Rapid communications

Increase in Legionnaires’ disease cases associated with travel to Dubai among travellers from the United Kingdom, Sweden and the Netherlands, October 2016 to end August 2017

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Between 1 October 2016 and 31 August 2017, 51 Legionnaires’ disease (LD) cases from the United Kingdom, Sweden and the Netherlands were identified with associated travel to Dubai. Cases did not all stay in the same accommodation, indicating that no single accommodation could be the source for all these infections. While local investigations continue into other potential sources, clinicians should remain alert to the possibility of LD among travellers returning from Dubai with respiratory illness.

In December 2016, the European Centre for Disease Prevention and Control (ECDC) reported an increase in Legionnaires’ disease (LD) cases associated with travel to Dubai, United Arab Emirates (UAE) [1] based on cases reported to ELDSNet (European Legionnaires’ disease surveillance network), an ECDC–operated surveillance system among European Union (EU) countries, Iceland and Norway [2] for laboratory-confirmed, travel-associated LD (TALD) cases who stayed in commercial accommodation site(s) (e.g. hotels) during the 2–10-day incubation period. As this increase in Dubai-associated TALD cases continues, we describe cases reported with symptom onset between 1 October 2016 and 31 August 2017, among residents from the United Kingdom (UK), Sweden and the Netherlands (the three countries that were initially reporting the largest numbers of cases). We describe the ongoing situation as at 18 September 2017 to provide further insight into the observed increase and create awareness among physicians and travellers returning with compatible symptoms to consider legionella as a differential diagnosis [1].

Case definition
Cases were classified as any person resident in the UK, Sweden or the Netherlands with clinical or radiological evidence of pneumonia, laboratory confirmation of Legionella infection and stay in Dubai during the 2–10 days before symptom onset. Laboratory confirmation included methods fulfilling the EU confirmed case definition (culture testing, urine antigen testing or serology) or the detection of Legionella spp. by PCR [3]. All patients meeting the case definition with symptom onset between 1 October 2016 and 31 August 2017, were described by age, sex, tobacco smoking status, presence of underlying medical conditions, laboratory confirmation method and where available, sequence-based typing.

Surveillance
The LD surveillance systems in our countries have been described elsewhere [4-7]. In brief, LD must be notified by medical practitioners to public health authorities, who interview the patient or close family members to identify potential legionella exposures during the incubation period, including any travel away from the patient’s main residence (national and/or foreign travel).

Description of cases
There were 51 laboratory-confirmed LD cases associated with travel to Dubai with symptom onset between 1 October 2016 and 31 August 2017. Of these, 36 were reported from the UK, eight from Sweden and seven from the Netherlands. Over two thirds of cases were men (36/51). The median age for all cases was
66 years (interquartile range (IQR): 57.5–72.0; range: 36–84 years). For cases with available information, 23/43 were smokers or ex-smokers and 18/44 had at least one long-term underlying medical condition. Just over a quarter of cases with hospitalisation information (10/36), required critical care admission. Figure 1 shows the distribution of cases by symptom onset date, and indicates cases concentrated in October 2016, with continuing elevated numbers in November, early December 2016, February and April 2017.

The most frequently used diagnostic method was urinary antigen testing (45/51 cases) with PCR methods used in 17/51 cases and culture in 7/51 cases; 14 cases were diagnosed using more than one type of laboratory test. Most cases were speciated as *Legionella pneumophila* (50/51), while the remaining case was *Legionella* spp. unknown. Serogroup was known for 16 cases: 13 were serogroup 1, two serogroup 13 and one serogroup 2–14. Full sequence-based typing (ST) was available for nine cases (6 cases ST616, 3 cases ST1327) and three cases had partial ST profiles.

The median number of days within the incubation period that cases spent in Dubai was six (IQR: 4–8, range 2–9 days). Eleven cases spent the whole incubation period in Dubai. Four cases also travelled to other emirates within UAE; six had foreign travel to four different countries in addition to UAE, during the incubation period.

In relation to potential aerosol exposures in Dubai, 44 of 48 cases with available information had used showers, while 29 of 45 recalled exposures to fountains and water features. Use of swimming pools (12/40) and spa pools (5/39) was less frequent among cases. Other activities for cases included boat trips (7 cases), fountain shows and visits to the gold souk (3 cases each).

The 51 cases were associated with 45 individual accommodation sites. Most (43/51) cases stayed in commercial accommodation: 27/43 in single accommodation (sites where there were no other associated cases in the previous two years), 15/43 in cluster accommodation (sites where there were two or more associated cases in a two-year period) and 1/43 in a commercial accommodation with limited information (preventing the identification of associated cases in the previous two years); seven stayed in private accommodation and for one case the accommodation type was unknown. Significantly, in addition to the seven private accommodation sites, there were 27 different commercial accommodation sites not previously associated with LD cases (i.e. not part of clusters themselves). Three of the 51 cases were associated with a foreign-travel related cluster in other countries. The cases for whom sequence-based typing was available were all linked to different accommodations sites. The average case numbers recorded for each month by onset date between October and August for 2013−14, 2014−15, 2015−16 and - separately for October 2016 to August 2017 for our three countries, are summarised in the Table, which shows that during the investigation period, the number of Dubai-associated TALD cases was higher than the rounded average case numbers of 3−12 cases for the equivalent 11-month period for each of our countries between 2013 and 2016.

Figure 2 shows that cumulative case numbers for all three countries were particularly elevated from September 2016 onwards, compared with average monthly cumulative case numbers reported for 2013−15. This was sustained for all three countries through to August 2017.

**Discussion**

Here we report an increase in Dubai-associated TALD cases, above the historical averages for each of our
Cumulative numbers for year to date, shown for 2016 and January–August 2017 compared to the average for 2013–15

Kingdom, Sweden and the Netherlands, January 2016–associated with travel to Dubai in residents of the United

Cumulative number of Legionnaires' disease cases

Figure 2

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UK traveller numbers to Dubai increased by 5% for the
calendar year from 2015 to 2016 [8] while travellers to
UAE from the Netherlands increased by 9% between
November 2016 and April 2017 compared with the
same time period one year earlier (data not shown);
however, the proportion of the latter dataset related to
Dubai specifically is unknown. Due to the incomplete
availability of Dubai-specific travel data for all three
countries as well as the limited comparability of these
available data sources, we have not specifically esti-
mated an incidence rate for LD cases associated with
travel to Dubai.

Another explanation is one or more new legionella
source(s) in Dubai, although there is limited informa-
tion available from local investigations. TALD investi-
gations generally focus on accommodation sites [2].
However, these accommodation sites seem an unlikely
explanation as only 15 cases were associated with clus-
ter sites. Therefore, wider environmental investigations
in addition to commercial accommodation sites are
required to identify and control the source of infection.
ECDC reported that there has been no increase in pneu-
monia notifications locally in Dubai between October
and December 2016 [9]. This could be explained by an
environmental source where foreign travellers are more
frequently exposed than local residents. Alternatively,
the local Dubai population is predominantly young,
with only 8.7% in the ≥50 age group in 2016, and there-
fore is potentially at lower LD risk [10].

Several public health actions have been undertaken.
To support local investigations, anonymised epidemi-
ological information collected by the public health agen-
cies in the EU countries has been shared with public
health authorities in Dubai by ECDC and the World
Health Organization (WHO). This supplements our rou-
tine international TALD case reporting via ELDSNet.
Similar information sharing for 17 TALD cases from dif-
ferent countries was successful in controlling an out-

Although the absolute numbers of Dubai-related TALD
cases are low in comparison to annual visitor numbers,
information for travellers about LD symptoms to be
aware of has been published on websites of national
public health institutes and on websites for travel
health [12-14].

This investigation highlights the benefits of interna-
tional TALD surveillance (such as ELDSNet) in facilitat-
ing identification and alerting of increases in cases
related to specific destinations; in addition, ascertain-
ment of cases linked to private accommodation, as well
as commercial accommodation, through such surveil-
ance, would be important to determine the full scale
of TALD in this particular situation. It should be noted
that there would be an inherent delay in reporting to
ECDC due to the time taken for diagnosis and collation
of relevant epidemiological data.

three countries. As our countries’ travellers accounted
for the majority of the increase when first observed by
ECDC [1], they provide an important insight into this
situation.

The hypothesis of increased LD risk related to travel to
Dubai rather than increased risk in the countries of resi-
dence is supported by the simultaneous peak in cases
occurring from September 2016 onwards for all three
countries (Table). Additionally, there were no changes
in LD surveillance and no community outbreaks in our
countries that provide an alternative explanation. Six
cases were typed as ST616, a strain observed in our
surveillance only in cases associated with travel to
Dubai. In addition, ST1327 has been associated with
tavel to Dubai for all but one case in our surveillance
(data not shown). Furthermore, 11 cases spent their
entire incubation period in Dubai. These findings sup-
port the assertion that these infections occurred within
Dubai.

There are several potential explanations for the
observed increase in cases associated with travel to
Dubai; one could be changes in patient-level risk fac-
tors for infection. However, this is unlikely to explain
the increase as patient-level risk factors such as under-
lying medical conditions, current or previous smoking
status were reported for 36 cases, which is consistent
with almost three quarters among LD cases, previously
reported in England and Wales in 2015 [7].

Another potential explanation is an increase in travel-
ers, although overall changes in traveller numbers do
not solely explain the scale of the observed increase.
UK traveller numbers to Dubai increased by 5% for the

Cumulative numbers for year to date, shown for 2016 and January–August 2017, with average cumulative numbers for 2013–15 for United Kingdom, Sweden and the Netherlands, combined.
Seasonal trends in travel to Dubai highlight the potential for further cases occurring in the coming months; for instance travel from the UK is particularly high during the winter and spring seasons [8]. Thus further environmental investigations remain important. While local public health authorities in Dubai conduct public health investigations and implement controls, clinicians should remain vigilant for LD symptoms among returning travellers, to aid prompt diagnosis and treatment.

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Conflict of interest

None declared.

Authors’ contributions

GD led the drafting of the article; GD, FN, ML, PB, RC contributed to description of cases. All authors contributed to development and refinement of this manuscript.

References


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Table

<table>
<thead>
<tr>
<th>Country of residence</th>
<th>Number of LD cases associated with travel to Dubai (1 Oct 2016−31 Aug 17)</th>
<th>Rounded average number of LD cases associated with travel to Dubai (1 Oct 2013−15 to 31 Aug 2014−16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>36</td>
<td>12</td>
</tr>
<tr>
<td>Sweden</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

LD: Legionnaires’ disease.