# The Human Health Risk Assessment Process

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Florida Department of Health

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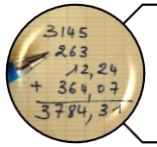
# Steps completed for a basic Human Health Risk Assessment

Discuss previous actions

Review results

Evaluate exposure

Determine exposure for situation




Determine Total Exposure

Calculate likelihood of specific effects, such as cancer

# 1. Discuss previous actions taken

Discussions with other agencies, such as the Florida Department of Environmental protection, include, but are not limited to:

- Environmental evaluation
- Previous activities around the location
- Any possible contamination of area

***Please understand we <u>do not</u> conduct tests**. However, we need results to continue the health risk analysis.*

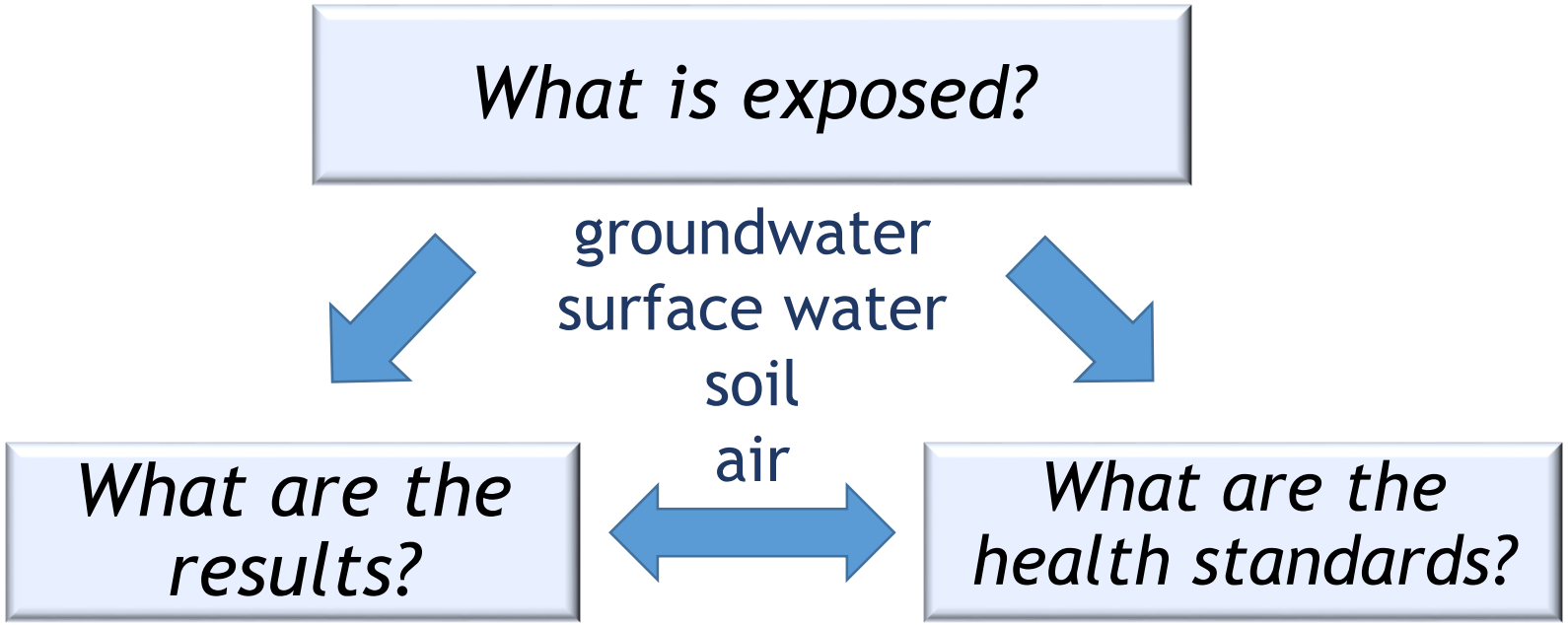
# 2. Review results

- Reviewing of the test results include:
  - How were the samples collected?
    (e.g. water, food, air, or soil)
  - Which chemicals were detected?
  - Did a certified lab test the samples?

*Please note that if the lab is not certified for the test, results are not valid.*

# 2. Review results *… cont …*

- Valid environmental data are compared to existing health standards for that source *(=comparison values)*:



# 2. Review results *… cont …*

- Valid environmental data are compared to existing health standards *(=comparison values)*:

  - Find the safety level for the chemical for that source (water, food, air, or soil)

  - Are the results above or below the safety level?
    - ❑ Results below the safety level, low health risk assumed
    - ❑ Results above the safety level, assessment will continue.

***Based on the chemical(s) detected and the source tested, possible exposures can be looked at.***

# 3. Exposure Evaluation

Factors considered for a complete pathway analysis

- **Where** — Where the hazard came from (chemical spill, buried material)? Where we are coming in contact with the hazard?
- **What** — What got contaminated (water, food, air, or soil)?
- **How** — How we are coming in contact with it (drinking the water, breathing the air, or touching the soil)?
- **Who** — Who is exposed? (e.g. worker, resident, child, adult, etc.)

# 4. Determine Exposure for Situations

Find exposure methods based on sample source:

- Water – consumption (drinking), contact (swimming, washing hands), breathing aerosols (showering, irrigation)
- Food – consumption
- Soil – consumption, contact

***Now that we have an idea for types of exposures, we look at the current situation.***

# 4. Determine Exposure for Situations

## *...cont... EXAMPLE*

*Where did it come from?*

*How did I get exposed?*

*leaking drum*

*What got exposed?*

**GROUNDWATER**

*faucet water*

Depending on where this occurred (at home or work), the risk of exposure can change.

# 4. Determine Exposure for Situations

*...cont...*

## Where is exposure?

*At Work*

*Exposed for 8 hours a day*

*Limited consumption*

*At Home*

*Exposed for longer time*

*Consumption*

*Showering*

*At a park*

*Exposed for a couple of hours a week*

*Consumption*

*Playing (contact to soil)*

*Swimming*


*Trespassing*

*Exposed for a couple of hours a day*

*Consumption*

*Walking*

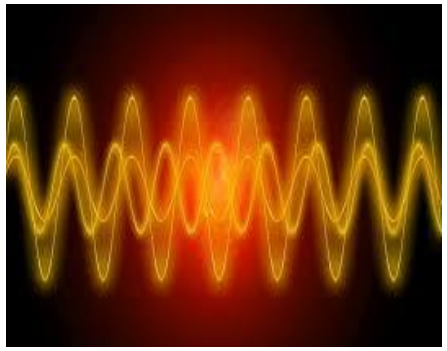
*Another factor is how much one was exposed!*

# 5. Determine Total Exposure

*Chemical Concentration (how much)*

*Duration (how long)*

*Frequency (how often)*



*Longer exposure*
*Higher concentration*
*Exposed more often*

=

*Increased Risk of Health Affects*

# 6. Solving the Exposure Questions

- If all the previous questions have been answered, we have a complete pathway of exposure, which is not always possible.
- When studying all the information gathered, it is possible to calculate a health risk to the situation.
- The results are communicated out to the public.

# 6. Solving the Exposure Questions *… cont …*

## Cancer Risk results are communicated as following:

| | |
|---|---|
| 1 in 10 people | "very high" increased cancer risk |
| 1 in 100 people | "high" increased cancer risk |
| 1 in 1,000 people | "moderate" increased cancer risk |
| 1 in 10,000 people | "low" increased cancer risk |
| 1 in 100,000 people | "very low" increased cancer risk |
| 1 in 1,000,000 people | "extremely low" increased cancer risk |

*(Example)* Children's (age 6 to 11yrs) dose calculation for exposure to 15mg/kg of arsenic in soil for 5 years = **$1.6*10^{-5}$**

***0.16*** *children in* ***1,000,000*** *may show an increased cancer risk, therefore, the increase cancer risk is extremely low*

# 6. Solving the Exposure Questions *… cont …*

**Non-Cancer Risk** is communicated based on the Hazard Quotient (HQ).

- When the HQ is greater than 1, assumption is there may be *non-cancer health affects*.
- When the HQ is less than and/or equal than 1, the assumption is that there won't be *non-cancer health affects*.

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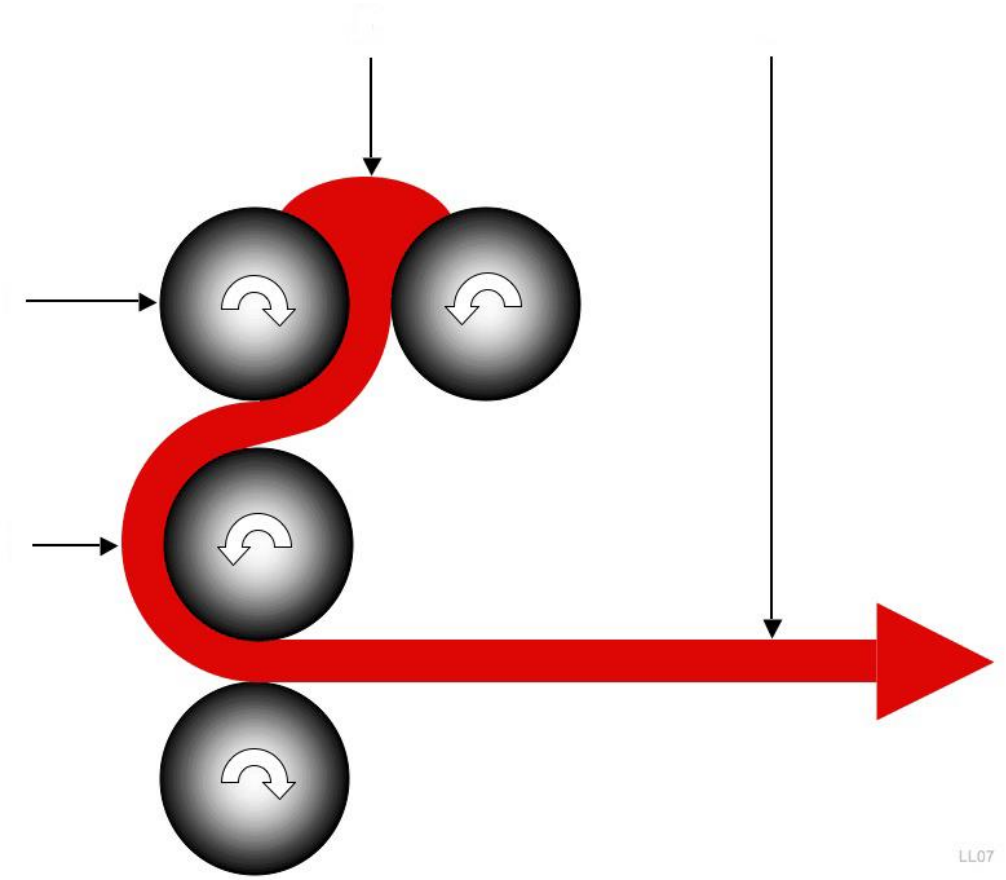
*(Example)* Children's (age 6 to 11yrs) HQ for exposure to 15mg/kg of arsenic in soil for 5 years = **0.13**

***0.13 is less than 1,*** *therefore no non-cancer risk is assumed*

# The Human Health Risk Assessment Process – In Summary

- ☑ Review previous events
- ☑ Review test results
- ☑ Determine exposures
- ☑ Calculate risks
- ☑ Communicate results



# Contact Us!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More information about us:

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