

Human Engineering Research Laboratories (HERL) - Response to COVID-19

Rory A. Cooper¹⁾, Garrett G. Grindle¹⁾, Hisaichi Ohnabe¹⁾²⁾

1) University of Pittsburgh • US Department of Veterans Affairs Human Engineering Research Laboratories

2) Niigata University of Health and Welfare

【Background】 HERL are a jointly supported by Univ. of Pittsburgh and US Dept. of Veterans Affairs. HERL was founded in 1994 to create and evaluate technologies to improve the lives of military veterans and people with disabilities. HERL includes extensive expertise and physical facilities for biomechanics, software development, electronic design-fabrication, and mechanical design-fabrication. Including extensive standard testing that support development of International Standards.

About 70 people work within HERL among them are students, professional staff, and investigators (faculty) who work as a team to create new technologies, conduct studies on emerging technologies, and help to translate findings into practice. HERL team members have extensive national and international collaborations and train students from throughout the world.

In Spring, 2020 the COVID-19 global pandemic began to reach large numbers world-wide and people with disabilities in Pennsylvania, USA were among those people affected. There became a rapid need to personal protective equipment, medical center modifications, and testing kits



Fig. 1. Face shields and face-masks created to help reduce the spread of COVID-19.

【Method】 HERL was approached by the leadership of the US Dept. of Veterans Affairs to assist in preparing to control this global pandemic and to mitigate the impact on veterans within our region. Given HERL's talented team, design skills, and fabrication facilities the mission to create personal protective equipment and test swabs began.

HERL team members have contributed to have made several important contributions to reducing the impact of COVID-19 among veterans and people with disabilities. A challenge for some people with disabilities early in the response was the need for support to have food and hygiene supplies delivered. In addition, face-shields, desk-shields, and bed-shields were created to protect health care workers. To reduce the spread of COVID-19 and to channel people for appropriate treatment, testing is required. Effective testing requires

large quantities of nasopharyngeal swabs. HERL tackled the effort to create nasopharyngeal swabs in rapid fashion – creating a design, determining an effective cleaning and sterilization process, fabricating and validating mechanical and statistical testing, conducting ergonomic tests, and verifying effectiveness to detect virus samples versus controls. After large scale production began, an inventory control and tracking process was established.

This work was conducted under the rules of quality assurance and US emergency response declaration; therefore no human subject protection board approval was required. The authors have no conflicts of interest to declare.

【Result】 HERL raised over \$20,000 in funds and organized volunteers to help people with disabilities with food and hygiene supplies. Forty people were provided assistance. About 50 face-shield, desk-shield, and bed-shield units were created, and more are in progress, see Figure 1. However, commercial supplies have started to meet the current demand. To date over 20,000 swabs have been produced and have been used or are available for testing with the region, see Figure 2.

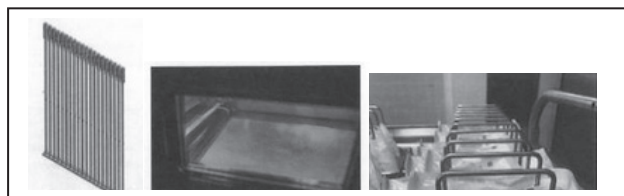


Fig. 2. HERL Test Swabs for COVID-19

【Consideration】 The COVID-19 pandemic caught most of the world by surprise and necessitated rapid responses. HERL for example redirected its research efforts from the creation and study of technologies for people with disabilities to meeting immediate emergency demands. Given this experience, it is important to reflect and to put systems in place for the research and development laboratories have the plans and resources in place to respond efficiently and effectively.

【Conclusion】 HERL's assistance with the US Department of Veterans Affairs emergency response made a positive impact in the fight against the COVID-19 pandemic and likely contributed to the low rate of transmission within western Pennsylvania, especially among veterans and their healthcare providers.

【References】

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