

FDGA Project Final Report

Written by Jennifer Lee, Ph.D.
Fashion Business Management
Jay and Patty Baker School of Business and Technology
Fashion Institute of Technology, SUNY

This report presents the outcomes of my new protective medical clothing design research project sponsored by FDGA. The purpose of this project is to create FIT's fashionable versions of medical clothing designs that were desired by the participating healthcare workers. A total of 27 healthcare professionals, including the registered nurses and nursing students currently working in large hospitals in New York City, participated in the project. The project was executed according to five steps as follows: First, the IRB application to conduct the research was approved by FIT's IRB committee on June 1, 2021; then, to identify the clothing needs of healthcare workers, an online survey and video interviews were conducted from June 2, 2021 to June 6, 2021. Second, before making physical garment prototypes, the new clothing designs were simulated in a 2D digitized pattern format and an avatar-fitted 3D virtual garment format using the CLO 3D garment visualization software program, then the initial design evaluations about the created virtual garments were completed by the participating medical professionals. Third, based on the survey and the virtual garment evaluation results, three physical garments were created; one was mainly made from disposable three-layered non-woven PPE (Polyphenylene Ether) materials donated by Fabscrap, a non-profit organization dedicated to sustainability, and the rest were created using reusable light-weight medical barrier fabrics (99% polyester, 1% carbon fiber) and various functional trim-materials. Fourth, from June 23, 2021 to June 26, 2021, the completed garments were shipped to the home addresses of the three participating registered nurses for physical fitting and evaluations. The final evaluation results and fitting photos and videos of the garments were collected from the participants. Finally, according to the evaluation results, the previous garment designs were corrected in a 3D virtual garment format then fitted on the avatars. It is planned that the outcomes of this design study will be published in one of the peer-reviewed journals and on the Loop for Good (the FIT's Sustainable Pop-up Shop Project) website and presented at academic conferences such as SUNY CIT.

The new design features of the completed garments:

According to the survey and interview results, the seven clothing features listed below were emphasized in the completed new protective medical clothing designs.

- 1. Fitting and sizing:** The garments' fitting and sizing were designed to be transformable through the use of expandable drawstrings, elastic bands, and Velcro, so the garments can be better fitted to wearers of different sizes and body types.
- 2. Wrist and arm areas' comfort and protection:** To improve the bulky sleeve features of the currently available medical gowns in the market, the wrist areas' fitting was improved by incorporating flat (height: ½ inch) elastic bands. The lower parts of the sleeves were designed to be tightened using the attached Velcro or elastic-band straps.
- 3. Neck protection:** Most of the medical gowns frequently used in hospitals do not include protection features for neck areas. The completed garments include high neck covers with elastic drawstrings at the opening for extra protection.
- 4. Garment opening and closing convenience:** To reduce the garment wearing/taking-off time, the completed garments' opening plackets were finished with Velcro closures instead of using complicated tied-straps that are frequently used for current medical clothing. To allow for easier body movement, especially when a wearer is bending forward, the garment opening plackets were constructed in a diagonal

direction instead of a straight direction. The diagonal Velcro opening plackets were tested at both the front and back sides of the completed garments.

5. Utility pockets: Most of the study participants addressed the need for utility pockets that would be attached to the outside of the medical clothing. Most of the currently available medical gowns do not have pockets. In the completed clothing, multiple utility pockets were patched at different locations of the garments such as on chest areas, the lower front side, and the lower back side.

6. Chest ID pocket: Due to limited face exposure while being covered by a face mask and/or protective glasses, many study participants mentioned that it is important to show their picture ID with the name of the medical professional when interacting with a patient. A transparent ID holding pocket was added to the left-side chest on each completed garment.

7. Garment design aesthetics: The aesthetics of clothing are one of the most important aspects of medical clothing identified in this study. Most of the study participants felt that the clothing aesthetics could aid in improving job performance and are helpful in their work with patients. The completed clothing designs were focused on the improvement of clothing aesthetics. For example, the feminine-looking dropped puff and pleated sleeves were added instead of regular set-in sleeves. Digitally printed fabrics with bright-colored flower patterns were attached to the pockets and sleeves. Bright neon-colored trim, such as on the drawstring and Velcro segments, were used. The overall garment silhouettes were inspired by high-performance active sportswear jackets.

After the completion of the project, my achieved outcomes include the enhancement of my 3D garment visualization techniques, design research capacities, and pedagogical skills on 2D and 3D computer-aided product development for students. My experiences and knowledge gained from this FDGA-sponsored project are enormous. In particular, I learned a great deal about the clothing needs of the medical professionals who have been saving so many lives in our large community amid the global pandemic. I would like to express my special thanks to Professor Elaine Maldonado and Celia Baez at the Center for Excellence in Teaching for helping me make this research project possible.

Garment #1: The Medical Gown with a Velcroed Back-Opening Placket in the PPE Materials





Model: Destinee Castillo, Nursing Student (New York, NY)



Model: Mary Mensah, Registered Nurse (New York, NY)

Garment #2: The Medical Gown with a Velcroed Back-Opening Placket in the Medical Barrier Fabrics



Model: Destinee Castillo, Nursing Student (New York, NY)



Model: Mary Jane Gali, Registered Nurse (New York, NY)

Garment #3: The Medical Gown with a Zippered Front-Opening Placket in the Medical Barrier Fabrics





Model: Mary Jane Gali, Registered Nurse (New York, NY)