The Human Health Risk Assessment Process

Hazardous Waste Site Risk Assessment Team
Bureau of Environment Health
Division of Disease Control and Health Protection
Florida Department of Health

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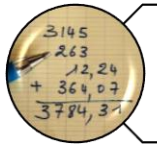
Steps completed for a basic Human Health Risk Assessment

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.*

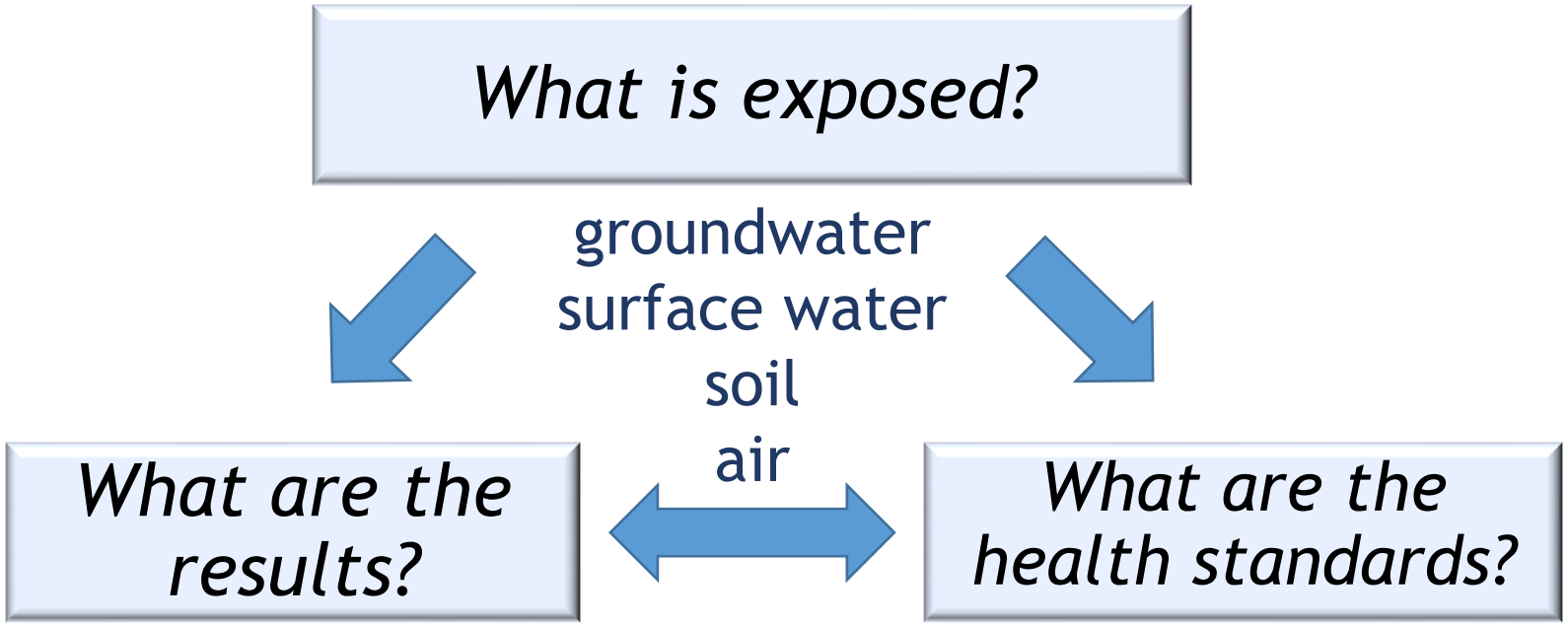
2. Review results

- 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

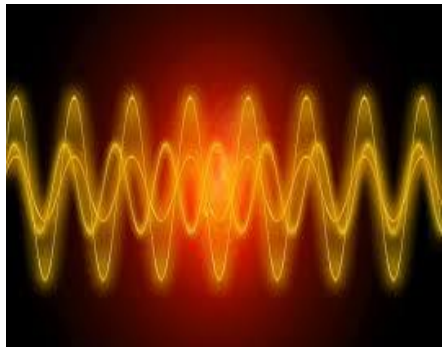
Another factor is how much one was exposed!

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 = **$3.1*10^{-6}$**

[school setting – 5 days/week, 35 weeks/year]

3.1 *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*.

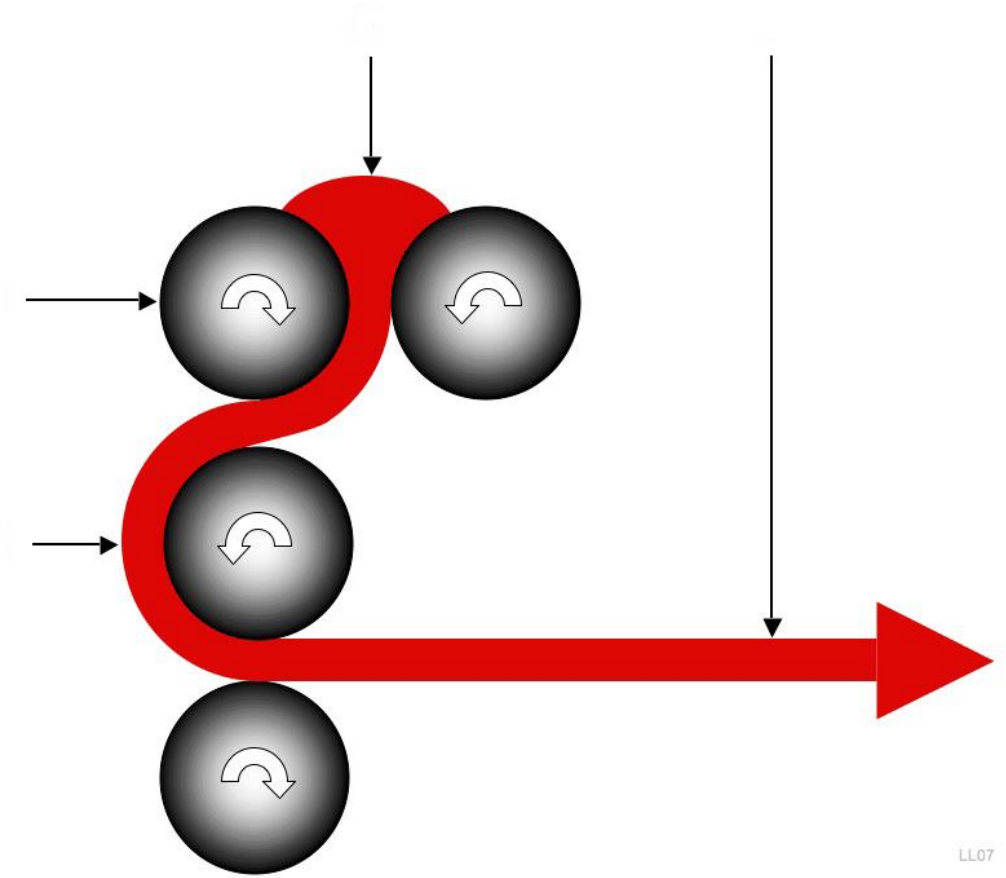
(Example) Children's (age 6 to 11yrs) HQ for exposure to 15mg/kg of arsenic in soil for 5 years = **0.11**

[school setting – 5 days/week, 35 weeks/year]

0.11 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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