Updates to TEL and AAL Values
Air Toxics

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Outline

TELS AND AALS

HEALTH BASIS

MOTIVATION AND PROCESS

UPDATES TO TELS AND AALS

MassDEP Air Guideline Values

TELs

Threshold Effects Exposure Limits (non-cancer)

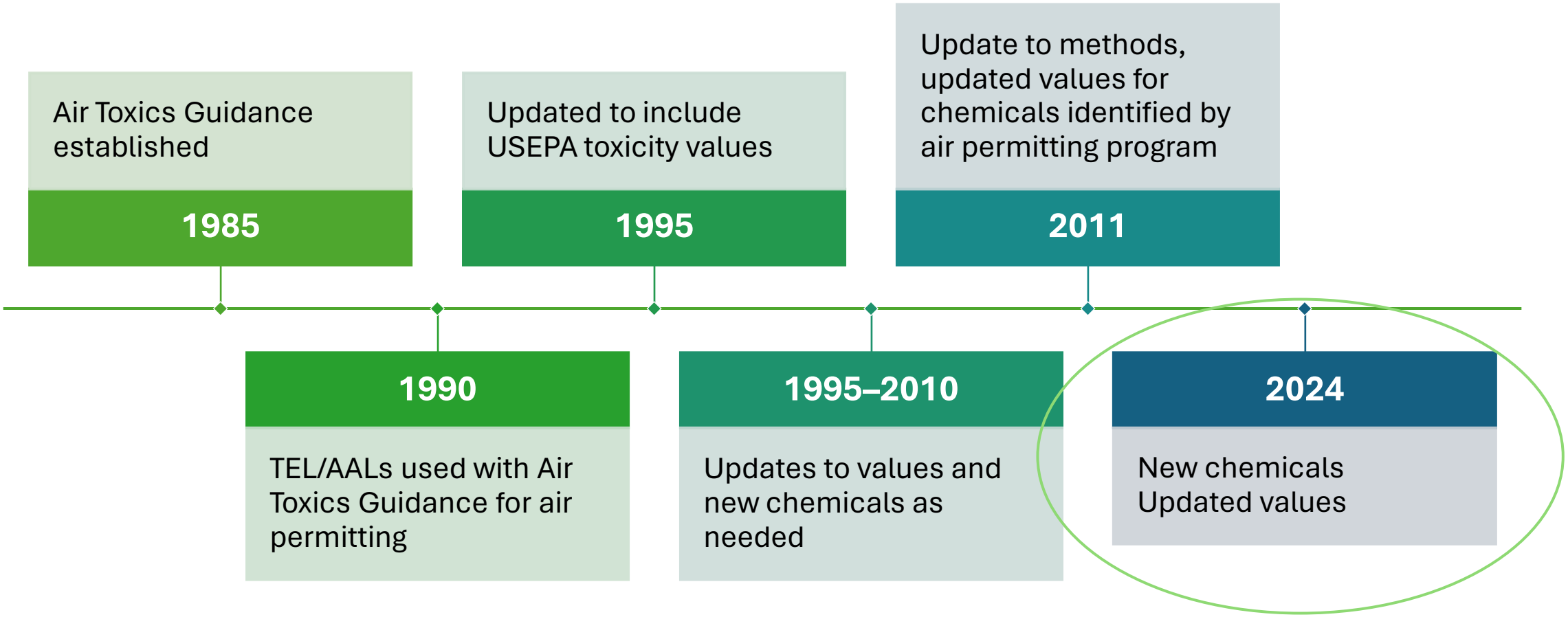
NTELs

Non-Threshold Effects Exposure Limits (cancer)

AALs

Allowable Ambient Levels

A Short History of TELs and AALs



Health Basis of MassDEP Air Guideline Values

CHEM/AAL

Chemical Health Effects Assessment Methodology and the Method to Derive Allowable Ambient Limits

Developed by ORS in the mid-1980s

Consistent process

Based on occupational standards

Updating Methodology

Developed by ORS in 2011

Consistent process

Primarily based on toxicity values developed by

- USEPA
- Agency for Toxic Substances and Disease Registry (ATSDR)
- California EPA

Toxicity Values

TEL – Threshold Effect Exposure Limits - Noncancer effects

Reference Concentration (RfC) – an estimate of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime (USEPA)

NTEL – Non-Threshold Effect Exposure Limits - Cancer risk

Inhalation Unit Risk (IUR) – the estimated excess lifetime cancer risk from continuous exposure at a concentration of 1 ug/m^3 in air (USEPA)

Exposure and Target Risk Values
MassDEP Air Guideline Values

TELs RfC & relative source contribution (RSC) = 20%

TEL = RfC x RSC = 10 ug/m^3 x 0.2 = 2 ug/m^3

Compare to 24-hour average

NTELs Cancer risk = 1 in 1 million

NTEL = 1 x 10^{-6} / IUR = 1 x 10^{-6} / 1 x 10^{-5} per ug/m^3 = 0.1 ug/m^3

Compare to annual average

AAL Minimum of TEL and NTEL

AAL = 0.1 ug/m^3

Compare to annual average

Motivation for 2024 Updates

- 2020 legislation
  Cumulative Impact Analysis - CIA -
  - Cumulative risk estimates for permit applications
- Update the air toxics chemical list
  - last reviewed and updated in 2011
- Incorporate new toxicity data
  - New methods from USEPA for developing toxicity values

MassDEP 2024 Air Guideline Values

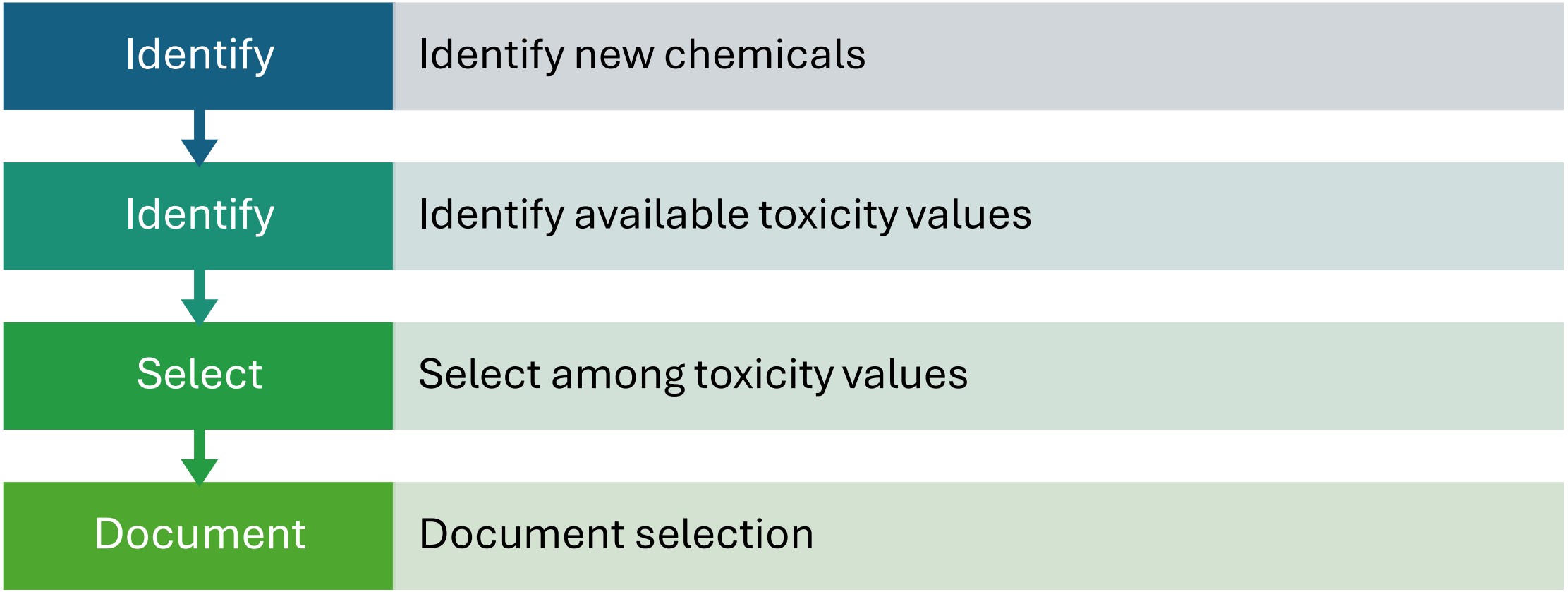
Inhalation Toxicity Value Reference Table 2024

CIA - Cumulative Risk Characterization

MATRiST

Air Guideline Values TELs and AALs

Process for 2024 Updates



Identifying New Chemicals

Review chemical lists

- USEPA HAPs (188)
- Massachusetts specific
  - Monitored air toxics VOCs, carbonyls, metals, PAHs
    - NATTS National Air Toxics Trends Station
  - Emissions from sources in MA - based on source registration
  - MCP listed chemicals inhalation pathway
  - TURI listed chemicals
- TRI reporting
- States – NH, NY, NJ, CA

Identifying Toxicity Values

- Identify existing peer reviewed toxicity values (RfC, IUR) from
  - USEPA – IRIS – Integrated Risk Information System
  - CalEPA – OEHHA – Office of Environmental Health
  - ATSDR – Agency for Toxic Substances Disease Registry
- Additional sources
  - USEPA - PPRTV -Provisional Peer Reviewed Toxicity Values
  - Surrogate – similar chemicals
  - Route to route extrapolation from oral toxicity value
  - ORS Derived values (e.g., CHEM/AAL)

Selecting Toxicity Values

- Principles from MassDEP Methodology for Updating Air Guidelines -2011
  - Quality of the data evaluated
  - Approach used to extrapolate to the general human population
  - Weight was given to values based on the studies with
    - more up-to-date data
    - greater ability to detect effects
    - more sensitive effects evaluated
    - dose extrapolation methods most consistent with current methods
    - dose-response methods most consistent with current methods

Selecting Toxicity Values

Considered consistency across MassDEP programs

General rules:

- Adopt MassDEP existing guidance
  - Petroleum hydrocarbons (2003)
  - Dioxins (1991)
- Values within a factor of 3
  - usually adopt USEPA value
- Values greater than a factor of 3
  - adopt value with best qualities

Document Rationale for Value Selected

Inhalation Toxicity Value Reference Table 2024

- Each value for each chemical, includes
  - Source and date
  - Any adjustments

2024 Updates to TELs/AALs

- Identify new chemicals
- Changes to existing values
- Examples of significant changes

Chemicals added to AAL/TEL list

141 new chemicals

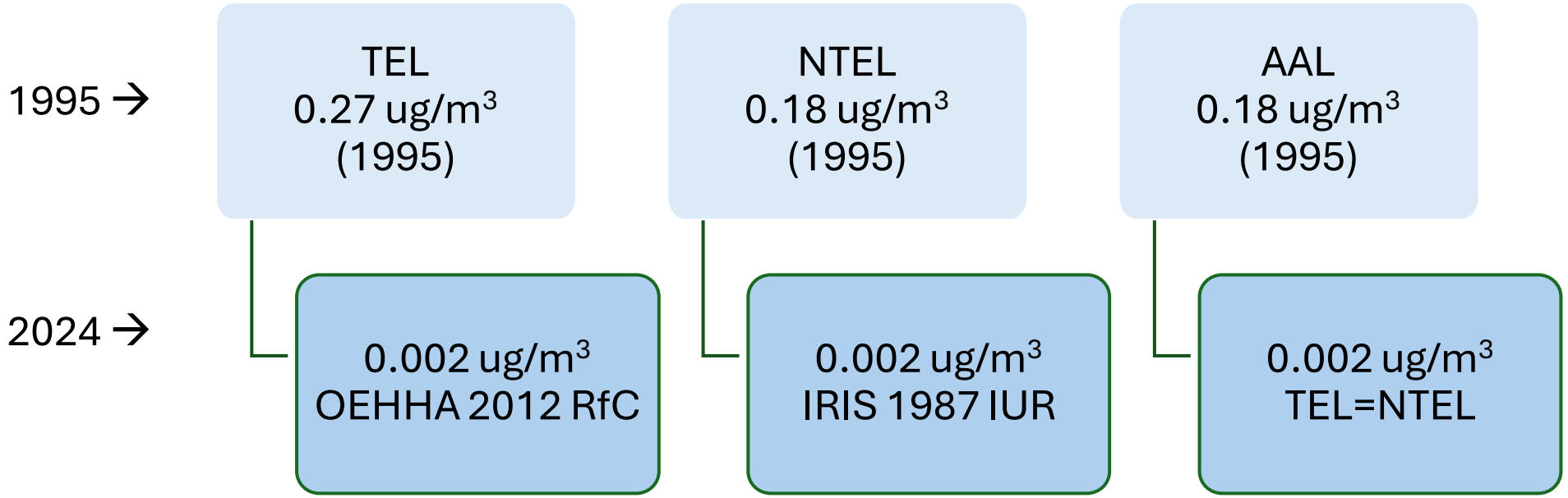
- 69 in groups
  - 21 Polycyclic Aromatic Hydrocarbons (PAHs)
  - 22 Dioxins/Furans (TCDD and equivalents)
  - 16 Petroleum hydrocarbons
  - 9 Metals
- 72 additional chemicals
  - Ethylene Oxide
  - Diesel Particulate Matter

Changes to Existing AAL/TEL Values

	TELs	AALs
Lower	34	32
Same	27	29
Higher	30	35

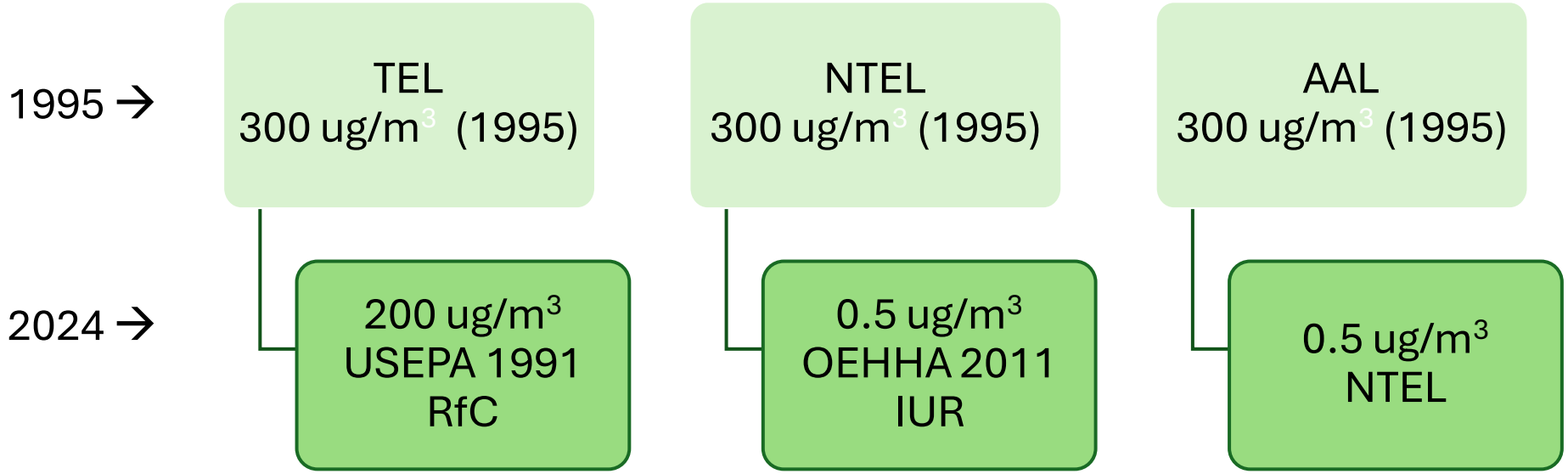
Example of large change in existing AAL/TEL

Nickel (metal and compounds, excludes nickel oxide)
2024 AAL is ~100 times lower



Example of large change in existing AAL/TEL

Ethyl Benzene – 2024 AAL is 600 times lower



Summary - Updates to TEL/AALs

- Updated and expanded list of chemicals evaluated for air toxics
- Toxicity values reviewed and incorporate new toxicity data

- 141 new chemicals added
- 237 total number of chemicals evaluated for air toxics

Thank You!

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