Malaria and the Receptive Area in the NT - or Know Your Mosquitos!
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It is generally regarded that the malaria receptive area of the Northern Territory is north of the 19° parallel i.e. a line just north of Tennant Creek. This line is based on historical evidence of previous outbreaks of malaria in the NT.¹ It is possible that malaria could once again become endemic i.e. permanently established north of this line. Before 1962, when endemic malaria was eradicated from the NT, there were numerous outbreaks in the Top End of the NT north of the 19° parallel. Malaria was not just restricted to the higher rainfall areas of the Top End.

Anopheles farauti species complex
In the Top End the primary vector of malaria was probably Anopheles farauti sp.¹ ² It is now known that this is a species complex of morphologically indistinguishable species.³ The various members of the complex can however be distinguished by a DNA probe technique.⁴ One member of the complex is found near the coast (An. farauti sp.1 is a brackish water breeder) and the other two are sub coastal and inland species (An. farauti sp.3 and the rarer An. farauti sp.2 are fresh water breeders). However An. farauti is not found in Katherine or south of this latitude, so the large past outbreaks south of Katherine were certainly due to another species of Anopheles.

Anopheles annulipes species complex
The probable vector of malaria in other areas of the NT was Anopheles annulipes s.l. This species is also a species complex, with at least three species and probably more present in the NT. At least one and probably more of the members of this species is an efficient vector of malaria under laboratory conditions and must have been an efficient vector in the field. Studies of this species in NSW have shown that it can be a relatively long lived species and hence capable of living long enough to be a good vector.⁵

The An. annulipes species complex is present throughout the NT but various members become increasingly abundant away from the northern coast. In the area from Katherine to Alice Springs this species can be seasonally very abundant. An. annulipes is the predominant Anopheles in the Wave Hill, the VRD and the Roper River areas, where large outbreaks of malaria occurred in the past.

It is also the predominant Anopheles in the Tennant Creek area following rain and relatively high numbers can be seasonally present near creeks and swampy areas in inland Australia. Very high An. annulipes numbers can occur in the Alice Springs areas in certain localities such as Ilparpa Swamp, and other areas following rain.

Areas of potential malaria transmission
While malaria outbreaks and endemic malaria have occurred north of the 19°parallel, it is not widely appreciated that seasonal malaria transmission can still occur in the summer months below the 19° parallel. The area above the 19° parallel marks the region where year round malaria transmission could occur, although this may be seasonal and retreat back to localised areas during the dry seasons.

However during the summer months and possibly the warmer months in winter, malaria transmission could still occur south of the 19° in the region from Tennant Creek to Alice Springs under certain favourable conditions. There are many locations, particularly after extended rain, where An. annulipes numbers can be very high.

If cases of imported malaria occur in this region in the summer months, the possibility of malaria transmission to other people must be considered.⁶ Whether transmission occurs will be dependent on many aspects such as the presence of gametocytes in the patient, the species of Plasmodium (P. vivax being more likely to be transmitted in the southern area in colder months compared with P. falciparum), the exposure of the patient, the numbers and proximity of Anopheles vectors, and seasonal conditions which promote the activity and the longevity of the Anopheles mosquitoes. For this reason, every malaria case in the NT should be reported and epidemiologically investigated.⁷ Entomological assessment can then be made on the likelihood of further transmission.

The malaria prevention procedures in the NT have prevented any introduced (as opposed to imported) cases of malaria. With awareness and continued vigilance we can maintain the NT as a malaria free region.

References


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**Keep Melioidosis in Mind in the Monsoon**

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With the wet season started we can expect cases of melioidosis in the tropical north of the Northern Territory, Western Australia and Queensland. Previous issues of *The Bulletin* have documented the local situation.\(^1\)\(^2\)\(^3\)

**What to keep in mind**

1. Melioidosis, caused by *Burkholderia* (formerly *Pseudomonas*) *pseudomallei*, is the commonest cause of fatal community-acquired bacterial pneumonia at Royal Darwin Hospital (and possibly also Katherine and Gove Hospitals).

2. Other presentations of melioidosis include skin abscesses/ulcers, abscesses in internal organs such as prostate, spleen and liver, fulminant septicemia with multi-organ abscesses and an unusual neurological illness (such as brainstem encephalitis). People without symptoms or known history of disease have also been found to be serologically positive.

3. In the ongoing prospective study of over 100 cases of melioidosis at Royal Darwin Hospital, around 40% are diabetic and about 50% are heavy alcohol consumers. Virtually all fatalities have been in patients with these or other risk factors such as renal disease.

4. Occasional cases do occur in children.

5. Diagnosis is increased by using selective culture media (modified Ashdown’s broth) and more frequent sampling (sputum, throat, rectal and ulcer swabs) and blood cultures. Clinicians should liaise with laboratory staff to ensure selective media are available.

6. Mortality is decreased by earlier diagnosis and appropriate antibiotic therapy.

7. Follow up of cases and ensuring compliance with the eradication therapy (usually three months of antibiotics after discharge) is critical to prevent relapse, which can be fatal.

8. The Top End empirical treatment protocol for adult community-acquired pneumonia is devised to cover melioidosis in patients with risk factors, as well as covering other important pathogens (see Table below and ref 1).

**Table**

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<tr>
<th>Initial therapy of Adult Community-acquired Pneumonia in the Top End</th>
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<tr>
<td><strong>MILD PNEUMONIA</strong></td>
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<tr>
<td>No risk factors* present</td>
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<td>Risk factors*</td>
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* Risk factors include: alcohol, diabetes, chronic lung disease, chronic renal failure, steroid therapy

For “atypical pneumonia” : consider erythromycin