A Culturally-Appropriate Household Heating Energy Transition for the Navajo Nation

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# SUMMARY

Household air pollution from indoor use of solid fuels such as wood and coal claims 4.3 million lives globally each year (WHO 2014). Most of this use is in developing countries; however, some communities in the United States also use these fuels indoors. About 65% of all Navajo households (USCB, 2014) and almost 90% of those in rural areas (NHA, 2011) rely on wood and coal to heat their homes, often using old, poorly ventilated, and inefficient stoves.

A study conducted by Bunnell et al. (2010) found that the combustion of solid fuels for indoor heating in Navajo homes was likely associated with negative health effects in this community. They suggested that high levels of indoor pollutants could be greatly reduced by changing indoor heating behaviors and improving heating stove quality. Combustion of coal emits contaminants such as sulfur dioxide, carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxide, polycyclic aromatic hydrocarbons, and particulate matter containing trace metals, which have been linked to negative health effects on people.

Our research team addressed this challenge by conducting three studies focused on the home heating needs of the Navajo Nation. First, we developed a framework to identify the most effective and suitable heating alternative for this community (Champion et al., 2017a). Next, we utilized a representative residential wood stove to determine emission factors for four relevant solid (wood and coal) fuels used by the Navajo (Champion et al., 2017b). Lastly, we used a cellular oxidative stress model to assess the oxidative and inflammatory effects of the fine particulate matter from those emissions (Li et al., 2018). Combined, these studies provided guidance for a current intervention in the Navajo Nation that includes a EPA-certified dual (wood/coal) designed specifically for this community. Our team is now completing a Pilot Study assessing the first roll-out of these new stoves. Our future work includes a multi-year evaluation of this intervention, which will incorporate health as well as educational components.

# REFERENCES

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