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Emergence of Melioidosis in Indonesia and Today's Challenges

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Abstract: A recent modeling study estimated that there could be as many as 20,000 human melioidosis cases per year in Indonesia, with around 10,000 potential deaths annually. Nonetheless, the true burden of melioidosis in Indonesia is still unknown. The Indonesia Melioidosis Network was formed during the first melioidosis workshop in 2017. Here, we reviewed 101 melioidosis cases (99 human and two animal cases) previously reported and described an additional 45 human melioidosis cases. All 146 culture-confirmed cases were found in Sumatra ($n = 15$), Java ($n = 104$), Kalimantan ($n = 15$), Sulawesi ($n = 11$) and Nusa Tenggara ($n = 1$). Misidentification of *Burkholderia pseudomallei* was not uncommon, and most cases were only recently identified. We also evaluated clinical manifestations and outcome of recent culture-confirmed cases between 2012 and 2017 ($n = 42$). Overall, 15 (36%) cases were children (age <15 years) and 27 (64%) were adults (age ≥ 15 years). The overall mortality was 43% (18/42). We conducted a survey and found that 57% (327/548) of healthcare workers had never heard of melioidosis. In conclusion, melioidosis is endemic throughout Indonesia and associated with high mortality. We propose that top priorities are increasing awareness of melioidosis amongst all healthcare workers, increasing the use of bacterial culture, and ensuring accurate identification of *B. pseudomallei* and diagnosis of melioidosis.

Keywords: *Burkholderia pseudomallei*; melioidosis; Indonesia

1. Introduction

Melioidosis in Indonesia was first diagnosed in Cikande, on Java island, in 1929 [1]. From then to 1960, a few additional cases were reported in Jakarta, Bogor and Surabaya, on Java island [2–5]. More recent reports concerned four culture-confirmed melioidosis cases among tsunami survivors in Banda Aceh, Sumatra, in 2005 [6], 51 culture-confirmed melioidosis patients in Malang, Java from 2011 to 2013 [7], and three culture-confirmed melioidosis patients in Makassar and Luwu Timur, Sulawesi, in 2013 [8]. Nonetheless, the reported cases are likely to be the tip of the iceberg and the true burden of melioidosis in Indonesia is still unclear.

A recent modeling study estimated the annual number of human melioidosis cases in Indonesia at 20,038, with 10,224 deaths annually if mortality was 51% [9]. This alarming estimate is possible, considering that, in Indonesia with a total population of about 260 million, about 1.6 million die every year, and about 350,000 and 150,000 of those who die are estimated to have communicable diseases and diabetes, respectively, defined as the primary causes of death using International Classification of Diseases (ICD) principles and Global Burden of Disease (GBD) analysis [10]. If melioidosis was an undiagnosed contributory cause in only 2% of these, this would account for 10,000 deaths [9]. The under-diagnosis and under-reporting of melioidosis worldwide are considered to be due to a lack of diagnostic microbiology laboratories serving the poor rural populations that are at greatest risk of infection, and a lack of awareness of the disease amongst physicians and laboratory staff [9,11]. Even good microbiological laboratories may initially miss the diagnosis and discard *B. pseudomallei* as a contaminant, especially in non-endemic areas [9,12]. Recent evidence suggests that, in Indonesia, where melioidosis is possibly highly endemic countrywide [9], capacity and utilization of bacterial cultures is limited [13], that misidentification of *B. pseudomallei* as another species or a contaminant is common, and that awareness of the disease among physicians and laboratory staff is very low [6–8].