**Risk Assessment**

**Risk** is the possibility that you might suffer an adverse effect or that something unwanted might happen.

Have you ever been asked if you are willing to take a risk, such as riding a motorcycle?

What is the possibility you might have an accident riding a motorcycle?

**Risk Assessment** is the process of estimating the likelihood of an event happening. It also estimates how much adverse effects the event will have over a specific period.

\[ \text{Risk} = \text{Hazard} \times \text{Exposure} \]

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**First step: Identify Hazards:**

The first step is to define the hazard and nature of harm.

A hazard is a property or situation that, under certain situations, can cause harm to your health.

Certain diseases occur as part of the normal aging process. However, being exposed to certain chemicals can increase the chances of certain diseases.

**Second step: Assess Exposure:**

After identifying the hazard, it can be determined if being exposed to certain chemicals can increase the chance of unwanted effects such as disease.

The exposure assessment determines the type, intensity, frequency, and duration of the human exposure to a specific substance.

For someone to be exposed, the hazard has to be present in the same time and place. The person can only be affected in the right time and place. This means, if there is hazard present but there is no exposure, then there is no risk.

Exposure to a substance can occur through many ways. Some of these are

- swallowing
- breathing in
- absorbing the substance through the skin

*Routes of Exposure*
**Third step: Evaluate Dose-Response:**

If a person is exposed to a hazard it does not mean that he/she will show any symptoms or get a disease.

- The effects most likely happen to the internal organs.
- Checking the response to the dose of exposure will tell if the amount of the hazard the person was exposed to can cause harm.

**Dose Amount = Harm Response**

The Dose-Response Relationship (or curve) gives information about the link between the amount of exposure and the response shows how different levels of exposure can change the response (health effects). The figure below shows two different types of dose-response relationships.

These curves estimate how different levels of exposure to a contaminant change the probability and severity of the health effects. The threshold is a dose level under which there is no observed response.

Results from animal and human research are used for the dose-response relationships.

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**Fourth step: Characterize Risk:**

Risk characterization combines hazard identification, exposure assessment, and dose response assessment.

It is a tool to predict the chance that a harmful event will occur in a particular population.

The goal of risk characterization is to sum up the key results of all the assessments. It must be done in a clear, constant, and coherent way.

In general, the results will include the impact to subpopulations, doubt, and the type of study needed for future actions.

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<table>
<thead>
<tr>
<th>Risk</th>
<th>Risk of Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer from cigarette smoking (one pack a day)</td>
<td>1:4</td>
</tr>
<tr>
<td>Death in a motor vehicle accident</td>
<td>1:50</td>
</tr>
<tr>
<td>Homicide</td>
<td>1:100</td>
</tr>
<tr>
<td>Home accident deaths</td>
<td>1:100</td>
</tr>
<tr>
<td>Cancer from exposure to radon in homes</td>
<td>3:1000</td>
</tr>
<tr>
<td>Exposure to the pesticide aflatoxin in peanut butter</td>
<td>6:10,000</td>
</tr>
<tr>
<td>Diarrhea from rotavirus</td>
<td>1:10,000</td>
</tr>
</tbody>
</table>


Examples of Risks

Original at: [http://superfund.pharmacy.arizona.edu/prof_comm_info.php](http://superfund.pharmacy.arizona.edu/prof_comm_info.php)

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[Images and diagrams related to dose-response curves and risk characterization]