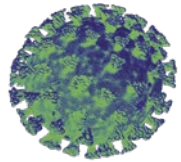
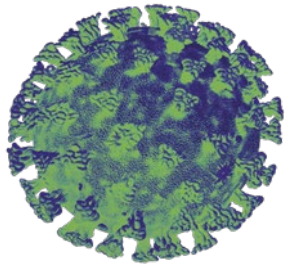
Wales COVID-19 Evidence Centre
Canolfan Dystiolaeth COVID-19 Cymru

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

The effiacy, effectiveness and safety of COVID-19 disinfection methods (including ozone machines) in educational settings for children and young people





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WC19-EC / WCEBC

Ariennir gan Lywodraeth Cymru
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Question Background

- Traditional face-to-face education has been **severely affected** by the COVID-19 pandemic
- To reduce further disruption caused by COVID-19 outbreaks in schools and keep educational institutes open, several disinfectant methods including ozone, light-based technologies (e.g.: UVC light), and hydrogen peroxide have been considered to clean surfaces
- However, concerns have been raised about the evidence for:
  - the efficacy of COVID-19 disinfection methods in laboratory settings
  - the effectiveness of COVID-19 disinfection methods in real-life settings
  - the safety of using these disinfection methods, particularly the potential health effects for children and adults
- We aimed to search the literature for the best available evidence on the efficacy, effectiveness and safety of COVID-19 disinfection methods
- In addition, we searched the evidence on the surface survival of COVID-19

What are the efficacy, effectiveness and safety of COVID-19 disinfection methods (including ozone machines) in educational settings for children and young people?

*efficacy in laboratory settings
**effectiveness in real world indoor settings

Five parts to the question

Surface survival of coronaviruses

Efficacy* of ozone, light based technologies and hydrogen peroxide as a disinfectant against coronaviruses

Effectiveness of ozone, light based technologies and hydrogen peroxide as a disinfectant against COVID-19**

Health effects of ozone for children and young people

Benefits and harms of using ozone as a disinfectant

Extent of the evidence

Surface survival of coronaviruses

Searches identified

- **3 systematic reviews**
- **2 rapid reviews**
- **1 science brief**

Efficacy of **ozone** as a disinfectant against **coronaviruses**

Searches identified

- **1 systematic review**
- **6 narrative reviews**
- **6 primary studies**

Effectiveness of **ozone** as a disinfectant against **COVID-19**

Searches identified

- **1 rapid review**
- **1 narrative review**
- **1 primary study**

Extent of the evidence

Efficacy of **light-based technologies** as a disinfectant against **coronaviruses**

Searches identified
- **3 systematic reviews**
- **4 narrative reviews**
- **1 protocol for a systematic review**
- **3 scientific reports**

Effectiveness of **light-based technologies** as a disinfectant against **COVID-19**

Searches identified
- **1 systematic review**
- **1 rapid review**
- **1 narrative review**
- **2 protocols for systematic reviews**

Efficacy of hydrogen peroxide as a disinfectant against **coronaviruses**

Searches identified
- **1 systematic review**
- **1 rapid review**
- **1 protocol for a systematic review**
- **1 letter to the editor**
- **2 scientific reports**

Effectiveness of hydrogen peroxide as a disinfectant against **COVID-19**

Searches identified
- **1 systematic review**
- **1 rapid review**
- **1 protocol for a systematic review**
- **1 letter to the editor**
- **2 scientific reports**

Extent of the evidence

Health effects of ozone for children and young people

Searches identified

- **3 systematic reviews**
- **1 evidence synthesis**
- **1 protocol for a systematic review**
- **1 narrative review**
- **1 scientific report and 1 web-based summary**

Benefits and harms of using ozone as a disinfectant

Searches identified

- **7 narrative reviews**
- **5 primary studies**
- **8 secondary resources**
- **1 web-based summary**

Key Findings

- COVID-19 fragments can be found on surfaces up to seven days later in the community but there is a lack of evidence whether these are viable

- When accounting for both surface survival data and real-world transmission factors, the risk of surface transmission after a person with COVID-19 has been in an indoor space is minor after 72 hours, regardless of last clean

Key Findings

- There is evidence from laboratory settings that ozone machines, light-based technologies and hydrogen peroxide do inactivate coronaviruses
- There is a lack of evidence for the effectiveness of ozone machines, light-based technologies and hydrogen peroxide in real-world settings
- There are uncertainties about training requirements for staff, methods for assurance of ozone removal and monitoring of occupational exposure

Key Findings

- There is strong evidence of a causal relationship between short term ozone exposure and respiratory health issues; these can occur at low concentrations of ozone; children with asthma are more at risk
- Rooms using ozone machines need to be sealed off to avoid leakage of the gas which is toxic at high concentrations
- Ozone may react with materials in the room to form secondary pollutants (e.g. formaldehyde)

Policy implications

There is no direct evidence for the effectiveness and safety of using ozone machines to deactivate COVID-19 in real-world educational settings for children, young people and staff

There is evidence for the risk of potential harm to children and young people if ozone machines are used in uncontrolled ways in educational settings

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REsearch

GENERation

Assimilation

Transfer

Embedding

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The WC19EC and authors of this work declare that they have no conflict of interest.

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