

BORRELIA BURGDORFERI (LYME DISEASE) IN AUSTRALIA

Evidence compiled by the Black Dot Project, 2019

- 1946

Spirochetal infections (Theileri) identified in cattle (1)

- 1959

Borrelia reported in Aust Journal of Zoology, Australian cattle, bandicoots, kangaroos (2)

- 1961

Further Borrelia found in calves after infestation with Australian ticks (3)

- 1962

Borrelia Queenslandica discovered in rats (4)

- 1982

First human case of Borrelia reported in MJA with ECM rash. 6 other cases reported in same region that year with bullseye rashes (5)

- 1986

Two patients from the south coast of NSW presenting with ECM rash and other classic Lyme disease symptoms. Both patients were treated based on clinical symptoms with antibiotics in early stages and recovered well (6)

- 1986

A 70 year old man who was brush cutting on the central coast north of Sydney, presented with ECM and severe headache to Concord Hospital, he was treated with intravenous penicillin for 10 days and recovered. Serology was sent to Centre for Disease Control (CDC) and his diagnosis was considered equivocal and to fulfill the clinical criteria for Lyme disease (7)

- 1987

Qld Health reported 30 cases of Borrelia burgdorferi antibody detection. Arthritis was a common symptom and none of the patients had a history of tick bite

- 1988 Cow with polyarthritis tests positive to Borrelia by IFAT using an American isolate of Borrelia Burgdorferi (9)

- 1988

The Sydney Morning Herald reported 4 new Australian cases identified by Munro and Dickeson at Westmead Hospital (10)

- 1989

Munro and Dickeson through Westmead Hospital Pathology then found that 16 of 428 (3.2%) of mostly long-standing symptomatic patients were considered positive consistent with Lyme disease by both IFA and enzyme-linked immunosorbent assay (ELISA) testing. 5 of the 16 acquired Lyme disease overseas (11)

- 1989

Munro and Dickeson also undertook surveys of blood donors from rural NSW and Sydney Metro. 2.2% of 189 patients were considered positive for Borrelia burgdorferi ELISA IgG (11)

- 1989

Flinders Island residents were tested and 8 of 40 returned positive by IFA and ELISA to *Borrelia burgdorferi*, the agent of Lyme disease (11)

- 1990

A communication from Qld Director of Environmental and Occupational Health Dr Ron Ramm assumed to be directed to pathologists and practitioners urged early treatment and stated that Lyme disease had now become a notifiable disease. In his letter he stated that 30% of 488(146) patients had tested positive for Lyme disease (12)

- 1990

Westmead Hospital confirm 27 positive cases out of 926 (3%) in a Communicable Disease Intelligence publication by undisclosed and unspecified inter-laboratory diagnostic criteria (13).

- 1990

Qld State Health Laboratories results confirmed 186/1247 (15%) a significantly higher percentage (13)

- 1990

WA State Health reported 3 cases, one of whom acquired overseas Lyme disease (13)

- 1990

The Doh Communicable Disease Intelligence service published “the aetiological agent may be related to, if not identical with, *Borrelia burgdorferi*” (13)

- 1991

Wills and Barry collected ticks from domestic pets and livestock in Manning River and Hunter valley districts. 42% of ticks tested culture positive for *Borrelia burgdorferi* B31 strain (14)

- 1992

Dept of Medical Entomology at Westmead Hospital found 70 isolates of spirochete like organisms from ticks in coastal areas from Qld to Vic (15)

- 1994

Russell and Doggett found “spirochete like” objects but classified them as artifacts (16) ;

- 1995

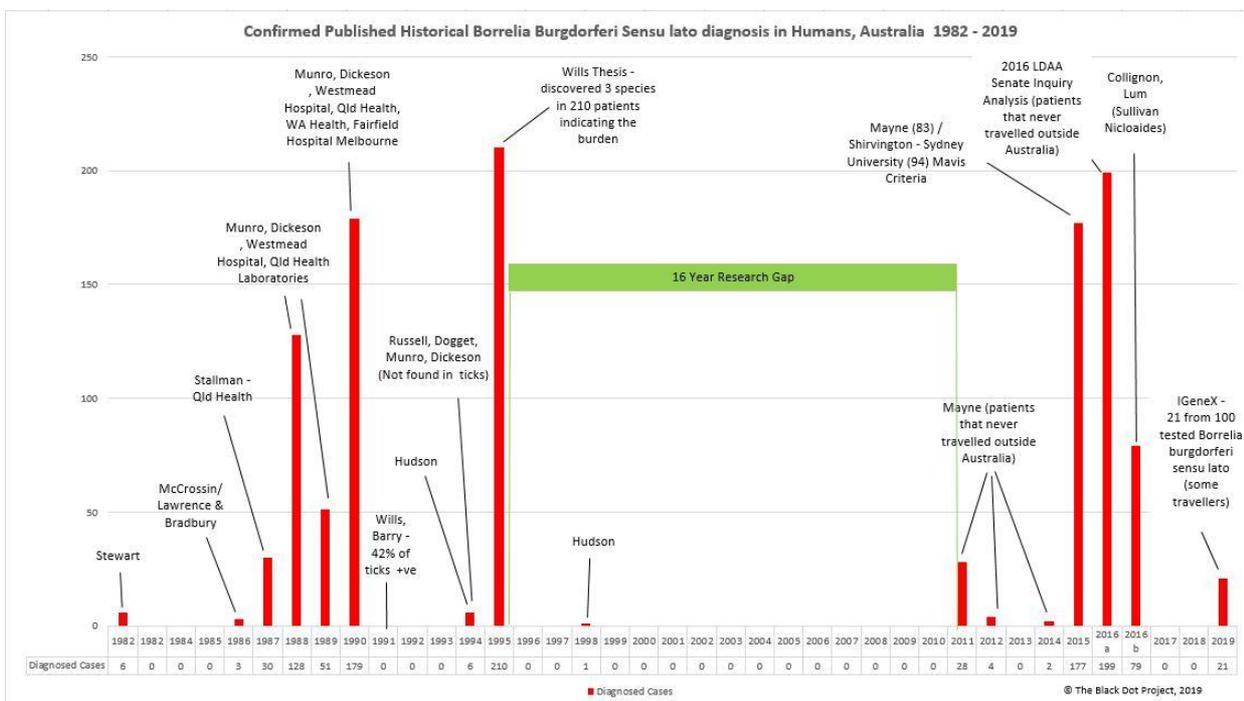
Thesis published (Wills) tabled 210 samples from 1043 (20%) patients from primarily east coast regions of Australia that had indicated seropositive results for the genotypes *Borrelia burgdorferi* (18) *Borrelia garinii* (97) and *Borrelia afzelii* (58) and combinations of several genotypes (37). The study was based on specimens received from interested and informed physicians. Prof Alan Barbour of the University of Health Science Centre in Texas USA then demonstrated that one of Will’s tick isolates was “morphologically indistinguishable” from *Borrelia burgdorferi* (17)

- 1996

The importance of tick-borne diseases was recognised by a Brisbane Infectious Disease Specialist and described as “an important cause of morbidity in medical and veterinary practice” (18)

- 1996

Laurie Cestnick of the School of Behavioural Sciences at Macquarie University published an article in the Australian and New Zealand Journal of Public Health stating: “In summary, given exposure to a tick, particularly in a proposed endemic area, and even one symptom of Lyme, the logical decision appears to be to offer treatment and ask more detailed questions later.” (19)



- 2003

In Australian Family Physician magazine a checklist for fatigue was published listing Lyme disease as one of the common infectious agents to rule out along with other common tick and mosquito-borne infections (20)

- 2011

28/41 patients tested by Mayne + Borrelia burgdorferi 13/41 babesia and 9/41 bartonella, Some had travelled out of Australia but not all (21)

- 2013

Mayne identifies borellia burgdorferi using PCR in skin lesions of patients that had never left Australia (22)

- 2014

Mayne study of two patients that presented with engorged ticks. Borrelia species DNA was detected in both patients tissue biopsies at the bite region demonstrating transmission from the ticks. One patient was identified as having Borrelia burgdorferi sensu stricto the causal agent of Lyme disease confirming further it's existence in Australia (23)

- 2014

Mayne 500 patients 54% tested positive for Borrelia, 83% had never left Australia (24)

- 2014

Masters Thesis from Sydney Uni student found 6% of CFS patients had both Borrelia and Rickettsia spp (25)

- 2015

Borrelia relapsing fever, bartonella found in ticks (26)

- 2016

Novel species of Borrelia found in echidnas close relation to relapsing fever (27)

- 2016

Senate Inquiry 199 patients presented with locally acquired Lyme disease (28)

- 2016

Australian Biologics confirms 23% of patients tested have positive Borrelia results (29)

- 2016

Collingnon/Lum study shows Sullivan Nicholaides returns 79/5395 tested positive (30)

- 2017

Two distinct Borrelia species identified in goanna tick (31)

- 2018

Study linked the new goanna (Borrelia turcica) and echidna (Borrelia tachyglossi) species genetically with the Lyme disease Borrelia group (32)

- 2019

IgeneX states in a study 21% of these Australian patients had been exposed to Borrelia burgdorferi sensu lato, the causative agent of Lyme disease, 18% to the tick-borne relapsing fever Borrelia group, while a further 7% were exposed to both groups of Borrelia," It is unknown how many travelled overseas. (33)

References

- (1) Mulhearn, C. R. A note on two blood parasites of cattle (*Spirochaeta theileri* and *Bartonella Bovis*) recorded for the first time in Australia. *Australian Veterinary Journal* 22, 118–119 (1946).
- (2) Mackerras, M. J. The haematozoa of Australian mammals. *Australian Journal of Zoology* 7, 105 (1959).
- (3) Callow, L. L. & Hoyte, H. M. D. TRANSMISSION EXPERIMENTS USING *BABESIA BIGEMINA* *THEILERIA MUTANS* *BORRELIA* SP. AND THE CATTLE TICK,.. *Australian Veterinary Journal* 37, 381–390 (1961)
- (4) Carley, J. G. & Pope, J. H. A new species of *Borrelia* (*B. queenslandica*) from *Rattus villosissimus* in Queensland. 40, 255–261 (1962)
- (5) Stewart, A. et al.. Lyme arthritis in the Hunter Valley.. *Med J Aust* 1, 139 (1982).
- (6) McCrossin, I. Lyme disease on the NSW south coast.. *Med J Aust* 144, 724–5 (1986).
- (7) Lawrence, R. H., Bradbury, R. & Cullen, J. S. Lyme disease on the NSW central coast.. *Med J Aust* 145, 364 (1986)
- (8) Stallman, N. Lyme borreliosis - a case report for Queensland. *Communicable Disease Intelligence* (1987).
- (9) ROTHWELL, J. T., CHRISTIE, B. M., WILLIAMS, C. & WALKER, K. H. Suspected Lyme Disease in a cow. *Australian Veterinary Journal* 66, 296–298 (1989)
- (10) Beale, B. TESTS REVEAL FOUR NEW CASES OF LYME DISEASE. *Sydney Morning Herald* August 19, p3, (1988)
- (11) Dickeson, R. M. D. Lyme Disease. *Today's Life Science* Oct: 32-39, (1989).
- (12) Ramm, R. Letter Qld Health- Early Treatment Urged for Tick Bites (1990).
- (13) Lyme Disease (editorial). *Communicable Disease Intelligence* 90/18 4-11, (1990)
- (14) Wills, R. D., M C; Barry. Detecting the cause of Lyme disease in Australia. *The Medical Journal of Australia* 155(4), pp275, (1991).
- (15) Alpers. *Borrelia* isolated from Australian ticks. *Today's Life Science* April: 40-41, (1992).
- (16) Russell, R. C. et al.. Lyme disease: a search for a causative agent in ticks in southeastern Australia. *Epidemiology and Infection* 112, 375–384 (1994)
- (17) Wills, M. C. Phd Thesis, Lyme Borreliosis, the Australian perspective 1995)
- (18) Playford, G. & Whitby, M. Tick-borne diseases in Australia.. *Aust Fam Physician* 25, 1841–5 (1996)
- (19) Cestnick, L. Lyme disease in Australia. *Australian and New Zealand Journal of Public Health* 22, 524–524 (1998).
- (20) Murtagh, J. Fatigue - a general diagnostic approach. *Australian Family Physician* Vol. 32, No. 11, 2003 Nov: 873-6, (2003).
- (21) Mayne, P. Emerging incidence of Lyme borreliosis babesiosis, bartonellosis, and granulocytic ehrlichiosis in Australia. *International Journal of General Medicine* 845 (2011). doi:10.2147/ijgm.s27336
- (22) Mayne, P. Investigation of *Borrelia burgdorferi* genotypes in Australia obtained from erythema migrans tissue. *Clinical Cosmetic and Investigational Dermatology* 69 (2012). doi:10.2147/ccid.s31913

- (23) Mayne, P. et al.. Evidence for *Ixodes holocyclus* (Acarina: Ixodidae) as a Vector for Human Lyme Borreliosis Infection in Australia. *Journal of Insect Science* 14, (2014)
- (24) Mayne, P. Clinical determinants of Lyme borreliosis babesiosis, bartonellosis, anaplasmosis, and ehrlichiosis in an Australian cohort. *International Journal of General Medicine* 15 (2014). doi:10.2147/ijgm.s75825
- (25) Kelly Thomas, Masters Thesis Do certain microbiological pathogens cause or have a role in the aetiology of the disease entity known as chronic fatigue syndrome?
- (26) Gofton, A. W. et al.. Inhibition of the endosymbiont *Candidatus Midichloria mitochondrii* during 16S rRNA gene profiling reveals potential pathogens in *Ixodes* ticks from Australia.. *Parasit Vectors* 8, 345 (2015).
- (27) Loh, S.-M. et al.. Novel *Borrelia* species detected in echidna ticks *Bothriocroton concolor*, in Australia. *Parasites & Vectors* 9, (2016)
- (28) 2016 Senate Inquiry Submission 528 Lyme disease Association of Australia
- (29) 2016 Senate Inquiry Submission 545.1 and 545.2 Australian Biologics
- (30) Collignon, P. J., Lum, G. D. & Robson, J. M. B. Does Lyme disease exist in Australia?. *The Medical Journal of Australia* 205, 413–417 (2016).
- (31) Panetta, J.L. Reptile-associated *Borrelia* species in the goanna tick (*Bothriocroton undatum*) from Sydney, Australia *Parasites & Vectors* (2017) 10:616
- (32) Gofton, A. W. et al.. Genome-wide analysis of *Borrelia turcica* and ‘*Candidatus Borrelia tachyglossi*’ shows relapsing fever-like genomes with unique genomic links to Lyme disease *Borrelia*. *Infection Genetics and Evolution* 66, 72–81 (2018).
- (33) Shah, J.S. Line Immunoblot Assay for Tick-Borne Relapsing Fever and Findings in Patient Sera from Australia, Ukraine and the USA, *Healthcare* 2019, 7, 121; doi:10.3390/healthcare7040121