

# Comprehensive design considerations for a new hospital gown: a patient-oriented qualitative study

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## Abstract

**Background:** The standard hospital gown has remained relatively unchanged despite reports that it is uncomfortable, embarrassing to wear and compromises patients' dignity. The objective of this qualitative study was to explore the experiences and perspectives of stakeholders involved in the gown life cycle.

**Methods:** We conducted a constructivist, qualitative interview study with a patient-oriented lens. A patient partner was fully integrated into our research team and directly involved in interview guide development, recruitment, data collection, analysis and writing. We audio-recorded telephone interviews with adult (i.e., aged 18 yr or older) patients and family members, interdisciplinary clinicians and key system stakeholders (e.g., designers, manufacturers, textile experts) in North America. We used a hybrid deductive–inductive approach to coding and theme development. This study took place from May 2018 to March 2020.

**Results:** Analysis of 40 stakeholder interviews (8 patients and family members, 12 clinicians, 20 system stakeholders) generated 4 themes: utility, economics, comfort and dignity, and aesthetics. Patients and clinicians emphasized that current gowns have many functional limitations. By contrast, system stakeholders emphasized that gowns need to be cost-effective and aligned with established health care processes and procedures. Across the stakeholder groups, hospital gowns were reported to not fulfill patients' needs and to negatively affect patients' and families' health care experiences.

**Interpretation:** Our findings suggest that the standard hospital gown fails to meet the needs of those involved in providing and receiving high-quality health care. Redesigning the gown would be a step toward increased person-centred care and requires partnership across the stakeholder groups involved in the gown life cycle to minimize implementation barriers while placing patients' needs at the forefront.

**Plain language summary:** Patients have complained about hospital gowns for years, but little has been done to design a gown that makes people feel less exposed and more comfortable. New designs have been developed, but they have high costs and do not fit within current health care processes and procedures. Our interview-based study gathered the experiences and points of view of a wide range of people involved in the gown's life cycle, from creation to disposal. We interviewed 40 people from 3 main groups: patients and family members; health care workers; and others such as designers, buyers and launderers. All groups felt that gowns are not user friendly. This affects how patients and families feel about their health care experiences. Patients want a gown that is better designed to meet their needs. However, not everyone may benefit from redesigns. For example, different fabrics could result in higher shipping and laundry costs. Everyone involved in the gown's life cycle must work together to create a comfortable and useful gown that does not cost much more to make or look after.

The design of the standard hospital gown is not patient centred. Hospital gowns can convey a sense of exposure, discomfort, disempowerment, embarrassment, reduced self-esteem and compromised dignity.<sup>1–3</sup> As a result, governments, researchers, celebrity designers and private health care systems have made efforts to redesign the standard gown to improve patients' experiences.<sup>4–7</sup> However, design innovations have not been met with substantial market uptake; new designs are still being developed and tested.<sup>8–10</sup> Gown studies and redesigns have focused on the needs of patients and clinicians,<sup>1,3,7</sup> resulting

in costly products<sup>7</sup> that limit use.<sup>1</sup> Little work has explored the perspectives of other gown stakeholders, such as manufacturers and launderers.<sup>11</sup>

**Competing interests:** See end of article.

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In its life cycle, the standard gown goes through 4 discrete stages: manufacturing, transport, patient utilization, and sterilization or disposal.<sup>10</sup> An effective patient gown design must meet the unique stakeholders' and functional challenges at each stage while considering impacts on patient experiences and outcomes. For example, fabric type can increase the risk of pressure injuries.<sup>12</sup> The objective of this qualitative study was to explore the experiences and perspectives of stakeholders involved in the life cycle of hospital gowns, while maintaining a patient-centred focus.

## Methods

### Study design and setting

We conducted a constructivist, qualitative interview study through a patient-oriented lens. A constructivist paradigm<sup>13</sup> appreciates each individual's unique experiences and perspectives. Findings are co-constructed between researchers and participants. Within our constructivist approach, we had a patient-oriented focus, as outlined by Canada's Strategy for Patient-Oriented Research,<sup>14</sup> which advocates for patients as partners in the research process to ensure studies focus on patient-identified priorities. This study took place from May 2018 to March 2020 and is reported following the Consolidated Criteria for Reporting Qualitative Research<sup>15</sup> and the Guidance for Reporting Involvement of Patients and the Public — GRIPP2 Short Form.<sup>16</sup>

Our research team consisted of S.S., a medical student (Dalhousie) with graduate (MBA) experience and training in quality improvement and innovation; P.S., a PhD candidate (Dalhousie) with qualitative research training and experience and a physical rehabilitation background; J.C., a surgical quality analyst (Michael Garron Hospital, Toronto) with graduate-level (MSc) research training and experience and involvement in hospital quality improvement; C.A., a patient partner with extensive volunteering experience at Michael Garron Hospital, including participation in patient experience panels and steering committees, and involvement in the Research and Innovation Council; G.M., an associate professor of craft — fashion design (Nova Scotia College of Art and Design [NSCAD] University, Halifax) with collaborative design experience in research; and K.R., a clinician-scientist (Dalhousie and Nova Scotia Health). All team members came in with the assumption that the current gown design was suboptimal.

### Participants and recruitment

We used a maximum variation<sup>17</sup> approach to purposeful sampling to explore a diverse number of stakeholders' experiences and perspectives. We sampled to exhaustion; recruitment and analysis continued until the data yielded little or no new information.<sup>18</sup> We identified stakeholders through the research team's volunteer and professional networks at Michael Garron Hospital, Nova Scotia Health and NSCAD University. We identified additional system stakeholders through Web searches. We also used a snowball sampling strategy with all stakeholder groups, asking participants to recommend others based on our recruitment gaps at that

point in time. To be eligible, participants had to be 18 years or older and located in North America.

We recruited participants by email from July 2018 to February 2019. We provided potential participants with details about the study and our goal of informing the redesign of the hospital gown. Those interested were emailed a consent form and invited to schedule an interview.

### Data source and collection

We developed a semistructured interview guide to explore stakeholders' experiences and perspectives. The guide was based on our team's collective expertise, knowledge gaps regarding gown-related experiences and perspectives, and literature on qualitative interviewing.<sup>13</sup> Before recruitment, P.S. led a qualitative-interviewing training session with C.A., S.S. and J.C. The interview guide was pilot-tested with mock interviews among C.A., S.S., J.C. and P.S. We subsequently revised the guide (Appendix 1, available at [www.cmajopen.ca/content/10/4/E1079/suppl/DC1](http://www.cmajopen.ca/content/10/4/E1079/suppl/DC1)), incorporating feedback and specific wording provided by our patient partner (C.A.).

Interviewers (C.A., S.S. and J.C.) obtained each participant's verbal consent directly before conducting one-on-one, semistructured telephone interviews. Participants were asked to report their sex, age and geographic location. Interviews were audio-recorded and transcribed verbatim. Interviewers took field notes during the interviews and directly afterward. Transcripts were not returned; however, to enhance the credibility and confirmability of our findings,<sup>19</sup> we emailed participants a summary of findings and gave them the opportunity to provide feedback.

### Patient engagement

Our patient partner (C.A.) was trained in research ethics and fully integrated into our research team, with the goal of ensuring the patient perspective was considered through every stage of the study. C.A. was directly involved in interview guide development, recruitment, data collection, analysis and writing. C.A. guided our team to integrate additional interview prompts that mattered from the patient perspective (e.g., added prompts about potential benefits and disadvantages of gown features such as pockets).

### Data analysis

Analysis of transcribed recordings was ongoing throughout sampling and data collection, using NVivo 12 software for Mac (QSR International). Owing to sporadic technical errors (audio recordings cut short), in some cases, we imported the interviewer's field notes into NVivo in lieu of transcribed data. We used a hybrid deductive-inductive approach to coding and theme development as it is an established qualitative method to analyze and report experiences and perspectives.<sup>20</sup> P.S. developed an initial codebook in NVivo in the form of deductive a priori "nodes" representing the basic concepts covered in the interview guide, such as "colour," "fasteners," "safety" and "costs." P.S. then coded the interview transcripts, assigning segments of text to corresponding nodes. During this process, new nodes were inductively created,

such as “double gowning,” “durability” and “pattern or print.” During regular teleconference calls, we discussed patterns and preliminary themes and triangulated them with field notes generated by C.A., S.S. and J.C. This facilitated the credibility and confirmability of our findings.<sup>19</sup> Thematic consensus was reached between P.S., C.A., S.S. and J.C., and then reviewed by G.M. and K.R. Toward the end of the analysis, we determined that we had obtained adequate information<sup>18</sup> for each stakeholder group.

### Ethics approval

This study received ethics approval from Nova Scotia Health’s Research Ethics Board and the Research Ethics Board at Michael Garron Hospital.

### Results

Across the 3 stakeholder groups, we interviewed 40 individuals (Table 1). Interviews typically lasted from 20 to 40 minutes. No participants retracted their data or requested alterations after receiving an email with a summary of the findings and a request for feedback. Four main themes were generated: gown utility, gown economics, gown comfort and patient dignity, and gown aesthetics.

#### Gown utility

Participants described the standard hospital gown as primarily a utility garment to facilitate health care processes. Though all stakeholder groups discussed this topic, clinicians focused on gown utility and its impact on patient outcomes. Functional benefits noted by clinicians included easy stain identification (e.g., bleeding), easy donning owing to large arm openings and open back, easy access for certain procedures (e.g., back opening for epidurals), and observation (e.g., easy to monitor for bruises or tissue injury on legs).

Many functional limitations of gowns were also outlined. Participants discussed how gowns complicate aspects of clinical examinations (e.g., cardiorespiratory examination) and interfere with equipment (e.g., intravenous lines). The standard back opening was frustrating to several clinicians as it did not have utility. Participants emphasized how gown-related factors can have a negative impact on recovery. Gowns were reported to restrict mobility and contribute to increased bed rest, owing to factors such as inability to fasten or close the gown and fear of exposure. The standard gown has 2 ties at the back of the garment that can accommodate a variety of patient shapes and sizes. However, participants reported challenges for patients with limited range of motion in their shoulders or issues with dexterity and fine motor skills. Participants also commented on issues when patients rolled over in bed; ties and loose gown material were reported to be uncomfortable and tended to get stuck under a patient’s body. Gown donning was also reported to be confusing, with patients not knowing if the opening should be in the front or back and how the ties worked.

From a laundering and gown-processing perspective, participants noted that ties are the primary reason gowns are discarded,

**Table 1: Demographic profile of participating stakeholders**

Characteristic	No. (%) <sup>*</sup> of stakeholders <i>n</i> = 40
Age, yr	
20–39	8 (20)
40–59	17 (43)
60–79	2 (5)
80–99	2 (5)
Age not specified	11 (28)
Sex	
Female	25 (63)
Male	15 (38)
Geography	
Ontario	22 (55)
Nova Scotia	7 (18)
Quebec	1 (3)
United States	2 (5)
Location not specified	8 (20)
Stakeholder group	
Patients or family members <sup>†</sup>	8 (20) <sup>¶</sup>
Clinicians <sup>‡</sup>	12 (30)
System stakeholders <sup>§</sup>	20 (50)

<sup>\*</sup>The percentages in some categories sum to more than 100 because of rounding.

<sup>†</sup>Domains: bariatric, burn care, diagnostic imaging, emergency care, intensive care, obstetric, other (general use or domain not declared), palliative, physical rehabilitation, psychiatry, surgery. Many participants discussed the gown in the context of multiple domains, owing to diverse and multiple experiences.

<sup>‡</sup>Domains: diagnostic imaging, emergency care, infection control, inpatient and outpatient care, long-term care, obstetric and pediatrics, physical and neurologic rehabilitation, psychiatry, surgery. Professions represented medicine, nursing, occupational therapy, physiotherapy, midwifery and diagnostic imaging. Many participants discussed the gown in the context of multiple domains owing to diverse and multiple experiences.

<sup>§</sup>Domains: fashion and design (health care–based); health care leadership (executives, purchasers, safety and quality control); hospital insurance; infection control (research or industry); laundering, repair or disposal; manufacturers; supply chain; textile experts; wearable technology. Many participants discussed the gown in the context of multiple domains owing to diverse and multiple experiences.

<sup>¶</sup>We categorized each participant into 1 of the 3 stakeholder groupings to reflect the context in which they primarily interacted with gowns. Clinicians and system stakeholders often spoke of their experiences as a patient or family member, which is not reflected in this sample size.

as they are torn off or knotted such that they cannot be untied. Participants suggested fastening alternatives such as buttons, snaps, zippers, magnets and Velcro. Others opposed these options, citing issues with snaps (difficult to replace, short lifespan, choking hazard), zippers or magnets (technical difficulty with hospital imaging; e.g., radiography), and Velcro (poor lifespan, skin irritation and infection control issues).

Overall, participants reported that the current hospital gown has both benefits and limitations regarding utility. Suggestions for improvements were conflicting, reflecting the different needs and perspectives of the stakeholders interviewed. Supporting quotes for this theme are provided in Table 2.

**Table 2 (part 1 of 2): Quotes supporting the theme “gown utility,” reflecting the functionality of the gown and impacts on health care processes and procedures and patient outcomes**

Primary stakeholder group (primary domain)	Participant quote
Patient or family member no. 1 (diagnostic imaging, surgery)	The problem is how can you do it by yourself. You have to tie these things up at the back and have your butt hang out. It's like why they have to tie up at the back and expect you to do it yourself? It's impossible.
Patient or family member no. 2 (emergency care, surgical)	I have to look for the ties and you can't tie it.
Patient or family member no. 3 (bariatric)	It's difficult to tie. I wouldn't be able to do it myself ... and there is always the fear that it will open up, right?
Clinician no. 1 (physician in emergency care)	A lot of people don't know if it should go on with the ties in the front or the ties in the back. There is not a day that goes by where I am in a clinical environment that someone hasn't got it on backward or falling off of them or it doesn't cover them or it's too long or short.
Clinician no. 2 (physiotherapist in multiple domains)	When they are not mobilizing or moving as much as they could — it actually produces a much worse outcome.
Clinician no. 3 (nurse in obstetrics)	The most important for our unit would be the ability to remove the gown without impacting the IVs and to be able to selectively expose body parts on the front of a patient ... For our purposes, they [current gowns] are terrible — everything about them is wrong. For a labouring mother and a new mother with a baby ... if we could just unbutton 1 side of the gown or 1 area of the gown as if it was designed in an intuitive way that allowed us to expose certain areas of the body, I think that would be great.
Clinician no. 4 (nurse in obstetrics)	One of the obstacles is that people are busy, and they don't want to go through the whole thing of taking the IV tubing out of a pump, pulling it through the gown and everything is twisted up, and then you've got all these other wires and an epidural tube is taped to the gown and all this other stuff. So, I find that patients a lot of the time, if I am covering somebody for break, I will come to the room and they are wearing a dirty gown and I wonder how long it has been like that and many people say it is a pain to change so leave it. It is annoying to have to thread everything through the arm so that could be something [to consider regarding redesign].
Clinician no. 5 (physiotherapist in multiple units)	<p>I do like the fact [that gowns] are just cotton or a cotton blend that is really thin — the cotton absorbs any liquid and shows it as a stain and typically it doesn't hide any issues that are going on where it's covering. So, if they are fresh from surgery and the wound is bleeding or their wound packing isn't doing what it is supposed to, you can see that really well. If they are having an incontinence issue, you can usually see that pretty easily. So, from a material thickness perspective, I like that because you can tell right away if there is any sort of other problems going on from a fluid perspective.</p> <p>The things that I liked were that they were really easy to remove ... I found that they were really fast to get on and off ... really easy to help with people who had limited arm range of motion. ... Often times the gowns get dirty and I found that the current gowns are really easy to tell if they are dirty ... It's really easy to tell if they are wet and I think that's part of the blue colour, too.</p> <p>If somebody had a bruise on their thigh, just from going in and glancing when they got out of bed, I could tell if it was better or worse rather than having somebody take down their pants to see those changes. So, in terms of physio assessment and measuring range of motion, I found the gown to be really easy that way and easy to move over to cover what needs to be covered.</p>
Clinician no. 6 (nurse in obstetrics)	Doing an epidural ... it is good to have that [back of gown] open, but I am not sure in general why the hospital gowns open at the back.
Clinician no. 7 (nurse in obstetrics, pediatrics)	I think the big thing for our department that makes the gown hard as well is the breastfeeding moms. After they deliver, their gowns are tied up at the back, they have to get someone to untie it and they have to pull it down, so they can breastfeed. It isn't accessible, it doesn't work.

**Table 2 (part 2 of 2): Quotes supporting the theme “gown utility,” reflecting the functionality of the gown and impacts on health care processes and procedures and patient outcomes**

Primary stakeholder group (primary domain)	Participant quote
System stakeholder no. 1 (researcher in geriatric medicine)	From a mobility perspective, I think the gowns, the way they are, are limiting mobility ... Patients don't feel as nice wearing the gowns. They don't feel as nice getting outside the room and walking if they are half exposed.
System stakeholder no. 2 (laundering, repair or disposal)	Through the design process, I imagine the fastener was given a lot of thought — what led to holding onto this design of the fastener as opposed to a button or a clasp or anything else along those lines?
System stakeholder no. 3 (fashion and design)	I am not a big fan of Velcro because the pinch grasp that you need to open and close Velcro is usually not present in the group of patients I observed in rehab; that is a very difficult fastener to manipulate. There is that hook side of the Velcro — if it comes in contact with skin or other clothing in the laundry, if you don't fasten it shut before you launder the garments, is also problematic because it sticks to other garments in the laundry and lint builds up in there, so I am not a big fan of Velcro, either. The challenge is what other fastener to use ... using a magnetic fastener? But again, doing a loop over top of the fastener, so you can put your 2 fingers under the loop and lift rather than pinching and grasping to get the fastener open.
System stakeholder no. 4 (hospital leadership)	They're confusing pieces of clothing and it's not always clear if the opening is in the front or the opening is in the back and maybe that varies.

Note: IV = intravenous.

### Gown economics

All stakeholder groups, especially system stakeholders, discussed the economic challenges that shape the life cycle of the hospital gown. Participants discussed the challenge of balancing health care expenses, industry profits and the needs of clinicians and patients. Although manufacturers and launderers appreciated the needs of clinicians and patients, design changes to the current gown can disrupt well-established gown processes (e.g., washing, ironing, folding and storage). Therefore, it was reported that any gown alterations or innovations would need buy-in from those involved in gown processing before being implemented at scale.

Some participants discussed gown innovations that might enhance patients' experiences while also providing cost savings. For example, changing to a more economical fabric (e.g., from cotton to polyester) or implementing design changes that would mitigate “double gowning,” the practice of wearing 2 gowns (one backward and one forward) to increase coverage or provide warmth or both. System stakeholders commented that designs that provide coverage yet have fewer gown parts (i.e., fewer seams) can result in decreased costs and increased durability. They also noted that heavier fabric should be considered carefully, as cost is often a function of weight. Heavier materials can also negatively affect laundering processes (e.g., fewer gowns per load).

Overall, participants emphasized that gown redesigns must benefit as many stakeholders as possible and that implementation would be easier when compromise among the various stakeholder groups is maximized. Many noted that cost is unfortunately a substantial barrier to patient-centred gown implementation and that gown redesign is not a health care priority. Supporting quotes for this theme are provided in Table 3.

### Gown comfort and patient dignity

Participants across all stakeholder groups indicated that the current gown design is humiliating, invades privacy and is culturally insensitive. This was of particular concern when patients are walking, have decreased levels of consciousness or are unable to fasten the standard gown with a back opening and ties. Family members and clinicians discussed the inherent vulnerability of patients while in hospital and the need to remove gown-related barriers to comfort and dignity. In terms of alternatives to the standard open-back gown, all stakeholder groups suggested a front- or side-opening robe-like gown, with fabric overlap.

Participants across all stakeholder groups discussed the lack of control patients have over the current hospital gown design and the need to give patients options and control, specifically appropriate sizes, comfortable materials and easy fastening. There was discussion on the choice of sleeve length, material thickness, colour and size, and options related to skin coverage to align with patients' gender identities and religious beliefs (e.g., Muslim women who might feel as if they are not covered enough, and some men who feel that the gown is like a “dress” and are hesitant to wear it — or when they do, they may interact differently with family). One patient mentioned the possibility of gown vending machines that would allow patients to select their own gown, similar to scrub-dispensing machines for clinicians. The suggestion of pants was made multiple times, as well as garments that are “more like clothes,” as described by a researcher and patient.

System stakeholders highlighted the challenges associated with enhancing gown options for patients. The primary trade-off is that increasing gown options reduces bulk orders of “one size fits all,” resulting in increased costs because of changes in order volumes. It was reported that having multiple types of



**Table 3: Quotes supporting the theme “gown economics,” reflecting the tensions between gown costs and design versus gown users’ needs**

Primary stakeholder group (primary domain)	Participant quote
Patient or family member no. 3 (bariatric)	I know it sounds terrible, but they [hospitals] want to spend their money on the machine [that] helps save lives versus a gown that is going to fit an overweight patient.
Clinician no. 6 (nurse in obstetrics)	You have to wear 2 [gowns] and I always give people 2 when they are walking around the halls because no one wants to have their back exposed.
Clinician no. 5 (physiotherapist in multiple units)	When they are walking — back, buttocks, legs, all of that can be exposed. It's tough with the gowns because a lot of patients really don't ... what we did to get around it was to just double-gown, right? So, 1 in the front and 1 on the back in reverse, but a lot of patients really don't like that because they feel confined.
System stakeholder no. 5 (textiles expert)	I know everybody hates them [current gowns] but my conclusion after supplying them for so many years and seeing that the basic design hasn't changed ... it is designed not for the convenience or for the comfort of the patient. It's designed for the efficiency of the laundry processing ... That [laundrying] is the most expensive. That is the biggest cost in the life cycle of these products ... Some companies here in Canada are putting a major push on converting everything to 100% polyester because it's so much cheaper to process [dries faster].
System stakeholder no. 2 (laundrying, repair or disposal)	If you're providing 2 gowns for dignity and the hospitals are billed on a per-kilogram basis or per-pound basis ... come up with a solution that you have 1 gown that weighs more than an individual [but] that is a lot less than 2. You are going to give them some cost savings.
System stakeholder no. 6 (hospital leadership)	We have seen a surge in requests — polyester in itself has come a long way in the last few years. So, it can be brushed, it can be heavier weight, it feels nice, it's nice against the skin and it's still breathable, but the great thing about polyester is that it holds its colour and is very durable.
System stakeholder no. 7 (manufacturing)	I would say cost is probably by far the number one [factor to consider] and you know you are probably the eighth or ninth person I have engaged with over the years, who has attempted to do this.

gowns, to facilitate comfort and dignity, can create issues from a laundering perspective, as established processes are in place to accommodate the current gown and to minimize labour (i.e., reduced number of manual folds before using a folding machine).

Overall, tensions across stakeholder groups were apparent; introducing new gowns may be met with process-related behaviour change or implementation problems despite the potential to increase patient comfort and dignity. The current gown was reported to not fulfill patients’ needs and negatively affected patients’ and families’ health care experiences. Supporting quotes for this theme are provided in Table 4.

### Gown aesthetics

Participants frequently commented on the look and feel of the current gown and how it could be improved. Regarding colour, some participants indicated their preference for the light colours of the current gown, as these have calming effects, are gender neutral and promote the perception of a clean or sterile environment. However, most participants suggested the colour could be improved upon or that patients should be given options. Participants also commented on the psychosocial impact of wearing the gown in public, noting that one does not normally wear pyjama-like clothes around strangers and that it may be embarrassing. Participants commented that the current gown is “ugly” and like a “prison jumpsuit.” Gown colour suggestions are found in Box 1 and supporting quotes for this theme are provided in Table 5.

### Interpretation

Our thematic analysis of 40 interviews across 3 stakeholder categories generated 4 main themes: gown utility, gown economics, gown comfort and patient dignity, and gown aesthetics. Although different stakeholder groups addressed different priorities for gown redesign, all stakeholder groups emphasized that there is much room for improvement. This is in line with a 2009 survey of 1200 interprofessional caregivers, of whom 63% felt that it was important to change the design of the current patient gown.<sup>21</sup> More recently, a 2020 qualitative study of 10 patients, 10 physicians and 10 nurses at an academic medical centre echoed this finding: a common theme across the groups was the negative impression of the gown and the need for improvements.<sup>1</sup>

Our findings about patients’ priorities reinforce results from a 2020 multimethod study consisting of semistructured interviews and an online survey that focused specifically on patients’ perspectives on gown wearing.<sup>3</sup> Regarding function, most patients reported that they struggled to put the gown on by themselves (64%) and that it did not fit (70%). With respect to dignity and comfort, most patients reported feeling exposed (72%), self-conscious (60%) and uncomfortable (57%). The 2020 qualitative study also reported that both patients and providers used the words “uncomfortable” and “exposed” as negative connotations related to the “patient gown.”<sup>1</sup> This theme was reiterated in a 2020 opinion perspective in the *BMJ* by a consultant in geriatric and acute general medicine,<sup>22</sup> who suggested that gowns be used only when they serve a function, in order to preserve patients’ dignity.

**Table 4: Quotes supporting the theme “gown comfort and patient dignity”**

Primary stakeholder group (primary domain)	Participant quote
Patient or family member no. 3 (bariatric)	They weren't fitting me, and they were uncomfortable because of my size ... I am a large fellow ... I am covered with a sheet most of the time ... Majority of the time is spent in the buff ... Gowns don't do anything ... One-size-fits-all is not a good mindset.
Patient or family no. 2 (emergency care, surgical)	The hospital gowns are not physically comfortable. They are uneasy and awkward. They take away your esteem. Do you know what I mean? Like, you go in there and you know how you feel, you are worried and anxious, and then you put this gown on and it's dreadful and terrible ... It is awful ... Make sure your butt is covered, and it is all twisted and it is extremely uncomfortable.
Patient or family no. 4 (surgery)	A side opening. One piece, but with the side opening. I came to the conclusion that would be the best for me, personally.
Clinician no. 8 (nurse in emergency care)	The side [opening] might actually might be ideal because a) it's easier to tie and b) I'd probably rather have some of my side exposed rather than my entire back ... They are kind of bleak looking, to be honest — maybe if the material was nicer and they had a little more dignity in terms of coverage, it might be a bit better.
Clinician no. 9 (occupational therapist in multiple units)	Especially men will request pants, maybe because they don't feel comfortable [in] something like a dress and most floors don't have the hospital pants available.
Clinician no. 6 (nurse in obstetrics)	They are ill designed because they don't look comfortable, they don't look cozy, they are open — you have to wear 2 ... People can be comfortable and more human and less like “here we are all like prisoners wearing the same orange jumpsuit.” I know that sounds extreme but [it] is a real big thing for me. I have been a patient in a gown before, so I can speak to that — you feel exposed. It is flimsy, it's not comfortable, there is not a lot of security in it, and I think a lot of the time when people are in hospitals, they want to feel comfortable.
System stakeholder no. 8 (fashion and design)	I think generally the most significant concerns of people are the modesty concern, how uncomfortable the fabric is, the fact that it is not attractive, it doesn't keep you warm and those ties are uncomfortable when you are lying on them or are trying to do them up. It's flawed in multiple ways.
System stakeholder no. 1 (researcher in geriatric medicine)	There are a lot of negative things associated with the gowns — definitely from the patient's and family's perspective around dignity, it's limited, it has created a stigma.
System stakeholder no. 4 (hospital leadership)	Feeling vulnerable and they are already in a position where they're in pain or uncomfortable or frightened and this adds to that power imbalance with health care providers and patients.
System stakeholder no. 9 (health care leadership)	It says one size fits all, but it doesn't fit obese patients.
System stakeholder no. 10 (health care leadership)	With all communities, modesty is coming up more often. People want more coverage. Mostly females or males speaking on behalf of Muslim females regarding coverage. May cost more, but trade-off, if right thing for patients.

**Box 1: Gown colour suggestions and rationale discussed by participants across stakeholder groups**

- Brighter, “cheery” or fun colours to improve psychosocial impact.
- Hospital colours (i.e., colour of hospital logo or branding); others suggested something “less hospital like.”
- Darker grey or blue, white or cream to get away from institutionalized colours and to facilitate a cozy, clean and comfortable experience.
- No busy colours or patterns, and no shades of black (considered too depressing) or reds (hides blood).
- Gender-neutral colours, such as yellow, green or grey.
- Ties to be a darker colour than the gown so they are easier to see.

Consistent with this theme, patients in our study strongly emphasized that the current gown design is confusing, lacks comfort and compromises their dignity. Clinicians also commented that the gown can affect patient outcomes and impede care. System stakeholders emphasized economic considerations associated with gown redesign, specifically laundering and processing. Although overlapping considerations are put forth by both patients and clinicians, successful gown innovations must also compete with or improve on the operating costs for the current gowns. Consistent with our findings, others have suggested that there is potential for redesigns not only to be more dignified, but also cost-effective, given the common practice of “double gowning,” whereby a second gown is offered in an effort to maintain patient dignity.<sup>3</sup>

Our participants' experiences and perspectives may inform future research and gown designs that can be assessed with

**Table 5: Quotes supporting the theme “gown aesthetics”**

Primary stakeholder group (primary domain)	Participant quote
Patient or family member no. 5 (psychiatric)	Well, they are ugly. I didn't feel attractive at all in the gown, I didn't feel dressed up — like when I wear my t-shirt and my flannel, I feel dressed up compared to the gown. The gown slumps and is long — like, it went down to your knees and it looked very old fashioned. I just think they're ugly.
Clinician no. 6 (nurse in obstetrics)	I think the blue with the pattern on is just like a bummer. I know it sounds silly ... You look like a bedsheet.
Clinician no. 1 (physician in emergency care)	I just feel like as soon as you put one of those things on people, suddenly, it is like this illness behaviour that goes with it, this stereotype that goes with the Johnny shirt hospital gown and all of a sudden it looks like you are sick.
Clinician no. 10 (nurse in emergency care)	A lot of people say it's ugly and there's a lot of negative comments usually.
System stakeholder no. 11 (health care leadership)	I think that we can do quite a bit in terms of improving the looks of them ... the ones we have here ... blue and white pattern or they're completely blue and they're ugly. They just look institutional.

key stakeholders in mind. Further research is required to develop fabrics, fasteners and wearable technologies that can improve patient outcomes, user experiences and the overall economics of the garment's life cycle. To date, we lack high-quality research that uses both subjective and objective outcomes to compare gown redesigns; there are opportunities for new gown developments and mixed-methods research to evaluate redesigns.

**Limitations**

Although we employed a maximum variation approach to purposeful sampling to explore diverse experiences and perspectives, most of our participants were in Canada; therefore, our results may not generalize to other countries and cultures with different patient populations and clinical settings. In addition, our design, and qualitative interviews in general, come with important factors to consider, including both self-report and recall biases.

**Lessons learned from patient engagement**

Our patient partner (C.A.) was involved in every step of this study. Her involvement helped us better explore and represent patients' experiences and perspectives. In particular, her surgical waiting and recovery room volunteer experience gave her first-hand insight into the problems associated with the gown, which informed aspects of the interview guide. Further, her involvement and experiences also helped us better identify and describe competing priorities across stakeholder groups.

C.A. reported that the team was “great and made me feel welcome and valued throughout the project.” She did not come from a health care or research background; therefore, she “found the learning curve steep, but the team was always willing to answer questions and offer guidance.” She offered that the “need for hand-holding may be a consideration for other teams to keep in mind.” Further, she identified that, at times, she was not certain of her role and what was expected. Therefore, there were instances where she felt concerned that she was “overstepping.” The team felt that C.A. was proactive and eager to participate in all aspects of the study; this was

welcomed and valued as she was considered a fully integrated member of our research team. However, in retrospect, a clear written summary of the patient partner role and expectations may have mitigated her concerns about overstepping or breaching her role, while also facilitating and validating her important contributions. We note too that other team members reflected on how their experience as patients informed their critiques of gowns.

**Conclusion**

The current patient gown design fails to meet the needs of those involved in providing and receiving high-quality care. A patient-centred redesign of the hospital gown will require alignment between user and system interests and can be informed by elements elucidated in this study. This will require partnership across the stakeholder groups involved in the gown life cycle to minimize implementation barriers, while placing patients' needs at the forefront.

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