

# EXERCISE PHILADELPHIA

Exercise Handbook - July 2023

This exercise handbook accompanies the off-the-shelf exercise materials for Exercise Philadelphia, which aims to enable participants to review, rehearse and enhance their preparedness and response to an outbreak of Legionnaires' disease. It provides a step-by-step guide on how to adapt the exercise materials and run your own tabletop exercise.



## Contents

1	Introduction .....	2
	Exercise aim and objectives .....	2
	Exercise format .....	2
2	Preparation .....	3
	What is an “off-the-shelf” exercise? .....	3
	Choosing participants .....	3
	Building an exercise programme.....	4
	Adapting the exercise materials.....	5
	Facilitation .....	6
3	Delivery .....	7
	Running the exercise .....	7
	Exercise Control .....	8
	Collecting participant responses .....	9
4	Post-exercise activity .....	9
	Debriefing participants.....	9
	Action planning .....	9
	Report writing .....	10
5	Reference materials.....	10
	General reading.....	10
	Selection of reading from published literature: Hospital-associated Legionnaires’ disease.....	11
	Selection of reading from published literature: Travel-associated Legionnaires’ disease.....	11
	Selection of reading from published literature: Community outbreak of Legionnaires’ disease.....	12
6	Annex.....	13

# 1 Introduction

Legionnaires' disease causes a considerable infectious disease burden in the EU/EEA, and notification rates have increased sharply in the years prior to the COVID-19 pandemic. The possible impact of pandemic measures, such as building closure or low-capacity usage, on *Legionella* risk in engineered water systems may be of concern in various risk settings.

Data collated through the ELDSNet<sup>1</sup> outbreak reporting scheme for 2016-2020 indicate that while many EU Member States detect and investigate several Legionnaires' disease outbreaks per year, others may detect or investigate few events. Equally, among those outbreaks reported, the size and complexity of source investigation varies considerably.

Considering the higher mortality risk associated with Legionnaires' disease and the often complex aspects of outbreak investigation of an environmental source of the bacteria, simulation exercises are an important tool for countries to prepare for outbreak events. This exercise package is envisioned to provide tools to countries wishing to review, rehearse or enhance their preparedness in this area.

This exercise handbook is designed to guide you through the preparation and delivery of Exercise Philadelphia, a set of self-contained exercise materials on Legionnaires' disease, with advice on how to evaluate your exercise and formulate local action plans.

## Exercise aim and objectives

The aim of this off-the-shelf exercise (OTSE) is to aid EU Member States (MS), European Economic Area (EEA) and Enlargement countries to review, rehearse and enhance their preparedness and response to an outbreak of Legionnaires' disease. Using the exercise modules and questions provided, participants will work towards the following objectives:

1. To develop a shared understanding of risk and escalation triggers.
2. To review outbreak surveillance and control arrangements on the national, and/or regional, and/or local levels.
3. To consider interdependencies with national, regional and local partners.
4. To review communication strategies and platforms used in an outbreak of Legionnaires' disease, including information exchange with international partners.

## Exercise format

Exercise Philadelphia consists of a series of questions for group reflection based on case scenarios that cover three different risk settings, considering community-, hospital- and travel-related cases. Each of these three modules can be exercised independently, or they can be used sequentially to cover multiple risk settings in one table-top exercise. The exercise materials are designed for face-to-face exercise participation but can also be adapted to a virtual setting. More information on how to design an exercise programme and choosing scenario modules and participants can be found in Section 2.

---

<sup>1</sup> The European Legionnaires' disease Surveillance Network (ELDSNet) carries out European surveillance of Legionnaires' disease in Europe and is coordinated by ECDC. All EU Member States, and Iceland and Norway, participate in the network. The members of ELDSNet are epidemiologists or microbiologists nominated by the national public health authorities.

## 2 Preparation

### What is an “off-the-shelf” exercise?

The materials provided in this “off-the-shelf” exercise package are the building blocks for your own organisational exercise. They are designed to be a useful resource to a variety of participants and contexts. Given different national health systems and outbreak response procedures, there can be no ‘one-size-fits-all’ exercise. Therefore, adapting these materials to your local context is important to enable you to conduct a relevant and effective tabletop exercise.

Similarly, the different exercise modules are tools to frame the challenges encountered in an outbreak investigation; they are not a key to unlock the answers to the exercise questions. Therefore, it can be helpful to remind participants not to ‘fight the scenario’, but to use it as a tool to discuss their own outbreak response protocols and procedures.

All materials are provided as Microsoft Word documents; we encourage you to change or adapt contents and question sets to make the exercise fit your purpose.



*The key to a successful off-the-shelf exercise is to view the exercise materials as building blocks to an exercise that fits your specific context. Think of the exercise materials as books to put on your bookshelf: You can decide yourself which books to put on the shelf, and how you want to organise them.*

### Choosing participants

Exercise Philadelphia can be run as a single- or multi-agency tabletop exercise, i.e. you can either run this exercise internally within your own organisation, or together with other organisations with whom you routinely work on the topic. Consider your local objectives: What is it that you want to get out of this exercise? Is it to test your own organisation’s plans and procedures? Or would you rather focus on communication and coordination between different organisations involved in the outbreak investigation process? What resources do you have available to organise your exercise? A large multi-agency exercise will require more preparation than one conducted for a single organisation.

A multi-agency exercise to rehearse a Legionnaires’ disease outbreak investigation and response might include some of the following participants (or national equivalents), who would also routinely be involved in a real-life outbreak investigation:

- Senior expert in disease control
- Regional/national Legionella experts or other expert epidemiologists/microbiologists with some Legionella experience
- Environmental microbiologist with expertise in detection and control of Legionella
- Senior representative of local clinical diagnostic laboratory
- Infection control nurse or national equivalent

- Data manager to take responsibility for all aspects of data structure, storage, security and dissemination
- Press or media spokesperson
- Engineers for suspect premises
- Environmental health scientist or hygienist or national equivalent
- Health and safety enforcement officer
- Hospital/industrial/community link persons

It is also possible to include role play in your exercise; for instance, if you want to include multi-agency aspects in your exercise, but do not have the time or resources to organise a full-scale multi-agency exercise. In that case, participants from your own organisation could play the roles of organisational partners with whom you would routinely work on an outbreak investigation. Do keep in mind that while this allows you to practice your side of coordinating with other agencies, it will not let other organisations practice their coordination with you. We advise you to find a balance between the exercise that is most useful to you and the resources you (and your partner organisations) have available to prepare and run it.

When it comes to deciding on the number of participants for your exercise, we advise that group discussions are most effective in smaller groups, provided that all necessary roles are represented. The balance you want to strike is having the right participants there to provide the input you need, while at the same time not having too many people, thereby preventing effective contributions.

Multi-agency exercises will usually have more participants than single-agency ones. If your exercise has a larger number of participants, you can group participants according to their roles and responsibilities and let them discuss the questions in separate “breakout rooms”. If using breakout rooms, you will usually bring participants back for a plenary discussion at the end of each exercise session, to share and discuss group responses together.

### Checklist questions

- What are the specific objectives of my exercise? What do I want to achieve in this exercise?
- Who are the participants I need to invite to achieve these objectives?

## Building an exercise programme

The materials for Exercise Philadelphia include three different scenario modules that you can use for your tabletop exercise:

1. An outbreak of Legionnaires’ disease in a hospital;
2. A travel-related outbreak of Legionnaires’ disease; and
3. An outbreak of Legionnaires’ disease in a community setting

Each of these modules consists of three exercise sessions, or ‘rounds’. In each session, participants receive information about the developing outbreak of Legionnaires’ disease in the form of injects, and there is a corresponding set of questions for each session. Participants are asked to discuss the questions and note down their answers in a participant response form.

The three modules are designed with increasing complexity, with Module 1 (Hospital) being the least complex in terms of the required outbreak investigation. Module 2 (Travel) is of intermediate complexity and has a stronger aspect of international cooperation. Module 3 (Community) is the most complex in its outbreak investigation requirements.

For a simple exercise, choose one of the three modules to discuss with members of your own organisation. This will take around three hours, which is a convenient half-day exercise programme. For a more complex exercise, you may want to choose more than one module, and/or include members of other organisations, to exercise multi-agency cooperation in outbreak investigations. This will make the exercise longer, and you could have a whole-day exercise programme.

Here is what an exercise programme could look like for a single-agency exercise using one module:

Single-agency exercise (~ 15 participants)	
09:00-09:15	Exercise introduction, aim and objectives
09:15-10:00	Session 1
10:00-10:45	Session 2
10:45-11:00	Coffee break
11:00-11:45	Session 3
11:45-12:00	Hot debrief, next steps

Here is an overview of the considerations that will help you determine the scope of your exercise; they centre around your specific objectives for the exercise, and the resources that you have available to organise it. Depending on these two variables, you can either choose to have a single- or a multi-agency exercise, using either one or multiple exercise modules.

#### Objectives

- Internal / external focus?
- Testing internal plans and procedures vs testing multi-agency plans
- Communication & coordination between internal teams, or with external organisations
- Specific themes of interest (e.g. travel outbreaks)

#### Resources

- Availability of staff to organise an exercise and lead time
- Internal exercises are less resource-intensive than those involving multiple organisations

#### Scope

- Single-agency exercise
- Multi-agency exercise
- One or multiple exercise modules

## Adapting the exercise materials



Once you have decided on the right module(s) for your exercise, you will need to look at the contents of the injects and corresponding questions sets to ensure that they fit your exercise context and participants.

The material as it is provided currently is targeted at those organisations directly responsible for carrying out Legionella outbreak investigations. In many countries, this is the local public health department. If you want to involve other organisations, such as city councils, laboratories, or national health bodies, you need to adapt the exercise materials and question sets to fit with the actors and processes in your country's public health framework. **Tailoring the exercise material to your specific context will help you get the most value from it.**

Depending on your requirements, you can adapt the following aspects of the exercise materials:

- You can add more **specific questions** to the question sets to help participants work through the exercise. This works well if you are using these materials to train staff on your outbreak protocols and procedures.
- You can add to or amend the **testing details or type of Legionella species/serogroup/ST results**, based on the context in your country and the laboratory services available.
- You can amend **inject dates** to fit the reporting delays that would be common in an outbreak investigation in your country; however, do consider the integrity of the scenarios in view of the incubation period for Legionnaires' disease, along with the turnaround time for different laboratory tests and reporting delays.
- You can amend the **sender or source of an inject**, to make it correspond to whoever would be sending this information in your own national context.

Generally, participants will always represent their own professional role when participating in an exercise, unless decided otherwise (for example, if you ask participants to play the role of other organisations, as described previously). Therefore, you will need to make sure that the information provided in the injects are what participants would routinely be presented with in an outbreak situation, and that the questions are targeted towards their specific professional context.

### Checklist questions

- Which exercise module will help me achieve my exercise objectives?
- How do I structure my exercise programme (depending on the modules I choose and the number and type of participants I invite)?
- Does the exercise module and corresponding question set fit my exercise objectives? Is it targeted to my participants? If not, what changes do I need to make?

## Facilitation

The last step in the preparation phase is to decide how you want to guide and steer your exercise discussions. Often, this is done using a facilitator. This can be you as the organiser, or a third person that you invite to join your exercise for this purpose.

Facilitators should be subject matter experts with authority in their field, so that they can keep the exercise moving while knowing which participants need to contribute on specific topics. They should aim to create a safe learning environment so that all participants feel comfortable to contribute.

Good facilitation takes planning. If you are using a facilitator who has not been involved in the exercise planning, it is essential that you set aside time to brief them about their role and expectations. This will also give them the opportunity to raise any questions they may have.

If you are running a small exercise with few participants, you may decide that a dedicated facilitator is not necessary. In this case, we would recommend that participants appoint a group chair who leads the discussions and takes participants through the sessions and question sets.

### 3 Delivery

This section explains what needs to be done on the day of the exercise to ensure a smooth and effective exercise delivery, and to capture participant responses and feedback.

#### Running the exercise


We recommend conducting a brief introduction before the exercise begins. This is to ensure participants understand the aim and objectives of the exercise and know what is in or out of scope for the day's discussions. It is also helpful to explain to participants how the exercise will be conducted, and how they are expected to participate. You may use the PowerPoint presentation included in the exercise materials for this purpose, adapting it as necessary to your context. The presentation also has an introductory slide for each scenario module, which you can use to set the scene for participants at the beginning of the exercise.

Once the exercise has started, participants will be given their first inject and question set to work on. As outlined in the previous section, this exercise is designed to be run in three sessions per module. Each exercise session has one or multiple injects that participants are asked to discuss, and there is one corresponding question set per session that participants are asked to answer during the session.

This is an example of an inject:

**MODULE 1: HOSPITAL**

**INJECT 1.0**

 **DATE:** 7 May  
**FROM:** Anytown Hospital  
**SUBJECT:** Legionnaires' disease case reports

**Report from Anytown Hospital**

Please find below details of a cluster of two cases of Legionnaires' disease at Anytown Hospital. Two patients have tested positive for *Legionella* by urinary antigen test on 6 May and present with symptoms of pneumonia. Sputum samples have been submitted for further microbiological testing, including culture.

They were both exposed to the hospital's haematology-oncology ward for the whole duration of their incubation period (2-10 days prior to symptom onset). The patients were admitted for treatment for active leukaemia and have received chemotherapy during their admission.

These results may be indicative of a hospital-associated outbreak and we are concerned about the possibility of an ongoing exposure risk for *Legionella* to other patients, visitors and employees.

Due to the patients' deteriorating condition, patient information is limited at present.

**Patient details:**

ID	Sex	Age	Date of admission	Clinical status	Microbiology results	Date of test
1	F	54	22/04	Severe symptoms of pneumonia	UAT positive	06/05
2	M	78	23/04	Severe symptoms of pneumonia	UAT positive	06/05

**MODULE 1: HOSPITAL** **HANDOUT** **EXERCISE PHILADELPHIA**

Injects are pieces of information that participants receive during the course of the exercise. They mimic information that participants would routinely receive in an outbreak scenario.

For the purpose of this exercise, injects take the form of an email. It is indicated at the top of each inject what date participants receive this and who this information is from. Keep in mind that the recipient is the participant acting in their own professional capacity. Depending on your exercise participants, you may need to change the sender of this inject. You may also include a "To" field to indicate the recipient of this information in your exercise if you find this helpful.

The main body of the inject is the information that participants need in order to answer the questions set out in the corresponding question set. Ensure that this information is similar to what the participants would usually receive in an outbreak investigation.



This is an example of a question set and participant response form:

The image displays two versions of a participant response form for 'Module 1: Hospital'. Both forms include a header with 'MODULE 1: HOSPITAL' and 'INJECTS 1.0 & 1.1'. The left form is a smaller, more compact version, while the right form is a larger, more detailed version. Both forms feature a green header for 'SESSION 1: QUESTIONS' and a list of four questions. The questions are: 1. What is your initial risk assessment? 2. What immediate actions would you take at this point? What are your next steps in the investigation of, and response to, this situation? 3. Who are you communicating with about this situation? By which methods and to what timeline? What information do you need? 4. What are the co-ordination arrangements you should consider in this situation?

Participants should receive all session injects and the corresponding question set as printed copies at the start of each session and they can decide how they want to work through them. This can be by either discussing them together as a group, or dividing them up among participants to work on independently according to roles and responsibilities (e.g. a press officer may be given a communications inject to work on). Question sets should be answered collectively throughout each session, and answers recorded on a participant response form (see Annex).

**Example:** You are using 'Module 1: Hospital' for your exercise.

Before you start your exercise, you welcome participants and introduce the aim and objectives of the exercise. As part of your introductory presentation, you present the scenario outline for your chosen module, to set the scene for the exercise. Now, your exercise can begin.

At the start of session 1, you will provide participants with injects 1.0 and 1.1, and the corresponding question set 'Session 1: Questions'. Participants are also provided with the Participant Response Form for their exercise module. At the start of session 2, participants receive injects 2.0, 2.1 and 2.2, and 'Session 2: Questions'. Finally, at the start of session 3, participants are provided with injects 3.0, 3.1, 3.2 and 3.3, and answer the question set for session 3.

## Exercise Control

Exercise Control, or EXCON, is the person or group of people responsible for distributing all injects and question sets to participants at the beginning of each session. This can be you as the organiser of the exercise, or designated staff that will not participate in the exercise.

To help with the running of the exercise, each of the exercise modules comes with a 'Master Events List' (see Annex), detailing which injects are to be delivered at which point in time during the exercise. Other useful documentation to have available include relevant organisational plans, SOPs or protocols, if required.

## Collecting participant responses

Participant responses to inject questions need to be captured using the participant response form (see Annex). The group should appoint a chair and notetaker at the start of the exercise who will work together with participants to accurately record responses. In more complex exercises with multiple breakout groups, each group will need their own chair and notetaker. As discussed previously, if you are using a facilitator for an exercise with few participants, this may remove the need for a dedicated chair, as the facilitator can take on that role.

The chair is responsible for leading the discussion, and using injects and question sets to help identify actions, issues, gaps and areas for further development. The notetaker will capture key actions and issues identified on the template provided for each session. The information captured will be used to inform the final exercise report.

If you are running a larger exercise with breakout groups, you can use plenary sessions to bring participants together and feed back their thoughts and responses to the larger group. This discussion is best managed by a facilitator.

## 4 Post-exercise activity

### Debriefing participants

At the end of the exercise, it can be useful to conduct a 'hot debrief' session, to collect participants' immediate thoughts on what went well and what could be improved in terms of their response to the outbreak scenario, and to hear what key points participants will take away from the exercise.

Optional: To supplement the evaluation data collected via participant responses during the exercise, and the feedback you receive at the hot debrief, it can be useful to conduct a 'cold' or 'structured debrief', which is a facilitated discussion held a few weeks after the exercise, so that participants have a chance to fully consider the feedback they would like to give on the exercise as well as consolidate lessons identified. The main purpose of the cold debrief is gaining a clear understanding of all problems noted in the exercise evaluation, understanding why the problems have occurred, and deciding on the appropriate corrective organisational measures.

### Action planning

One of the key outputs from any exercise should be a list of lessons identified. In order for organisations and participants to realise the full benefit of the exercise, it is important that these lessons are developed into actions. Given that participants may represent different organisation or parts of organisations with their own workload, it is highly likely that they will have their own priorities when they return to work following an exercise. The risk here is that lessons which have been identified are never implemented to become lessons learned.

Developing a concrete action plan increases the likelihood of lessons being adopted going forward. This involves clearly identifying actions which need to be followed up on, and their progress reviewed at agreed intervals after the exercise has been completed. Importantly, the exercise organiser needs to clearly define the lesson or action to be reviewed, who is to take responsibility to implement the action, and who are to be part of the reviewing panel to assess progress. This can be a part of the exercise report, or follow on as a separate activity after the report has been published.

## Report writing

The exercise report is the key output from the whole of the exercise planning and delivery process. It brings together a record of why the exercise was held, what its aims and objectives were, who attended, if the objectives were achieved, and what was discussed and potentially agreed or decided.

In order to give a fair reflection of the exercise it is essential to use evidence, as not all participants will share the same recollection of what occurred during the exercise. Evidence from a number of different sources should be considered:

- Participant answers to questions as recorded on participant response forms
- Hot and cold debrief notes
- Other evidence, such as notes taken during exercise sessions, as required.

Once evidence has been evaluated for each exercise objective, the draft report should be written by the exercise organiser prior to being shared for comment with the agreed review team. Once the report is agreed, we recommend circulating it to the participants of the exercise.

An exercise report may include some or all of the following elements:

- Brief description of the exercise, including aim and objectives, scenario
- List of participants
- Exercise evaluation against exercise objectives (this should be the main part of the report)
- Summary of lessons identified
- Action plan

## 5 Reference materials

While this exercise is intended to test your own organisational plans and procedures, you may wish to refer to the documents listed below for background information and best practice in Legionella outbreak investigations.

### General reading

[Surveillance and outbreak management of water-related infectious diseases associated with water-supply systems](#). Copenhagen: World Health Organization Regional Office for Europe; 2019.

[Legionnaires' disease outbreak investigation toolbox](#). Stockholm: European Centre for Disease Prevention and Control.

[Legionnaires' disease GIS tool](#). Stockholm: European Centre for Disease Prevention and Control.

[European Legionnaires' Disease Surveillance Network \(ELDSNet\) – Operating procedures for the surveillance of travel-associated Legionnaires' disease in the EU/EEA](#). Stockholm: European Centre for Disease Prevention and Control; 2017.

[Schematic overview of outbreak investigation process](#). Stockholm: European Centre for Disease Prevention and Control.

[External quality assessment \(EQA\) schemes to support European surveillance of Legionnaires' disease 2019–2020](#). Stockholm: European Centre for Disease Prevention and Control.

[Guidelines for drinking-water quality. Fourth Edition incorporating the First Addendum](#). Geneva: World Health Organization; 2017.

[European technical guidelines for the prevention, control and investigation, of infections caused by Legionella species](#). ESGLI; 2017.

Harrison, T.G.; Doshi, N.; Fry, N.K.; Joseph, C.A. [Comparison of clinical and environmental isolates of Legionella pneumophila obtained in the UK over 19 years](#). Clinical Microbiology and Infection, 2007, 13 (1), 78-85.

Eri van Heijnsbergen, Johanna A. C. Schalk, Sjoerd M. Euser, Petra S. Brandsema, Jeroen W. den Boer, and Ana Maria de Roda Husman. [Confirmed and Potential Sources of Legionella Reviewed](#) Environmental Science & Technology 2015 49 (8), 4797-4815  
DOI: 10.1021/acs.est.5b00142

Mouchtouri, V.; Velonakis, E.; Tsakalof, A.; Kapoula, C.; Goutziana, G.; Vatopoulos, A.; Kremastinou, J.; Hadjichristodoulou, C. [Risk factors for contamination of hotel water distribution systems by Legionella species](#). Appl. Environ. Microbiol. 2007, 73, 1489–1492.

### Selection of reading from published literature: Hospital-associated Legionnaires' disease

Beauté J, Plachouras D, Sandin S, Giesecke J, Sparén P. Healthcare-Associated Legionnaires' Disease, Europe, 2008-2017. Emerg Infect Dis. 2020 Oct;26(10):2309-2318. doi: 10.3201/eid2610.181889. PMID: 32946366; PMCID: PMC7510712.

Kessler MA, Osman F, Marx J Jr, Pop-Vicas A, Safdar N. Hospital-acquired Legionella pneumonia outbreak at an academic medical center: Lessons learned. Am J Infect Control. 2021 Aug;49(8):1014-1020. doi: 10.1016/j.ajic.2021.02.013. Epub 2021 Feb 22. PMID: 33631307.

Rosendahl Madsen AM, Holm A, Jensen TG, Knudsen E, Lundgaard H, Skov MN, Uldum SA, Kemp M. Whole-genome sequencing for identification of the source in hospital-acquired Legionnaires' disease. J Hosp Infect. 2017 Aug;96(4):392-395. doi: 10.1016/j.jhin.2017.04.020. Epub 2017 Apr 27. PMID: 28622979.

Shanu Agarwal, Virginia Abell, Thomas M. File. Nosocomial (Health Care–Associated) Legionnaire's Disease. Infectious Disease Clinics of North America, Volume 31, Issue 1, 2017, Pages 155-165, <https://doi.org/10.1016/j.idc.2016.10.011>.

Schulze-Röbbecke, R. (2020). A pseudo-outbreak of Legionnaires' disease in an acute-care hospital. Infection Control & Hospital Epidemiology, 41(2), 256-257. doi:10.1017/ice.2019.365

Haupt TE, Heffernan RT, Kazmierczak JJ, Nehls-Lowe H, Rheineck B, Powell C, Leonhardt KK, Chitnis AS, Davis JP. An outbreak of Legionnaires disease associated with a decorative water wall fountain in a hospital. Infect Control Hosp Epidemiol. 2012 Feb;33(2):185-91. doi: 10.1086/663711. Epub 2011 Dec 23. PMID: 22227989.

O'Neill, H. Humphreys. Surveillance of hospital water and primary prevention of nosocomial legionellosis: what is the evidence? Journal of Hospital Infection, Volume 59, Issue 4, 2005, Pages 273-279, ISSN 0195-6701, <https://doi.org/10.1016/j.jhin.2004.09.031>.

### Selection of reading from published literature: Travel-associated Legionnaires' disease

Beauté J, Sandin S, de Jong B, Hallström LP, Robesyn E, Giesecke J, Sparén P, On Behalf Of The European Legionnaires' Disease Surveillance Network. Factors associated with Legionnaires' disease

recurrence in hotel and holiday rental accommodation sites. *Euro Surveill.* 2019 May;24(20):1800295. doi: 10.2807/1560-7917.ES.2019.24.20.1800295. PMID: 31115313; PMCID: PMC6530253

Rota MC, Bella A, Caporali MG, Nicolau A, Drasar V, Ricci ML, Scaturro M, Gumá M, Crespi S. Travel-associated Legionnaires' disease: would changing cluster definition lead to the prevention of a larger number of cases? *Epidemiol Infect.* 2018 Dec 3;147:e62. doi: 10.1017/S0950268818003266. PMID: 30501676; PMCID: PMC6518564.

Dabrera G, Brandsema P, Lofdahl M, Naik F, Cameron R, McMenamin J, Pebody R, Phin N. 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. *Euro Surveill.* 2017 Sep 21;22(38):30618. doi: 10.2807/1560-7917.ES.2017.22.38.30618. PMID: 28935023; PMCID: PMC5709948.

Sánchez-Busó L, Guiral S, Crespi S, Moya V, Camaró ML, Olmos MP, Adrián F, Morera V, González-Morán F, Vanaclocha H, González-Candelas F. Genomic Investigation of a Legionellosis Outbreak in a Persistently Colonized Hotel. *Front Microbiol.* 2016 Jan 21;6:1556. doi: 10.3389/fmicb.2015.01556. PMID: 26834713; PMCID: PMC4720873.

Rota M, Scaturro M, Fontana S, Foroni M, Boschetto G, Trentin L, Blengio G, Bandettini G, Buratto T, Caporali M, Napoli C, Ricci M. Cluster of travel-associated Legionnaires disease in Lazise, Italy, July to August 2011. *Euro Surveill.* 2011 Oct 6;16(40):19982. doi: 10.2807/ese.16.40.19982-en. PMID: 21996379.

Payne L, Andersson Y, Ledet Muller L, Blystad H, Nguyen Tran Minh TM, Ruutu P, Joseph C, Ricketts K. Outbreak of Legionnaires' disease among tourists staying at a hotel in Phuket, Thailand. *Euro Surveill.* 2007 Jan 11;12(1):E070111.2. doi: 10.2807/esw.12.02.03109-en. PMID: 17370931.

### Selection of reading from published literature: Community outbreak of Legionnaires' disease

Scaturro M, Rota MC, Caporali MG, Girolamo A, Magoni M, Barberis D, Romano C, Cereda D, Gramegna M, Piro A, Corbellini S, Giagulli C, Rezza G, Caruso A, Ricci ML. A community-acquired Legionnaires' disease outbreak caused by *Legionella pneumophila* serogroup 2: an uncommon event, Italy, August to October 2018. *Euro Surveill.* 2021 Jun;26(25):2001961. doi: 10.2807/1560-7917.ES.2021.26.25.2001961. PMID: 34169820; PMCID: PMC8229375.

Faccini M, Russo AG, Bonini M, Tunesi S, Murtas R, Sandrini M, Senatore S, Lamberti A, Ciconali G, Cammarata S, Barrese E, Ceriotti V, Vitaliti S, Foti M, Gentili G, Graziano E, Panciroli E, Bosio M, Gramegna M, Cereda D, Perno CF, Mazzola E, Campisi D, Aulicino G, Castaldi S, Girolamo A, Caporali MG, Scaturro M, Rota MC, Ricci ML. Large community-acquired Legionnaires' disease outbreak caused by *Legionella pneumophila* serogroup 1, Italy, July to August 2018. *Euro Surveill.* 2020 May;25(20):1900523. doi: 10.2807/1560-7917.ES.2020.25.20.1900523. PMID: 32458793; PMCID: PMC7262491.

Fitzhenry R, Weiss D, Cimini D, et al. Legionnaires' Disease Outbreaks and Cooling Towers, New York City, New York, USA. *Emerg Infect Dis.* 2017;23(11):1769-1776. doi:10.3201/eid2311.161584

Shivaji T, Sousa Pinto C, San-Bento A, Oliveira Serra LA, Valente J, Machado J, Marques T, Carvalho L, Nogueira PJ, Nunes B, Vasconcelos P. A large community outbreak of Legionnaires disease in Vila Franca de Xira, Portugal, October to November 2014. *Euro Surveill.* 2014 Dec 18;19(50):20991. doi: 10.2807/1560-7917.es2014.19.50.20991. PMID: 25597540.

Sabria M, Alvarez J, Dominguez A, Pedrol A, Sauca G, Salleras L, Lopez A, Garcia-Nuñez MA, Parron I, Barrufet MP. A community outbreak of Legionnaires' disease: evidence of a cooling tower as the source. *Clin Microbiol Infect.* 2006 Jul;12(7):642-7. doi: 10.1111/j.1469-0691.2006.01447.x. PMID: 16774560.

Pereira A J, Broadbent J, Mahgoub H, Morgan O, Bracebridge S, Reacher M, Ibbotson S, Lee J. V., Harrison T G, Nair P. Legionnaires' disease: when an 'outbreak' is not an outbreak. *Euro Surveill.* 2006;11(48):pii=3089. <https://doi.org/10.2807/esw.11.48.03089-en>

Nguyen TM, Illef D, Jarraud S, Rouil L, Campese C, Che D, Haeghebaert S, Ganiayre F, Marcel F, Etienne J, Desenclos JC. A community-wide outbreak of legionnaires disease linked to industrial cooling towers--how far can contaminated aerosols spread? *J Infect Dis.* 2006 Jan 1;193(1):102-11. doi: 10.1086/498575. Epub 2005 Nov 28. PMID: 16323138.

## 6 Annex

The following documents are part of this exercise package, and can be found as separate documents on the EVA platform:

- Exercise modules, including master events list, injects and question sets, and participant response forms
- PowerPoint exercise presentation
- Debrief template