Assessment and Management of Chemical Risks in Academic Laboratories (1)

-Important factors for risk assessment in chemical laboratories-

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Risk Assessment of Chemicals in Laboratory

-------Why Now ?

Researchers always think about risk or hazardousness of chemicals which they use in the next experiments, regardless of being conscious.

Big–scale revision of Japanese occupational safety and health law (2014, Ministry of Health, Labor and Welfare)

→ Risk assessment of chemicals was made mandatory.

Good opportunity to reconsider the chemical risks in laboratory

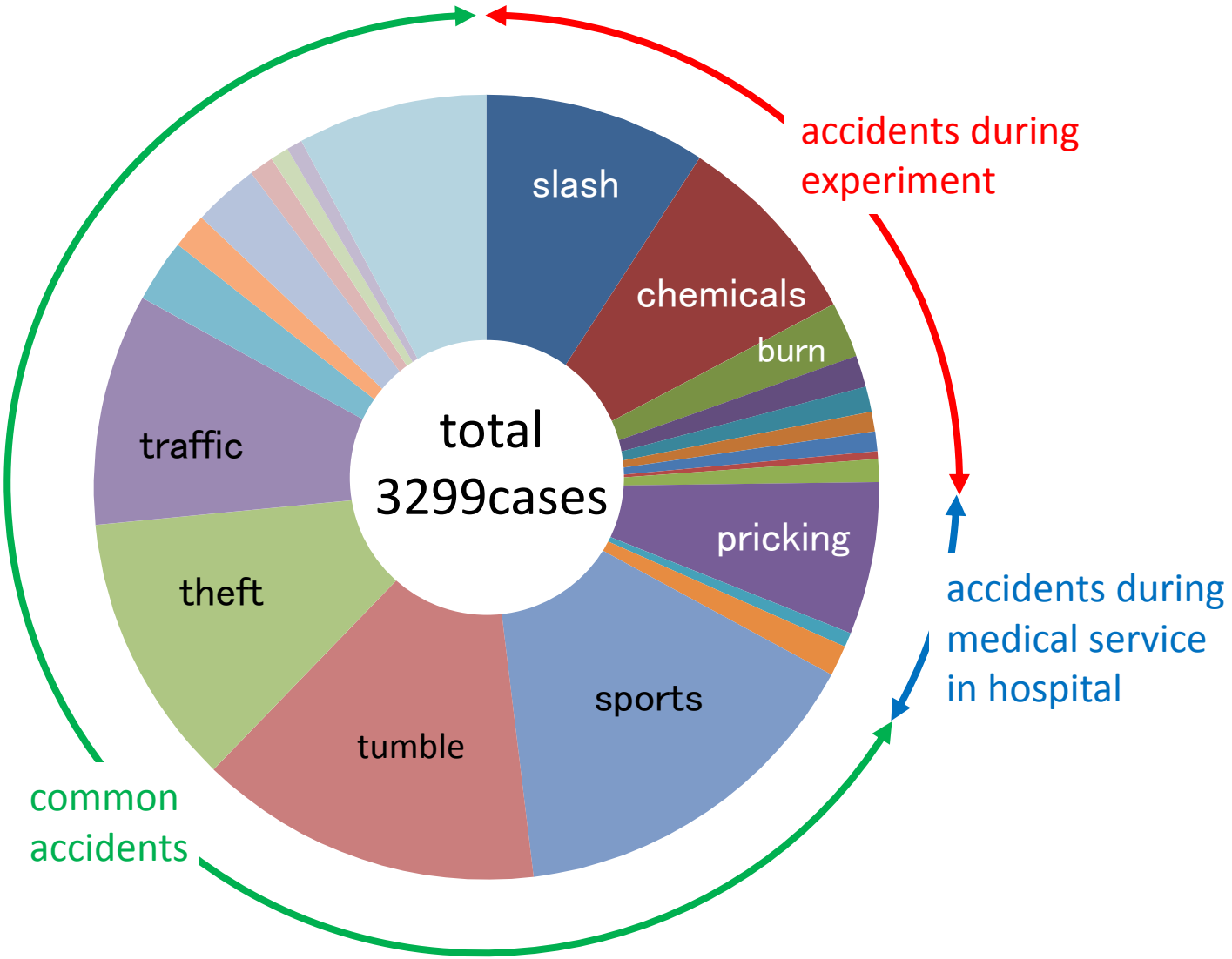
Steps of risk assessment
defined by the Ministry of Health, Labor and Welfare

1. Identify the hazardousness of chemicals in all operations.
2. Estimate the risks by combination of seriousness and frequency of each hazards.
3. Decision the order of priority of counter measures.
4. Consider the concrete methods to eliminate or reduce the risks.
5. Record all of results of this sequence.

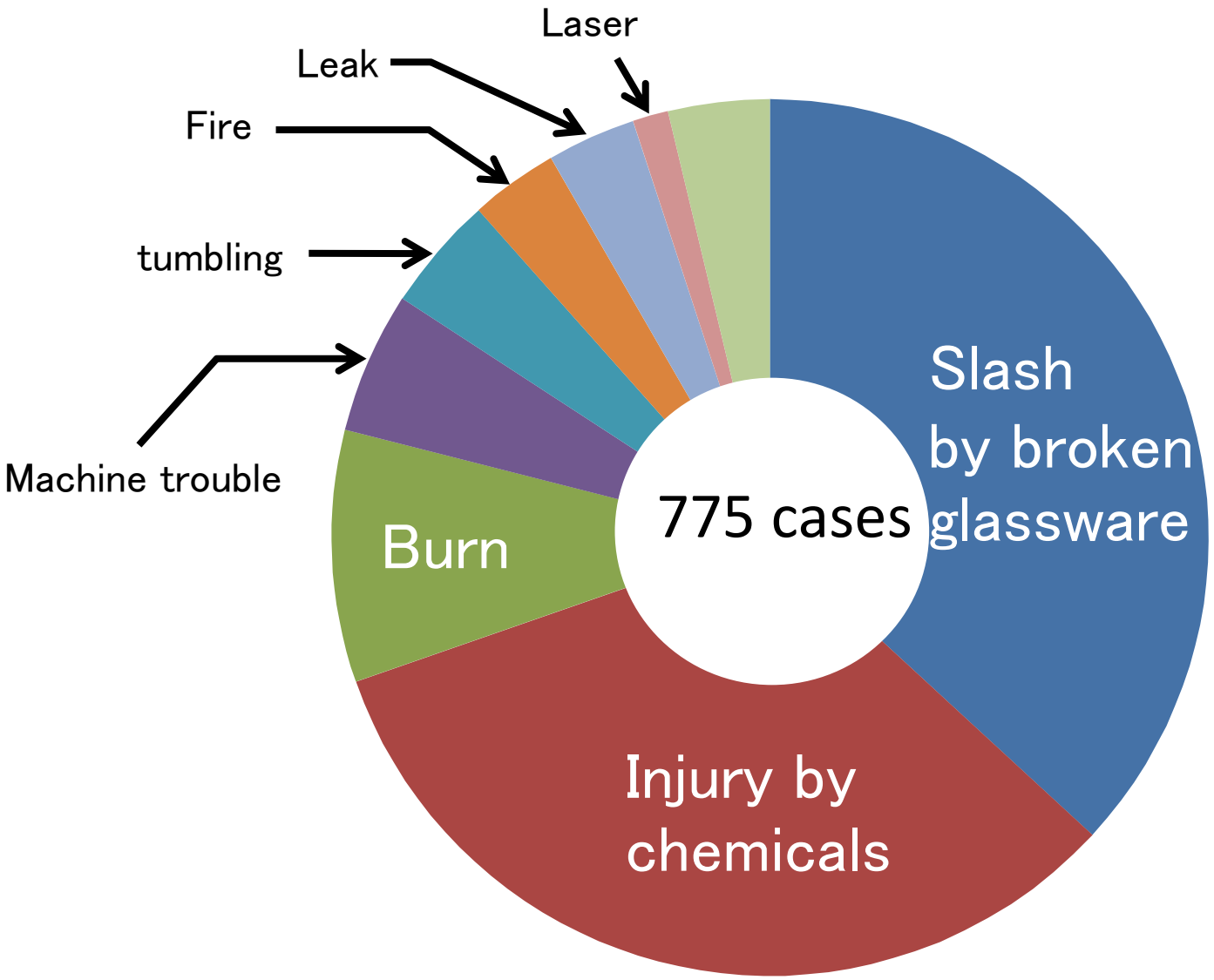
The words “all operations” lead researchers think about the risks in each experiment.

Is it enough?

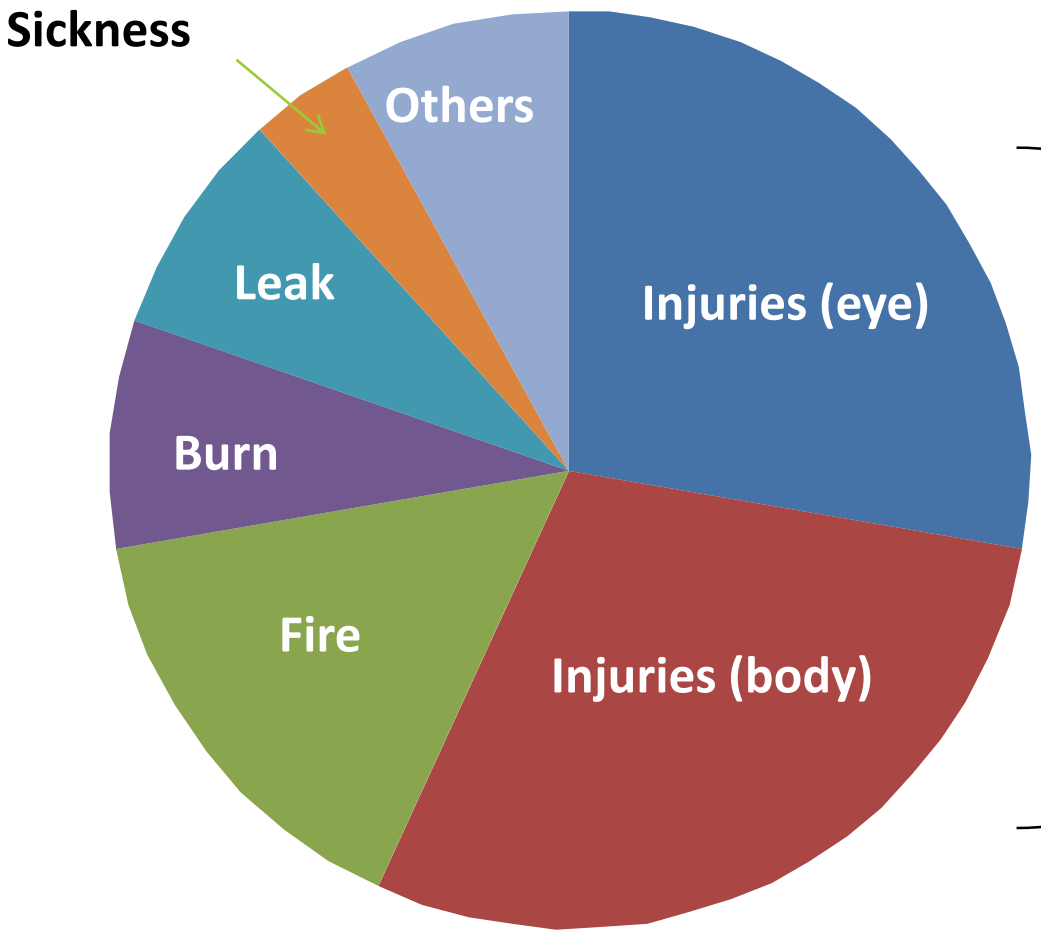
Tendency of accidents in Osaka university (2004.5 ～ 2013.3)



Tendency of Experimental Accidents

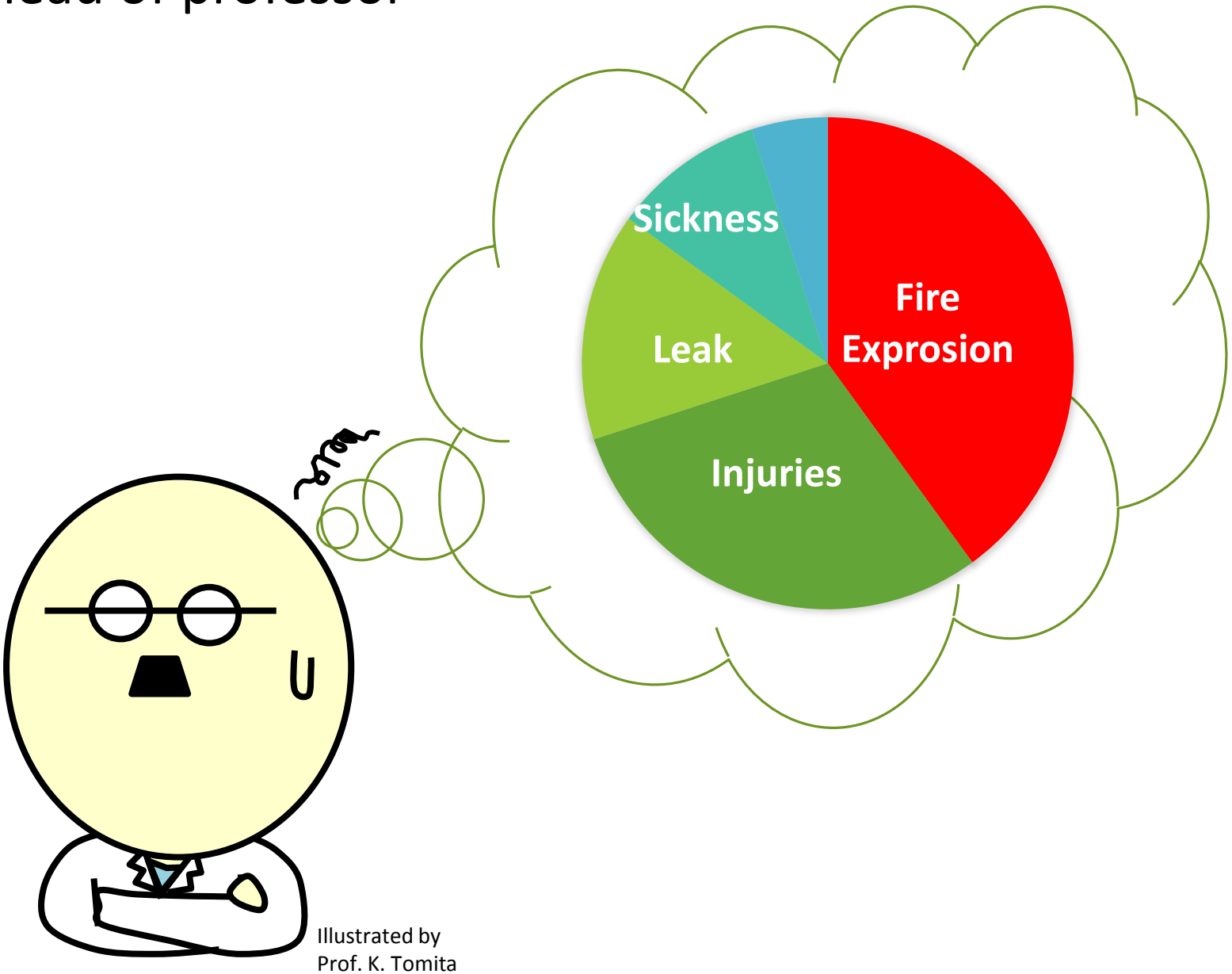


Detail of accidents by chemicals



In many cases, they do not wear the protective equipments (lab coat, goggle etc.)

Inside head of professor



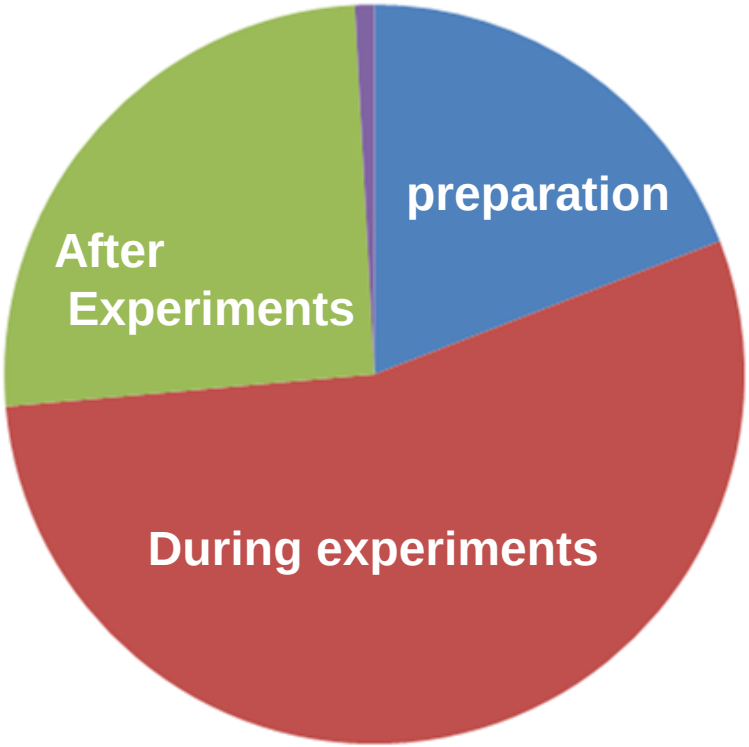
Illustrated by
Prof. K. Tomita

Important factors for risk assessment in chemical laboratories

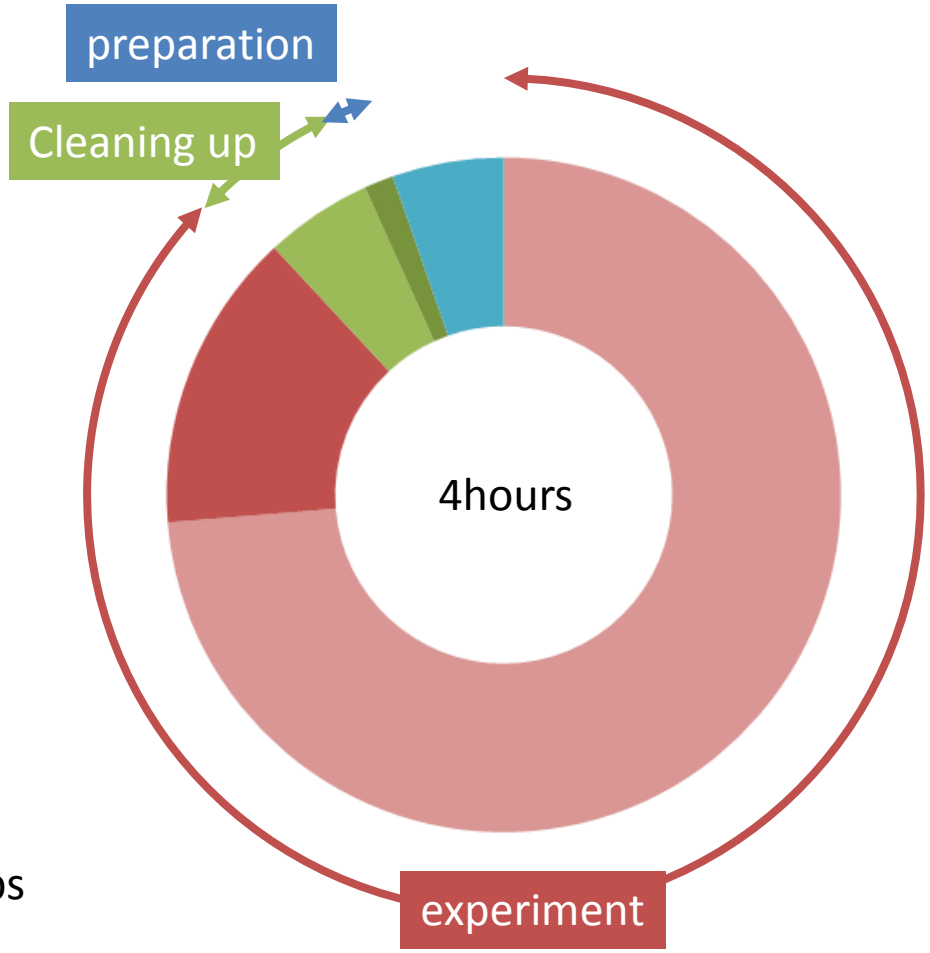
1. Risk assessment method should include higher risks in chemical lab. such as fire and injuries.

   Because the method exemplified by the Ministry of health, labor and welfare was too emphasized against the risk of long term exposure to chemicals.

When accidents occur?



Distribution of accidents by experimental steps in Osaka University



Distribution of experimental time of a graduate student

Yukiko Nezu, Doctoral thesis ,The university of Tokyo

Risk of other operations than experiment itself is higher

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   Because the method exemplified by the Ministry of health, labor and welfare was too emphasized against the risk of long term exposure to chemicals.

2. Risks during preparation, waste disposal, cleaning up are higher.

   It is crucial to let researchers think about the risk other than experiment itself.

Difference between factory and laboratory

Factory

Arranging equipment, operations, and things in space

- Routine work
- Fixed location of each work
- Working space divided by type of works
- Expert of each work

Total risk of the space ≒ Sum of each operation

Laboratory

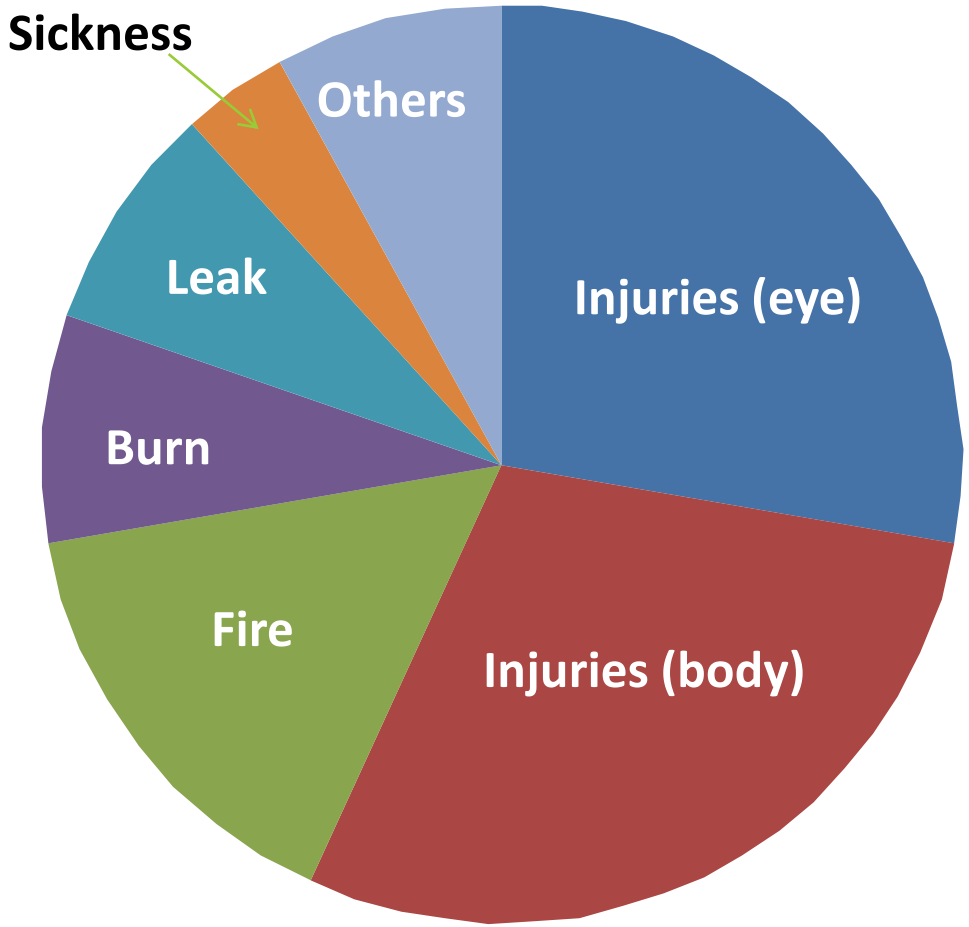
Arranging researchers in space

- Non-routine work
- Fixed location of each researcher
- Sharing limited space by researchers
- Existence of students (beginner)

Total risk of the space ≠ Sum of each experiment

It is insufficient only by risk assessment of each experiment

Detail of accidents by chemicals



Over 50% of chemical injury accidents, victims got involved in the accidents of other researchers.

Researchers are sharing limited space in laboratory

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3. Risk assessment of whole laboratory is essential in addition to that of each experiment.

   Laboratory is a space that many researchers do their own experiments independently at a time. → Total risk will be always changing by the combination of experiments.

More detailed studies of our works will be presented in the following presentations.

Assessment and Management of Chemical Risks in Academic Laboratory(2)
-Influence of laboratory layout on airflow in university laboratory-
Yukiko Nezu, Yuki Nabeshima, Hitoshi Yamamoto, and Yoshito Oshima

Assessment and Management of Chemical Risks in Academic Laboratories (3)
- Observing behavior of experimenter and chemical reagents in an actual chemical laboratory-
Yoshito Oshima, Yukiko Nezu, and Hitoshi Yamamoto

Thank you for your kind attention!

Acknowledgement

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