

## **An Examination of Disease in Captive Australian Koalas (*Phascolarctos cinereus*) and Potential Links to Koala Retrovirus (KoRV)**

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**ABSTRACT.** Koalas (*Phascolarctos cinereus*) are known to suffer from a range of neoplastic and immunodeficiency-related disorders but the importance of these conditions to captive koala populations has not previously been thoroughly examined. This study aimed to improve our understanding of disease in captive koalas by conducting a detailed questionnaire survey across most facilities that house koalas in Australia. Responses were received from 16 facilities across five Australian states that resulted in disease information for a total of 264 koalas. The collated data indicated that neoplasia is the major type of diagnosed disease affecting captive koalas, with lymphoma clearly the most common (c. 40%). A variety of other disorders were reported including bone marrow disease (especially leukaemia), cryptococcosis and dermatitis, the latter of which was the only condition reported from all five states. These data suggest a higher incidence of disease in facilities in Queensland and New South Wales, which are predominantly comprised of northern koalas. Mortality records spanning up to 28 years were received from six of the surveyed facilities which indicated that of 303 deceased captive koalas, 32% of deaths were attributable to the diseases mentioned above. It is likely that the prevalence of disease reported here is an underestimate due to the lack of, or inconsistent application of, appropriate diagnostic investigations amongst facilities from all states. Given that previous research suggests that northern koalas are ubiquitously infected with koala retrovirus (KoRV) and that they have higher viraemic loads than their southern counterparts, there may be a link between KoRV and the higher disease expression among northern koalas postulated here. Further research is required to determine if there is a causal link between KoRV and the predominant diseases among captive koalas reported in this study.

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Wild koala (*Phascolarctos cinereus*) populations are found across a broad geographic range in eastern and south-eastern Australia and occur in the states Queensland (QLD), New South Wales (NSW), Australian Capital Territory (ACT), Victoria (VIC) and South Australia (SA) (Martin & Handasyde, 1999). Koalas are generally referred to as either “northern” or “southern”, a description which is largely determined by state borders. Northern koalas are distributed from north QLD to south of the NSW/VIC border and southern koalas are distributed through most of VIC and SA

(Carrick, 2013). Variations in appearance between northern and southern koalas are evident and most notably include longer fur length and larger size in southern compared to northern koalas. In many parts of the species range, populations of wild koalas are declining at alarming rates and local extinctions have already occurred across considerable areas. Declines are largely attributed to habitat loss, trauma (road and domestic/wild dog attacks) and disease within populations (principally chlamydia). A further potential threat to koalas that is receiving increased scientific attention