



# Healing by Leaps and Gowns: A Novel Patient Gowning System to the Rescue

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## Abstract

Patient attire is paramount to a patient's dignity and hospital experience. The traditional hospital gown is dehumanizing, anachronistic, and was designed for providers' convenience. In this descriptive, prospective follow-up to our previous pilot study, we evaluated male and female medical and surgical patients and provider preference and experience with a novel patient gowning system, the Patient Access Linen System (PALS). This study was conducted in 2 hospitals within our health system. Our objective was to assess patient and provider satisfaction, experience, and preference using the PALS. A multiple-choice, free response survey was administered to patients and providers following the use of an item. A total of 315 patients and 249 staff in 2 hospitals completed surveys regarding their experience using or providing care to patients using the PALS. Patients and providers had consistently positive experiences with the PALS, including questions about comfort and function. The data demonstrate a clear preference for the PALS compared to the traditional hospital gown and give additional supporting evidence that the comfort of hospital clothing is of paramount importance to patients.

## Keywords

hospital gown, patient satisfaction, experience, patient feedback

## Introduction

"I was naked, and you clothed me; I was sick, and you visited me" (Mathew 25:36).

As health care providers, we often forget the intense vulnerability that accompanies being hospitalized. We are trained to be compassionate, yet we often forget what it feels like to be a patient, how the lack of privacy, comfort, and control diminishes patient experience (1). It is difficult enough to be hospitalized and even more so if you are sick and afraid (2). The palpable dichotomy between the pristine white coat of a physician and the revealing patient gown is another barrier and perpetuates the hierarchy within care institutions (3–5). Clothing buffers us against environmental change and protects us in social contexts (6). To paraphrase the designer, Coco Chanel, "Clothing has 2 purposes: comfort and love." A growing body of literature highlights external factors that impact patients' sense of comfort in the hospital (7,8). Central to this discussion is the outdated, traditional hospital gown (9).

One of the first steps transforming a "person" to "patient" is the donning of the hospital gown. The purpose of clothing is "to maintain bodily and mental efficiency and a feeling of comfort in a particular climactic condition" (10). With their

open backs and thin fabric, these gowns add to depersonalization and discomfort among patients. Common adjectives used are "exposed, vulnerable, uncomfortable, cold, embarrassed, and disempowered" to describe the traditional gown (3). A more appropriate description might be "open and froze from your nose to your toes" (11). Additionally, the traditional gown thrusts the "sick" role on patients and loss of healthy identity (6). It has been documented that improvements in hospital gowning would improve patient experience and possibly lead to more effective medical outcomes (3,8,12,13). Unfortunately, actions needed to make these improvements a reality have been scarce, though the "traditional" hospital gown is, simply put, a tradition whose time is past.

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Although there have been attempts to address this issue, synergism of function and form (allowing full coverage for patients while permitting examination of discrete anatomic areas for providers) has been missing (11). Patient experience is key in the triad of patient safety and clinical efficacy. A comfortable patient may hear clinician instructions more clearly and possibly ambulate more postoperatively (14). Patient experience is an equally important element of this construct, thereby strengthening safety and clinical efficacy into a powerful triad.

In response to the growing need for a better experience, we developed and patented the Patient Access Linen System (PALS), maintaining patients' modesty and ease of examination for providers (11). The PALS reintroduces dignity to the hospital experience. The products were initially piloted among obstetric and gynecologic patients in a New York tertiary care hospital (11). Overall, positive feedback from both patients and providers during the pilot encouraged further testing of the PALS, as described below. We wished to determine whether the PALS could be expanded effectively to more varied populations of patients and care providers.

During the initial pilot study, we assessed patient and staff satisfaction, patient comfort, and ease of examination for providers focused exclusively on obstetric and gynecologic patients. In this study, we included male and female patients across multiple age ranges on medical and general surgical services. Our hypothesis was that satisfaction with PALS would be maintained in more diverse patients and settings. Ultimately, we hope that the PALS will improve the complex patient–physician–hospital experience.

## Materials, Patients, and Methods

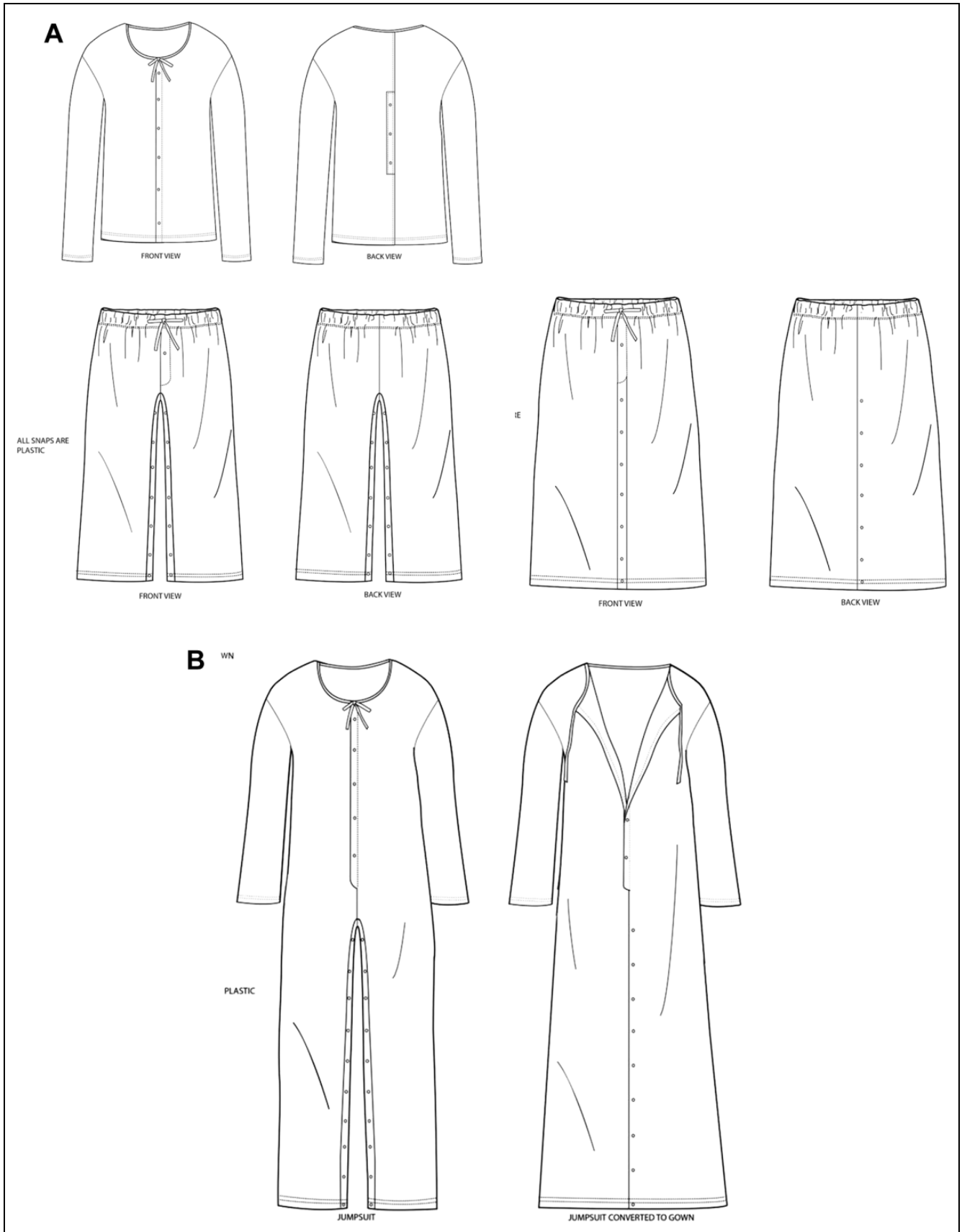
The PALS designs (PALS, US provisional application number 62/339,186, May 20, 2016) were developed in collaboration with a clothing designer/fabric artist and senior obstetrician gynecologist. Given the low-risk, noninvasive nature of a hospital attire study, the initial PALS pilot and the current expansion study were granted exemptions by institutional review board of our health system.

The PALS system offers 2 models: (1) top and bottom combination (Figure 1A) and (2) jumpsuit combining elements of the 2-piece design into 1 unit (Figure 1B). Both designs are manufactured for patients with body mass index up to 35, with adjustable neckline (Models 1 and 2) and waist (Model 1) as needed. The fabric is 70% cotton and 30% polyester, consistent with commercial sleepwear. Garment closure is accomplished with radiopaque snaps, drawstring closure at the neckline, and half-elastic/half drawstring closure at the waistline (model 1A lower portion). Snaps allow for opening of targeted areas of the garment needed for specific examinations, preserving the coverage of other anatomic areas. The top opens and closes with snaps vertically (front and middle third of the back). The drawstring neckline

permits excellent coverage, allowing examination of the upper body (cardiovascular, breast, and upper abdomen), opening the portion of the PALS as clinically required and closing it once the examination is concluded. The inseam of both the 1- and 2-piece models contains snaps allowing conversion into pants (front-to-back closure) or skirt (side-to-side closure) depending on patient preference and cultural requirements. This feature allows for examinations of the lower abdomen, perineum, and lower limbs maintaining coverage once the examination is concluded. The absence of the waist closure in the jumpsuit is the only difference between the 2 models. The PALS also differs from traditional gowns since examinations and procedures are more easily accomplished (changing intravenous, placing catheters, drain changes, epidural placement, gynecology examinations, and vaginal delivery).

The current study was conducted from January 2019 to February 2020 at 2 hospitals (hospitals A and B) within our health system. Female and male inpatients and outpatients older than 18 years on the surgery, medicine, and obstetrics and gynecology services were included. Participating providers were employees of the health system who delivered direct patient care. Patients unable to understand instructions due to decreased consciousness were excluded. Patients were offered the option to participate by their providers; if they accepted, they could choose which model garment they preferred (top, top and pants, or jumpsuit) from the PALS system. Inpatients wore a PALS item for up to 12 hours, and outpatients wore it during their visit. Following the experience, patients and staff completed anonymous surveys about the PALS experience. Inpatients could utilize the traditional gown during the hospital stay. Demographic data, including sex and age ranges (<20, 21-40, 41-60, 61-80, 80+), were collected. Surveys for patients and providers were separate and anonymous and were returned to a central drop box for collection by a designated member of the research team. Patients were given the option of repeating the use of the PALS during their inpatient stay to evaluate a model other than the one first chosen. These patients completed and returned a second survey (counted in total surveys returned).

The patient survey consisted of 9 questions utilizing a summated (Likert) rating scale and 1 free response question. Rating response options were “definitely yes,” “somewhat yes,” “neutral/no opinion,” “somewhat no,” or “definitely no.” The provider survey consisted of 13 summated questions and 1 free response question. Response options for providers were “difficult” to “easy,” “not beneficial” to “beneficial,” and “do not like” to “like a lot.” Responses from both questionnaires provided information on which item(s) of the PALS system was used, ease of donning/doffing, comfort, modesty, ease of mobility, and ease of examination. Percent satisfaction was calculated by dividing the average Likert numeric scale ratings by 5 (highest possible score).



**Figure 1.** (A) Patient access linen system (PALS) top and bottom shown with pants option (left) and skirt option (right). (B) Patient access linen system (PALS) jumpsuit, pants option on left, dress option, and drop neckline on right.

## Statistical Analysis

Surveys were reviewed by a research team of statisticians. Data were analyzed using SAS/STAT software, version 9.4, of the SAS System for Windows. Frequencies and

percentages were tabulated and calculated for each item in patient and provider surveys. Qualitative data from the patient and care provider open-ended survey questions were reviewed and pooled to determine patterns of responses.

**Table 1.** Demographics of Patients and Garments Used.

	Hospital A, N = 225, n (%)	Hospital B, N = 90, n (%)
Gender		
Female	181 (80.4)	54 (60.0)
Male	28 (12.4)	30 (33.3)
No data	16 (7.11)	6 (6.67)
Age		
20 or younger	6 (2.67)	12 (13.3)
21-40	60 (26.7)	12 (13.3)
41-60	69 (30.7)	20 (22.2)
61-80	66 (29.3)	37 (40.0)
80+	21 (9.33)	1 (1.11)
"Prefer not to say"	3 (1.33)	8 (8.89)
Garment used		
Jumpsuit	154 (68.4)	39 (43.3)
Top and pants	19 (8.44)	22 (24.4)
Top only	51 (22.7)	21 (23.3)

## Results

A total of 315 patients and 249 care providers (nurses, medical assistants, physicians, and midlevels) across 2 hospitals completed surveys regarding their experiences using the PALS garments. Although the majority of patients from these institutions were female (80.4% at hospital A and 60.0% at hospital B), there were a substantial number of responses from males (12.4% at hospital A and 33.3% at hospital B). Age was subdivided into age ranges by hospital (<20, 21-40, 41-60, 61-80, 80+; Table 1). More patients chose the jumpsuit (68.4% at hospital A and 43.3% at hospital B). At hospital A, most of the remaining patients chose the top; at hospital B, this was divided between top and pants and top (Table 2).

Patients overwhelmingly responded that the comfort of hospital clothing was integral to their overall experience; 82.2% at hospital A and 62.2% at hospital B rating it "very important," and 16.7% at hospital A and 32.9% at hospital B

**Table 2.** Patient and Staff Survey Results of Hospitals A and B and Hospitals Stratified by Men and Women.<sup>a</sup>

Patients	Hospital A			Hospital B		
	Mean	Median	Satisfaction (%)	Mean	Median	Satisfaction (%)
Questions						
Were you able to move about easily when walking and while in bed?	4.17	4	83	3.99	4	80
Was this gown easy to put on and remove?	4.28	5	86	4.16	4	83
Compared to a traditional hospital gown, did this gown make you feel more comfortable and/or protected?	4.30	5	86	4.26	4	85
Do you prefer this gown to traditional hospital gown?	4.17	5	83	4.21	4	84
Staff	Hospital A			Hospital B		
Questions	Mean	Median	Satisfaction (%)	Mean	Median	Satisfaction (%)
What did you think of the design?	3.93	4	79	3.78	4	76
If you were a patient, would you prefer this gown to the traditional gown?	3.88	4	78	3.91	4	78
As a caregiver, did this gown make caring for the patient easy?	4.00	4	80	4.11	4	82
Did the patient seem happy/satisfied with this gown?	4.12	4	82	4.02	4	80
Did you notice any patient improvements in regard to the patient experience because of this gown?	3.92	4	78	3.85	4	77
Patients	All females			All males		
Questions	Mean	Median	Satisfaction (%)	Mean	Median	Satisfaction (%)
Were you able to move about easily when walking and while in bed?	4.07	4	82	4.18	4	84
Was this gown easy to put on and remove?	4.22	4	84	4.26	4	85
Compared to a traditional hospital gown, did this gown make you feel more comfortable and/or protected?	4.27	5	85	4.26	4	85
Do you prefer this gown to traditional hospital gown?	4.23	4	84	4.36	5	87

<sup>a</sup>5 = definitely yes; 4 = somewhat yes; 3 = neutral/no opinion; 2 = somewhat no; 1 = definitely no.

rating it “somewhat important.” The majority of patients at each hospital responded that compared to the traditional gown, the PALS made them feel more comfortable and protected; 82.6% at hospital A and 86.6% at hospital B responded “definitely or somewhat yes” to the question. Only 4% of patients at hospital A and 1.11% at hospital B believed this was “not important.” Most patients at each hospital also preferred the PALS to traditional hospital gowns; 80% at hospital A and 84.5% at hospital B responded “definitely/somewhat yes” to this question (Table 2).

Staff responses paralleled the patients’ positive evaluations. Responding to whether staff believed the changes in hospital gowning improved patient experience, 63.4% at hospital A and 50.5% at hospital B responded either “definitely yes” or “somewhat yes.” When asked whether patients were happy or satisfied with the garments, 70% of staff at hospital A and 57.6% at hospital B responded either “definitely yes” or “somewhat yes.” The remainder of responses to these questions were mainly “neutral/no opinion” with some “definitely/somewhat no” (Table 2).

When questioned about the ease of use and mobility, feedback from patients was encouraging. In response to the question “Were you able to move about easily when walking and while in bed?” 83.6% at hospital A and 83.4% at hospital B responded “definitely or somewhat yes”; in response to “Was this gown easy to put on and remove?” 84.9% at hospital A and 85.6% at hospital B responded “definitely or somewhat yes.” As applicable, when queried “Did you like the option to modify the jumpsuit and pants into a nightgown or skirt?” 55.6% at hospital A and 43.3% at hospital B said “yes” (Table 2).

Results were further stratified to compare male and female responses. Men had a higher satisfaction in ambulation, donning, and in the overall recommendation of PALS compared to women, whereas women felt more comfortable and/or protected compared to males (Table 2).

Staff surveys included questions regarding the ease of use and examination. Overall, staff felt the design and ease of use benefited both patients and providers. When asked “If you were an inpatient would you choose this over the conventional gown?” 66.6% at hospital A and 60.6% at hospital B stated “definitely or somewhat yes.” Furthermore, when asked “As a caregiver, did this gown make caring for the patient easy?” 67.4% at hospital A and 63.6% at hospital B said “definitely or somewhat yes” (Table 2).

Finally, both patients and staff were given the opportunity to provide free-text feedback. Some themes among the free-text feedback included comments regarding sizing, fabric, and the need for pockets (Table 3).

## Discussion

Based on positive feedback from our initial pilot (OB/GYN patients), we decided to study the PALS including male and female medical and surgical patients (11). As established in the pilot, the PALS studied here similarly enhanced patient

**Table 3.** Free Response Feedback.

Patients	
	About time!
	For women, it is ideal.
	The top of the gown is a bit baggy /droopy.
	Please change the color of the gown.
	Good and comfortable.
	Put in pockets.
	The top and pants were comfortable and easy to put on and remove.
	I felt at ease wearing it.
	Thank you for doing this.
	The new gowns are much more comfortable than the old ones.
	The gown gives the patient more comfort and privacy due to the fact that the back is closed.
	The body is not exposed and the color is nice.
	Just the right weight. Not too hot and not too cold.
	Maybe make a size for smaller women.
	This garment is great!
Staff	
	Adding a loop for a Foley or pockets for monitor or JP drains would be helpful.
	Love the color.
	Felt had more privacy and more roomy.
	Patient liked fabric and said it was more comfortable.
	Patient had back surgery and the doctor had a hard time changing dressing on her back.
	Excellent; just 1 recommendation—please reconsider pattern of fabric!
	Patients liked gown look.
	Please consider another size for smaller patients.

and provider experience compared to the traditional hospital gown. Feedback from this expanded study was largely positive from both patients and staff. The majority of patients and staff across both hospitals and services concurred that hospital gowning is an integral component of patient experience and would choose the PALS over the traditional gown. These data provide encouraging and necessary support to continue expanding the PALS throughout our 23 hospital health systems.

We offer 2 explanations for the gender difference found in our study. First, women in our study were more likely to have had incisions in more anatomically private areas with the potential of greater vulnerability. PALS allows for improved lower abdominal, pelvic, and perineal coverage than the traditional gown, thus potential improvement in protection and comfort. Second, men may not be willing to admit the need for protection (since men are traditionally “the protector”); the higher satisfaction parameters (ambulation, donning, etc) may be more acceptable elements to admit to.

The free response questions also garnered excellent feedback, which will influence future design improvements. Twenty percent of patients and staff alike commented on the need for pockets since patients frequently need their phones, telemetry monitors, or other devices while ambulating.

Additionally, 10% of patients and staff suggested 2 sizing options since the current garment was occasionally too large, which inadvertently may have made them feel overexposed. Some respondents (5%) suggested different fabrics that may allow patients to feel even more comfortable. Each posed suggestion is easily implementable using the PALS patented design.

Although medicine is continually advancing, hospital attire is an area that has lacked modernization. A recent article from the *Lancet* discussed the impact on patients of wearing traditional hospital gowns (15). A majority of respondents in that study felt uncertain as to whether the gown was a medical necessity, considered the gown design inadequate, and described feeling exposed, self-conscious, and uncomfortable. The PALS garment was created as a response to this “gaping” need. The PALS was designed to optimize examinations by clinicians while maintaining patient comfort and dignity. In designing it, we aimed to improve patient satisfaction, bridge the gap between patient and clinician, and improve the overall hospital experience. The trip from home to hospital is often quick; the unexpected journey made as patient rather than as person (although familiar and shared), an unwelcome experience nevertheless. Our collective ability to care for our patients is enhanced through identification. The PALS may be only a small step in this process by ameliorating the difference between those giving and receiving care; we hope it does make a small contribution toward enhanced connections and perhaps even empathy.

As providers, we often classify patients by disease; in doing so, we may fail to prioritize other aspects of their care that contribute to the hospital experience, such as respect, patient-centered communication, and prioritizing individualization (16). Hospital patient attire perpetuates the “sick role” and further widens the gap between provider and patient (4,5). The ultimate goal of introducing PALS is to return dignity, control, and comfort to people, which is frequently stripped (literally) upon hospitalization (2,17). Enhancing patient privacy, dignity, and comfort returns some control to patients and may allow them to cope better with their respective disease processes (18).

A recent study by Aamar et al examined novel patient garb to minimize embarrassment during colonoscopy. All participants reported high rates of satisfaction and decrease in embarrassment (12). Another study analyzed the impact of wearing patient gowns on well-being and concluded that the current design of the hospital gown is not fit for purpose and impacts negatively on patient well-being (6). Both papers, especially the latter, reaffirm the need for hospital gown change.

The PALS is unique in that it enhances patient experience while facilitating providers’ care and ultimately contributing to a more humanistic relationship. Furthermore, a patient who is comfortable is more likely to hear medical advice (hopefully increasing clinical efficacy) and the more likely patient safety will increase (eg, early ambulation), resulting

in an overall improved patient experience (14). The PALS also provides a possible return on investment by potentiating a decrease in length of hospital stay.

The strengths of this study include the patient-centered design of the garments with the intent to return a sense of dignity to the patient experience. Although the main focus is the patient, the garments also take into account the ease of use and examination by providers. Furthermore, this follow-up study took the much-needed step of examining the impact of the garments for both sexes and different patient groups (medical and surgical), by expanding into other hospitals and including males. Surveys were anonymous and completed in real time. The free-text responses allowed identification of patterns of feedback regarding the garments. Positive comments frequently mentioned the garments’ comfort and increased sense of privacy. Patients appreciated the idea of a garment that could provide more coverage and expressed gratitude for its creation.

Limitations of this follow-up study include lack of randomization, lack of extensive demographic data, and the ability to complete more than 1 survey per person. Since the primary purpose of our surveys was to receive feedback about the “touch, look, and feel” of the PALS, we designed questions that were brief and face valid. Future research will focus on constructing a randomized study, measuring multiple dimensions which would eliminate patients’ previous biases concerning hospital gowns as a possible motivation to participate in the study. Furthermore, psychometric surveys, capturing more detailed demographic data, will provide more information about factors that may influence responses beyond what is presented here.

## Conclusion

Although physical healing is the paramount goal of any hospital stay, a patient’s psychological and emotional well-being should not be marginalized, minimized, or overlooked as these elements are critical and integral to overall patient outcome. Ultimately, we believe that patient comfort and dignity are key pillars to contributing to a positive hospital experience. Clothing is an outward manifestation of our inner being and emotional state; there is no other important place this is reflected than for a hospitalized patient. Although attempts have been made to address the issue of outdated hospital attire, very little has been done to change this. Patient experience, clinical efficacy, and safety are integral and synergistic. The more comfortable and secure patients feel in their hospital clothing (their experience), the more likely they are to listen and hear instructions (efficacy) and even to ambulate more and more often (increasing safety and possibly decreasing length of stay). We have created a new hospital attire system, the PALS, which begins to address these needs. We plan to continue developing and improving our creation, and we sincerely hope that the PALS becomes both valued and widespread in the armamentarium of patient-centered clothing.

## Authors' Note

All procedures in this study were conducted in accordance with the institutional review board of the Northwell Health.

Verbal informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

## Declaration of Conflicting Interests

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## Supplemental Material

Supplemental material for this article is available online.

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