

# Legionella Risk Assessment and Control

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# Personal

- Director of Consulting Services  
ISHEM Consulting 2002-present
  - Legionella Risk Assessment & Control
  - HS&E Management Policy & Strategy
  - Expert Witness
  - HS&E Compliance Lead Auditor
- Past Chairman of Legionella Control Association

# Legionella Risk Assessment and Control

## Agenda:

- Legionellosis in Ireland
- Legislation and Guidance
- Risk Assessment
- Comparison of Irish Guidelines and BS8580
- Competence of Risk Assessors
- Value of Independent Risk Assessment
- Summary

# Legionellosis in Ireland



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# Legionellosis in Ireland

## Forms of Legionellosis

- Legionnaires' Disease: severe pneumonia, 10% fatality rate: incubation period of 2-10 days with high fever, chills, headache and muscular pains
- Pontiac Fever and Lochgoilhead Fever: non-pneumonic forms, no reported fatalities: influenza-like illness with fever, headaches and muscle pains; full recovery without treatment
- All forms of Legionellosis are caused by Legionella bacteria



# Legionellosis in Ireland

## Causal Agent

- caused by Legionella bacteria, of which there are >50 different species
- Legionella pneumophila (LP) is responsible for over 90% of reported cases
  - majority caused by LP serogroup 1
  - remainder caused by LP serogroup 2-14
- other 10% caused by other Legionella species

# Legionellosis in Ireland



Two members of staff at the Allianz insurance HQ in Dublin contracted Legionnaires' disease. Legionella bacteria found in building air-conditioning cooling tower

# Legionellosis in Ireland

## Legionnaires' Disease (LD) and Legionella

- South Eastern Health Board reported a patient with LD at St Luke's General Hospital in Kilkenny.
- 3 cases of LD at Wexford hotel (Easter 2011)
- Woman died after contracting LD at Waterford Regional Hospital.
- Man contracted community acquired LD in Cork, not travel linked but regular hot tub user
- Woman mid-30s working at St Vincent's Hospital Mountmellick contracted LD
- Legionella closed down Carrickfergus Leisure Centre – HSENI issue improvement notice



# Legionellosis in Ireland

## Legionnaires' Disease

- 67 reported cases during 2000-2007
- 15 reported cases in 2007, equivalent to 3.5 cases/million population
- over 60% of reported cases are associated with travel, about 30% are community acquired and <10% are nosocomial
- two-thirds of all cases were male
- fatality rate typically 9%

# Legionellosis in Ireland

## Reported cases of LD in Ireland

| Age Group            | 2003     | 2004     | 2005     | 2006      | 2007      | 2008      | 2009     | 2010      | 2011     |
|----------------------|----------|----------|----------|-----------|-----------|-----------|----------|-----------|----------|
| <30                  | 1        | 0        | 0        | 0         | 1         | 0         | 0        | 1         | 0        |
| 30-39                | 0        | 0        | 2        | 0         | 3         | 0         | 0        | 0         | 0        |
| 40-49                | 0        | 1        | 3        | 7         | 4         | 2         | 0        | 2         | 0        |
| 50-59                | 0        | 1        | 1        | 2         | 2         | 3         | 2        | 1         | 1        |
| 60-69                | 2        | 1        | 1        | 1         | 3         | 4         | 3        | 3         | 4        |
| 70+                  | 3        | 1        | 1        | 2         | 2         | 2         | 2        | 4         | 2        |
| <b>Total</b>         | <b>6</b> | <b>4</b> | <b>8</b> | <b>12</b> | <b>15</b> | <b>11</b> | <b>7</b> | <b>11</b> | <b>7</b> |
| <b>CIR / million</b> | 1.5      | 1.0      | 1.9      | 2.8       | 3.5       | 2.6       | 1.7      | 2.6       | 1.7      |

Data courtesy of HSE-HPSC – 2011 provisional data subject to confirmation

# Legionellosis in Ireland

## Legionnaires' Disease

- EWGLI adopted gold standard of 20 cases/million population
- reported cases may represent <10-15% actual due to under-diagnosis/reporting, including:
  - pneumonia being treated with Legionella effective antibiotic with no testing for LD
  - lack of sensitivity and specificity of diagnostic methods
  - cases not being notified

# Legislation and Guidance



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# Legislation & Guidance

## Legislation in Ireland

- The Safety, Health and Welfare at Work Act 2005 (S.I. No. 10 of 2005)
- The Safety, Health and Welfare at Work Regulations 2007 (S.I. No. 299 of 2007)
- The Safety, Health and Welfare at Work (Biological Agents) Regulations, 1994 as amended in 1998
- The Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001

# Legislation & Guidance

## The Safety, Health and Welfare at Work Act 2005

The employer and any person who has control to any extent of the place of work, are required, by Section 19 of the 2005 Act to:

- carry out a written risk assessment of the place of work, including, assessing the risk to non-employees using the workplace
- prepare a safety statement (section 20 of the 2005 Act) setting out the way in which risk is managed.

# Legislation & Guidance

## Safety, Health and Welfare at (Biological Agents) Regulations amended 1998

Regulation 4 (Appendix D) obliges the employer to:

- carry out a written risk assessment of exposure of an employee to a biological agents (including *Legionella bacteria*)
- identify appropriate control measures to be taken
- forward information on the risk assessment to the HSA, should the Authority so request.

# Legislation & Guidance

## National Guidance for Control of Legionellosis in Ireland 2009: Chapter 4: Risk Assessment

- Responsibilities, training and competence
- Undertaking a risk assessment
- Process of risk assessment
- Written risk assessment
- Frequency of risk assessment
- Risk rating

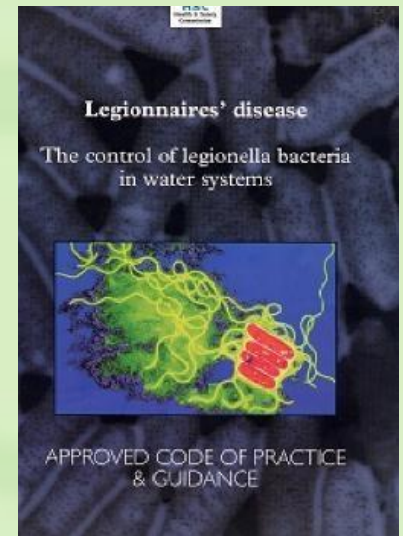


# Legislation & Guidance

## Legislation in Northern Ireland

### UK HSC Code of Practice L8 2000

- identifying & assessing risks
- managing the risk
- preventing or controlling the risk
- record keeping
- responsibilities of manufacturers, importers, suppliers and installers



# Risk Assessment

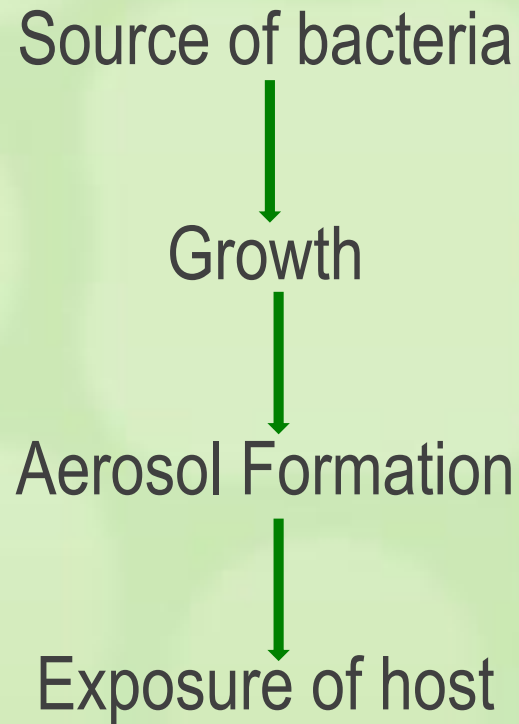


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# Risk Assessment

## Risk factors:



# Risk Assessment

## Risk Factors:

- Legionella is widespread in nature it can enter water systems in supply water and in airborne dust/debris
- Temperatures 20 to 45°C, nutrients, sludge, scale and corrosion deposits promote growth of Legionella
- Water droplets (aerosols), 2-5microns can carry Legionella into lungs by-passing natural defences
- Extended exposure to aerosols-contaminated with Legionella increases risks of infection
- Certain individuals have increased risk, e.g. elderly, smokers, alcoholics & diabetics; immunosuppressed patients; males x3 more susceptible than females

# Risk Assessment

## Ireland National Guidance:

- Legal obligation on employers to assess risk for Legionella prevention/control in workplace
- Risk assessors must be competent, independent of those carrying out control and remedial measures.
- Risk Assessment should:
  - identify and assess risk of exposure to Legionella
  - establish preventive and control measures
  - provide direction on prioritising risk control actions
- Assessment should also consider extent of exposure and the presence of vulnerable individuals

# Risk Assessment

## Ireland National Guidance:

- Risk assessment report should set out
  - scope of assessment
  - details of site, water systems and arrangements for managing and recording control of risks
  - assessment of risks for each system/activity
  - recommendations for preventing or controlling risks  
incl. monitoring and remedial actions
- Risk assessment should be reviewed regularly at least annually and in situations when the original assessment is considered to be no longer valid.

# Risk Assessment

## British Standard 8580 : 2010

- BS 8580 entitled Water quality. Risk assessments for Legionella control. Code of practice
  - Foreword / Introduction / Scope
  - Factors to be Considered
  - Preparation for Risk Assessment
  - Desktop Appraisal of Documentation
  - Site Visit/Survey
  - Risk Assessment Reporting
  - Risk Assessment Review
  - Annexes A - H

# Risk Assessment

## British Standard 8580 : 2010

### Scope

- BS8580 applies to assessments on premises, plant & systems and to review/audit of previous assessments
- BS8580 only covers artificial water systems and does not cover preparation of scheme of control

### Terms and Definitions

- Inherent risk: risk before controls put in place
- Risk appetite: risk should be as low as reasonably practicable (ALARP)



# Risk Assessment

## British Standard 8580 : 2010

### Factors to be considered

- contamination; amplification; transmission; exposure; and host susceptibility

### Preparation for risk assessment

*Competence of Risk Assessor:* specialist knowledge of Legionella bacteria, relevant water treatment and water systems and are competent. Risk assessor should demonstrate impartiality and integrity.

*Agreeing Terms of Reference:* scope, requirement for: schematics, communication & reporting; time frame for completion; access, safe working and permits, factors affecting validity of assessment; representative samples

# Risk Assessment

## British Standard 8580 : 2010

### Desktop appraisal of documentation

*Preparation:* current risk assessment should be appraised to check validity and identify changes

*Appraisal of Scheme of Control:* check adequacy of existing scheme of control

*Appraisal of Maintenance and Testing Records:* check implementation of actions in scheme of control; examine records, review actions taken after adverse results

*Appraisal of Management Responsibilities:* check appointment of duty holder/responsible person, roles of consultants, FM providers, WT suppliers, lines of communication/reporting

# Risk Assessment

## British Standard 8580 : 2010

### Desktop appraisal of documentation

*Appraisal of Training Records and Competence:* review training records, verify competence checks, how assessed and their adequacy for site and service providers

*Appraisal of Safe Operation of Systems:* check that scheme for safe operation and maintenance is in place and working

*Appraisal of Monitoring and Inspection:* confirm relevance/success of monitoring and inspection work incl. escalation procedures, availability of records, etc.

# Risk Assessment

## British Standard 8580 : 2010

### Site Visit/Survey

*General:* conduct a site survey with reference to schematics and logbooks

*Site Inspection:* interview to staff & managers, validate monitoring data, reporting of out-line conditions

*Visual Inspection of Sources of Contamination:* inspect water systems to determine condition and operation

*Measurement:* e.g. temperature, pH, biocides

*Testing for Legionella:* samples for Legionella analysis not normally required, except when assessor decides sampling is needed to assist in determining level of risk and adequacy of control measures

# Risk Assessment

## British Standard 8580 : 2010 Risk Assessment and Reporting

- Risk assessor should identify and record each hazard, and evaluate/assess its risk
- Risks should be analysed considering consequences and their likelihood
- Risk assessment should take account of inherent risk, the controls in place and mitigation of risk
- Risks should be evaluated by comparing levels of risk with those acceptable for each circumstance – ALARP
- Risk factors should be prioritised

# Risk Assessment

## British Standard 8580 : 2010 Risk Assessment and Reporting

Report should:

- contain sufficient detail to allow owners of risk to understand key issues/actions required to control risk.
- identify cause/source of risk, evaluating risk factors and prioritisation of corrective/remedial actions; when the assessment should be reviewed.
- explain how risk is determined
- make practical recommendations to control any risks identified and how they can be eliminated/minimised

# Risk Assessment

## British Standard 8580 : 2010 Risk Assessment Review

- Risk assessment should be reviewed every 2 years or when changes to water systems, management of control measures, information of Legionella
- Validity of risk assessment should be reviewed by considering risks identified & how these are changing over time; monitoring data for controls in place; whether risks are being managed; escalation of risk management issues
- Risk assessment should be revised as required

# Comparison of Risk Assessment Requirements in Irish Guidelines and BS8580



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# Comparison Irish Guidelines-v-BS8580

| Requirement   | Irish GL        | BS 8580         |
|---|-----------------|-----------------|
| Risk assessors should be competent, independent of those carrying out control and remedial measures   | YES             | YES             |
| Scope of Assessment should be defined   | YES             | YES             |
| Identify and assess risk of exposure to Legionella; recommend actions to eliminate or control risk; and assist in prioritising actions for risk control | YES             | YES             |
| Risk assessment should consider contamination; amplification; transmission; exposure; and host susceptibility   | YES             | YES             |
| Risk assessment report should contain sufficient detail for owners of risk to understand risk levels and actions required to control risk               | YES             | YES             |
| Risk assessment should be reviewed if considered no longer valid and at least annually / 2 yearly   | YES<br>annually | YES<br>2 yearly |

# Assessing Competence of Risk Assessors



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# Assessing Competence

## What is Competence?

- competence is a product of training experience, knowledge and other qualities enabling the job to be carried out properly and safely
- level of competence required will be dependent on the needs of situation and the nature of the risks involved
- where specialist input is required then both the competence of the individuals and organisation should be tested.

# Assessing Competence

## Competence of Risk Assessors

In employing risk assessors the responsible person is required to make reasonable enquiries as to be satisfied of the competence of the individual and organisation, including details of:

- Availability of training records
- Assessed training
- On-the-job checking of competence

Guidance on competency can be obtained by reference to the appropriate professional body or trade association e.g. UK Legionella Control Association

# Value of Independent Risk Assessor



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# Value of Independent Risk Assessor

- Risks are assessed impartially avoiding commercial interest in servicing remedial or corrective actions, or routine water treatment and hygiene servicing.
- Risk assessment reviews are conducted impartially enabling the performance of existing risk control measures to be assessed objectively and any defects identified and corrected
- Risk assessment reviews can more effectively challenge existing risk control programmes - reducing monitoring, treatment and testing requirements
- Easier for responsible person to demonstrate compliance with Irish Guidelines and BS 8580

# Summary



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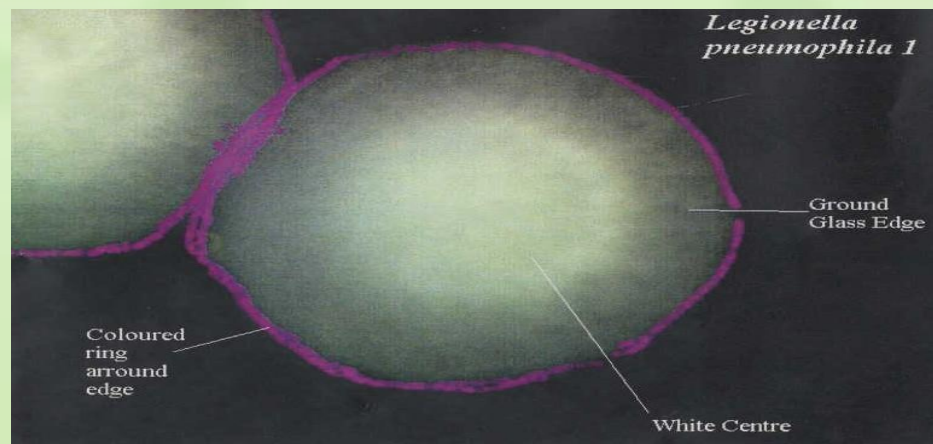
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# Summary

- Risk Assessment for Legionella control is a legal requirement
- Risk Assessors should be competent and independent
- Risk assessment must identify and assess risk of exposure to Legionella and make recommendations for controlling risk ALARP
- Risk assessment must be reviewed at least annually and 2 yearly (NI)



# Legionella bacteria



# Risk Assessment Checklist

## Before appointment

- check the competence of the assessor
- agree scope and terms of reference
- use an independent risk assessor

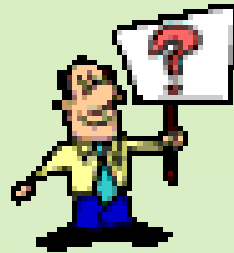
## Does the risk assessment take account of:

- contamination; amplification; transmission; exposure and host susceptibility

## Does the risk assessment include:

- desktop appraisal of documentation; site survey information; risk scoring systems and recommend control measures

Any Questions



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