



**MINISTRY
OF HEALTH**



For a healthier life

Reducing Exposure to Lead in Drinking Water

December 2017

Lead

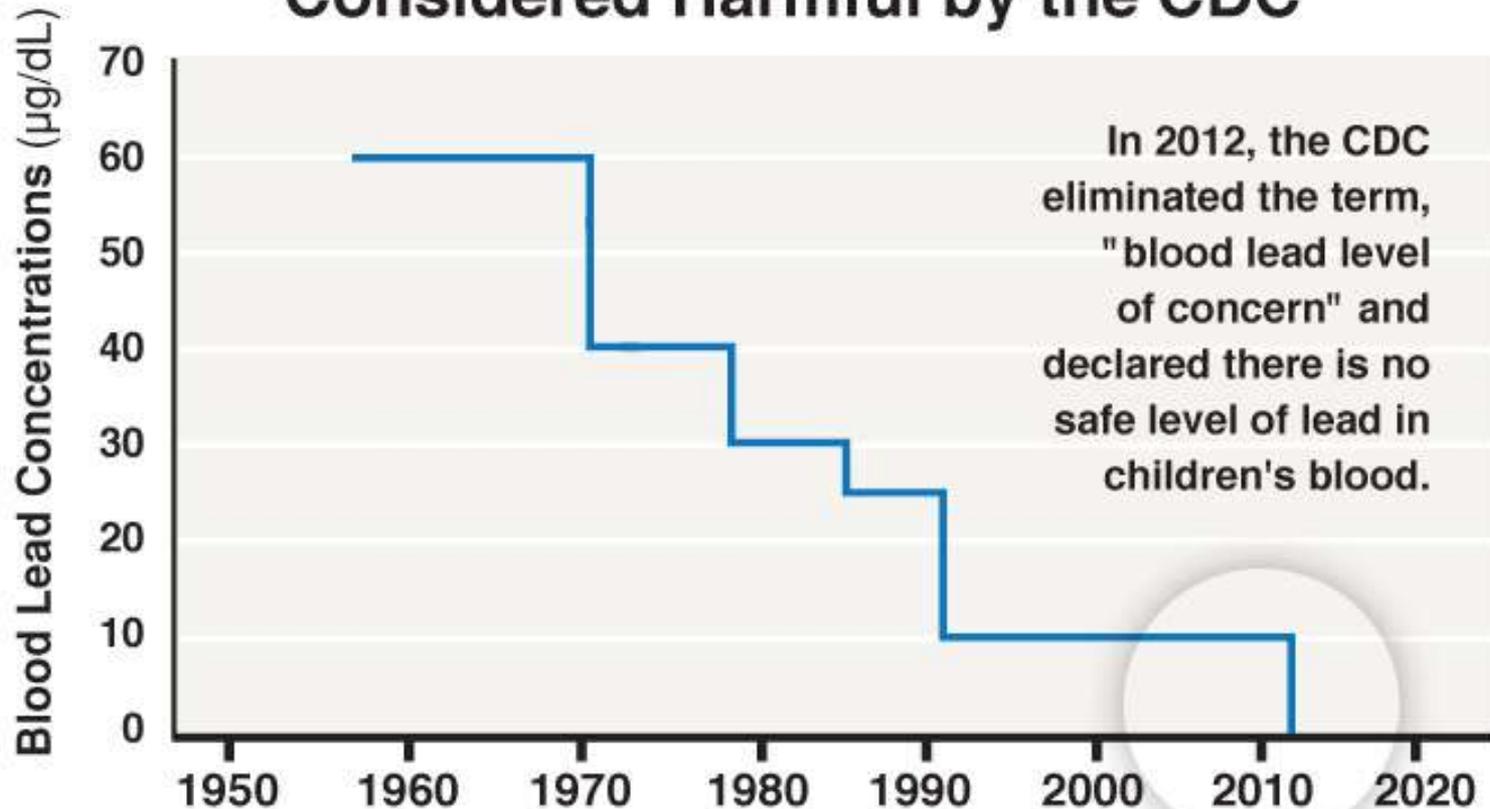
Adverse Health Effects on:

- Cognition (IQ, memory, attention)
- Cardiovascular disease
- Kidney function
- Reproduction

Susceptible populations include the developing fetus, infants, young children (rapid development of the central nervous system)

Exposure to very low concentrations associated with reductions in IQ and academic performance, increase in aggressive behavior

Blood Lead Concentrations Considered Harmful by the CDC



Reference: Lanphear et al., 2005, *Environmental Health Perspectives*

No Safe Dose of Lead in Drinking Water

- The drinking water guideline value recommended by the World Health Organization, and adopted as the Israeli standard (10 $\mu\text{g}/\text{L}$) is based on analytical and practical considerations and not public health risk
- The EU Scientific Committee on Health and Environmental Risks (SCHER) concluded in 2011 that effects can occur at the proposed drinking-water standard for lead (10 $\mu\text{g}/\text{L}$) and that a further reduction in lead intake is warranted for risk reduction

Framework for Water Quality Protection

	At the source	In the public/ municipal supply system	In the building supply system – private and institutional
Source of Lead	Environmental	Supply system	Plumbing system
Testing	~ 150 chemical and microbial parameters are tested	Microbial, heavy metals , treatment chemicals and byproducts	Microbial, treatment chemicals, heavy metals (lead, copper, iron)
Frequency	depends on source type, quality, specific parameter	depends on size of population	In institutions and businesses – testing according to MOH instructions In private homes - voluntary
Responsibility	water supplier	water supplier	institutions/ property owners

Control of Lead in Drinking Water

Regular Testing in Drinking Water
Source

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graph TD; A[Regular Testing in Drinking Water Source] --> B[Regular Testing in the Supply System]; B --> C[Within structure];
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Regular Testing in the Supply
System

Within structure

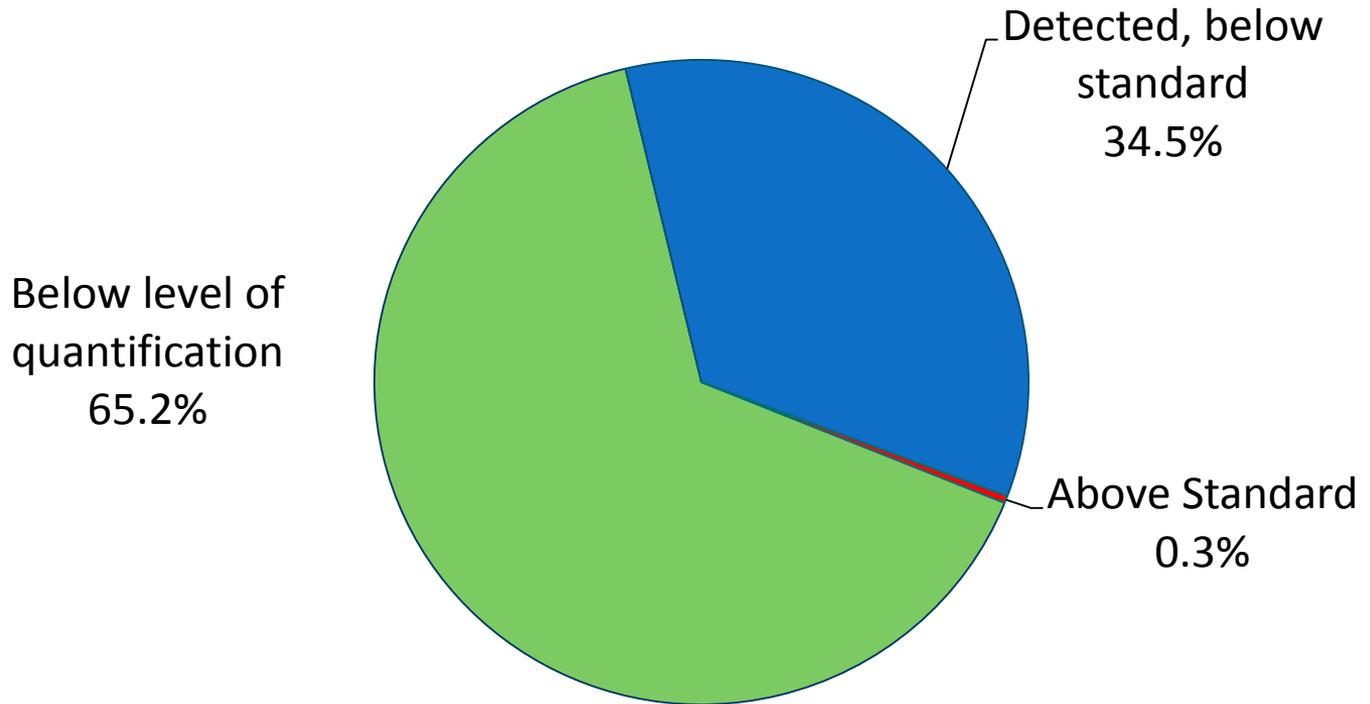
**Requirements from 2004 – Israeli standard 5452
includes heavy metal leaching requirements**

Update in 2016 – lead content reduced to 0.25%

Fixtures and pipes as sources of lead in drinking water

- ❑ Fixtures and pipes can leach heavy metals to water as result of electrochemical activity, or use of un-stabilized water in supply system
- ❑ Lead can be found in galvanized pipes, pipes from copper, plastic, bronze and steel valves and fixtures, and those made of metal alloys containing copper, lead and zinc
- ❑ In 2014 – 2016, 5180 routine tests in the supply system, of which 99.7% were below the standard; rare instances of exceedances are handled by the water supplier

Lead Concentration in Drinking Water in Municipal Water Supply System, 2014 - 2016 (n = 5178)



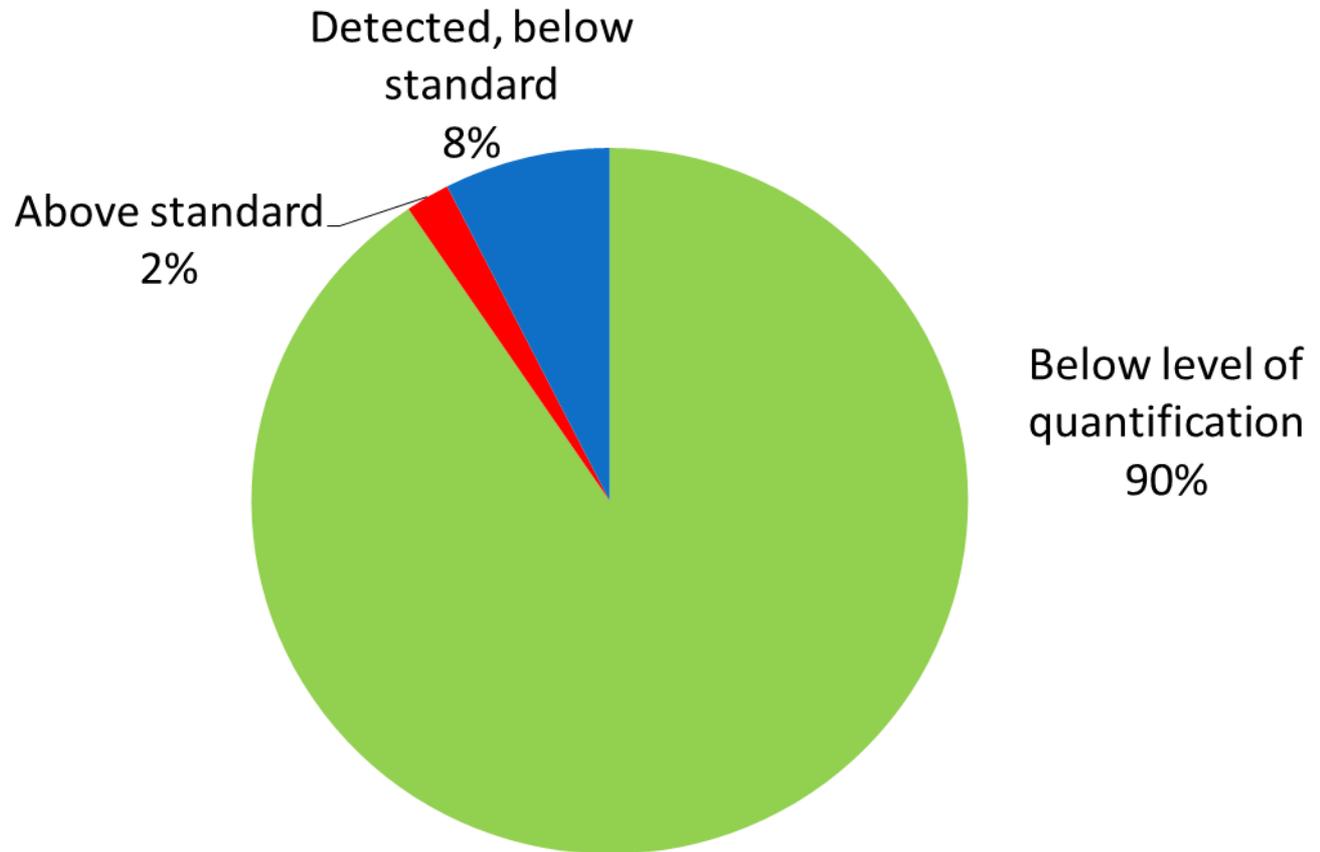
Restricting Lead Content in Water Fixtures

- ❑ Federal law in US from 2014 restricts lead content in pipes and fixtures to 0.25%; NSF61 updated accordingly
- ❑ In Europe, voluntary standards (updated in January 2017) by four countries (“4MS”) restrict lead content in drinking water fixtures according to wetted surface area and alloy composition (0.25% - 3.5% lead). Calculated so that drinking water concentration not to exceed 10 µg/L
- ❑ In Israeli Standard 5452:
 - ❑ Concentration of lead in leachate not to exceed 10 µg/L
 - ❑ Revision from 2016: restriction of lead content to 0.25% (enters into force in 2018 for plastic and 2019 for metal alloys)

Water Systems within Structures

- Drinking Water Standards (2013): consumers can request that water supplier test heavy metals at the tap
- Exceedances from standard should be reported immediately to consumer, responsibility for required actions on consumer
- In 2011, Ministry of Health conducted a survey on heavy metals in tap water in homes, including 800 samples.
- Vast majority of results did not exceed standard (98%)

Lead Concentration in Drinking Water in Households and Institutions, 2011



Ministry of Health Instructions, in light of survey results

To water suppliers and heads of institutions and businesses:

- Ensure planning, building, and installation of materials that meet 5452 requirements
- Routine testing in water system
- Testing in building water system of public buildings, with emphasis on schools

To general public:

- Avoid drinking and cooking with first draw samples
- Avoid drinking and cooking with hot water
- Avoid drinking and cooking with water turbidity or color
- If you have concerns about drinking water quality, test your water for heavy metals

Potential Pitfalls

- Israeli standard 5452 is not retroactive; does not apply to systems already installed
- Problems with enforcement and supervision
- Low level of public awareness
- Less than full compliance with requirements to test heavy metals in public supply system

Lessons Learned: Flint, Michigan

Frequent fluctuations in drinking water sources – potential risk of heavy metal leaching

MoH published recommendations to water suppliers

- Water sources should be chemically comparable, especially in stabilization parameters
- When changing drinking water sources unavoidable:
 - Advance planning and communication with consumers
 - Stabilize water sources
 - Change should be gradual and slow
 - Accompanied by monitoring: heavy metals , ion composition, microbial quality

Survey of Heavy Metals in Schools and Kindergartens

- 2017 – 2018: Ministry of Health is conducting a survey on heavy metals in schools: 1,500 samples throughout the country
- Wide range of institutions will be included: with different drinking water sources, type and age of plumbing, age of children
- Testing will include taps used daily, first draw samples before and after water runs through the system; drinking water coolers

Thank you

