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# The Room-Temperature Lavatory, Getting (completely) out of Hot Water

# 2009 Legionnaires' Disease becomes #1 Drinking Water outbreaks in US

## CDC Reported DW Outbreaks 1971 - 2012

1 – 1974 EPA SDWA

2 – 1987 South Dakota Plumbing Code

3 – 1989 ASHRAE 90.1

4 - 1998 OSHA Legionella Guideline

5 – 1998 USGBC LEED

6 – 1999 ACHD Legionella

7 - 2000 ASHRAE Guideline 12

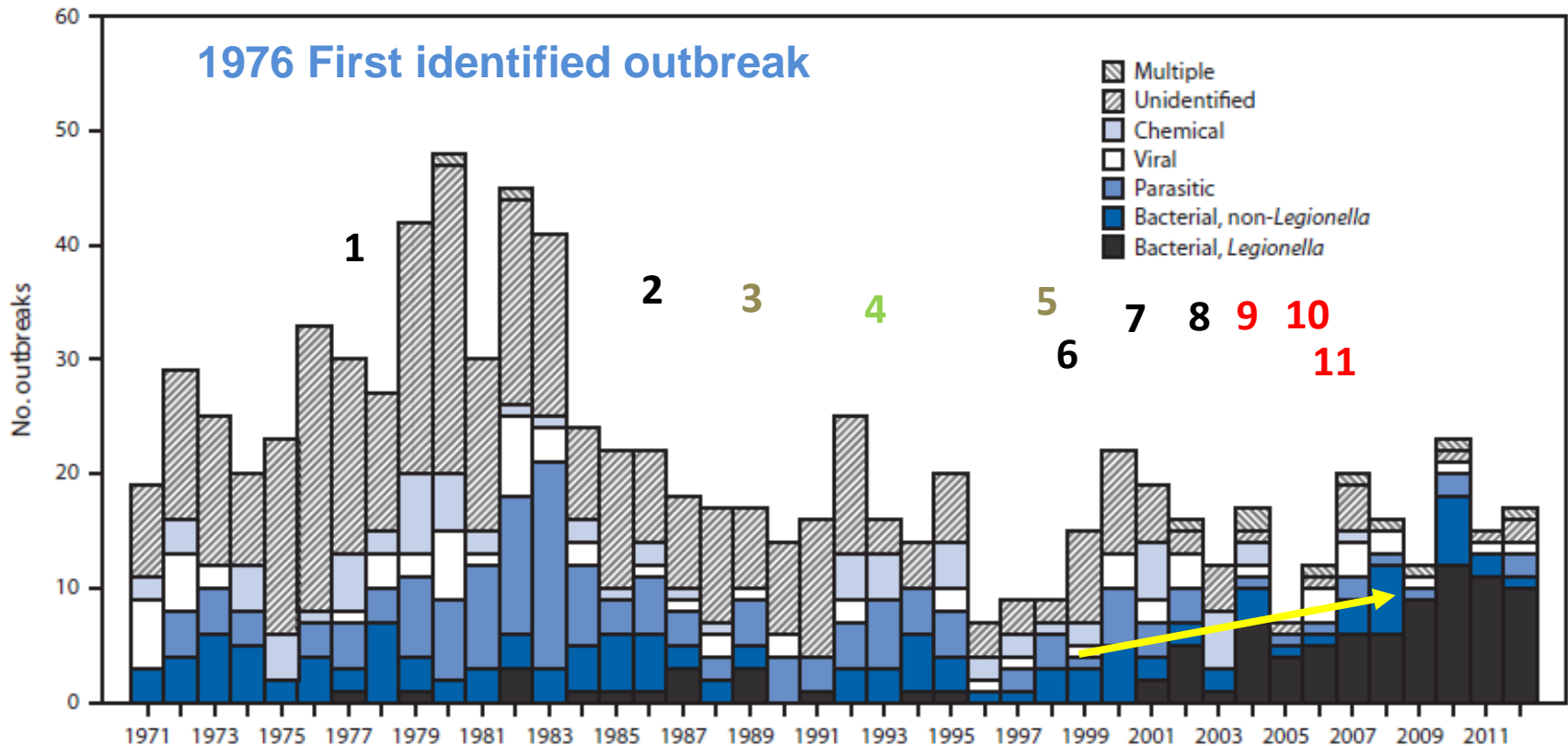
8 – 2001 Joint Commission EOC

9 - 2003 CDC EIC Guideline

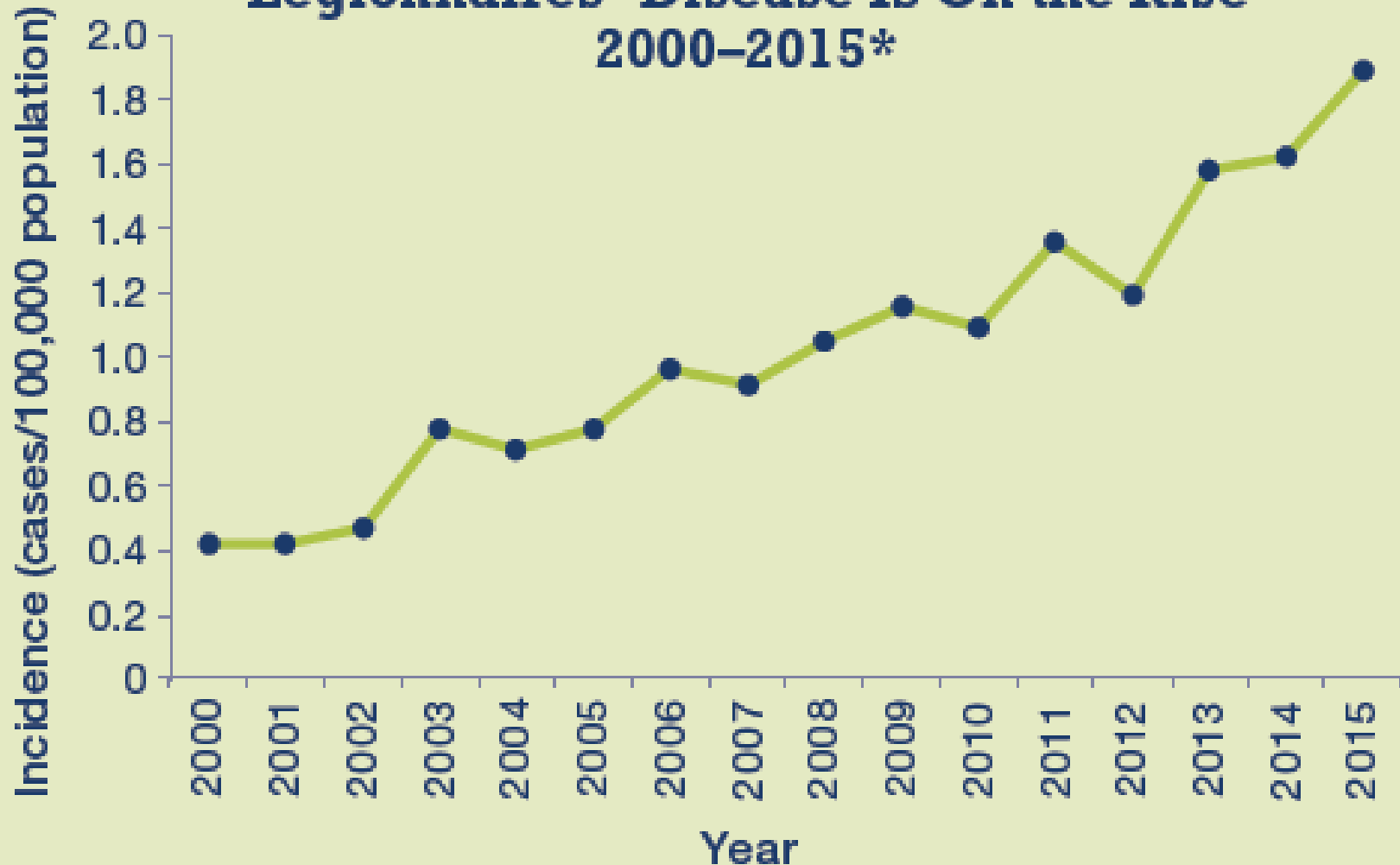
10 – 2006 IPC Public Handwashing Sinks 85 to 110

11 - 2007 EPA Water Sense

FIGURE. Etiology of 885 drinking water-associated outbreaks, by year — United States, 1971–2012\*



## Legionnaires' Disease Is On the Rise 2000–2015\*



\* National Notifiable Diseases Surveillance System

# **International Emerging Technology Symposium**

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## **Water Quality, Water Savings and the Water-Energy Nexus Three Issues, One Solution?**

**By**

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# ASHRAE 90.1 “Energy Standard for Buildings Except Low-Rise Residential Buildings” (1989)

**11.4.5.2 Lavatories in public facility restrooms (such as those in service stations, airports, train terminals, and convention halls) shall meet all of the following requirements:**

(a) **Flow Rate**, Be equipped to limit the flow of hot water to

1. **either a maximum of 0.50 gpm,**

2. or 0.75 gpm if a device or fitting is used that limits the period of water discharge, such as a foot switch or fixture occupancy sensor,

3. or 2.5 gpm if equipped with a self-closing valve.

(b) **Total Flow**,

1. Either be equipped with a foot switch or fixture occupancy sensor or similar device

2. or be equipped with a device or fitting that limits delivery to a maximum of 0.25 gallons per cycle of hot water for circulating systems and a maximum of 0.50 per cycle gallons for non-circulating systems. Lavatories for physically handicapped persons need not be so equipped.

**(c) Temperature, Limit the outlet temperature to 110°F maximum.**

This problem began with  
the best of intentions  
and we all know where that leads...



# IPC 2006

| Plumbing Fixture                    | Maximum Discharge Temperature |
|-------------------------------------|-------------------------------|
| Bidet                               | 110°F                         |
| <b>Public Hand washing Stations</b> | <b>85°F to 110°F</b>          |
| Showers                             | 120°F                         |
| Bathtub / Whirlpool Bathtub         | 120°F                         |

# IPC 2012

- 416.5 Tempered water for public hand-washing facilities. Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for customers, patrons and visitors.



# Safety Showers

## ANSI Z358.1-2004

### Water Temperature

The ANSI Z358.1-2004 requires tepid water and defines it as, “Moderately warm; lukewarm.” A good range to stay between is **60-95** degrees F. To assure tepid water, the equipment generally needs both hot and cold water, with a blending valve to mix the water. Consult the MSDS to determine if a chemical reaction is accelerated by the flushing fluid temperature. You may need to consult with a medical professional if this is the case.

# And to make matters worse

- The 2014 version of the standard states that the water temperature delivered by emergency equipment should be 'tepid.' Tepid is defined to be between 60°F (16°C) and 100°F (38°C).

# Nonfatal Scald-Related Burns Among Adults Aged $\geq 65$ Years --- United States, 2001—2006

CDC MMWR Weekly September 18, 2009 / 58(36);993-996

A total of 705 ED visits for nonfatal scald burns were identified during the study period. No consistent temporal variation in the number of visits was observed across the 6 years,<sup>†</sup> or by hours of the day, days of the week, or seasons of the year. In 536 (76%) of the 705 visits, the nonfatal scald burn occurred at home, most commonly in the kitchen (60%), dining area (20%), and bathroom (11%). Hot food was involved in 42% of burns (rate = 9.9 per 100,000), hot water or steam in 30% (rate = 7.2), and contact with cookware in 9% (rate = 2.2); 8% (rate = 1.9) of nonfatal scald burns were related to home or kitchen appliances, including 3% with microwave ovens. Among the 705 visit narratives, 90% recorded the type of liquids associated with the burn, including hot (boiling) water (42%), hot oil (21%), coffee (15%), food (12%), steam (7%), and tea (3%).

# Nonfatal Scald-Related Burns Among Adults Aged $\geq 65$ Years

--- United States, 2001—2006

CDC MMWR Weekly September 18, 2009 / 58(36);993-996

“During the 6-year period, the estimated average annual number of initial ED visits for nonfatal scald-related burns in persons aged  $\geq 65$  years was 8,620.”

Of that number only 220 cases per year were related to potable hot water (sinks, showers and tubs)

# Nonfatal Scald-Related Burns Among Adults Aged ≥65 Years --- United States, 2001—2006

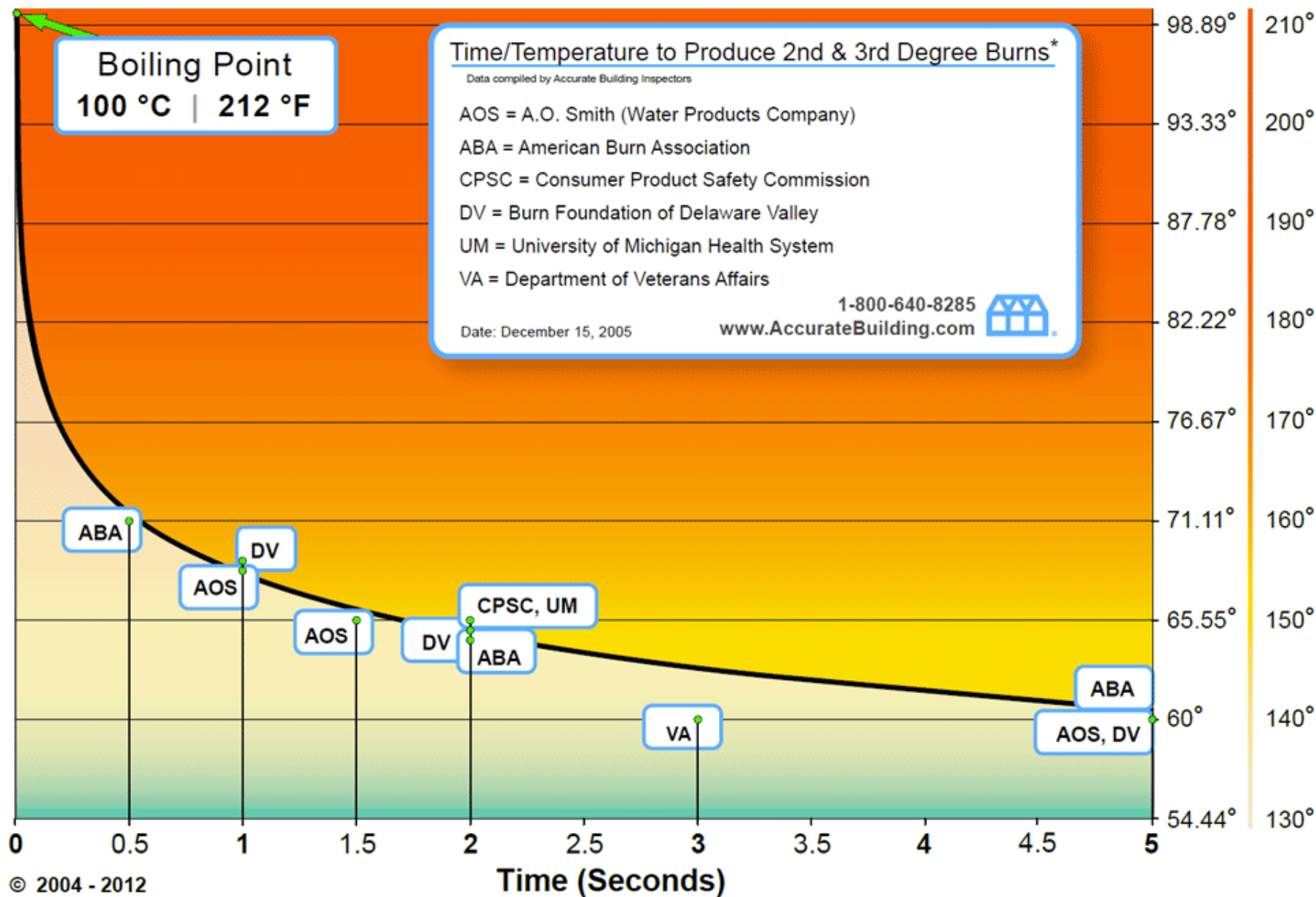
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| Burn Source               | Number |
|---------------------------|--------|
| Food                      | 3,580  |
| Water/steam               | 2,600  |
| Cookware**                | 780    |
| Home/kitchen appliances†† | 690    |
| Bathroom products§§       | 220    |
| Dining accessories¶¶      | 220    |
| Other***                  | 480    |
| Unknown¶                  | 50     |
|                           | 8,620  |

§§ Includes bathtub, shower, and whirlpool.

# Hot Water Burn & Scalding Graph

**Temperature**  
 °Celsius / °Fahrenheit  
 °C °F



# **UPC Code Change Submittal #1**

## **Understanding Temperature and Legionella**

# Design Temperature Risk Analysis Legionella vs Scald

|         |        | Temp Range  | Name             | Risk             |           |
|---------|--------|---|------------------|------------------|-----------|
|         |        |   |                  | Legionella       | Scald     |
| 82.2° C | 180° F | ≥160  | Disinfecting Hot | No               | Immediate |
| 76.7° C | 170° F | ≥140 to <160  | Very Hot         | No               | Very High |
| 71.1° C | 160° F | ≥130 to <140  | Hot              | No               | Moderate  |
| 65.5° C | 150° F | ≥120 to <130  | Tempered         | Very Low         | Very Low  |
| 60.0° C | 140° F | ≥110 to <120  | Warm             | Moderate to High | No        |
| 54.4° C | 130° F | ≥85 to <110   | <b>Tepid</b>     | <b>Very High</b> | <b>No</b> |
| 48.9° C | 120° F | <b>DANGER – PETRI DISH RANGE FOR HUMAN PATHOGENS!</b> |                  |                  |           |
| 43.3° C | 110° F | ≥77 to <85  | Tepid Cold       | Very Low         | No        |
| 37.8° C | 100° F | < 77°F  | Cold             | No               | No        |
| 32.2° C | 90° F  |   |                  |                  |           |
| 26.7° C | 80° F  |   |                  |                  |           |
| 21.1° C | 70° F  |   |                  |                  |           |
| 15.6° C | 60° F  |   |                  |                  |           |
| 10.0° C | 50° F  |   |                  |                  |           |

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Effective Engineering Solutions to Engineering System Pathogens



# UPC Code Change Submittal #2

~~**407.3 Limitation of Hot Water Temperature for Public Lavatories.** Hot water delivered from public-use lavatories shall be limited to a maximum temperature of 120°F (49°C) by a device that is in accordance with ASSE 1070/ASME A112.18.1070/CSA B125.3 The water heater thermostat shall not be considered a control for meeting this provision.~~

**407.4 Transient Public Lavatories.** Self-closing or metering faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to service stations, train stations, airports, restaurants, and convention halls. Transient public lavatories shall be provided with cold water, hot water or both. Hot water delivered from transient public-use lavatories shall be limited to a maximum temperature of 120°F (49°C) by a device that is in accordance with ASSE 1017 or ASSE 1070/ASME A112.18.1070/CSA B125.3 The water heater thermostat shall not be considered a control for meeting this provision.