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Hand sanitiser is flammable

OPINIONS

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The author has completed the ICMJE form and declares the following conflicts of interest: Consult Gruppen has provided fire technical advice to sellers of products that are not alcohol-based, and it was in this context that the author became aware of the problem.

Hand sanitiser is both flammable and explosive. During the COVID-19 pandemic, the use of hand sanitiser has seen a dramatic increase, exposing patients and healthcare personnel to significant risk of injury.

Hand sanitiser contains ethanol, a highly flammable substance that can be ignited by static electricity. When ethanol ignites, the flame is almost completely invisible and does not produce smoke (1, 2). The problem of burns when using and storing alcohol-based sanitiser should be well known, and Norwegian health institutions are obliged to carry out ongoing HSE work. In my role as fire safety adviser, I am surprised by my findings in nursing homes.

Breaching regulations and legislation

All organisations must comply with the Internal Control Regulations (3), which require them to conduct systematic health and safety work. An important part of this work is preventing and limiting the consequences of fire. This is also regulated in the Fire and Explosion Protection Act (4) and the Regulations on Fire Prevention (5). Since fire is created and does not start on its own, these regulations are aimed at caution and prevention. In addition, health

institutions are subject to the Regulations on the Handling of Hazardous Substances, which cover the handling of flammable, reactive and pressurised substances as well as equipment for this purpose (6).

Inspections by the author at nursing homes in the autumn of 2020 revealed breaches in the Internal Control Regulations' requirement for systematic work to identify risk, in the Regulations on Fire Prevention's requirement to reduce the likelihood of fire and limit the damage, and in the Regulations on the Handling of Hazardous Substances' ban on storing flammable liquid where no risk analysis has been performed (7).

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In order for visitors to be able to disinfect their hands, hand sanitiser is often placed just inside the main entrance. When the flammable liquid is placed in the immediate vicinity of both waste bins and flammable furniture, there is a high probability of something catching fire. These types of fires can quickly escalate and have serious consequences, which is a violation of both the Internal Control Regulations (risk must be identified) and the Regulations on Fire Prevention (damage must be prevented and limited).

Nursing homes typically store consumables in neighbouring rooms, often with a door directly out to the escape route. These are often cellulose products, such as paper towels and toilet paper, nappies and work clothes, as well as products such as plastic cups and liquids in plastic jugs or bottles. This does not necessarily constitute an unacceptable risk, but when flammable packaging is stored together with several hundred litres of flammable disinfectants in flammable bottles in the same room, the risk becomes unacceptably high.

Misleading information on fire and explosion hazards

The Norwegian Institute of Public Health's website states the following: 'While the location of dispensers in many countries is strictly regulated, there are no national regulations in Norway other than the regulations covering the handling of flammable, reactive and pressurised substances as well as equipment for this purpose. In addition to storing *large quantities*, which in accordance with Section 14 of the regulations should be included in the institution's safety assessment, the institution *only* has a duty of care (Section 5) in relation to the use of flammable liquid. However, the location of dispensers must be clarified with the HSE officer at the individual institution, and a safety assessment *should* be carried out of dispenser locations in the individual areas.' (Italics added by the author.) (8).

Waste bins placed directly under alcohol-based disinfectant. Photo: Arnstein Fedøy

The claim that risk in general, and the risk of fire and explosion in particular, is not regulated beyond the Regulations on the Handling of Hazardous Substances is incorrect and misleading. Pursuant to Section 5 of the Internal Control Regulations, 'Internal control shall be adapted to the nature, activities, risks and size of the enterprise to the extent required to comply with requirements set out in or pursuant to the health, environmental and safety legislation.' This includes 'identify dangers and problems and against this background assess risks; draw up appurtenant plans and measures to reduce such risks' and 'implement routines to uncover, rectify and prevent breaches of requirements established in or pursuant to the health, environmental and safety legislation' (3).

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Alcohol-based liquid can be ignited by static electric discharge, and a person's whole body can be on fire without the flame being noticed at first, since alcohol burns with invisible flames and does not produce smoke. The claim by the Norwegian Institute of Public Health that the deployment of dispensers is neither risky nor a fire hazard is therefore baseless.

The further claim that only large volumes of liquid require a risk assessment is also incorrect and misleading. Although up to 10 litres of flammable liquid can legally be stored in a home under Section 6 of the Regulations on the Handling of Hazardous Substances (6), this is not permitted in buildings that require more extensive safety precautions. Here, a risk analysis must first be performed and the necessary technical and organisational measures implemented.

The risk is under-communicated

The management and staff that the author spoke with at nursing homes gave the very clear impression that they had not understood that use or storage of alcohol-based disinfectant posed a risk. This applies to the high risk of fire (the liquid is highly flammable), fire spread (liquid flows out) and personal injury (liquid on the skin can be ignited by static electricity). Spills, leaks and use also pose a risk of explosion. There is very little awareness that washing down a room, where large surfaces are wet, can lead to an explosive saturation of evaporated alcohol in the air.

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Given the dramatic increase in the use of hand sanitiser, it is more important now than ever for people to understand the risks involved and how to prevent them. The under-communication of the flammable and explosive properties of ethanol in the health sector is untenable. We cannot just ignore this issue.

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