The four Poles of the compass to manage the challenges without losing sight of the north!

Pole 1
Identify the HAZARD:
Intrinsic properties

Pole 2
Evaluate the RISK
related to the exposure to the hazard

Pole 3 :
Decide (regulate) the level of SAFETY
to be taken into consideration

Pole 4 :
Integrate EXPECTATIONS
between tolerated risks and expected benefits

2d pole:
Evaluate the RISK(S)
of exposure to the hazard

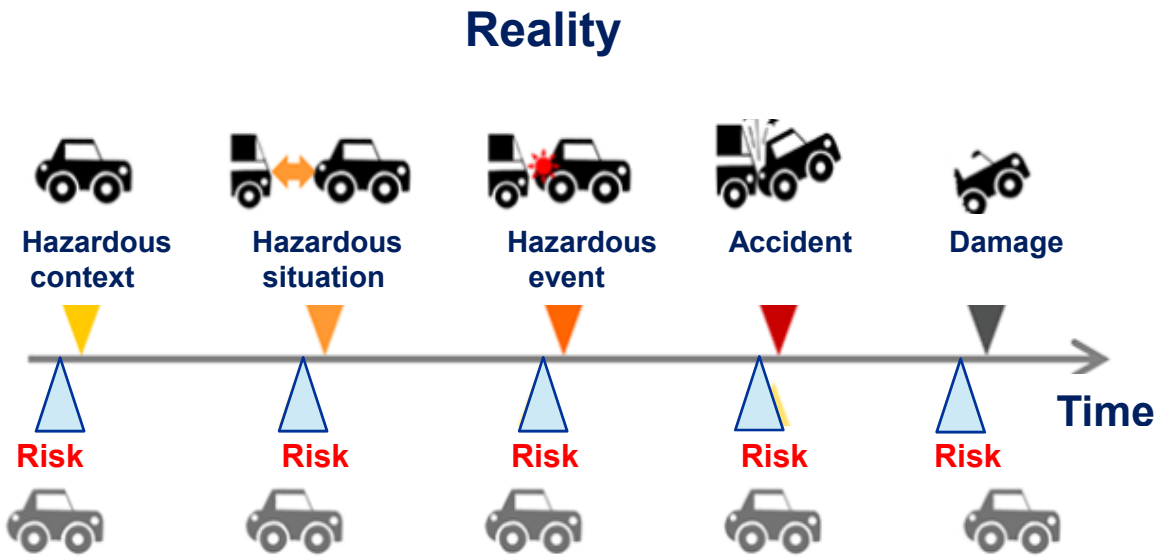
2d pole : Assess the risk(s)

- The risk is linked to the level of exposure to an agent with undesirable properties;
- The degree of risk depends on a combination of the frequency of exposure and the intensity of exposure;

Risk = danger x (frequency + intensity)

- Risk is defined as a probability and therefore incorporates a degree of uncertainty;
- Unlike an intrinsic hazard, it can often be controlled.

The relationship between hazard and risk:
the materialization of the probability of being exposed to it



2d pole : minimise the risks (1/2)

- Unlike an hazardous property which is intrinsic, a risk of exposure can be reduced, therefore it can be mastered;
- Risk reduction measures can target:
  - The reduction of the sources of the dangerous agent, either physical or chemical;
  - The reduction in exposure levels, especially for *infectious agents*, as their sources are not always manageable.

2d pole : minimise the risks (2/2)

- **The reduction measures decided may relate to:**
  - ***Prevention an/or restriction of use*** **/substitution of the hazardous agent itself;**
  - ***Reduction at the source*** **of emissions;**
  - ***Containment*****;**
  - ***Disinfection*****, depollution / dilution;**
  - ***Personal protection means*** **if exposure is unavoidable:** ***trainings, masks, gloves, etc.,***
- **Acceptable exposure limits can be decided on the basis of bacteriological or (eco) toxicological tests;**
- **Actual exposure levels must be measured or assessed (anticipated) if this is an unprecedented hazard.**

The risk of exposure to infectious agents

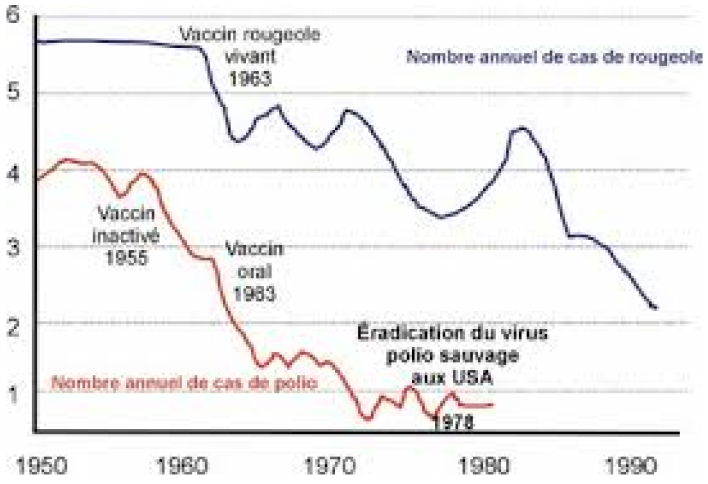
A peculiarity of infectious agents is that, unlike chemical or physical agents, they multiply spontaneously within target species;

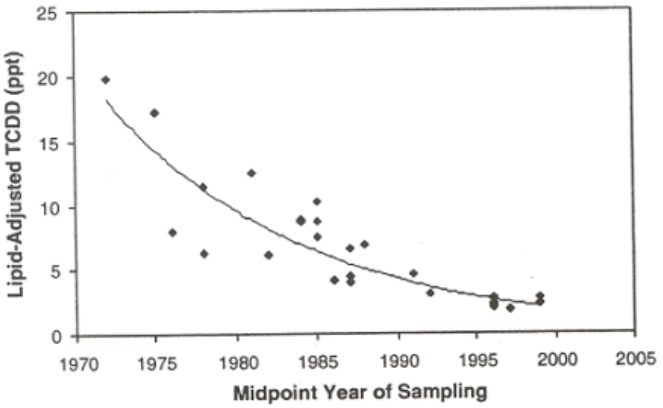
- **Therefore, it is possible that a single exposure reaches the threshold of probability of triggering the pathogenic effect;**
- **This risk will depend on various factors such as the *stability of the agent*, its *mode of propagation*, its *intrinsically pathogenic character* as well as, of course, the *immune capacity of the organism* to develop an adapted effective defense;**

Infectious risk will then to be measured as the *probability of point or single exposure,* therefore relatively independently of its "intensity" and duration.

Examples of managed risks

Some infectious diseases or human exposure to toxic lemicas like dioxins





Evolution of the risk of poliomyelitis and measles and human level of contamination by dioxin (TCDD)

GreenFacts
Facts on Sustainability, Health and the Environment

The case of « agents families »

- ***Examples: virus, GMO's, nanomaterials, … ;***

- **What are we doing to characterize their individual risks? "Case by case" or globally?**
- **The "risk" of GMO syndrome:**

"All in the same bag !"

- **Their hazards, and therefore their risks, are not necessarily comparable.**

Example : a GMO that produces insulin in a specialized laboratory cannot be compared to a genetically modified plant found in the wild;