

Melioidosis in Queensland

2012-2016

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1. Introduction

Melioidosis is caused by infection with the bacterium *Burkholderia pseudomallei* (1). It is endemic to northern Australia and parts of southeast Asia (2), but can occur in other tropical or subtropical areas (1). *B. pseudomallei* is a resilient, gram negative rod bacterium, found in certain soils and waters (1, 3). Environmental sampling has isolated the bacteria from soil, mud, and pooled surface water in northern Australia (2). Transmission is believed to occur through contact with contaminated water and soil through skin wounds, inhalation of soil dust, and aspiration or ingestion of contaminated water (1, 3).

Melioidosis is highly seasonal with the majority of cases presenting during the wet season (3). Previously published data on melioidosis in north, far north Queensland, and the Torres Strait have shown high proportions of cases occurring during or soon after the wet season (4-6).

The clinical presentation of melioidosis can vary, and includes localised cutaneous infection, visceral abscesses, pneumonia, and septicaemia (3). Literature suggests over half of cases present with bacteraemia, with up to a quarter with septic shock (1); recently published Queensland data from North Queensland showing 74 per cent of cases bacteraemic and 33 per cent with septic shock in cases with a positive laboratory culture of *B. pseudomallei* in Cairns Hospital between 1 January 1998 – 31 July 2016 (5). Generally, approximately half of cases present with a pneumonia (1), with 61 per cent reported to have pneumonia in the recently published Cairns Hospital study (5). Case fatality varies by country (1), with published case mortality data from Australia ranging from 18-26 per cent in various case series (4-7). Survival may be improving however, as a recent publication from Cairns Hospital demonstrated a decrease in the case fatality rate of melioidosis to nine per cent in 2012-2016 thought to reflect national improvements in sepsis management (5).

This report describes notified cases of melioidosis in Queensland over a five year period (2012-2016), including the demographic profile and clinical details.

2. Methods

Melioidosis is a notifiable condition based on laboratory criteria prescribed in the Queensland *Public Health Regulation 2005*. This requires pathology providers to notify the Department of Health when *Burkholderia pseudomallei* is isolated or detected from any site (8). Notified cases are followed up by Queensland Public Health Units to determine risk factor and exposure history. Death data were confirmed by a cross-check of records against Birth, Deaths, and Marriages unit records by the Queensland Health Statistics Branch.

Data for this report were extracted from the Notifiable Diseases System on 15 March 2017 for all cases of melioidosis notified from 1 January 2012 to 31 December 2016. Cases were assigned to a geographic Hospital and Health Service (HHS) area based on their residential address at the time of notification. Descriptive analyses were performed using Microsoft Excel™. Notification rates were calculated using the Queensland Hospital and Health Service and Indigenous/non-Indigenous Estimated

Resident Population (ERP) 2012-2015 (9). The 2015 ERP was used to calculate 2016 rates as 2016 ERP was not available at time of report. Average notification rates for the period 2012-2016 were calculated using 2014 ERP.

3. Results

Notifications of melioidosis in Queensland

There were 153 notified cases of melioidosis from 1 January 2012 to 31 December 2016 (Table 1). During this period, notifications peaked in 2015, with the Queensland notification rate for that year being 0.8 cases per 100,000 population per year. The average notification rate over the five year period was 0.6 cases per 100,000 population per year.

Table 1: Notified cases and notification rate of melioidosis, Queensland, 1 January 2012 – 31 December 2016

Year of onset	Number of notified cases	Notification rate per 100,000 population per year
2012	27	0.6
2013	30	0.6
2014	21	0.4
2015	40	0.8
2016	35	0.7

Melioidosis is a seasonal disease, with 58 per cent of notified cases with onset in January – March in the five year period, with cases most frequently notified in March (22 per cent of all cases from 2012-2016) (Figure 1).

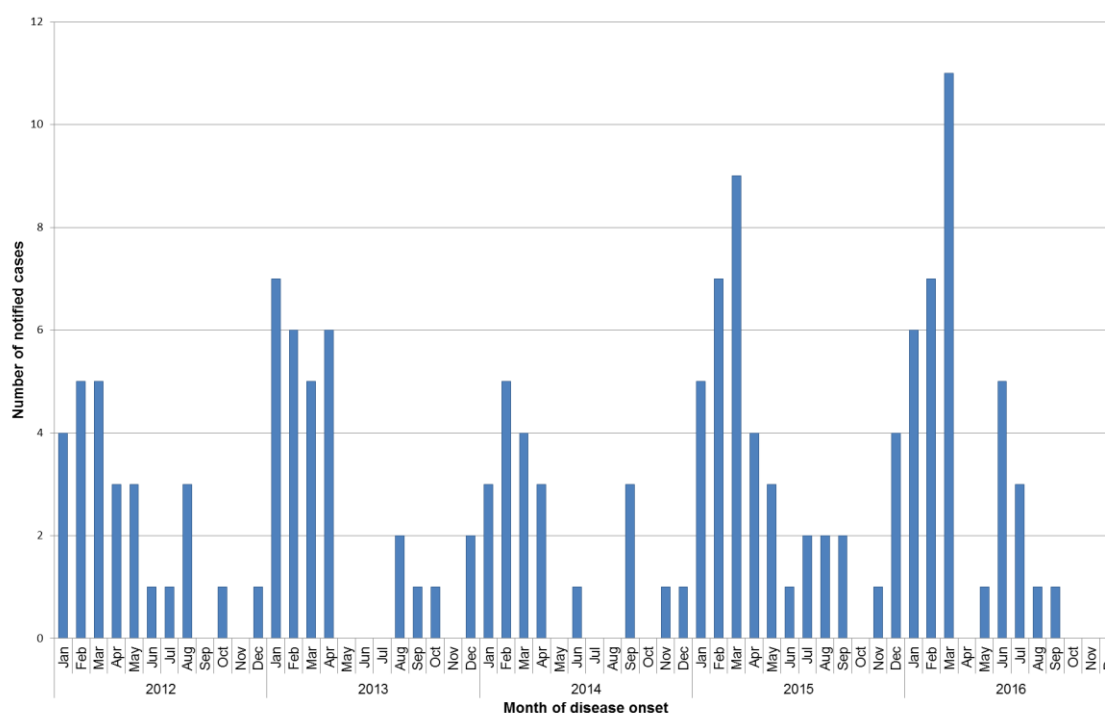


Figure 1: Notified cases of melioidosis by month, Queensland, 1 January 2012 – 31 December 2016

Demographic information

From 2012-2016, there were 115 males (75 per cent) and 38 females (25 per cent) notified with melioidosis. The age range was nine years to 90 years, with a median age of 57 years. The most frequently notified age group was the 55-59 year old group (Figure 2).

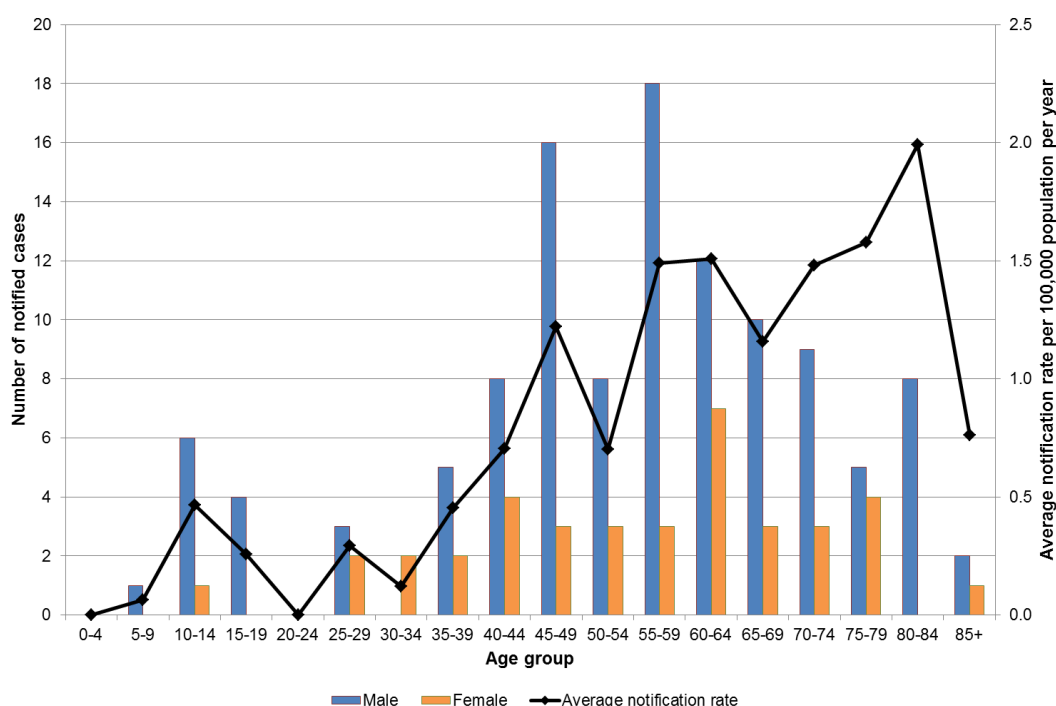


Figure 2: Notified cases by age group and sex and age-specific notification rates of melioidosis, Queensland, 1 January 2012 – 32 December 2016

There were 58 Aboriginal and Torres Strait Islander Queenslanders (38 per cent) notified with melioidosis in the five year period compared with 95 non-Indigenous Queenslanders (62 per cent) (Table 2).

Table 2: Notified cases of melioidosis by Indigenous status, Queensland, 1 January 2012 – 31 December 2016

Indigenous status	2012	2013	2014	2015	2016
Aboriginal but not Torres Strait Islander origin	6 (22%)	7 (23%)	6 (29%)	5 (13%)	11 (31%)
Torres Strait Islander but not Aboriginal origin	4 (15%)	3 (10%)	1 (5%)	6 (15%)	2 (6%)
Both Aboriginal and Torres Strait Islander origin	3 (11%)	1 (3%)	2 (10%)	1 (3%)	0 (0%)
Neither Aboriginal nor Torres Strait Islander origin	14 (52%)	19 (63%)	12 (57%)	28 (70%)	22 (63%)
Total	27 (100%)	30 (100%)	21 (100%)	40 (100%)	35 (100%)

Aboriginal and Torres Strait Islander people are disproportionately affected by melioidosis, with the average notification rate in Aboriginal and Torres Strait Islander Queenslanders in 2012-2016 was 5.7 cases per 100,000 population per year compared to 0.4 cases per 100,000 population per year for non-Indigenous Queenslanders (Table 3).

Table 3: Notified cases and notification rate per 100,000 population per year of melioidosis by Indigenous status, Queensland, 1 January 2012 – 31 December 2016

Year of onset	Indigenous cases (notification rate)	Non-indigenous cases (notification rate)	Total cases (notification rate)
2012	13 (6.7)	14 (0.3)	27 (0.6)
2013	11 (5.5)	19 (0.4)	30 (0.6)
2014	9 (4.4)	12 (0.3)	21 (0.4)
2015	12 (5.8)	28 (0.6)	40 (0.8)
2016	13 (6.2)	22 (0.5)	35 (0.7)
Total	71 (5.7)	95 (0.4)	153 (0.6)

Cases were most frequently notified from north Queensland, with 29 per cent of cases residing in Cairns and Hinterland HHS, 24 per cent of cases residing in Torres and Cape HHS and 16 per cent of cases residing in Townsville HHS from 2012-2016 at the time of notification (Table 4).

Table 4: Notified cases of melioidosis by Hospital and Health Service of usual residence, Queensland, 1 January 2012 – 31 December 2016

HHS	2012	2013	2014	2015	2016	Total
Cairns and Hinterland	5 (19%)	8 (27%)	6 (29%)	14 (35%)	12 (34%)	45 (29%)
Torres and Cape	7 (26%)	5 (17%)	6 (29%)	11 (28%)	7 (20%)	36 (24%)
Townsville	4 (15%)	10 (33%)	3 (14%)	1 (3%)	7 (20%)	25 (16%)
Central Queensland	4 (15%)	1 (3%)	1 (5%)	3 (8%)	3 (9%)	12 (8%)
Mackay	2 (7%)	4 (13%)	-	4 (10%)	2 (6%)	12 (8%)
North West	1 (4%)	1 (3%)	2 (10%)	1 (3%)	2 (6%)	7 (5%)
Darling Downs	-	1 (3%)	-	1 (3%)	1 (3%)	3 (2%)
Metro South	1 (4%)	-	-	2 (5%)	-	3 (2%)
Sunshine Coast	-	-	2 (10%)	1 (3%)	-	3 (2%)
West Moreton	-	-	-	1 (3%)	1 (3%)	2 (1%)
Wide Bay	2 (7%)	-	-	-	-	2 (1%)
Gold Coast	-	-	1 (5%)	-	-	1 (1%)
Metro North	-	-	-	1 (3%)	-	1 (1%)
South West	1 (4%)	-	-	-	-	1 (1%)
Central West	-	-	-	-	-	-
Total	27 (100%)	30 (100%)	21 (100%)	40 (100%)	35 (100%)	153 (100%)

Notification rates were highest in Torres and Cape HHS across all years, with an average notification rate of 28.2 cases per 100,000 population per year from 2012-2016. Notification rates for all HHSs are shown in Table 5.

Table 5: Notification rate per 100,000 population per year and average notification rate from 2012-2016 of melioidosis by Hospital and Health Service of usual residence, Queensland, 1 January 2012 – 31 December 2016

HHS	2012	2013	2014	2015	2016	Average notification rate
Torres and Cape	28.0	19.8	23.5	42.4	27.0	28.2
North West	3.1	3.1	6.1	3.1	6.2	4.3
Cairns and Hinterland	2.1	3.3	2.4	5.6	4.8	3.6
Townsville	1.7	4.2	1.2	0.4	2.9	2.1
Mackay	1.1	2.2	0.0	2.2	1.1	1.3
Central Queensland	1.8	0.4	0.4	1.3	1.3	1.1
South West	3.8	0.0	0.0	0.0	0.0	0.7
Darling Downs	0.0	0.4	0.0	0.4	0.4	0.2
Wide Bay	1.0	0.0	0.0	0.0	0.0	0.2
Sunshine Coast	0.0	0.0	0.5	0.3	0.0	0.2
West Moreton	0.0	0.0	0.0	0.4	0.4	0.2
Metro South	0.1	0.0	0.0	0.2	0.0	0.1
Gold Coast	0.0	0.0	0.2	0.0	0.0	0.0
Metro North	0.0	0.0	0.0	0.1	0.0	0.0
Central West	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	0.6	0.4	0.8	0.7	0.6

Clinical details and risk factors

Age and pre-existing medical conditions, particularly chronic diseases, are risk factors for melioidosis infection. Diabetes was the most common risk factor identified in cases notified from 2012 to 2016 after age (Table 6).

Table 6: Risk factors for notified cases of melioidosis, Queensland, 1 January 2012 – 31 December 2016

Risk factors	Number of cases (%)
Aged ≥ 65 years (non-Indigenous Queenslanders)	38 (40%)
Aged ≥ 50 years (Indigenous Queenslanders)	21 (36%)
Diabetes	57 (37%)
High alcohol intake	38 (25%)
Chronic lung disease	25 (16%)
Chronic renal disease	13 (8%)
Malignancy	18 (12%)
Immunosuppression/transplant	8 (5%)

Seventy-eight per cent of cases had at least one risk factor identified, with 42 per cent reporting two or more risk factors (Table 7).

Table 7: Number of risk factors for notified cases of melioidosis, Queensland, 1 January 2012 – 31 December 2016

Number of risk factors identified	Number of cases (%)
No identified risks	4
1	44
2	39
3	19
4	5
5	0
6	1
Age risk*, unknown other risks	11
No age risk*, unknown other risks	30
Total	153 (100%)

*Age risk identified as ≥ 65 years for non-Indigenous Queenslanders and ≥ 50 years for Indigenous Queenslanders.

The most common clinical presentation recorded for the five year period was septicaemia (62 per cent), followed by pneumonia (42 per cent) (Table 8).

Table 8: Notification rate per 100,000 population per year and average notification rate from 2012-2016 of melioidosis, Queensland, 1 January 2012 – 31 December 2016

Major clinical symptoms	2012	2013	2014	2015	2016
Septicaemia	12 (44%)	20 (67%)	12 (57%)	26 (65%)	25 (71%)
Pneumonia	5 (19%)	17 (57%)	10 (48%)	15 (38%)	17 (49%)
Internal organ abscess	5 (19%)	7 (23%)	7 (33%)	6 (15%)	9 (26%)

It is important to note that data on these fields was not complete; with 29 per cent of cases missing information on septicaemia, 46 per cent of cases missing information on pneumonia, and 65 per cent of cases missing information on organ abscesses.

An average of 93 per cent of notified cases of melioidosis were hospitalised in the previous five year period (Table 9).

Table 9: Notification rate per 100,000 population per year and average notification rate from 2012-2016 of melioidosis, Queensland, 1 January 2012 – 31 December 2016

Hospitalisation	2012	2013	2014	2015	2016
Admitted	23 (85%)	30 (100%)	20 (95%)	38 (95%)	32 (91%)
No admission	1 (4%)	-	1 (5%)	1 (3%)	3 (9%)
Unknown	3 (11%)	-	-	1 (3%)	-
Total	27 (100%)	30 (100%)	21 (100%)	40 (100%)	35 (100%)

There were 11 cases (7 per cent) recorded as having died from melioidosis from 2012 to 2016, seven in Aboriginal and Torres Strait Islander people and four in non-Indigenous people.

Eighty-two per cent of cases notified were resident in the north Queensland HHSs of Torres and Cape, Cairns and Hinterland, North West, Townsville, and Mackay which are considered endemic for melioidosis. Eight cases (5 per cent) who resided in central or southern Queensland reported travel to north Australia in the two months prior to

their disease onset. Three cases (2 per cent) reported travel abroad to tropical regions in the two months prior to disease onset.


Forty-nine cases (32 per cent) reported contact with soil, 16 cases (10 per cent) reported contact with non-treated water, and 5 cases (3 per cent) reported contact with earth works. Completeness of exposure information has been variable during the five year period.

4. Summary

There were 153 notified cases of melioidosis in Queensland from 2012 to 2016, with 82 per cent residing in endemic areas of north Queensland. The majority of cases were notified in the January-March period, during and following the tropical wet season. Three times more males were notified than females, and the average notification rate for Aboriginal and Torres Strait Islander Queenslanders for the five year period was 14.3 times higher than for non-Indigenous Queenslanders. The older age distribution may be associated with the predominance of comorbidities in the older age groups. Infection was frequently severe, with 93 per cent of notified cases hospitalised. Limited information was available on further specific environmental exposures so these have not been included in the report.

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