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Singapore Healthcare Management 2019

Are those Disinfecting Wipes safe for you?

Managing Occupational Exposures of Healthcare Workers Using Chlorine Dioxide Wipes

BACKGROUND

Non-lumened flexible nasoendoscopes used in Otolaryngology clinics are expensive, heat-sensitive, delicate instruments that cannot be sterilized in an autoclave but must be disinfected by means of high level disinfection (HLD). In Singapore General Hospital, the method of disinfection was recently changed to the use of commercial chemical-impregnated wipes which generates less than 1% chlorine dioxide upon activation.

METHODOLOGY

The aim of this project is to evaluate the use of these wipes on potential exposure of healthcare workers (HCWs) to airborne chlorine dioxide during disinfection.

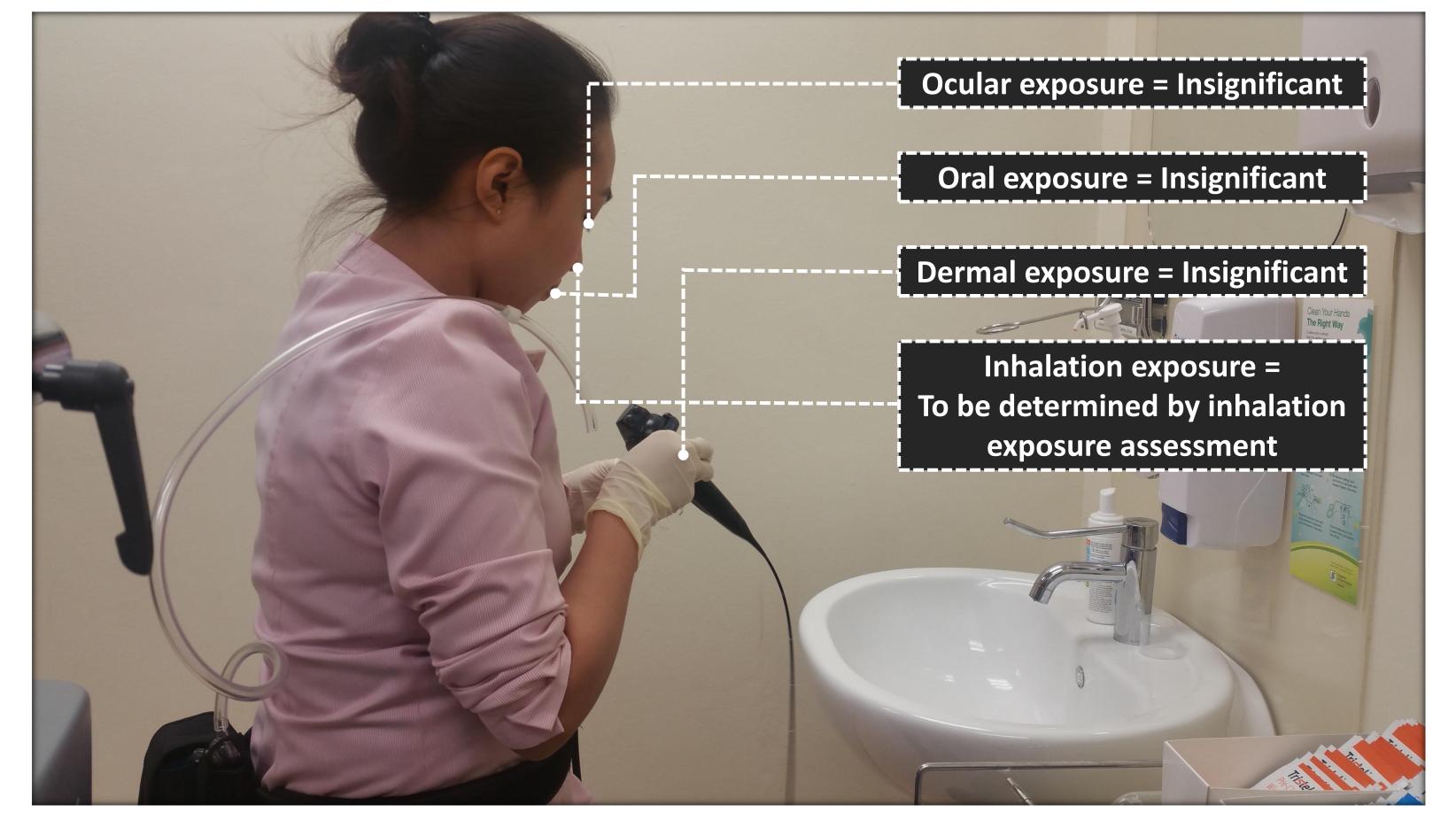
2. Inhalation Exposure Assessment

1. Hazard Identification

1a. Review of safety data sheet CHLORINE DIOXIDE

| EINECS | CAS | CLP Classification | Percent |
|-----------|------------|---|---------|
| 233-162-8 | 10049-04-4 | Acute Tox. 3: H301; Skin Corr. 1B: H314; Aquatic Acute 1: H400 | <1% |

1b. Observation of work activity



2a. Development of sampling strategy for air monitoring

| Similar Exposure Group (SEG) | Task | Predicted Exposure Level Ranking | Type of sample | Personal | | Area | | |
|-------------------------------------|--|-------------------------------------|--|------------|-----------|-------------------------|----------------------|--------------------|
| Type I Nursing Staff | Perform high level disinfection (HLD) of nasoendoscopes | (Highest to Lowest) | Monitoring Duration Long-term (10 hours) | | 10 hours) | Short-term (15 mins) | Long-term (10 hours) | |
| Type I | | | Type of Personal / Area Sample | Worst Case | | Worst Case | Worst Case | On |
| Type II Nursing Staff Type II | Assist doctor in in the same consultation room where HLD was performed | 2 | | Type I | Type II | Type I | Next to HLD | Consultation Table |
| Doctor | Provide consultation in the same room where HLD was performed | 3 | #SEG / #Location | 34 | 24 | 34 | 19 | 19 |
| Housekeeper | Collect waste (include used activated wipes) from consultation room to designated area | 4 | No. of sample | 11 | 3 | 4 | 8 | 8 |

2b. Air monitoring (Method: OSHA ID-202)

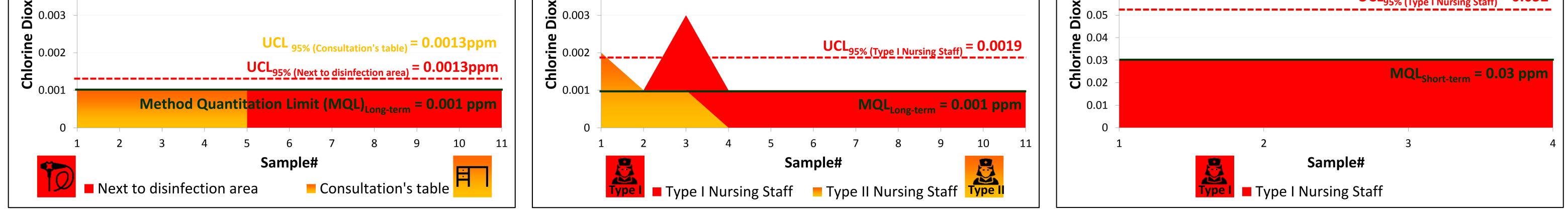




RESULT

The chlorine dioxide concentrations and upper confidence limit at 95% confidence level (UCL_{95%}) for long-term (10 hours) and short-term (15 mins) personal samples and long-term (10 hours) area samples collected were all below the permissible exposure limits (PELs) as stipulated in the Workplace Safety and Health (General Provisions) Regulation, First Schedule: Permissible Exposure Levels of Toxic Substances for Chlorine dioxide.

| Figure 3: Chlorine Dioxide Level for Short-term Personal Sample | | Figure 2: Chlorine Dioxide Level for Long-term Personal Sample | | Figure 1: Chlorine Dioxide Level for Long-term Area Sample | |
|--|----------------------------|---|--|---|--|
| PEL _{Short-term} = 0.3ppm | 0.3 | PEL _{Long-term} = 0.07ppm | 0.07 | PEL _{Long-term} = 0.07ppm | 0.07 - |
| | 6 0.1 | | 6 0.06 - | | E 0.06 |
| $UCL_{off} = 0.052$ | 0.07 0.06 | UCL _{95%} (Type II Nursing Staff) = 0.0036 | d e i e | | d e i i i i |



CONCLUSION

The study presented evidence that the exposure of HCWs to chlorine dioxide during high-level disinfection of flexible nasoendoscopes were deemed insignificant. Despite the insignificant exposure of HCW to chlorine dioxide during nasoendoscope disinfection, risk control measures should be maintained for this activity and those would be

- To maintain a minimum of 10 air change per hour (ACH) at those rooms where HLD is performed;
- Staff to perform the HLD with the chemical-impregnated wipes away from breathing zone;
- To conduct refresher training to reinforce the HCWs with the proper skills to perform the HLD safely.