



PPE REFASHIONED: CRAFTING THE GOWN OF CARE

The potential of reusable PPE to reduce waste and enhance wearer comfort was showcased at an exhibition at Nottingham Trent University in October 2023. It was the culmination of an AHRC-funded project to demonstrate the creative potential of PPE as both critical clothing and a waste stream, writes Katherine Townsend, Professor of Fashion and Textile Practice from NTU.

The PPE Refashioned exhibition at the Nottingham School of Art & Design featured a collection of reusable PPE isolation gowns, complemented by fashion and textile artefacts made by students, academic staff and designers using similar, repurposed garments.

The Arts and Humanities Research Council-funded project came about as a result of the issues associated with single-

use PPE during the coronavirus pandemic, 75% of which ends up in landfill or the ocean (United Nations 2022). In response, United Kingdom Research & Innovation put out a call for the development of 'reusable products to meet net-zero targets' (UKRI, 2020). Reading about the lack of care afforded to (mainly female) nursing staff forced to wear 'one-size-fits-all' garments, I was compelled to

Left: View of PPE Refashioned exhibition featuring researchers, students and staff work.

Right: The Gown of Care designed by Cunnington & Sanderson

write a funding proposal: *Redesigning PPE: enhancing the comfort and safety of healthcare workers wearing isolation gowns to treat patients with COVID-19*, which was supported by the AHRC from January 2021 to July 2022.

The empirical investigation was undertaken in the Fashion, Textile & Knitwear (FTK) department at NTU by a research team with expertise in fashion, textile, pattern cutting and uniform design, including Eloise Salter and Karen Harrigan (NTU) and Dr Sonja Šterman (University of Maribor, Slovenia). Our dual research aims were to design a fit-for-purpose reusable PPE isolation gown and reduce the quantity of single-use gowns being procured and disposed of in the UK.

With the help of the Textile Services Association, we identified industry partners in the East Midlands and by spring 2022 had developed a reusable PPE gown system (XS-5XL), in collaboration with medical apparel manufacturer Anze, which met the prerequisite EN 13795 standards (CE/UKCA). The gowns were fabricated in woven (100% recycled) polyester by Toray Textiles Europe, and tested through wearer trials with five NHS Trusts with the support





Half-scale replicas of nurses' uniforms from 1852, 1942 and 2022 by Karen Harrigan.

of Synergy LMS and RevolutionZERO.

The wearer testing confirmed improved fit and thermal comfort, but it also highlighted the issue of what happens to gowns at their legislated 'end of life' of 75 washes, and the limitations of a 'linear model characterised by low rates of use, reuse and repair' (EU Strategy for Sustainable & Circular Textiles, 2022). As gowns are either shipped offshore to medical charities or sent to landfill, we applied to AHRC to extend the project to July 2023 to explore the possibilities of extending the use phase in line with a 'virtuous system' (Zero Waste Europe 2023).

Working with our industry partners, we developed a circular model incorporating three additional use phases: patient care, creative repurposing, and fibre-to-fibre recycling. As design researchers,

we focused on creative repurposing by exploring how fashion and textile techniques could inform new products to extend the useful life of the fabric.

To further this aim, we invited students and staff from FTK to a series of PPE repurposing workshops in April/May to experiment with the structure and surface of the discarded materials.

Two Fashion Knitwear students shredded the gowns, then hand knitted, knotted and crocheted the 'PPE yarn' to make garments and accessories. A Textile student collected scraps from workshop participants to weave herringbone swatches. Department staff deconstructed and remade the gowns into zero-waste fashion concepts such as a gender-neutral work shirt and lifestyle bag that doubled as a 'safe PPE changing mat'.

Three half-scale outfits illustrated the



Left: *Knotted cover-up and top* by Emily Cheung; *Woven Waste* swatch by Fiona Foster. Right: *Cross-Contamination Gown* by Katherine Townsend & Leanne Tonkin, *Kontent for Lifestyle bag* by Emma Prince, biofilm-inspired sublimation prints by Alison Escott.

evolution of nurses' clothing, as worn by Florence Nightingale in the mid 1850s, to early NHS uniforms designed by Hardy Amies in 1942, to scrubs, introduced in the 1970s. Print and hand embroidery were used to transfer images of biofilms and stains and mimic surgical stitching and repair techniques, reinforcing the gown's role as a protective layer.

In June, four independent fashion designers were invited to take part in the project and were supplied with used gowns to reinterpret in line with their brand's identity.

G Force used the etymology of national health to inspire two jacket designs featuring vinyl and knitted medical symbols of viruses, the staff of Hermes, broken bones, and crosses.

One BC's 'Spiralisation' concept involved

forensic deconstruction of the original garments, which were reassembled as an outfit incorporating spiral cutting.

Klements used the PPE to create separates from its collection 'Ghosts', inspired by previous occupants of a historic building. The combination of imperfections, sublimated patches of colour, and figure drawings suggest traces of many wearers.

Cunnington & Sanderson utilised 12 used garments in their conceptual zero-waste gown, which encapsulates the motivations for the research project. The designers learnt about the gowns' fabric structure, how they felt, draped, moved and their positioning on the body. Connecting and sewing the gowns together, the final ensemble was completed to be 'worn as one', symbolising the feelings of care, dedication and unity these gowns evoke.