

Supplemental Tables

Table S1. *L. pneumophila* isolates associated with the PA healthcare facility

Sample Name	Isolation date	CDC isolate number	Patient/Location	Serogroup	SBT alleles							ST
					<i>flaA</i>	<i>pilE</i>	<i>asd</i>	<i>mip</i>	<i>mo mpS</i>	<i>proA</i>	<i>neuA</i>	
<b>PA-12 clinical isolates</b>												
	8/28/2012	D-7119	86 yo male, from sputum	1	14	18	8	10	28	19	2	1395
	8/28/2012	D-7120	64 yo male, from sputum	1	14	18	8	10	28	19	2	1395
	9/23/2012	D-7133	57 yo male, from sputum	1	14	18	8	10	28	19	2	1395
<b>PA-12 environmental isolates</b>												
<b>Isolate sent from the local lab</b>												
9800	10/3/2012	D-7121	Bulk water, 3rd floor patient room sink	1	14	18	8	10	28	19	2	1395
<b>Isolates from samples collected during the infield outbreak investigation</b>												
PA12-1-002 c1	11/8/2012	F-4181	Bulk water, 9th floor patient room sink (1)	1	14	18	8	10	28	19	2	1395
PA12-1-004 c1	11/8/2012	F-4182	Bulk water, 9th floor patient room sink (2)	1	14	18	8	10	28	19	2	1395
PA12-1-010 c2	11/8/2012	F-4185	Bulk water, 3rd floor operating theater sink	1	14	18	8	10	28	19	2	1395
PA12-1-010 c4	11/8/2012	F-4187	Bulk water, 3rd floor operating theater sink	1	1	4	3	1	1	1	9	8
PA12-1-011 c4	11/8/2012	F-4188	Bulk water, 3rd floor operating theater sink	1	14	18	8	10	28	19	2	1395
PA12-1-054 c1	11/8/2012	F-4191	Bulk water, supply line #1, downstream of secondary disinfection unit	1	14	18	8	10	28	19	2	1395
PA12-1-055 c1	11/8/2012	F-4192	Bulk water, return line #1	1	14	18	8	10	28	19	2	1395
PA12-1-056 c1	11/8/2012	F-4193	Bulk water, supply line #2, downstream of secondary disinfection unit	1	14	18	8	10	28	19	2	1395
PA12-1-057 c1	11/8/2012	F-4194	Bulk water, return line #3	1	14	18	8	10	28	19	2	1395
PA12-1-058 c2	11/8/2012	F-4196	Bulk water, supply line #3, downstream of secondary disinfection unit	1	14	18	8	10	28	19	2	1395
PA12-1-108 c1	11/8/2012	F-4197	Bulk water, 3rd floor ward room sink	1	14	18	8	10	28	19	2	1395
PA12-1-114 c1	11/8/2012	F-4198	Bulk water, 6th floor common shower - stagnant water from hose line	1	11	14	16	16	15	13	2	154
PA12-1-122 c1	11/8/2012	F-4200	Bulk water, 10th floor drinking fountain (cold)	1	1	4	3	1	1	1	9	8
<b>1980's environmental isolates</b>												
ATCC 33737 U8W	prior to 1982	D-7160	tap water, 8th floor West wing	5	<b>14<sup>a</sup></b>	<b>18</b>	<b>8</b>	18	<b>28</b>	<b>19</b>	201	1335
ATCC 33736 U7W	prior to 1982	D-7159	tap water, 7th floor West wing	5	<b>14</b>	<b>18</b>	<b>8</b>	18	<b>28</b>	<b>19</b>	201	1335
ATCC 33735 MICU-B	prior to 1982	D-7158	tap water, medical intensive care unit	5	<b>14</b>	<b>18</b>	<b>8</b>	18	<b>28</b>	<b>19</b>	201	1335

<sup>a</sup>Bold font indicates the alleles in ST1335 profile that are the same as in ST1395.

Table S2. Additional STs containing *flaA*, *asd*, and *proA* alleles that were included in the subsp. *fraseri* consensus SBT pattern **11-x-16-x-x-13-x**

A. STs found with the **11-x-x-x-x-x** pattern search. STs listed in the Table 2B of the main text are not included.

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup	Clonal Complex
<b>11</b> <sup>a</sup> -4-3-1-1-1-1	161	1	CC M <sup>b</sup>
<b>11</b> -14-3-1-15- <b>13</b> -9	198	1	CC A <sup>c</sup>
<b>11</b> -14-32-3-7-33-9	357	1	singleton
<b>11</b> -21-33-37-31-1-11	415	8	singleton
<b>11</b> -14-3-25-1- <b>13</b> -1	629	1	singleton
<b>11</b> -4-1-1-15- <b>13</b> -1	965	1	CC A
<b>11</b> -14- <b>16</b> -16-15-42-2	1216	1	CC A
<b>11</b> -14- <b>16</b> -16-15-1-11	1513	1	CC A
<b>11</b> -14-32-62-7-33-226	1741	4	singleton
<b>11</b> -14-22-16-15- <b>13</b> -2	1835	1	CC A

<sup>a</sup>Bold font indicates alleles of the subsp. *fraseri* consensus SBT pattern

<sup>b</sup>“CC M” indicates that the ST belongs to a clonal complex M (Figure 2A)

<sup>c</sup>“CC A” indicates that the ST belongs to a clonal complex M (Figure 2A)

B. Search with the x-x-**16**-x-x-x pattern. STs listed in Table 2B or Table S3A are not included.

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup	Clonal complex
2-14- <b>16</b> <sup>a</sup> -16-15- <b>13</b> -2	595	1	CC A <sup>b</sup>
2-14- <b>16</b> -1-15- <b>13</b> -1	608	1	CC A
1-4- <b>16</b> -1-15-1-1	634	1	singleton
12-14- <b>16</b> -16-15- <b>13</b> -11	678	1	CC A
2-14- <b>16</b> -31-15- <b>13</b> -6	690	5	singleton
21-16- <b>16</b> -16-15- <b>13</b> -9	887	NK <sup>c</sup>	singleton
1-14- <b>16</b> -1-15- <b>13</b> -1	971	1	CC A
1-14- <b>16</b> -16-15- <b>13</b> -2	986	1	CC A
2-14- <b>16</b> -12-15- <b>13</b> -3	1128	14	singleton
2-14- <b>16</b> -30-15- <b>13</b> -9	1158	8	CC A
30-14- <b>16</b> -54-7- <b>13</b> -41	1219	NK	singleton
2-14- <b>16</b> -10-15- <b>13</b> -11	1290	1	CC A
8-14- <b>16</b> -25-7- <b>13</b> -206	1369	4	CC A
2-14- <b>16</b> -25-7- <b>13</b> -206	1377	4	CC A
10-14- <b>16</b> -16-15- <b>13</b> -2	1458	1	CC A
6-14- <b>16</b> -16-15- <b>13</b> -2	1471	1	CC A
2-14- <b>16</b> -31-15- <b>13</b> -210	1472	1	CC A
7-3- <b>16</b> -16-15- <b>13</b> -2	1501	1	singleton
1-14- <b>16</b> -31-15- <b>13</b> -1	1561	1	CC A
1-14- <b>16</b> -16-15- <b>13</b> -9	1562	1	CC A
8-14- <b>16</b> -16-15- <b>13</b> -2	1563	1	CC A
1-14- <b>16</b> -25-7- <b>13</b> -206	1639	4	CC A
1-14- <b>16</b> -25-7- <b>13</b> -1	1640	4	CC A
3-14- <b>16</b> -16-15- <b>13</b> -9	1778	1	CC A
2-14- <b>16</b> -16-15- <b>13</b> -9	1779	NK	CC A
1-4- <b>16</b> -1-1-1-9	2034	NK	CC M
30-50- <b>16</b> -31-61- <b>13</b> -44	2078	9	singleton
1-14- <b>16</b> -1-15- <b>13</b> -2	2259	1	CC A
10-14- <b>16</b> -1-15- <b>13</b> -2	2261	2-14 <sup>d</sup>	CC A
1-14- <b>16</b> -10-15- <b>13</b> -13	2281	NK	singleton
10-14- <b>16</b> -12-15- <b>13</b> -215	2282	2-14	CC A
1-14- <b>16</b> -31-15- <b>13</b> -210	2312	NK	CC A
3-14- <b>16</b> -1-15- <b>13</b> -207	2325	1	CC A
1-14- <b>16</b> -25-15- <b>13</b> -1	2355	9	CC A
1-14- <b>16</b> -25-15- <b>13</b> -206	2357	4	CC A
2-14- <b>16</b> -31-15- <b>13</b> -11	2358	13	CC A
2-14- <b>16</b> -1-15- <b>13</b> -10	2359	1	CC A
6-14- <b>16</b> -1-15- <b>13</b> -10	2360	1	CC A
12-14- <b>16</b> -18-15- <b>13</b> -201	2365	11	ST1300 and ST2365 <sup>e</sup>
1-6- <b>16</b> -16-15-1-2	2381	1	singleton

12-14- <b>16</b> -16-15- <b>13</b> -2	2477	1	CC A
7-14- <b>16</b> -1-15- <b>13</b> -2	2526	1	CC A
7-14- <b>16</b> -12-15- <b>13</b> -1	2527	2-14	CC A
1-14- <b>16</b> -12-15- <b>13</b> -215	2530	2-14	CC A
7-14- <b>16</b> -16-15- <b>13</b> -9	2531	1	CC A

<sup>a</sup>Bold font indicates alleles of the subsp. *fraseri* consensus SBT pattern

<sup>b</sup>“CC A” indicates that the ST belongs to a clonal complex A (Figure 2A)

<sup>c</sup>NK means that the serogroup is unknown

<sup>d</sup>“2-14” indicates that the serogroup is one of the 2-14 serogroups of Lp

<sup>e</sup>The ST belongs to a clonal complex consisting of two STs (ST1300 and ST2365), see Table 2B

C. Search with the x-x-x-x-x-**13**-x pattern. STs listed in Table 2B or Tables S3A-B are not included.

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup	Clonal complex
3-4-1-1-14- <b>13</b> <sup>a</sup> -30	628	1	ST628 and ST1635 <sup>b</sup>
1-14-3-1-15- <b>13</b> -9	904	1	CC A
30-18-44-15-61- <b>13</b> -6	941	1	singleton
30-18-44-10-61- <b>13</b> -10	943	1	singleton
6-10-15-13-17- <b>13</b> -11	1503	1	CC M
2-3-9-10-2- <b>13</b> -6	1512	1	CC founder ST23 <sup>c</sup>
30-14-67-21-61- <b>13</b> -15	2006	1	singleton
3-14-3-16-15- <b>13</b> -2	2166	1	singleton
30-18-44-77-61- <b>13</b> -217	2186	4	singleton
2-10-14-5-39- <b>13</b> -6	2427	1	singleton

<sup>a</sup>Bold font indicates alleles of the subsp. *fraseri* consensus SBT pattern

<sup>b</sup>The ST belongs to a clonal complex consisting of two STs (ST628 and ST1635),

<sup>c</sup>The ST belongs to a clonal complex which primary founder is ST23

Table S3. Additional STs containing *flaA*, *pilE*, *asd*, *mompS* and *proA* alleles that were included in the subsp. *pascullei* consensus SBT pattern **14-18-8-x-28-19-x**. The ST1335 and ST1395 are not listed below.

A. Search with the x-**18**-x-x-x-x pattern.

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup
30- <b>18</b> <sup>a</sup> -44-15-61-13-6	941	1
30- <b>18</b> -44-10-61-13-10	943	1
2- <b>18</b> -18-15-2-1-6	1577	1
30- <b>18</b> -44-77-61-13-217	2186	4

<sup>a</sup>Bold font indicates alleles of the subsp. *pascullei* SBT pattern

B. Search with the x-x-**8**-x-x-x pattern

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup
7-8- <b>8</b> -2-4-2-1	1431	6

C. Search with the x-x-x-x-**28**-x-x pattern

SBT profile <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup
6-10-15-19- <b>28</b> -4-11	1116	1

D. Search with the x-x-x-x-x-**19**-x pattern

SBT profile <i>flaA-pilE-asd-mip-mompS-<b>proA</b>-neuA</i>	ST	Serogroup
2-6-15-28-9- <b>19</b> -9	910	10
3-4-1-1-1- <b>19</b> -1	1559	1

Table S4. Additional STs containing *pilE* and *proA* alleles that were included in the subsp. *raphaeli* consensus SBT pattern x-27-x-x-x-29-x

A. Search with the x-27-x-x-x-x-x- pattern

SBT profiles <i>flaA-pilE-asd-mip-mompS-proA-neuA</i>	ST	Serogroup	Comments
4-27-11-16-59-12-26	922	1	singleton
21-27-28-3-15-11-11	1096	1	ST1096 and ST2131 <sup>a</sup>
34-27-55-54-71-44-44	1225	1	singleton
21-27-29-54-15-47-9	1587	5	singleton
3-27-29-54-15-47-8	1589	5	singleton

<sup>a</sup>The ST belongs to a clonal complex consisting of two STs (ST1096 and ST2131),

B. Search with the x-x-x-x-x-29-x pattern

SBT profiles	ST	Serogroup	Clonal Complex
21-14-29-35-15-29-10	251	1	CC D <sup>a</sup>
21-14-29-16-15-29-1	451	1	CC D
21-14-29-15-15-29-6	701	1	CC D
21-14-29-30-15-29-6	741	1	CC D
8-14-29-10-15-29-6	798	1	CC D
21-14-29-35-15-29-6	799	1	CC D
21-14-29-10-15-29-6	819	1	CC D, founder of CC D
21-14-29-2-15-29-6	883	1	CC D
21-14-29-46-15-29-10	944	1	CC D
21-14-29-1-15-29-6	1203	1	CC D
21-14-29-5-15-29-2	1243	1	singleton
21-10-29-15-15-29-6	1284	1	CC D
2-14-29-15-15-29-6	1500	1	CC D
21-14-29-35-15-29-206	1520	2-14 and 5	CC D
21-14-28-15-15-29-9	1521	NK	singleton
21-10-28-28-15-29-6	1570	1	singleton
21-14-29-35-15-29-9	1588	5	CC D
21-14-28-35-15-29-206	1590	5	CC D
21-14-29-1-15-29-206	1726	1	CC D
21-23-28-2-15-29-6	1766	1	CC B <sup>b</sup>
21-14-29-10-15-29-206	1823	1	CC D
21-14-29-11-15-29-6	1867	1	CC D
21-14-29-11-15-29-6	1904	7	CC D
21-10-28-2-15-29-227	1973	2-14	singleton
21-14-29-16-15-29-6	2116	7	CC D
21-14-28-5-15-29-10	2152	NK	CC D
21-14-28-10-15-29-6	2184	1	CC D
21-14-29-3-15-29-9	2189	NK	CC D
21-14-29-10-15-29-10	2308	1	CC D
21-14-28-10-15-29-10	2491	1	CC D

<sup>a</sup> "CC D" indicates that the ST belongs to a clonal complex D (Figure 2A)

<sup>b</sup> "CC B" indicates that the ST belongs to a clonal complex B (Figure 2A)

Table S5. Additional STs that may be a part of the D-7708 subspecies  
 Search was conducted with the **30**-x-x-x-x-x pattern

SBT profiles	ST	Serogroup	Comment
<b>30-18-44-15-61-13-6</b>	941	1	
<b>30-18-44-10-61-13-10</b>	943	1	
<b>30-14-16-54-7-13-41</b>	1219	NK	
<b>30-14-67-21-61-13-15</b>	2006	1	
<b>30-50-16-31-61-13-44</b>	2078	9	
<b>30-13-70-15-61-53-6</b>	2160	1	
<b>30-18-44-77-61-13-217</b>	2186	4	D-7708



Table S6. Percent identity of the full length *mip* sequences from 38Lp strains as compared to the *mip* sequences from the subspecies type strains.

Subspecies/strains	Philadelphia-1	Los Angeles 1	U8W	NY-23	D-7708
<i>pneumophila</i>					
Philadelphia-1	100	98.433	95.58	95.58	95.3
Lens	98.43	99.43	96.15	96.15	95.87
Corby	98.86	99.29	96.44	96.15	95.87
Lorraine	99.43	98.72	95.58	95.3	95.01
Thunder Bay	98.86	99.29	96.44	96.15	95.87
ATCC 43290	98.86	99.29	96.44	96.15	95.87
Alcoy	99.57	98.57	95.73	95.44	95.16
Albuquerque 1	100	98.43	95.58	95.58	95.3
Bellingham 1	98.72	99.14	96.58	96.01	95.73
Flint 2	100	98.43	95.58	95.58	95.3
Pontiac 1	99.43	98.72	95.58	95.3	95.01
Allentown	99.72	98.43	95.58	95.58	95.3
Burlington 1	100	98.43	95.58	95.58	95.3
OLDA	100	98.43	95.58	95.58	95.3
Knoxville 1	99.72	98.43	95.58	95.58	95.3
Birmingham 1	99.43	98.72	95.58	95.3	95.01
Average:	99.44	98.76	95.85	95.69	95.41
<i>fraseri</i>					
Los Angeles 1	98.43	100	96.011	95.73	95.44
Dallas 1E	95.58	96.01	100	95.44	96.01
Detroit 1	98.43	99.71	96.011	95.73	95.44
F-4198	98.43	99.71	96.011	95.73	95.44
D-5387	98.43	99.71	96.011	95.73	95.44
D-4058	100	98.43	95.584	95.58	95.3
D-3137	98.72	99.14	96.581	96.01	95.73
D-5945	100	98.43	95.584	95.58	95.3
D-6026	100	98.43	95.584	95.58	95.3
D-5744	99.14	98.72	96.154	96.15	95.87
Lansing 3	98.43	100	96.011	95.73	95.44
Average:	98.69	98.94	96.32	95.73	95.52
<i>pascullei</i>					
U8W (D-7160)	95.58	96.01	100	95.44	96.01
MICU-B (D-7158)	95.58	96.01	100	95.44	96.01
D-7119	99.71	98.43	95.58	95.58	95.3
F-4185	99.71	98.43	95.58	95.58	95.3
Average:	97.65	97.22	97.79	95.51	95.65
<i>raphaeli</i>					
NY23 (D-7705)	95.58	95.73	95.44	100	98.57
NY24 (D-7706)	95.58	95.73	95.44	100	98.57
D-4954	95.73	95.87	95.87	99.29	98.72
D-4040	98.86	99.29	96.44	96.15	95.87
D-5265	98.86	99.29	96.44	96.15	95.87
D-7787	95.58	95.73	96.01	99.14	98.29
Average:	96.7	96.94	95.94	98.46	97.65
<u>D-7708</u>					
D-7708	95.3	95.44	96.01	98.57	100

Table S7. Percent identity of the full length *gyrB* sequences from 38 Lp strains as compared to the *gyrB* sequences from the subspecies type strains

Subspecies/Strains	Philadelphia-1	Los Angeles 1	U8W	NY-23	D-7708
<i>pneumophila</i>					
Philadelphia-1	100	91.11	91.31	91.23	91.07
Lens	98.51	91.15	91.15	91.19	91.11
Corby	97.93	91.27	91.56	91.31	91.23
Lorraine	98.76	91.23	91.48	91.27	91.11
Thunder Bay	100	91.11	91.31	91.23	91.07
ATCC 43290	100	91.12	91.31	91.23	91.07
Alcoy	97.93	91.27	91.56	91.31	91.23
Albuquerque 1	97.85	90.86	91.03	91.07	90.82
Bellingham 1	98.1	90.9	91.19	91.07	90.86
Flint 2	97.85	90.86	91.03	91.07	90.82
Pontiac 1	97.85	90.82	91.03	91.03	90.78
Allentown	98.63	91.31	91.48	91.36	91.27
Burlington 1	100	91.11	91.31	91.23	91.07
OLDA	97.85	90.86	91.03	91.07	90.82
Knoxville 1	98.59	91.27	91.44	91.31	91.23
Birmingham 1	98.85	90.82	91.03	91.03	90.78
Average:	98.68	91.1	91.26	91.19	91.02
<i>fraseri</i>					
Los Angeles 1	91.12	100	96.44	98.88	99.75
Dallas 1E	91.03	99.63	96.32	98.76	99.71
Detroit 1	91.03	99.63	96.32	98.76	99.71
F-4198	91.03	99.63	96.32	98.76	99.71
D-5387	91.03	99.63	96.32	98.76	99.71
D-4058	91.03	99.63	96.32	98.76	99.71
D-3137	91.03	99.63	96.32	98.76	99.71
D-5945	91.03	99.63	96.32	98.76	99.71
D-6026	91.03	99.63	96.32	98.76	99.71
D-5744	91.03	99.63	96.32	98.76	99.71
Lansing 3	91.03	99.63	96.32	98.76	99.71
Average:	91.02	99.66	96.33	98.77	99.71
<i>pascullei</i>					
U8W (D-7160)	91.31	96.44	100	96.44	96.53
MICU-B (D-7158)	91.31	96.44	100	96.44	96.53
D-7119	91.31	96.44	100	96.44	96.53
F-4185	91.31	96.44	100	96.44	96.53
Average:	91.31	96.44	100	96.44	96.53
<i>raphaelli</i>					
NY23 (D-7705)	91.23	98.88	96.44	100	98.97
NY24 (D-7706)	91.23	98.88	96.44	100	98.97
D-4954	91.23	98.88	96.44	99.92	98.97
D-4040	91.23	98.88	96.44	99.92	98.97
D-5265	91.53	98.78	96.57	99.83	98.84
D-7787	91.23	98.88	96.44	99.92	98.97
Average:	91.28	98.86	96.46	99.93	98.95
<b>D-7708</b>					
D-7708	91.07	99.75	96.53	98.97	100

Table S8. Shared and unique genes among 38 *L. pneumophila* strains representing four subspecies

	Number of genes		Number of tested strains
	All genes	Genes encoding hypothetical proteins	
All subspecies	2326	550	38
<i>pneumophila</i>	9	6	16
<i>fraseri</i>	38	25	11
D-7708	58	38	1
<i>fraseri</i> + D-7708	6	5	12
<i>raphaeli</i>	30	13	6
<i>pascullei</i>	71	48	4