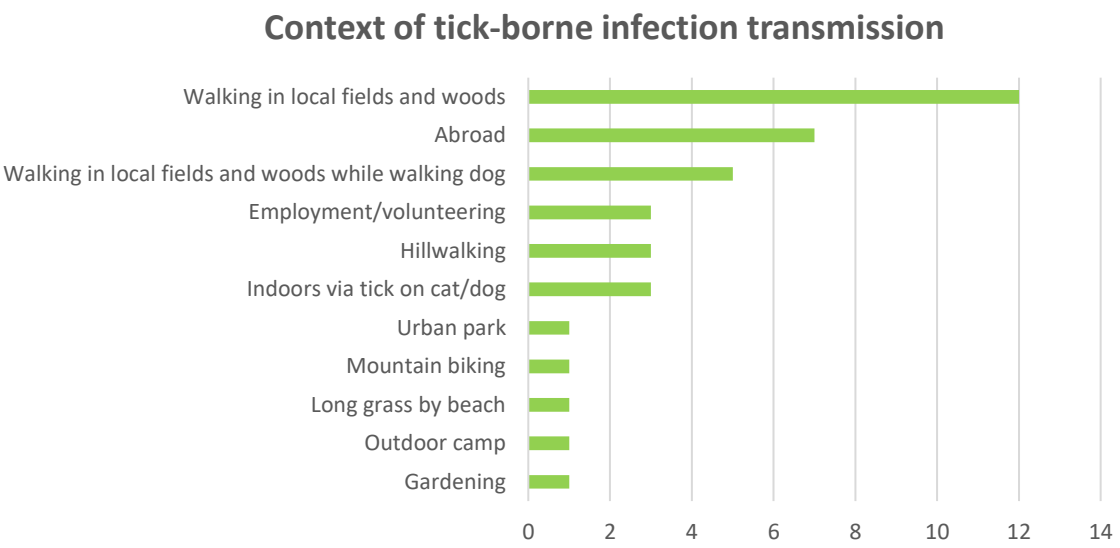
EXPOSURE TYPE	EXAMPLES
Occupational	• Forestry workers • Farmers • Gamekeepers/countryside rangers • Ecologists/field based academic study • Staff in urban parks • Other outdoor workers • Combined cadet force
Recreational	• Hikers/ramblers/mountaineers/hill walkers • Users of city parks in high-risk regions • Children in their own gardens and local play areas (often outside and wearing shorts and t-shirts) • Golfers • Fishers • Birdwatchers • Cyclists/runners
Residential/other	• Residential areas bordering woodland or greenery • Gardeners • Pet owners

ORGANISATIONAL 'TARGET MARKET'

Encourage target organisations to provide information on risks of ticks and tick-borne infection, and advice on practical measures to reduce personal risk.

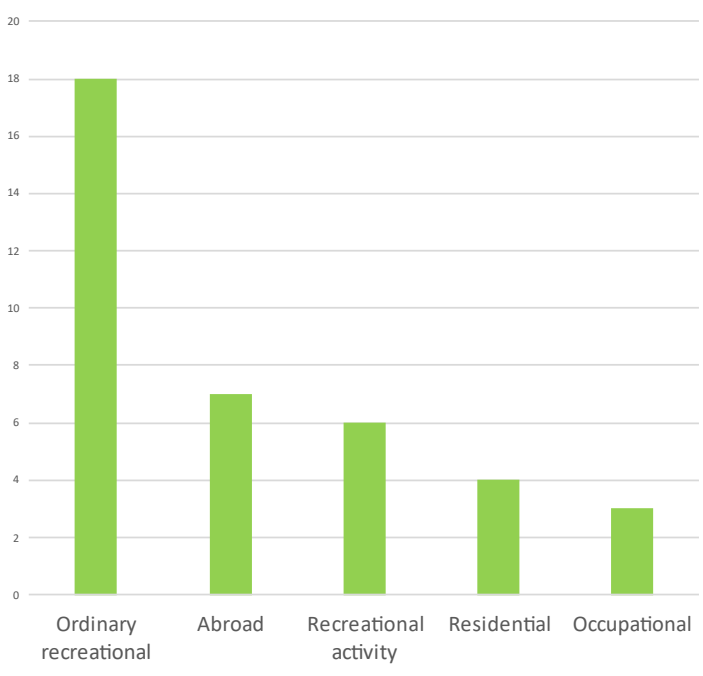
ORGANISATION SECTOR	EXAMPLES
Hospitality	• Guest houses and hotels in high-risk areas • Youth Hostel Association • Caravan clubs • Booking websites (holiday/hotels/hostels/campsites)
Commercial retailers (Encourage stocking of tick removers, insect repellent, and stock information on tick awareness)	• Outdoor enthusiast market (e.g., Go outdoors, Blacks, Millets, Sports Direct etc) • Outdoor activity centres • Pharmacies • Pet shops • Veterinary practices • Travel clinics
Educational establishments (Aim at both students and parents)	• Schools • Colleges • Universities • Nurseries • Parenting classes
Other outdoor orientated organisations	• Scouts and guides • National Trust • Historic Scotland • British Deer Society

LYME RESOURCE CENTRE (LRC) SURVEY OF 38 PEOPLE WITH TICK-BORNE INFECTIONS (2021): CONTEXT OF TICK BITE AND TRANSMISSION OF TICK-BORNE INFECTION



Context by which tick-borne infections are acquired by common theme (LRC survey 2021):

TICK-BORNE DISEASE TRANSMISSION COMMON THEME (LRC SURVEY 2021)	SURVEY CATEGORY
Ordinary recreational	Walking in local fields and woods Walking in local fields and woods while walking dog Urban park
Abroad	Abroad
Recreational activity	Hillwalking Outdoor camp Long grass by beach Mountain biking
Residential	Indoor via tick on cat/dog, Gardening
Occupational	Employment/volunteering (forestry, surveying marine wildlife)



ETHNIC MINORITY COMMUNITIES

Studies from the USA indicate disproportionately more severe disease outcomes in non-white patients[1,2,3], thought to be due to lack of awareness/recognition by physicians. This is likely transferable to the UK and European settings.

There is lack of data on this matter in the UK setting as the question has not been considered in the research literature (within the context of possible missed diagnosis).

The medical missed diagnosis component needs to be addressed. However, this broad and diverse group may benefit from:

- Guidance on practical measures to reduce the risk of tick bites and tick-borne infections when visiting areas of the UK, and other temperate regions in the world.
- Targeted health information e.g.:
    - Appearance of erythema migrans in non-white skin tones.

Further reading:

- **O'Brien, Liz. (2017). Lyme disease: information for environment sector organisations on raising awareness amongst staff and visitors. Forest Research – Forestry commission.** https://www.researchgate.net/publication/319159287_Lyme_disease_information_for_environment_sector_organisations_on_raising_awareness_amongst_staff_and_visitors [accessed 12/10/21].
    - **Good summary of key points in tackling communicating awareness – relevant information regarding practicalities of raising awareness.**
- William, Wint, et al. European Centre for Disease Prevention and Control and European Food Safety Authority. "The importance of vector abundance and seasonality: Results from an expert consultation VectorNet project." Stockholm and Parma: ECDC and EFSA; *EFSA Supporting Publications* 15.11 (2018): 1491E. https://www.ecdc.europa.eu/sites/default/files/documents/vector-abundance-and-seasonality.pdf [accessed 12/10/21].
    - **Relevant paragraphs on Lyme disease on page 8. Higher transmission rates of Lyme disease from ticks in urban/peri-urban areas (e.g., areas of countryside close to urban areas).**
- Lyme Resource Centre: https://www.lymeresourcecentre.com/ [accessed 12/10/21].

References

1. https://newsroom.ucla.edu/releases/black-patients-diagnosed-with-lyme-disease-later [accessed 12/10/21].
2. Ly DP. Black-white differences in the clinical manifestations and timing of initial Lyme disease diagnoses. J Gen Intern Med. 2021 Sep 30. doi: 10.1007/s11606-021-07129-1. Epub ahead of print. PMID: 34595684.
3. Alan D. Fix, César A. Peña, G. Thomas Strickland, Racial Differences in Reported Lyme Disease Incidence, *American Journal of Epidemiology*, Volume 152, Issue 8, 15 October 2000, Pages 756–759, https://doi.org/10.1093/aje/152.8.756, https://academic.oup.com/aje/article/152/8/756/126833?login=true [accessed 12/10/21].
4. Icons via https://uxwing.com/ [accessed 14/10/21].