Effectiveness of Alcohol-Based Hand Hygiene Products Against the Current Pandemic Strain of H1N1

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Abstract

Background: In 2009 a novel strain of H1N1 emerged as the etiologic agent of the recent pandemic Influenza outbreaks. One of the key recommendations for preventing the transmission of illness from H1N1 or other infectious pathogens is proper hand hygiene. The use of alcohol-based hand sanitizers has been recommended by the CDC to help prevent transmission of H1N1.

Objectives: The objective of this study was to determine whether CDC recommendations for use of an alcohol-based hand sanitizer to prevent transmission of H1N1 are supported. A secondary objective was to determine whether product format has an impact on the efficacy of alcohol-based hand sanitizers against H1N1.

Methods: Five alcohol-based hand sanitizers were tested: a 62% ethanol gel, 62% ethanol foam, 2 different 70% ethanol gel formulations, and a 62% ethyl alcohol spray formulation. Samples were evaluated using the standard virucidal suspension test method (ASTM E1052). Each sample was exposed to pandemic strain A/California/04/2009 of Swine-origin H1N1 and the H1N1 used in the study.

Results: All alcohol-based products achieved complete reduction (>4.25 log reduction) of the virus within the 15-second contact time.

Conclusions: The CDC recommendations for use of alcohol-based hand sanitizers for preventing transmission of the current pandemic strain of H1N1 are supported. Alcohol-based hand sanitizers are considered a reliable intervention for the reduction of H1N1 virus on hands.

Additional Information

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Materials and Methods

Test Products: Five commercially available alcohol-based products were evaluated in this study. These included a 62% ethanol gel Instant Hand Sanitizer (IHS), a 62% ethyl alcohol foam IHS, a 70% ethanol gel IHS, an advanced formula 70% ethyl alcohol gel IHS, and a 62% ethyl alcohol sanitizing wipe. All products were tested by GOJO Industries, Inc., Akron, Ohio.

Test Method: Products were tested according to ASTM 1052-06, 8 standard test method for efficacy of antiseptic handrub against viruses in suspension. The challenge virus was Swine-origin H1N1 Influenza a virus strain A/California/04/2009 (CDC I.D. 20090712047). Test products were mixed with virus suspension to give a 30% concentration of test product. After a 15-second exposure, the virus was neutralized by dilution in lx Minimum Essential Medium. Selected dilutions of the medium/test product mixture were added to cultured host cells (Madin-Darby Canine Kidney MDCK [ATCC#CCL-34]) and incubated at 37°C with 5% CO2 for a period of 5-14 days. Residual infectious virus was detected by viral-induced cytopathic effect, and a 50% tissue culture infectious dose (TCID50) was calculated using the Spearman-Karber calculation. Log10 of infectivity was calculated, and Log10 reductions were calculated by comparison to the virus control. Evaluations included a virus control, cytotoxicity control, neutralization control, and negative control.

Results:

<table>
<thead>
<tr>
<th>Test Product</th>
<th>Log10 Reduction</th>
<th>Percent Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>62% Ethanol Gel IHS</td>
<td>&gt;4.25</td>
<td>&gt;99.99%</td>
</tr>
<tr>
<td>62% Ethanol Foam IHS</td>
<td>&gt;4.25</td>
<td>&gt;99.99%</td>
</tr>
<tr>
<td>70% Ethanol Gel IHS</td>
<td>&gt;4.25</td>
<td>&gt;99.99%</td>
</tr>
<tr>
<td>70% Ethanol Advanced Formula Gel IHS</td>
<td>&gt;4.25</td>
<td>&gt;99.99%</td>
</tr>
<tr>
<td>62% Ethanol Sanitizing Wipe</td>
<td>&gt;4.25</td>
<td>&gt;99.99%</td>
</tr>
</tbody>
</table>

All alcohol-based products achieved complete reduction of 2009 H1N1 Flu in 15 seconds.

Conclusions:

- Alcohol-based hand hygiene products (62%-70% ethanol) all achieved a high reduction of 2009 H1N1 Flu virus in vitro. This data is consistent with previous data which show that >60% ethanol products are effective against various strains of Influenza.
- Product format (gel, foam, wipe) did not impact efficacy of alcohol-based hand sanitizers; therefore, it appears that active ingredient is the primary determinant of efficacy against 2009 H1N1 Flu, and formulation effects are minimal.
- The CDC recommendations for use of alcohol-based hand hygiene agents for preventing transmission of 2009 H1N1 Flu are supported.
- Alcohol-based hand hygiene products should be considered as an effective hand hygiene intervention whenever there are concerns about H1N1 Flu or other types of Influenza outbreaks.

References:
8. CDC Website, www.cdc.gov/flu/fluinfo/grms.htm