

CHEMICAL RISK ASSESSEMENT IN A QUALITY CONTROL LABORATORY BY A TOOL USING ACTIVITY ANALYSIS

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Background

- ☐ Chemical risk is the result of occupational exposure to a chemical agent. This exposure can induce several effect: which can cause fatal intoxications
- ☐ Purpose :
 - Assess the risks related to the chemical reagents used in the control laboratory
 - Propose preventive measures to reduce his risks.



**Dangerous
chemicals**

Materials and methods

OPERA Tool : "First Chemical Risk Assessment Tool by Activity Analysis".

Aim of the tool: Quantify the level of severity of the chemical risk and to guide its reduction.

1/ Quantification of the level of severity is established by giving the informations on the label of the chemical product, or on **the Material Safety Data Sheet (MSDS)**:

- Nature of the risk (Factor A)
- Nature of the safety (Factor B)
- Conditions of use products (Factor C)
- Respect of safety measures (Factor D)

2/ Calculation of Level of severity :

$$\text{Severity} = [(A/B) + C] \times D$$



4/ Two scales of values have been established: the first allows to qualify the level of severity of the risk and the second makes to prioritize the setting up of an action.

Level of severity	Evaluation of severity	Priority of an action
$1 \leq \text{Severity} < 5$	Very low severity	Not priority
$5 \leq \text{Severity} < 20$	Low severity	Recommended
$20 \leq \text{Severity} < 40$	Medium severity	Needed
$40 \leq \text{Severity} < 60$	High severity	Urgent
$60 < \text{Severity}$	Very high severity	Immediate

Results

☐ OPERA Analysis

- Analysis is established for 85 chemical reagents in the laboratory.
- 24% of the totality of the reagents : **Non-hazardous**

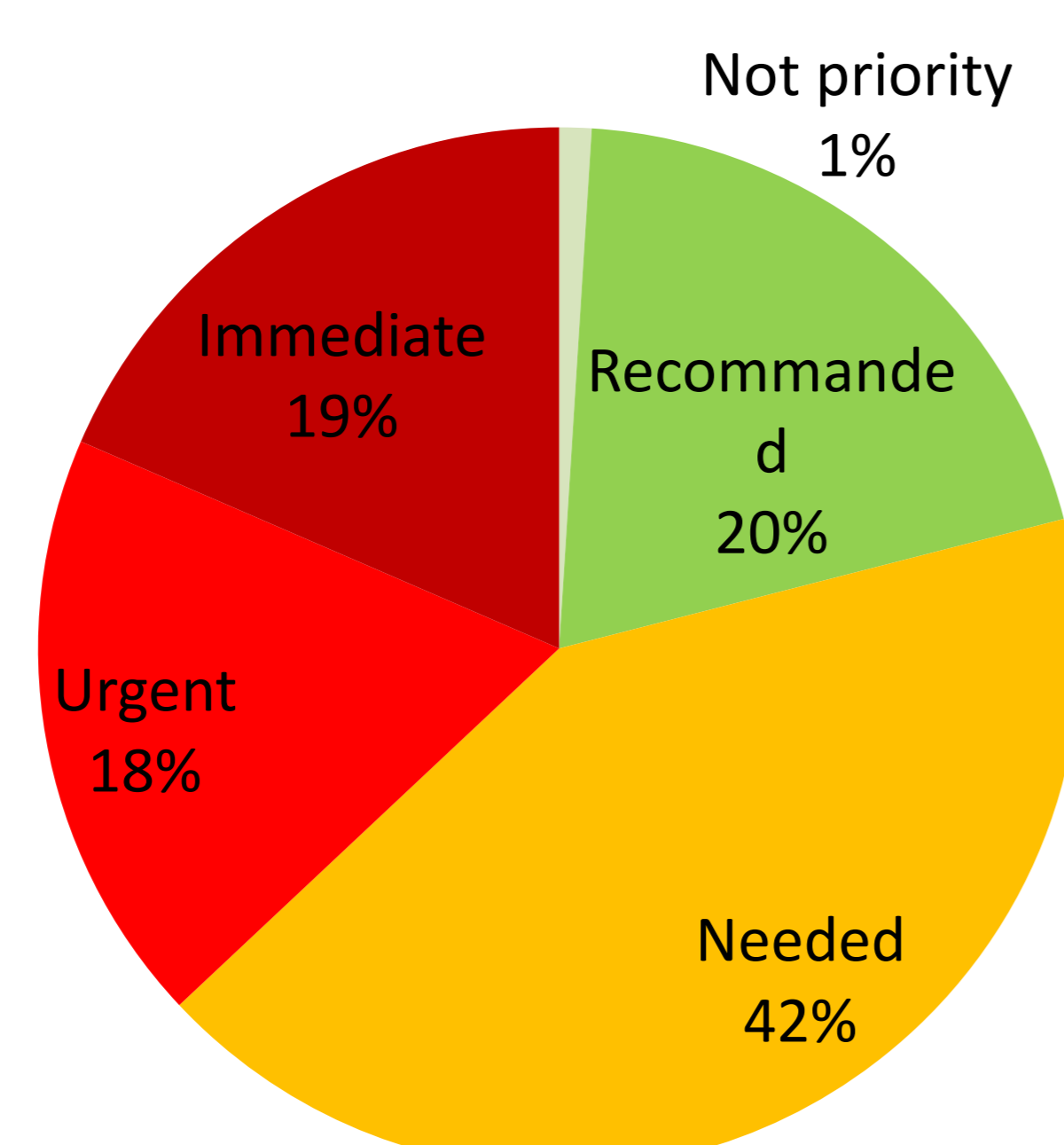


Figure 1: Classification of preventive actions

Table 1: Examples of chemical reagents depending the severity

Level of risk	Example of chemical reagents in laboratory
Very low risk	Potassium nitrate Zinc powder
Low risk	Silver nitrate Potassium hydroxide Sodium carbonate anhydrous
Medium risk	Benzoic acid Hydrogen peroxide Magnesium acetate
High risk	Nitrobenzene Boric acid Chlorforme
Very high risk	Ethyl acrylate Ammonium persulfate Formaldehyde

☐ Preventive actions for reduction of chemical risks

- Use of personal protective equipment: mask, gloves
- Use of collective Equipment : Hood

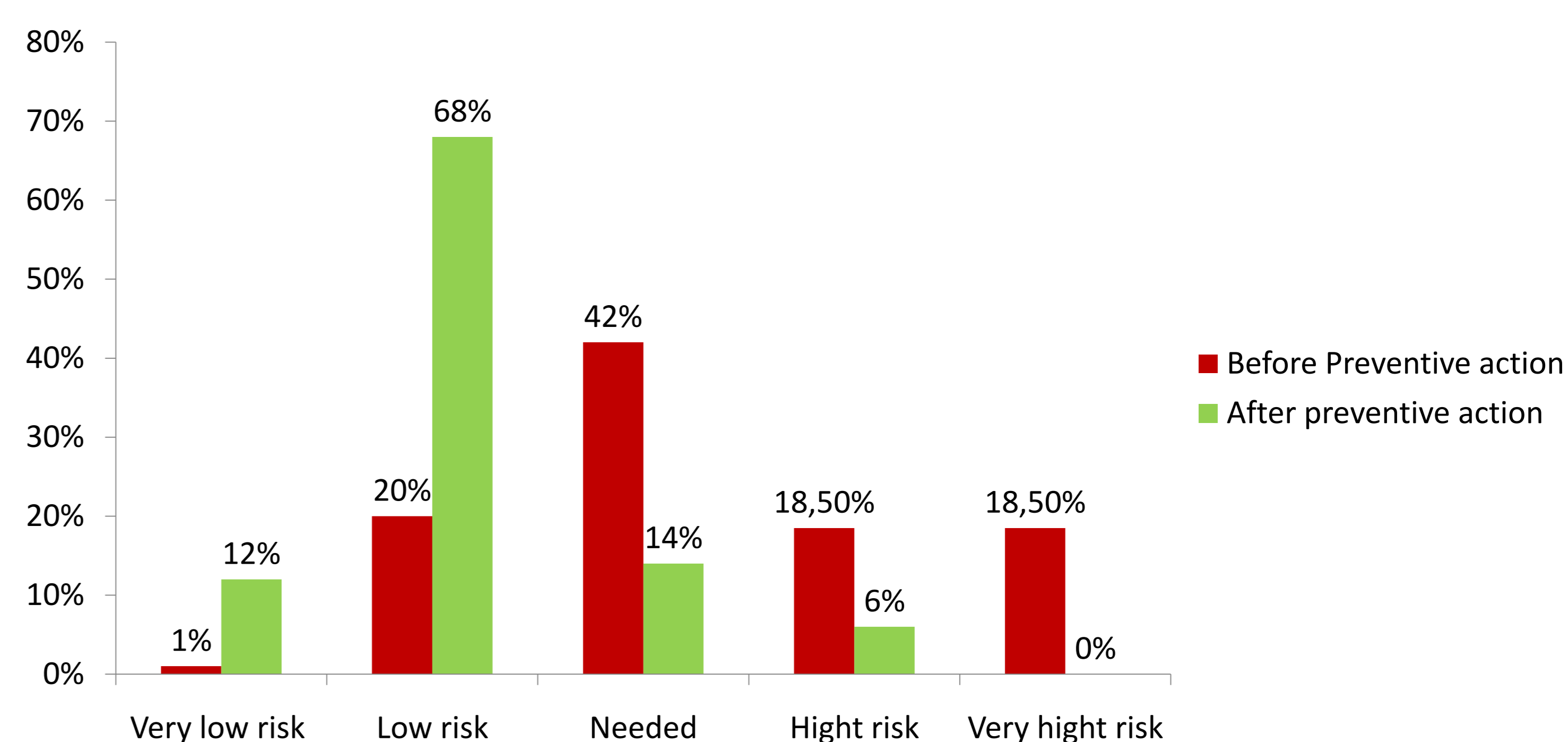


Figure 2: Percentage of the severity of the risk after implementation of preventive actions

Conclusion

- ☐ The level of severity of reagent is manageable by acting on two risk factors:
 - The respect of the safety mesure of each chemical.
 - The exposure of the operator to the operations carried out.

