



# Legionella and Meth Labs Risks in Hospitality and Resorts

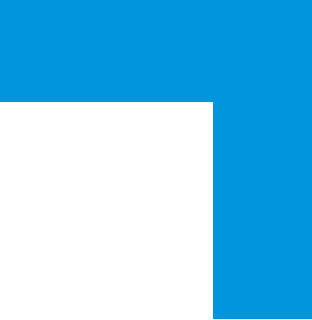
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# Legionella

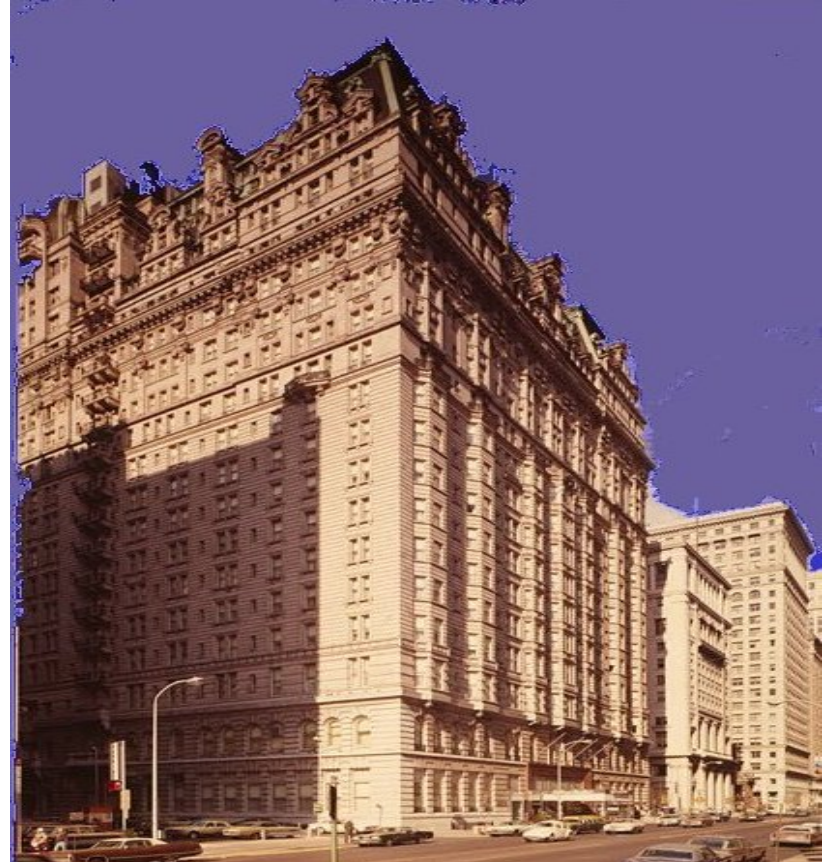
A Hidden Cause of Death



# Bellevue Stratford Hotel - 1976

## *Legionnaires Disease and Legionella*

- Named after fatal outbreak at 1976 American Legion Convention in Philadelphia
- 34 died
- 221 others sickened



# Legionella Bacteria

*Legionella* bacteria are natural inhabitants of water and are common in the environment:

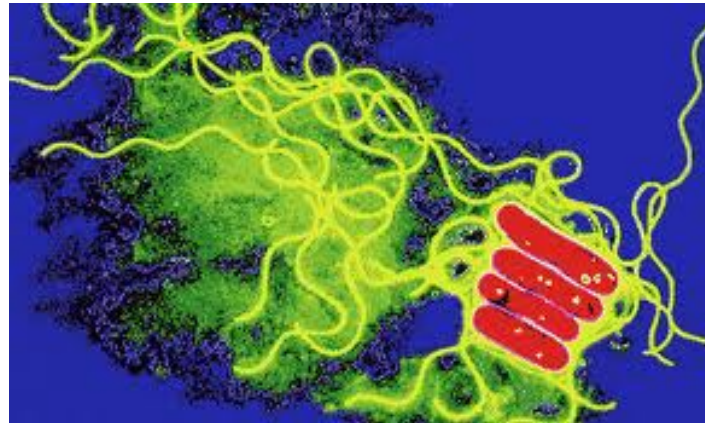
- In the water
- In the soil

*Legionellosis* leads to two distinct illnesses in people:

- Legionnaires Disease, a pneumonia-like illness
- Serious and can be fatal
- Pontiac Fever, an influenza-like illness – not serious

Neither is contagious

Neither is a food borne illness



# Exposure

## Route of exposure – inhalation

- Inhalation of small aerosol particles from water mists
- Mist sources: fountains, shower heads, spas, sprayers, misters, aerators, cooling towers

## Route of exposure – aspiration (uncommon)

- Aspiration of mouth fluid into the lungs
- Mist source may not be required – drinking water with *Legionella* would suffice
  - Ice Machines



# Legionella Illness

## Incidence and Mortality

- 2000 – 2009: 22,418 cases reported in US\*
- Estimated 8,000 - 18,000 hospitalized each year in US\*
- About 1 in 100,000 people (same in Europe)
- 99% Legionnaires Disease - 1% Pontiac Fever
- 4% related to a known outbreak or cluster
- 8% of reported cases were fatal



# Legionella Susceptibility

## Persons At Higher Risk

- Have underlying illness or weak immune system
  - Elderly (55+)
  - Smokers
  - HIV positive
  - Recent organ transplant or chemotherapy



# Cooling Towers

## Outdoor air intake adjacent to Cooling Tower

- Mists entrained into HVAC system
- Near main entrance and valet
- Next to parking structure
- Possible impact to guests and employee's





# Domestic Water

Hot and cold water systems (sources of mist)



# Sources of Mist

Showers

Produce Misters

Humidifiers

Spa's

Aerators

Kitchen Sprayers

Fountains

Pools



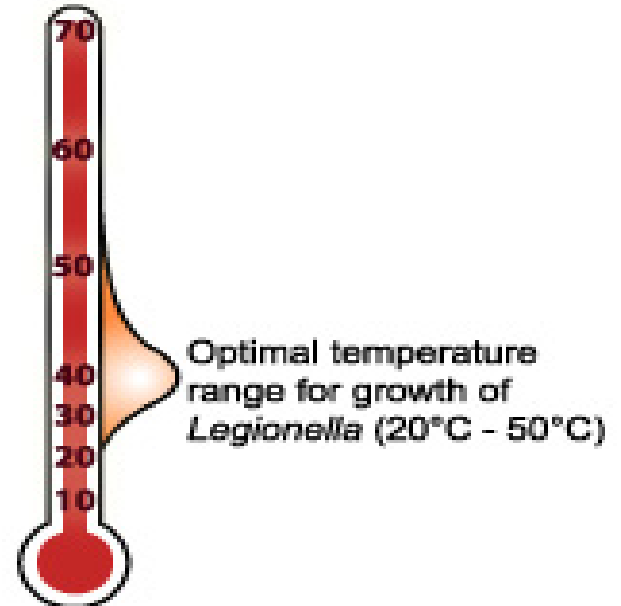
# Water Temperatures

Temperatures in cold-water systems should be maintained at a sufficiently low temperature (20°C, 68°F, or lower) to minimize bacterial growth

Temperature in hot-water systems should be maintained at a sufficiently high temperature (60°C, 140°F, or higher)

Temperature for growth

68°F to 122°F (90°F to 105°F optimal)



# Legionella Growth Conditions

Water temperature 68°F to 122°F

No residual chlorine

Stagnant water – inactive line/fixture

Presence of biofilms, growth of algae, protozoa and other bacteria



# Legionella Control Conditions

Water temperature  $>122^{\circ}\text{F}$  – *Legionella* starts to die – slowly

Water held @  $140^{\circ}\text{F}$  for 10 minutes to 1 hour in tank – more thorough kill

Shock heating and chlorination to reduce levels in systems

Continuous treatment (e.g. chlorine dioxide)



# How Does *Legionella* Get In My Water ?

## Domestic Water Supply to Facility

- Public water supplier
- Private well

## Construction or Repair

- Soil/dirt in plumbing
- Inadequate flushing/disinfection
- Connection to contaminated systems

## Outdoor dusts

- Cooling towers
- Fountains



# How Does *Legionella* Grow To Levels Of Concern ?

Cold Water >68°F in system

- Pipes exposed to high outdoor temperatures
- Non-insulated adjacent cold and hot lines
- Infrequently used cold water lines

Hot Water <122°F in system

- Water heater setting (scalding protection)
- Long and/or poorly insulated lines
- Infrequently used hot water lines

Biofilms - slime



# The Dead Leg

Creates potential for Legionella growth





# Food Production And Preparation

## Risk Factors

- Multiple uses of water
- High potential for mist exposure
- Steam from cooking or washing operations

## Risk Reducing Factors

- Control of water source – dedicated systems
- Control of water temperature – sanitation versus anti-scalding
- Improve ventilation
- Wear N-95 particulate respirators during heavy steam cleaning activities



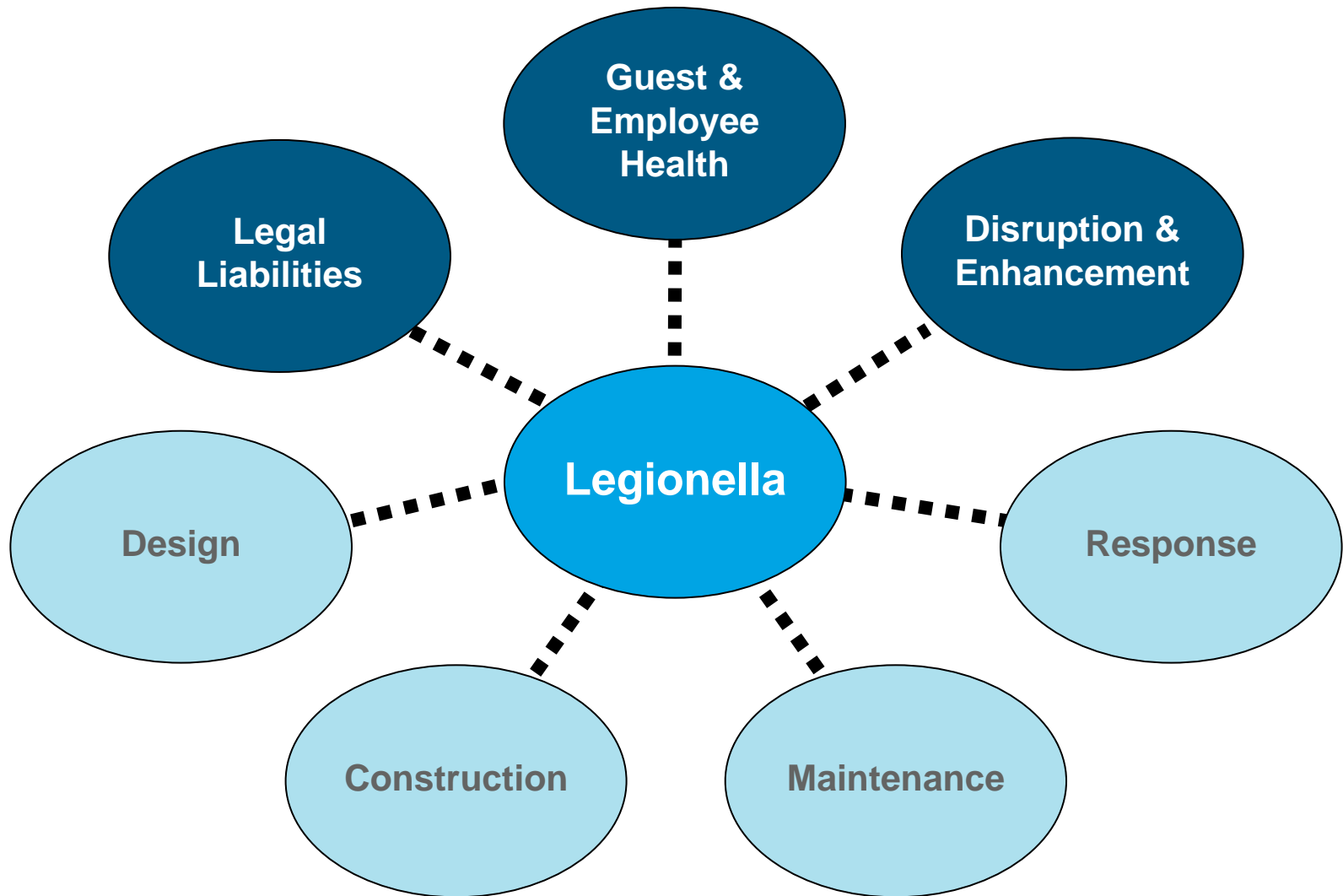
# Food Production And Preparation

## Concerns

- Infrequently used plumbing – “dead leg”
  - Seasonal production or use
  - Excess capacity
- Out of service for repair or renovation
- Employee exposures during flushing
  - Remove spray or aeration devices
  - Wear N-95 particulate respirator



# Risk Management Considerations



# Legionella – Hospitality Case Studies

## Northeastern United States

- Resort named as possible site for cluster outbreak
- Areas impacted were back of house

## Southwestern United States

- Hotel/Resort guest death traced to hotel water feature
- Sampling supports that the hotel was potentially liable



## Southwestern United States

- Guests of Hotel/Resort are diagnosed with legionnaires disease
- Local health authority requests to sample water systems
- Local health authority samples multiple systems
- Results of sampling require Owner to remediate the property

# Legionella – Guidelines

## OSHA Technical Manual

- “Legionnaires’ Disease”
  - [www.osha.gov/dts/osta/otm/otm\\_iii/otm\\_iii\\_7.html](http://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_7.html)

## ASTM D 5952-02

- “Standard Guide for Inspecting Water Systems for *Legionella* and Investigating Outbreaks of *Legionellosis*”

## PathCon Laboratories

- Technical Bulletin 1.5
  - “*Legionella* Bacteria in Environmental Samples: Hazard Analysis and Suggested Remedial Actions”
  - Published 1990 – still cited and applied
  - Adapted by OSHA

## ASHRAE 188P

- “Prevention of *Legionellosis* Associated with Building Water Systems”

# ASHRAE 188P – HACCP Specifics:

(Hazard Analysis and Critical Control Point)

- HACCP Plan - ASHRAE 188 approach
- Form team of knowledgeable employees, suppliers, contractors, and consultants
- Perform Hazard Analysis
  - ID potential significant hazards in water systems
- Critical Control Points
  - ID points in water systems where control is critical to health
  - Apply and maintain controls at critical points

# Prevention

## Design – New Construction or Renovation

- Eliminate or reduce hazards by design
- Specify engineering controls in design

## Construction or Repair of Water Systems

- Isolate clean sections from open sections
- Prior to bringing on-line
  - Flush and disinfect open (dirty) sections
  - Sample for bacteria, including *Legionella*



# Operations And Maintenance

Install critical controls

Monitor performance of critical controls

- Residual chlorine
- Water temperature
- Sample results - *Legionella* bacteria in water
  - Initial & periodic

Manage repairs and renovations

“Exercise” low-use lines – flush frequently

Plan for an event – concern or outbreak





# Case Study – Southwest United States



## Condominium Hotel

- New Construction
- New Plumbing leaked during construction
- Infrequent occupancy
- Elderly and ill guests
- Infected cooling towers
- Infected domestic hot water
- Luke warm “hot” and “cold” water

## Litigation Defense Parties

- Building Owners
- Condo Association
- Building Managers
- General Contractor
- Plumbing Contractor
- Cooling tower treatment contractor:
  - Tower Service
  - Domestic Water

## Liability Concerns

- Cooling Towers
  - Building owners
  - Building managers
  - Tower treatment contractor
- Domestic Water (const)
  - General Contractor
  - Plumbing Contractor
  - Tower treatment contractor – Most knowledgeable?
  - No warning to Owners or other trades

# Incident Response Plan

## Actions

- Start when *legionella* counts in systems are higher than that of the municipal water system
- Intensive control start when over 10 cfu/ml

## Sample Plans for all suspect sources

- Data evaluation and remediation targets

## Treatment Plan

- Heat
- Chlorination
- Chlorine dioxide
- Ultraviolet Light



# Manage The Risk

## Access Resources:

- Understand how water impacts your facilities
- Educate engineering and facility personnel
- Review company policy and coverage solutions
- Discuss potential concerns with your insurance carrier and broker
- Identify response resources for planning and emergencies
- Create management programs with environmental consultants
- Involve outside resources when planning construction or renovations
- Contact professionals immediately if notified of a possible outbreak





# METH LABS

Emerging Risk For  
The Hospitality Industry

Should I Be Worried ?

# Methamphetamine: America In Crises

## The Social Impacts of Methamphetamine:

- In the news:
  - Call it crystal, crank, ice... you don't want to be around it.
  - 84,000 Meth labs have been seized in the United States since 2004.\*
  - Fewer than 5% of the labs are discovered.\*



# Methamphetamine: America In Crises

## The Impacts of Methamphetamine on the Hospitality Industry:

- For every pound of Meth produced, 5-7 pounds of waste remains\*
- Traces of Methamphetamine have been found in Hotels and Motels across the country. They can be released from porous materials for months, even years
- Hotel workers have been unknowingly exposed to chemical waste and ammonia
- Short term exposure can lead to headaches, nausea and fatigue
- Long term exposure can lead to kidney failure and neurological problems

# What Does A Hospitality Meth Lab Look Like?



## The Lab Materials

- Tempered glass products
- Assorted chemicals
- Hot plates
- Filters
- Hose and filters
- Extremely flammable

## The Location

- Motel and Hotel rooms are preferred
- Many higher end hotels and resorts are also seeing "cooking" activity
- Gasses are often vented into sinks or directly into commodes using flexible dryer vent tubing

## The Technique

- Shake and Bake (One method)
- Easily concealed in a backpack or suitcase
- Mobile
- Quick turn around times
- Hide behind "Do not Disturb" signs

# Primary Chemical Exposures

## All Types of Cooking Methods

- Solvents
- Hydrochloric Acid
- Methamphetamine

## Red Phosphorous

- Phosphine
- Iodine

## Anhydrous, Nazi or Birch Reduction

- Anhydrous Ammonia





# What Are the Hazards?



## Fire and Explosion

- Damage to Property
- Potential injury to guests or employee's
- Associated costs of cleanup
- Business interruption costs

## Brand Reputation

- Emergency Response actions from police and fire
- Media coverage
- Reduced occupancy
- Potential for litigation

# Voluntary Federal Guidelines

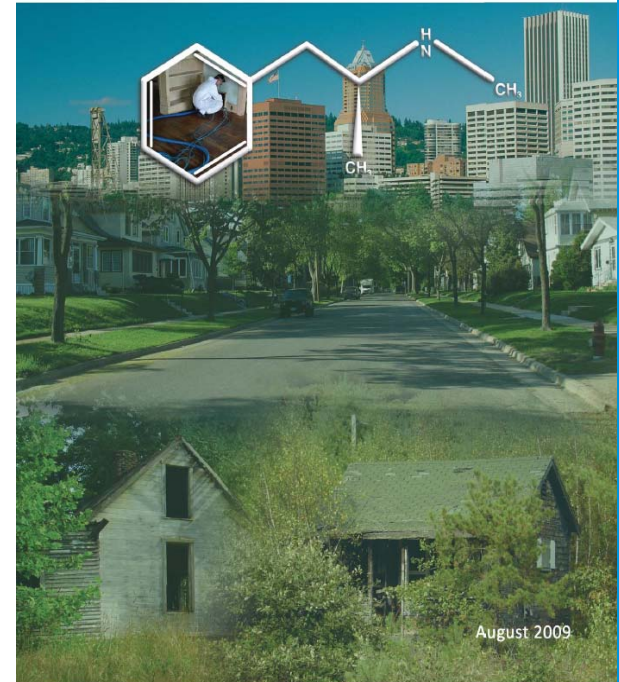
US Environmental Protection Agency.

- Resource guide
- Describes hazards and provides guidelines for worker and property protection.



U.S. Environmental Protection Agency

## Voluntary Guidelines for Methamphetamine Laboratory Cleanup



# Remediation Concerns

## Incorporation Into Building Materials

- Carpeting
- Drywall
- Clothing

## Smoke Residuals vs. Surface Residuals

## Sampling Protocols

- How many samples
- Stratification of samples

## Decontamination Solvents

## Who will perform the remediation



# Remediation Concerns

Primary removal conducted by Law Enforcement

Many states have enacted Remediation Guidelines

General Requirements:

- Removal of porous surfaces
- Cleaning of smooth surfaces
- Removal of carpeting
- Removal of contaminated material
- Containment of remaining contaminated materials
- Post remediation sampling

Additional Concerns

- Septic systems and surrounding soils

# Risk Management Concerns

## Contamination

- Was the physical structure contaminated?
- How was it contaminated?
  - Chemical or Smoke
  - Expected Problems (air handling equipment, other)

## Clean-up

- Was the clean-up effective?
- Is the residence/room ready to be occupied?
- Have the guidelines been met?



## Liability

- What are the ramifications associated the clean-up and associated method?

# Manage The Risk

## Access Resources:

- Educate engineering, facility and housekeeping personnel to dangers
- Ensure that defined protocols are established and understood by all staff who may encounter production materials or residue
- Discuss potential concerns with your insurance carrier and broker
- Review company policy and coverage solutions
- Create management/response programs with environmental consultants
- Isolate areas if site contamination is suspected
- Establish resources with local emergency responders and law enforcement



# Thank You

AIG Hospitality and Leisure  
Industry Practice Group

Forensic Analytical Consulting Services, Inc.

# Questions and Answers



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