### Sources of Exposure

**General Populations**
- Exposure to ethylbenzene is possible through contact with gasoline, automobile emissions, solvents, printing inks, varnishes and paints, and other consumer products.
- Cigarette smoke is also a source of ethylbenzene exposure.
- Ground water from sources near manufacturing and processing facilities, petroleum refineries, and leaking underground storage tanks may be contaminated with ethylbenzene.

**Occupational Populations**
- Occupational exposures are expected within the petroleum industry, industries using solvents, paints, and coatings, and during the manufacture and handling of ethylbenzene and styrene.

### Toxicokinetics and Normal Human Levels

**Toxicokinetics**
- Ethylbenzene is well absorbed from the lungs, gastrointestinal tract, and through the skin.
- Absorbed ethylbenzene is rapidly eliminated by metabolism and excretion of metabolites; the half-time in blood is less than 1 hour.
- The major metabolic pathways are side-chain and ring hydroxylation with subsequent formation of glucuronide and sulfate conjugates.
- Ethylbenzene metabolites, primarily conjugates, mandelic acid, and phenylglyoxylic acid, are excreted in the urine.

**Normal Human Levels**
- No data available.

### Biomarkers/Environmental Levels

**Biomarkers**
- Ethylbenzene can be measured in blood, subcutaneous fat, and in expired air.
- Expired air concentrations have been correlated with levels of ethylbenzene in ambient air.
- Urinary levels of mandelic acid and/or phenylglyoxylic acid. However, these are also elevated following exposure to styrene.

**Environmental Levels**

**Air**
- Median ethylbenzene concentrations of 0.6 ppb in urban and suburban air and 0.01 ppb in rural air have been reported.

**Sediment and Soil**
- Ethylbenzene is rarely detected in soil.

**Water**
- Ethylbenzene is rarely detected in drinking water.

### Reference

Chemical and Physical Information

**Ethylbenzene is a Liquid**
- Ethylbenzene is a colorless liquid with an aromatic odor, and is flammable and combustible. Ethylbenzene is naturally found in crude petroleum and is widely distributed in the environment.
- It is a high production volume chemical primarily used for the production of styrene. Ethylbenzene is also used as a solvent and in the manufacture of several organic compounds other than styrene.
- Consumer products containing ethylbenzene include gasoline, paints and varnishes, inks, pesticides, carpet glues, automotive products, and tobacco products.

**Ethylbenzene in the Environment**
- Ethylbenzene partitions primarily to air and removal via photochemically generated hydroxyl radicals is an important degradation mechanism. The half-life in air is approximately 1–2 days. Ethylbenzene is ubiquitous in ambient air, mainly as a result of automobile emissions.
- In surface water, most of the ethylbenzene will evaporate. The remaining ethylbenzene is broken down through photooxidation and biodegradation.
- Ethylbenzene is moderately mobile and biodegrades in soil.
- Ethylbenzene does not appear to bioconcentrate in aquatic food chains.

Routes of Exposure

- **Inhalation** – Predominant route of exposure for general population and workers.
- **Oral** – Minor route of exposure via ingestion of contaminated water.
- **Dermal** – Skin contact may occur during showering or bathing with contaminated water or from contact with contaminated soil or products containing ethylbenzene.

Relevance to Public Health (Health Effects)

**Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.**

**Minimal Risk Levels (MRLs)**

**Inhalation**
- An MRL of 5 ppm has been derived for acute-duration inhalation exposure (≤14 days).
- An MRL of 2 ppm has been derived for intermediate-duration inhalation exposure (15–364 days).
- An MRL of 0.06 ppm has been derived for chronic-duration inhalation exposure (≥1 year).

**Oral**
- No acute-duration oral MRL was derived for ethylbenzene.
- An MRL of 0.4 mg/kg/day has been derived for intermediate-duration oral exposure (15–364 days).
- No chronic-duration oral MRL was derived for ethylbenzene.

**Health Effects**

- Exposure to high levels of ethylbenzene can cause eye and throat irritation, vertigo, and dizziness.
- In animals, the most sensitive target of ethylbenzene toxicity appears to be the auditory system; a potentially irreversible damage to cochlear hair cells and hearing loss have been observed in rats following acute and intermediate-duration inhalation exposure and acute oral exposure.
- Animal studies indicate that intermediate-duration oral exposure can be hepatotoxic.
- Direct contact with liquid ethylbenzene caused eye and skin irritation in animals.
- Developmental effects (decreases in growth and increased skeletal variations) have been observed in animals following inhalation exposure to high levels of ethylbenzene.
- IARC has classified ethylbenzene as possibly carcinogenic to humans (Group 2B).

**Children’s Health**
- Children are expected to be affected by ethylbenzene poisoning in the same manner as adults.