

## Human Infections and Detection of *Plasmodium knowlesi*

Balbir Singh and Cyrus Daneshvar  
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# Human Infections and Detection of *Plasmodium knowlesi*

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## SUMMARY

*Plasmodium knowlesi* is a malaria parasite that is found in nature in long-tailed and pig-tailed macaques. Naturally acquired human infections were thought to be extremely rare until a large focus of human infections was reported in 2004 in Sarawak, Malaysian Borneo. Human infections have since been described throughout Southeast Asia, and *P. knowlesi* is now recognized as the fifth species of *Plasmodium* causing malaria in humans. The molecular, entomological, and epidemiological data indicate that human infections with *P. knowlesi* are not newly emergent and that knowlesi malaria is primarily a zoonosis. Human infections were undiagnosed until molecular detection methods that could distinguish *P. knowlesi* from the morphologically similar human malaria parasite *P. malariae* became available. *P. knowlesi* infections cause a spectrum of disease and are potentially fatal, but if detected early enough, infections in humans are readily treatable. In this review on knowlesi malaria, we describe the early

studies on *P. knowlesi* and focus on the epidemiology, diagnosis, clinical aspects, and treatment of knowlesi malaria. We also discuss the gaps in our knowledge and the challenges that lie ahead in studying the epidemiology and pathogenesis of knowlesi malaria and in the prevention and control of this zoonotic infection.

## INTRODUCTION

Malaria is caused by protozoan parasites belonging to the genus *Plasmodium*. Over 150 species have been described to date, infecting mammals, birds, and reptiles (1). Despite having

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