The war on malaria and Nora Heysen's documentation of Australian medical research through art between 1943 and 1945

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ABSTRACT

- With the expansion of the Second World War into the Pacific in 1941, and due to the deleterious impact of malarial infection on fighting capacity, the Australian Army devoted significant resources to new research into the prevention and treatment of malaria between 1943 and 1945 by forming the Land Headquarters Medical Research Unit in Cairns, Queensland.
- The documentation of this research became a significant subject for leading Australian artist Nora Heysen, when she was commissioned as the first female war artist by the Australian War Memorial in 1943.

MJA 2011; 194: 418–419

Throughout history there has been a long association between war and infectious disease. Until relatively recently, the number of casualties from disease outnumbered those who died in action, with battles often decided by the side that could put the most healthy soldiers into the front line.[1] For much of the history of war, research and technological innovation has been dedicated to developing greater destructive capacity, rather than protecting troops from disease epidemics such as malaria.

We describe the progress in malaria prevention and treatment made by Australian medical servicemen and women, and its historical documentation by Australia's first female official war artist, Nora Heysen (see Box, and illustrations). Heysen's works are now part of the Australian War Memorial collection and are the subject of an exhibition titled "The War on Malaria", which will be displayed until mid 2011.

The debilitating impact of malaria on fighting capacity was encountered by Australian forces in the First World War. While its impact on the Gallipoli campaign was relatively minor, the Palestine campaign included fighting within the Jordan valley, an area of high malaria transmission.[2-4] By the end of the campaign, almost half the 40 000-strong Desert Mounted Corps had been evacuated because of illness, with 6347 men testing positive for malaria.[1]

At that time, mobile diagnosis units and techniques such as drainage of low-lying water were used to reduce malarial infection.[5] Despite these efforts, it was fortunate that victory came swiftly to the allied forces in Palestine, as twin epidemics of malaria and influenza broke out within weeks of the start of the final offensive in September 1918.[1]

During the Second World War, from June 1941, Australian troops were sent to Port Moresby in Papua New Guinea (PNG) in response to the threat from Japanese forces advancing in areas of the Pacific. Because Port Moresby is in a relatively dry coastal area, the potential impact of malaria on the war in the Pacific was initially underestimated.[4]

In the first 6 months of 1942, 1184 cases of malaria were recorded among the 6500 Australians serving in Port Moresby.[6] Initially, most of these cases were caused by *Plasmodium vivax*, but by June 1942, most cases arose from infection with the more serious *Plasmodium falciparum*. An irregular supply of the suppressive drug quinine contributed to high infection rates among Australian troops. By November 1942, an epidemic of malaria had broken out, with rates of incidence increasing from 33 men per 1000 per week to 82 men per 1000 per week by December that year.[6]

The Australian response to the malaria threat in the Pacific was led by Colonel (later Brigadier) Neil Hamilton Fairley. He drew on his experiences in Egypt during the First World War where he had seen firsthand the impact of malaria through his work in the 14th Australian General Hospital.[7] Fairley's experience was vital as interest

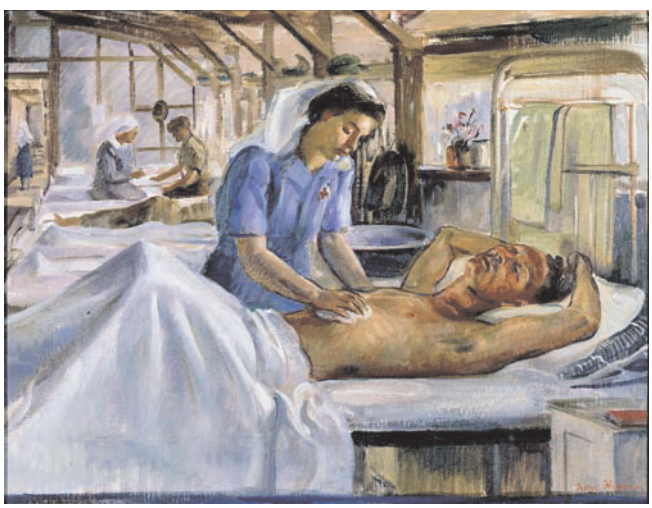
Documentation through art*

In 1943, Australia's first female official war artist, Nora Heysen, was deployed to Papua New Guinea (PNG) to document the lives and work of Australian servicemen and women.

Military officials had refused to post a woman to areas of combat, so, instead, Heysen chose to record the medical front line. While in PNG, Heysen saw firsthand the major threat that malaria presented to Australian troops operating in the Pacific.

When Heysen contracted a skin condition and was required to return to Australia in 1944, she continued her official war artist commission by working at the 5 Australian Camp Hospital in Cairns, Queensland. Heysen's works provide more than an informative visual record of this vital part of Australian medical history — they are compelling portraits of the researchers, pathologists and nurses who took part in 6-week experimental treatment trials. The courage of the servicemen who volunteered to contract malaria and undertake these trials impressed Heysen, and many of them became portrait subjects.

* Source: AWM 93 Registry Files 50/4/2/131 Part 1 and 2, Application and appointment as Official War Artist — Miss Nora Heysen. ◆



Nora Heysen (1911–2003). Sponging a malaria patient *1945. Oil on canvas on plywood. 45.5 x 60.7 cm. ART24373, Australian War Memorial. Acquired under the official war art scheme, 1946.* ◆

in protective measures against malarial infection grew in the light of its impact on the Pacific campaign.

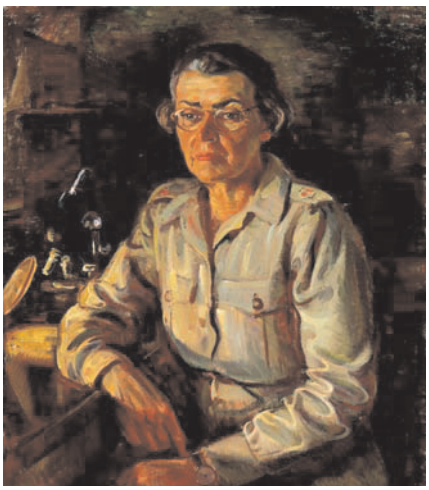
In 1942, Fairley, as Director of Medicine for the Australian Army, along with a University of Sydney research chemist, Dr Adrien Albert, travelled to England and the United States to highlight the risk posed by malaria in the Pacific.[8] This trip led to discussion about the urgency to reduce malarial infection in the Pacific region. In June 1943, the Land Headquarters Medical Research Unit was established at the 5 Australian Camp Hospital in Cairns, Queensland.[6,9]

The Unit's first research experiments, under the directorship of entomologist Major Mabel Josephine Mackerras, involved collecting mosquito pupae of the *Anopheles punctulatus* group in PNG and flying them to Cairns, where they grew to maturity in specially built laboratories.[8] Servicemen carrying *P. falciparum* or *P. vivax* gametocytes were exposed to the adult mosquitoes, which were then used to infect malaria-free volunteers from across Australia.[8] Testing of a new antimalarial drug, atebrin (developed by German chemists not long before the war), was then conducted under diverse physical conditions to simulate war conditions, including extremes of temperature and intense physical activity.[8,9] Regular reading of blood smears made it clear that atebrin prevented malaria under the most extreme conditions.[4]

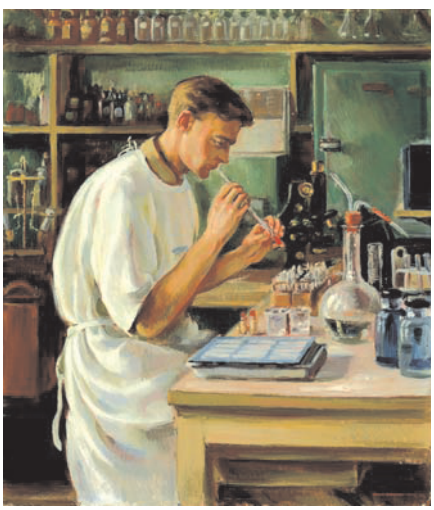
The outcomes of this research were first reported, by Fairley, at a conference on the prevention of disease in warfare in June 1944.[9] Among the key findings were that the administration of 0.1 g (equivalent to one atebrin tablet daily) cured *P. falciparum* malaria and suppressed the onset of *P. vivax* malaria.[6] Further, once an adequate level was achieved and maintained in the bloodstream, participants could be subjected to demanding physical activity and extreme temperatures without the recurrence of any malaria symptoms.[8,9] However, at that same conference, Major James C English of the 1 Australian Corps also reported that field malariologists were concerned about a total reliance on atebrin for treatment. Tests had shown recurrence of *P. vivax* malaria if treatment was ceased — a likely possibility on the battlefield because of irregular supply.[6]

The influence of this new research was evident in the adoption of widespread discipline in malaria prevention in subsequent military operations in the Pacific.[9] However, the concerns of malariologists were confirmed with a new outbreak among Australian servicemen in Aitape and Wewak. Further complications emerged in instances where a single tablet of atebrin was not adequate, but two tablets resulted in the complication of skin eruptions.[6] The investigation of the Aitape–Wewak outbreak was one of the first studies of malarial resistance to drug treatment in humans,[8] and led to research into other treatment approaches.

At the end of the Second World War, the Australian Army's antimalarial units were demobilised. Improved antimalarial drugs and the long-acting insecticide DDT had by this time changed the face of malaria control.[10]



Nora Heysen (1911–2003). Major Josephine Mackerras *1945. Oil on canvas. 82.8 x 66 cm. ART24395, Australian War Memorial. Acquired under the official war art scheme 1945.* ◆



Nora Heysen (1911–2003). Pathologist titrating sera (Captain Robert Black*) *1944. Oil on hardboard. 45.9 x 39.6 cm. ART22409, Australian War Memorial. Acquired under the official war art scheme, 1945.*

* Professor Robert Black, husband of Nora Heysen, served during the Second World War as an Army Captain at the Land Headquarters Medical Research Unit in Cairns. ◆

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Acknowledgement

We thank Professor Karl Rieckmann for providing details from his studies of the history of malaria control.

Competing interests

None identified.

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Provenance: *Not commissioned; externally peer reviewed.*

(Received 10 Mar 2011, accepted 17 Mar 2011) ❑