Background:
Fusarium and Mucor are two filamentous fungus strains that can cause infections in humans. Fusarium is known for causing corneal infections. Patients who have diabetes mellitus or are immunocompromised are at a higher risk of mucormycosis. Wireless electroceutical dressing (WED) contains embedded silver and zinc nanoparticles in a geometric pattern. Both zinc and silver have been known to be antimicrobial; yet the combination results in a weak electric field when exposed to an electrolyte-containing solution. WED has been found to have antifungal effects against Candida albicans and Aspergillus fumigatus.

Methods:
We investigated the antifungal effect of WED against Fusarium and Mucor growth and survival through daily radial growth and optic density readings.

Results:
Our results show that the WED weakly inhibits radial growth of Fusarium strains and strongly inhibits radial growth of Mucor strains, with greater inhibition near physiologic temperatures. Although zinc and silver-only fabric inhibited the radial growth of Mucor, no growth occurred on WED (Ag-Zn) plates for Mucor strains. Optic density readings had mixed results; Ag-Zn liquid cultures had reduced absorbance than control cultures for both strains. Zone of inhibition studies of Fusarium showed no growth on Ag-Zn fabrics with full coverage on all other control and metal containing plates. WED had a greater effect on reducing Mucor growth than Fusarium.

Conclusions:
WED utilizes a weak electrical field created by silver and zinc nanoparticles to create an antifungal effect. This leads to strong inhibition of Mucor, Candida, and Aspergillus growth and weak inhibition of Fusarium growth. Further studies are needed to determine the specific effect of WED on fungal viability, the mechanism, and in vivo efficacy. This work could increase patient treatment options for fungal wound infections.