Heartworm- Dr Cathy Fox (SV George) and JDG

Summary
An adult, male, six-year-old boxer presented to a private veterinarian in Knysna in early October 2012 with an acute head tilt and malaise. A peripheral blood smear performed by the private vet showed micrifilaria present in the blood. EDTA blood samples and blood smears were sent to Pathcare in Cape Town where the presence of microfilaria was confirmed. The EDTA samples were then sent to the parasitology section Faculty of Veterinary Science at Onderstepoort where the microfilaria were confirmed to be *Dirofilaria immitis* (heartworm) based on Acid Phosphatase Staining and the DiroCHEK® test for antigen. The dog later died (between the 24th and 27th of October – it had wandered from home and drowned in a nearby dam) and during the necropsy adult heartworms were found in the dog's right atrium (see Fig. 1) and there was extensive lung damage due to the drowning and/or heartworm migration. Heartworm is an exotic disease in South Africa.

Figure 1: During the necropsy on the boxer: adult heartworms present in the heart. Lesions associated with drowning and/or heartworm migration were also noted in the lungs.

Epidemiological comments
The dog was imported into South Africa in April 2012 from the British Virgin Islands. It had undergone the required pre-import testing for heartworm (amongst other diseases). The test performed was the antigen detecting test used to identify adult worms in the animal by detecting a protein secreted by mainly the female heartworm. This test was performed on the 29 March 2012. As a result of the life cycle and the test detection limits there is a period of between 5-7 months post infection (see Fig. 2 on following page) where this test will not be positive in the face of a heartworm infected animal. This period can be longer if the animal is on macrocytic lactone preventive therapy. The British Virgin Islands have a climate that is ideal for heartworm infection and that area is endemic for the parasite. It has relatively high mean daily temperatures all year round (+-24°C) with consistent rainfall and high humidity.
Working back 7 months from the negative antigen test in March 2012 will give the most likely period of earliest infection of the animal and this period would start from the beginning of the British Virgin Islands' autumn in Sept/Oct 2011. The owners unfortunately misunderstood the requirements to continue using monthly ivermectin preventive dosages after the importation of the animal which was supposed to continue for 6 months post import. This treatment is, however, only effective against the larval stages and, at best, young adult worms until two months post infection so the likelihood of this treatment having made a difference in this case is debatable - the prophylaxis would have only made a difference if infection took place in Jan or Feb 2012 but if it took place before this (with the earliest infection defined as Sept/Oct 2011) then this treatment protocol would not have influenced the outcome in this case. The dog has fortunately remained relatively isolated since having come to South Africa. It lived on a large property with two other dogs. It was in boarding kennels in Knysna during late September/early October and is likely to have had microfilaria at this time. Fortunately the risk of transmission to contact animals at the kennels was low as the kennels were not in an urban environment and the temperatures at that time were still cold. The long term mean daily high temperature for October in that area is 21.2°C (Univ of Stellenbosch data). Considering there is a two-week extrinsic incubation period within the mosquito: any period of risk of transmission to kennelled dogs existed for the period in October after the dog had left the kennels and this was during a period when the numbers of boarders decreased significantly after the school holidays. The extrinsic incubation within the vector is highly