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A NATIONAL CROSS-SECTIONAL STUDY EVALUATING PATIENT PREFERENCES FOR PHYSICIAN ATTIRE

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**A NATIONAL CROSS-SECTIONAL STUDY EVALUATING
PATIENT PREFERENCES FOR PHYSICIAN ATTIRE**

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2
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3 **OBJECTIVES:** Several large studies have shown that improving the patient experience is
4 associated with higher reported patient satisfaction, increased adherence to
5 recommended treatment plans and clinical outcomes. Whether physician attire can
6 affect the patient experience—and how this influences satisfaction— is unknown.
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8 Therefore, we performed a national, cross-sectional study to examine patient
9 perceptions, expectations and preferences regarding physicians dress.
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19 **SETTING:** Ten academic hospitals in the United States.
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24 **PARTICIPANTS:** Convenience sample of 4,062 patients recruited from June 1, 2015 to
25 October 31, 2016.
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31 **PRIMARY AND SECONDARY OUTCOMES MEASURED:** We conducted a questionnaire-based
32 study of patients across ten academic hospitals in the United States. The questionnaire
33 included photographs of the same male and female physician dressed in seven different
34 forms of attire and were asked to rate the provider pictured in various clinical settings.
35 Preference for attire was calculated as the composite of five domains (knowledgeable,
36 trustworthy, caring, approachable, and comfortable) via a standardized instrument.
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38 Secondary outcome measures included variation in preferences by respondent
39 characteristics (e.g., gender), context of care (e.g., inpatient vs. outpatient) and
40 geographic region.
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3 **RESULTS:** Of 4,062 patient responses, 53% indicated that that physician attire was
4
5 important to them during care. Over one third agreed that it influenced their satisfaction
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7 with care. Compared to all other forms of attire, formal attire with a white coat was most
8
9 highly rated ($p=0.001$ vs. scrubs with white coat; $p<0.001$ all other comparisons).
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11 Important differences in preferences for attire by clinical context and respondent
12
13 characteristics were noted. For example, respondents ≥ 65 years preferred formal attire
14
15 with white coats ($p<0.001$) while scrubs were most preferred for surgeons.
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21 **CONCLUSIONS:** Important perceptions and expectations for physician dress that vary by
22
23 patients, context, and region exist. Nuanced policies addressing physician dress code to
24
25 improve patient satisfaction appear important.
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31 **TRIAL REGISTRATION:** Observational study, not registered
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STRENGTHS AND LIMITATIONS OF THIS STUDY

- The largest study to examine patient preferences for physician attire. Given methodological strengths including randomization of instrument sequence, as well as inclusion of diverse regions and patient populations, our findings clarify possible dress codes in various healthcare settings.
- Our study and survey instrument were specifically designed to avoid biases associated with images. For example, we hired a professional photographer and studio to ensure photographs of physicians were otherwise identical. Similarly, we also used models of the same race (Caucasian) with identical postures and facial expressions so as to limit confounding associated with models of different backgrounds or appearance as has occurred in previous studies.
- Our findings have policy implications: namely, patients appear to care about attire and may expect to see their doctor in certain ways. Hospitals, clinics, emergency departments and ambulatory surgical centers should consider using these data to set dress codes for physicians providing care in these settings.
- The providers pictured in our survey instrument were young, slender, Caucasian and all cared for in academic settings, which may have introduced bias into responses. Similarly, we did not record information for patients who refused to participate in the study, also potentially introducing bias
- While approaching patients as they were receiving care helps generate validity, it is possible that reported impressions may not reflect actual preferences.

INTRODUCTION

At its core, the practice of medicine hinges on the patient-physician relationship. From initial introductions, physicians work to build rapport to foster a partnership to provide patient-centered care, defined as that which is: “respectful of, and responsive to, individual patient preferences, needs and values.”¹ Not surprisingly, medical school curricula often include courses aimed at improving the patient experience.² Similarly, since 2007, the Centers for Medicare and Medicaid have required hospitals to collect, submit and publicly report the results of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey or risk financial penalties.³ These data are also important because they have been linked to clinical outcomes. For example, a positive correlation between patient satisfaction, improved mortality and reduced 30-day readmissions have been reported.⁴⁻⁸

Although improving the patient experience, and consequently satisfaction, is an important target for many hospitals, how best to do this is unclear. One approach is to understand how physician attire influences the patient experience and develop guidelines based on patients’ preferences. Indeed, some healthcare systems across the country have adopted stringent dress codes. In a recently published article, we contacted human resource professionals and administrators at top US News & World Report Hospitals,⁹ and found that five had written guidelines endorsing formal and professional attire. Yet patient preferences for physician attire are not straightforward. In a systematic review, we found that while patients preferred formal attire and white coats overall, attire such as scrubs or casual dress were preferred in specific settings.⁹ These findings make intuitive sense: patients often have notions of how a “professional” should

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3 dress and are more likely to respond positively to those that meet these stereotypes.
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5 Strategies targeting physician dress may therefore enhance trust and satisfaction.
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8 To date, no studies have examined whether physician dress may influence
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10 satisfaction and, if so, what types of attire might be most relevant. Additionally, whether
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12 these preferences vary by context of care (e.g., inpatient vs. outpatient setting), patient
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14 characteristics (e.g., age and gender) or region is not known. Therefore, we performed
15
16 a cross-sectional survey of patients receiving care across the US using a standardized
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18 questionnaire to better understand these issues.
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24 **METHODS**

25 26 *Study design and population*

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28 Between June 1, 2015 to October 31, 2016, a total of 6,280 surveys
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30 were provided to ten academic medical centers in the United States (US) of
31
32 which 4,062 surveys were filled and available for analyses (response rate = 65%). The
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34 questionnaire consisted of 22 questions and included photographs of a male and a
35
36 female physician in various forms of attire. The questionnaire was administered to adult
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38 patients that were receiving care in clinics (outpatients) or admitted to the hospital
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40 (inpatients). At all sites, the questionnaire was administered by research staff using
41
42 paper instruments. Respondents provided verbal consent. No identifying information
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44 was collected from those that completed the study.
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51 *Study design and data collection*

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3 The questionnaire was developed from a systematic review that examined the
4 role of physician attire on patient preferences and satisfaction.⁹ A multidisciplinary team
5 of psychometricians, research scientists, choice architects, survey experts, and
6 bioethicists developed the study instrument. Each question sought to elicit preferences
7 regarding various forms of physician attire, including: casual, casual with white coat,
8 scrubs, scrubs with white coat, formal, formal with white coat, and business suit (**Figure**
9 **1**). Photographs of the same Caucasian male and female physician donning such attire
10 were taken by a professional photographer with strict attention to facial expressions,
11 pose, lighting, and other non-verbal cues as these may influence preference or likability.
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24 To avoid bias, 14 different versions of the study instrument were created, and
25 distribution of the questionnaires was randomized to participants. In each version, the
26 gender and attire of the first physician model varied to prevent ordering, priming or
27 anchoring effects (**Supplementary File**). The questionnaire had four sections: in the
28 first section, respondents were asked to rate the physician depicted across five domains
29 including knowledge, trust, care, approachability, and comfort. In the second section,
30 respondents were presented with seven photographs of the same physician wearing
31 different attire and asked to select their preference in various clinical settings. The third
32 and fourth sections sought respondents' general opinions regarding physician attire,
33 demographic data and frequency of interactions with physicians.
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47 Before administration, the survey instrument was pilot-tested with a convenience
48 sample of patients at the lead site to ensure photographs, questions, ratings, and
49 randomly generated order of the 14 surveys at each site would functioned as desired.
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Measurements

Ratings regarding how knowledgeable, trustworthy, caring, and approachable each physician appeared, as well as how comfortable the physician made the respondent feel, were measured using a 1-10 scale, where 1 indicated “somewhat preferred” vs. 10 “extremely preferred.” Preference of attire within specific care settings (e.g., primary care, emergency room, hospital, surgery, and overall) was assessed using photos for each of the 7 attire categories. Respondent opinions regarding importance of dress and white coats were collected using a 1-5 Likert scale, where 1 indicated “strongly disagree” and 5 indicated “strongly agree.” We assessed patient satisfaction based on agreement with two questions: “How my doctor dresses is important to me,” and “How my doctor dresses influences how happy I am with the care received.” For analyses, responses were trichotomized as follows: agreement = strongly agree and agree; neither agree nor disagree; and disagreement = disagree or strongly disagree. Demographics including age, gender, education level, race, and number of physician encounters were collected. Preferences for attire and demographics were dichotomized for bivariate comparison. Questions that were unanswered or where more than one response was entered were excluded.

Outcomes

The primary outcome of interest – preference for attire -- was calculated as the composite average of the five individual rating domains (knowledgeable, trustworthy, caring, approachable, and comfortable). Additionally, variation in preferences for physician attire by respondent characteristics (e.g., gender, age), context of care (e.g.,

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3 inpatient vs. outpatient) and geographical region (e.g., Northeast, Midwest, South, and
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5 West) were also assessed.
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10 *Statistical analyses*

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12 Data from paper questionnaires were entered independently and in duplicate.
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14 Since respondents were not required to answer all questions, the denominator for
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16 individual questions (and associated response rate) varied. Descriptive statistics
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18 (means, percentage) and standard deviation (SD) were initially used to tabulate results.
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20 Differences in the mean composite rating scores from the physician ratings section were
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22 assessed using one-way ANOVA. To reduce the potential for Type I error, post-
23
24 estimation pairwise comparisons were performed using the Tukey-Kramer method.²
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26 Differences in proportions for categorical data were compared using the Z-test. Bivariate
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28 comparisons between respondent characteristics and preferences for attire were
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30 assessed using Chi-squared tests. A two-sided p-value of less than 0.05 was
31
32 considered statistically significant. All analyses were performed using Stata 14 MP/SE
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34 (StataCorp, College Station, TX).
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42 *Ethical and Regulatory Oversight*

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44 The study was reviewed and deemed exempt from regulation by the University
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46 of Michigan Institutional Review Board (HUM00085305).
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51 **RESULTS**

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53 A total of 4,062 questionnaires were completed by patients across ten academic
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3 medical centers in the United States. Respondents represented all parts of the United
4 States including the Northeast, Midwest, South and West. Most patients were surveyed
5 while admitted to the hospital (n=2,616 [64%]); however, a substantial proportion of
6 outpatients were also included (n=1,446 [36%]). Respondents were most often white
7 (71%) and male (65%). The plurality of patients was 65 years of age or older (36%).
8 Seventy percent of those surveyed indicated having attended some college or having
9 college degrees. With respect to interactions with the health system, 38% of
10 respondents reported 6 or more physician visits in the past year (**Table 1**).
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24 *Ratings of Physician Attire*

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26 Respondents rated formal attire with white coat for both male and female
27 physician models as the most preferred form of dress compared to other forms of attire
28 with a mean composite score of 8.1 (SD 1.8) [all pairwise comparisons $p < 0.001$].
29 Cronbach's alpha for the 5-items included in the composite score was 0.96.. Ratings for
30 formal attire with white coat were greatest across all domains including how
31 knowledgeable, trustworthy, caring, and approachable the physician appeared as well
32 as how comfortable the physician made the respondent feel. Moreover, these findings
33 were significant in the domains of trustworthiness, caring and how comfortable the
34 physician made the respondent feel in all pairwise comparison testing to other forms of
35 attire ($p < 0.05$). For the rating of approachability, formal attire with a white coat was not
36 statistically different from scrubs with a white coat or formal without a white coat in
37 pairwise comparison. Scrubs with white coat ranked second overall, with a mean
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3 composite score of 7.6 (SD=1.9) followed by formal attire without a white coat with a
4 mean composite score of 7.5 (SD=2.0) (**Figure 2**).

10 *Preferences for Physician Attire by Care Settings*

12 When examining preferences for physician attire by care setting, important
13 differences emerged. Formal attire with white coat was preferred by respondents for
14 their primary care (44%) and hospital physician (39%). Conversely, scrubs were rated
15 highest for emergency room physicians (40%) and surgeons (42%). In both emergency
16 and surgery settings, scrubs alone were followed in preference by scrubs with white
17 coats (34% and 23%, respectively). When asked, "Overall, which clothes do you feel
18 that your doctor should wear?" most respondents preferred formal attire with white coat
19 (44%) followed by scrubs with white coat (26%) (**Table 2**). Excluding surgeons,
20 respondents universally preferred physicians in white coats over no white coats. When
21 evaluating surgeons, respondents indicated no preference for a white coat on female
22 physicians ($p=0.85$), but preferred male physicians without white coats ($p<0.001$). No
23 differences in preference by physician gender in other clinical care settings were noted
24 (**Figure 3**).

44 *Perceived Influence on Satisfaction, Importance and Appropriateness of Physician Attire*

46 More than half (53%) of the patients surveyed agreed with the statement that
47 how their doctor dresses was important to them, while 36% of respondents agreed with
48 the statement that physician attire influenced how happy they were with the care they
49 received. Views regarding appropriateness of casual attire when physicians see
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3 patients on the weekends were mixed: 44% of respondents stated this was appropriate
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5 while 56% were either neutral or disagreed with the practice.
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8 Specific questions regarding when physicians should don a white coat elicited
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10 various preferences. Most respondents (55%) indicated that they agreed or strongly
11
12 agreed with the statement that doctors should wear a white coat when seeing patients
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14 in the office. In the emergency room, however, 44% agreed with the statement that
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16 physicians should wear a white coat when seeing patients vs. 56% that indicated either
17
18 no preference (38%) or disagreement (18%). When asked whether doctors should wear
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20 a white coat when seeing patients in the hospital, the majority of respondents (62%)
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22 agreed or strongly agreed with this statement (**Table 3**).
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28 *Variations in Patient Preferences of Physician Attire*

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31 Important variations in patient preferences for attire were noted. For example,
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33 female respondents more often preferred scrubs with white coats in emergency room
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35 and hospital settings than males (41% vs. 31% [$p<0.001$] and 32% vs. 27% [$p=0.001$],
36
37 respectively). However, both genders indicated formal attire with white coat was overall
38
39 most preferred (43% and 44%, respectively). In hospital settings, respondents 65 years
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41 of age or older frequently preferred formal attire with white coats than younger patients
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43 (44% vs. 36%, $p<0.001$). Conversely, younger patients more often preferred scrubs and
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45 white coats than formal attire overall (28% vs. 21%, $p<0.001$). Some differences in
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47 preferences regarding physician dress based on respondent education level were also
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49 noted. Specifically, respondents with a college degree preferred formal and white coat
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3 for their primary care provider more often than those without a college degree (48% vs.
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5 42%, $p<0.001$).

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8 No differences in preferences between those with three or more physician visits
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10 in the preceding year vs. those with less frequent visits were noted. Similarly,
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12 preferences for attire did not vary by setting in which respondents were polled, although
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14 respondents in the outpatient setting more often preferred doctors in the hospital to
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16 wear scrubs and a white coat compared to hospitalized respondents (32% vs. 27%,
17
18 $p=0.002$). However, preferences for attire did vary by geographic region. For example,
19
20 while formal attire and white coats were preferred across all regions, 50% of
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22 respondents in the West and 51% in the South selected this as their preferred option
23
24 compared to 38% and 40% in the Northeast and Midwest, respectively. Conversely,
25
26 over half of all respondents in the Northeast selected scrubs as their preferred attire for
27
28 surgeons compared to a quarter of respondents in the South (54% vs. 25%, $p<0.001$).

32 33 34 35 **CONCLUSIONS**

36
37 This study of over 4,000 patients receiving medical care in diverse academic
38
39 medical centers is the largest to report preferences regarding physician attire in the US.
40
41 Over half of the participants indicated that how a physician dresses was important to
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43 them, with over one in three stating that this influenced how happy they were with care
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45 received. Overall, respondents indicated that formal attire with white coats was the most
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47 preferred form of physician dress. However, in settings such as surgery or emergency
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49 rooms, scrubs with white coats were most preferred. Although variation in preferences
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51 by respondent age, gender, education and geography were noted, these findings
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3 indicate that not only do most patients have expectations regarding doctor attire, but
4 that a “professional” look matters most. Given the size, methodological rigor and
5 representativeness of these data, policies addressing physician attire should be
6 considered to improve patient satisfaction.
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12 Previous studies have shown that patients harbor conscious and unconscious
13 biases when it comes to provider dress.^{10,11} Thus, our finding that patients have specific
14 preferences regarding physician attire was not surprising. What this study highlights,
15 however, is the potential importance of physician attire to the physician-patient
16 relationship. Indeed, specific clinical and contextual aspects appear to influence a
17 patient’s preconceived notion of ‘professional attire’. For instance, we found that the
18 locale where care is delivered (e.g., hospital vs. clinic) as well as context of care (e.g.,
19 emergency room or surgery) affected preferences. Similarly, we observed that certain
20 respondent characteristics such as age, gender, and education also influenced their
21 preferences. These findings can potentially be used to improve the patient experience.
22 For instance, providers engaged in care of elderly patients (e.g., geriatric clinics,
23 hospital settings or extended-care facilities) may consider donning formal attire more so
24 than surgeons or emergency room physicians where scrubs may be more important.
25 Similarly, hospitals in southern regions of the US may wish to endorse formal attire and
26 white coats as their preferred policy. For providers in the emergency room and surgical
27 arenas, such attire may in fact be viewed as out of place – and thus different rules might
28 be necessary. These examples illustrate how policies for specific doctors, settings or
29 patients can be leveraged to focus on patient-centered care.
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3 How should one interpret these findings given concerns for infection transmission
4 associated with physician dress? Previous studies have shown that bacteria and
5 pathogens can be isolated from white coats, neckties and sleeves of medical
6 providers.¹²⁻²⁰ These studies are one of the reasons why a “bare below the elbows”
7 (BBE) policy exists in some countries. While we did not specifically ask respondents to
8 consider this risk when choosing attire preferences, three aspects deserve discussion.
9
10 First, despite the abundance of literature on infection prevention, we are unaware of any
11 study that links physician dress to source or transmission of infection. Rather, one study
12 randomly sampled physicians’ fingertips and reported no association between BBE-
13 compliant versus non-compliant attire and presence of bacterial colony-forming units or
14 clinically significant organisms.²¹ Second, evidence suggests that other practices (e.g.,
15 hand hygiene) may be more relevant than physician dress in preventing infection. In an
16 institution-wide study at Vanderbilt University Medical Center, direct observation
17 combined with financial incentives for appropriate hand hygiene increased compliance
18 with hand hygiene policies and decreased device-associated standardized infection
19 ratios.²² Conversely, wearing a white coat has been associated with increased selective
20 and sustained attentiveness to tasks.²³ These findings suggest that clothing may
21 influence the wearer’s own psychological processes, a phenomenon coined “enclothed
22 cognition.”²⁴ Therefore, attentiveness to hand hygiene may, in fact, be increased when
23 physicians wear white coats or formal attire – improving patient care and
24 satisfaction.^{25,26} Third, we add to the growing body of evidence that suggests patients
25 have preferences regarding attire.^{9,10,27-47} Physician attire may offer an important
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3 modifiable variable in the doctor-patient relationship that could improve patient
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5 experience and satisfaction and ultimately produce better outcomes.⁴⁸⁻⁵⁰
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8 Our study has several limitations. First, as with other studies of physician attire,
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10 we showed respondents pictures of providers and elicited preferences via a paper
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12 questionnaire. Our providers were young, slender, Caucasian and all cared for in
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14 academic settings, which may have introduced bias into responses. Similarly, we did
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16 not record information for patients who refused to participate in the study, also
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18 potentially introducing bias. Second, while approaching patients as they were receiving
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20 care helps generate validity, it is possible that reported impressions may not reflect
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22 actual preferences. Third, we asked patients to report preferences via Likert scales and
23
24 predefined categories. Although this allows for a range of answers (including a neither
25
26 agree or disagree option), such categorizations may force respondents to answer in
27
28 ways that do not capture their true feelings. Fourth, while the proportion of Caucasian
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30 respondents were similar to 2010 Census data estimates, a lower than expected
31
32 number of Hispanic respondents (5% compared with 16% estimated by the Census
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34 data) participated.⁵¹ Thus, whether our findings will hold true across race or ethnicity is
35
36 not known. Finally, we did not include questions regarding infection transmission given
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38 the lack of evidence supporting the notion that white coats or attire is associated with
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40 infections.
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47 Our study also has important strengths. First, this is the largest study to examine
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49 patient preferences for physician attire. Given methodological strengths including
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51 randomization of instrument sequence, as well as inclusion of diverse regions and
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53 patient populations, our findings clarify possible dress codes in various healthcare
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3 settings. Second, in contrast to other studies, we specifically designed our study and
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5 survey instrument to avoid biases associated with images. For example, we hired a
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7 professional photographer and studio to ensure photographs of physicians were
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9 otherwise identical. Similarly we also used models of the same race (Caucasian) with
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11 identical postures and facial expressions so as to limit confounding associated with
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13 models of different backgrounds or appearance as has occurred in previous
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15 studies.^{29,36,37,39,45} Additionally, we implemented strategies during survey collection such
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17 as randomizing order of delivery and images to minimize bias. These approaches help
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19 lend a high degree of internal validity to our findings. Third, our findings have policy
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21 implications: namely, patients appear to care about attire and may expect to see their
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23 doctor in certain ways. Hospitals, clinics, emergency departments and ambulatory
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25 surgical centers should consider using these data to set dress codes for physicians
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27 providing care in these settings.
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33 In summary, while physician attire cannot replace excellent clinical care, our data
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35 suggest that it may impact how patients perceive care and perhaps how willing they are
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37 to trust their doctors. In an era of patient-centeredness and patient satisfaction,
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39 physician attire may be an important, modifiable component of patient care. As
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41 perceptions and expectations regarding physician dress by patients, context, and region
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43 exist, nuanced policies that target such factors appear relevant. Future studies
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45 implementing such policies in both hospital, clinic and emergency room settings appear
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47 necessary.
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TABLES

TABLE 1. Characteristics of Study Respondents and Sites*

Characteristics	N (%)
Age	N=3998
18-25	151 (4)
26-34	340 (9)
35-54	952 (24)
55-64	1103 (28)
65+	1452 (36)
Gender	N=3946
Female	1374 (35)
Male	2572 (65)
Education	N=3970
Less than High School	110 (3)
High School	1080 (27)
Some College	1101 (28)
College	1052 (27)
Graduate Degree or Above	627 (16)
Race	N=3974
White	2802 (71)
African American	731 (18)
Asian	79 (2)
Hispanic	181 (5)
Other/Mixed Race	181 (5)
Number of Different Doctors Seen in the Past Year	N=3987
0	29 (1)
1	250 (6)
2	496 (12)
3	637 (16)
4	606 (15)
5	440 (11)
6 or more	1529 (38)
Geographic Region	N =4062
Midwest	2225
Northeast	449
West	257
South	1131

TABLE 2. Respondent Preferences for Physician Attire (By Setting)

Preference for Physician Attire [by Setting]	Total no. (%)
<i>Which doctor would you prefer for your primary care physician?</i>	N=3959
Casual	133 (3)
Casual & White Coat	417 (11)
Scrubs	201 (5)
Scrubs & White Coat	586 (15)
Formal	610 (15)
Formal & White coat	1758 (44)
Business Suit	254 (6)
<i>Which doctor would you prefer to see when visiting the ER?</i>	N=3966
Casual	54 (1)
Casual & White Coat	240 (6)
Scrubs	1577 (40)
Scrubs & White Coat	1351 (34)
Formal	113 (3)
Formal & White coat	592 (15)
Business Suit	39 (1)
<i>Which doctor would you prefer when in the hospital?</i>	N=3946
Casual	61 (2)
Casual & White Coat	351 (9)
Scrubs	412 (10)
Scrubs & White Coat	1126 (29)
Formal	280 (7)
Formal & White coat	1546 (39)
Business Suit	170 (4)
<i>Which doctor would you prefer for your surgeon?</i>	N=3952
Casual	32 (1)
Casual & White Coat	151 (4)
Scrubs	1648 (42)
Scrubs & White Coat	926 (23)
Formal	150 (4)
Formal & White coat	824 (21)
Business Suit	221 (6)
<i>Overall, which clothes do you feel your doctor should wear?</i>	N=3924
Casual	60 (2)
Casual & White Coat	292 (7)
Scrubs	329 (8)
Scrubs & White Coat	1013 (26)
Formal	340 (9)
Formal & White coat	1708 (44)
Business Suit	182 (5)

TABLE 3. Respondent Opinions Regarding Importance of Physician Attire

Opinions Regarding Influence and Appropriateness of Physician Dress	Total no. (%)
<i>How my doctor dresses is important to me.</i>	N=4016
Disagree or Strongly Disagree	593 (15)
Neither Agree nor Disagree	1286 (32)
Agree or Strongly Agree	2,137 (53)
<i>How my doctor dresses influences how happy I am with the care I receive.</i>	N=4010
Disagree or Strongly Disagree	931 (23)
Neither Agree nor Disagree	1620 (40)
Agree or Strongly Agree	1,459 (36)
<i>It is appropriate for a doctor to dress casually when seeing patients over the weekend.</i>	N=4003
Disagree or Strongly Disagree	857 (21)
Neither Agree nor Disagree	1372 (34)
Agree or Strongly Agree	1,774 (44)
<i>Doctors should wear a white coat when seeing patients in their office.</i>	N=4007
Disagree or Strongly Disagree	485 (12)
Neither Agree nor Disagree	1321 (33)
Agree or Strongly Agree	2,201 (55)
<i>Doctors should wear a white coat when seeing patient in the ER.</i>	N=4005
Disagree or Strongly Disagree	704 (18)
Neither Agree nor Disagree	1519 (38)
Agree or Strongly Agree	1,782 (44)
<i>Doctors should wear a white coat when seeing patients in the hospital.</i>	N=4006
Disagree or Strongly Disagree	346 (9)
Neither Agree nor Disagree	1188 (30)
Agree or Strongly Agree	2,472 (62)
<i>Doctors should always wear a white coat when seeing patients in any setting.</i>	N=4007
Disagree or Strongly Disagree	1,022 (26)
Neither Agree nor Disagree	1641 (41)
Agree or Strongly Agree	1,344 (34)

Note: Percentages may not add up to 100 due to rounding.

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For peer review only

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3 **FIGURES**
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8 **Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument**
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Figure 2. Rating of Physician Attire Across Preference Domains

For peer review only

Figure 3. Preference for white coat by clinical care setting and physician gender

For peer review only

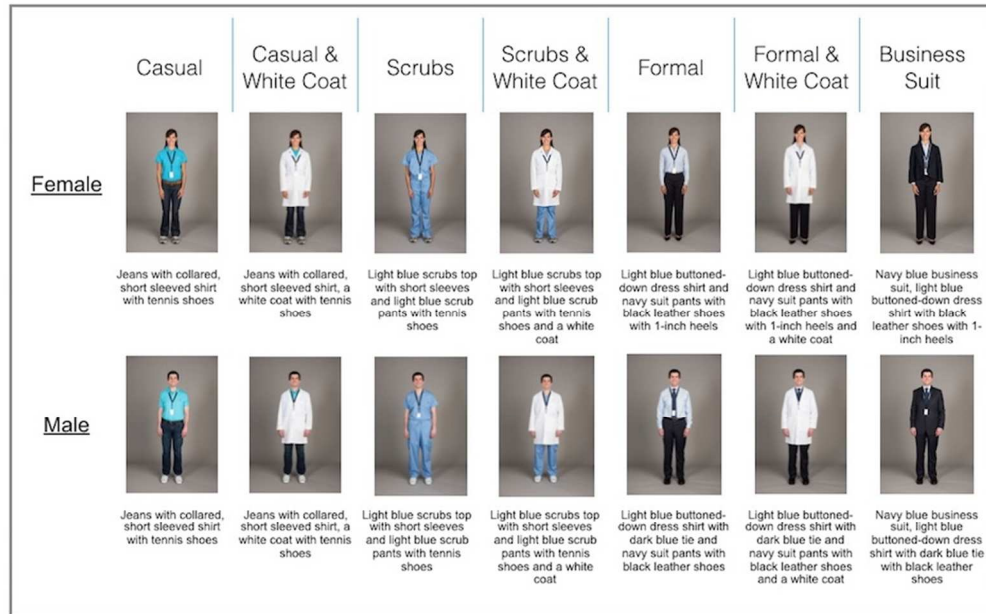
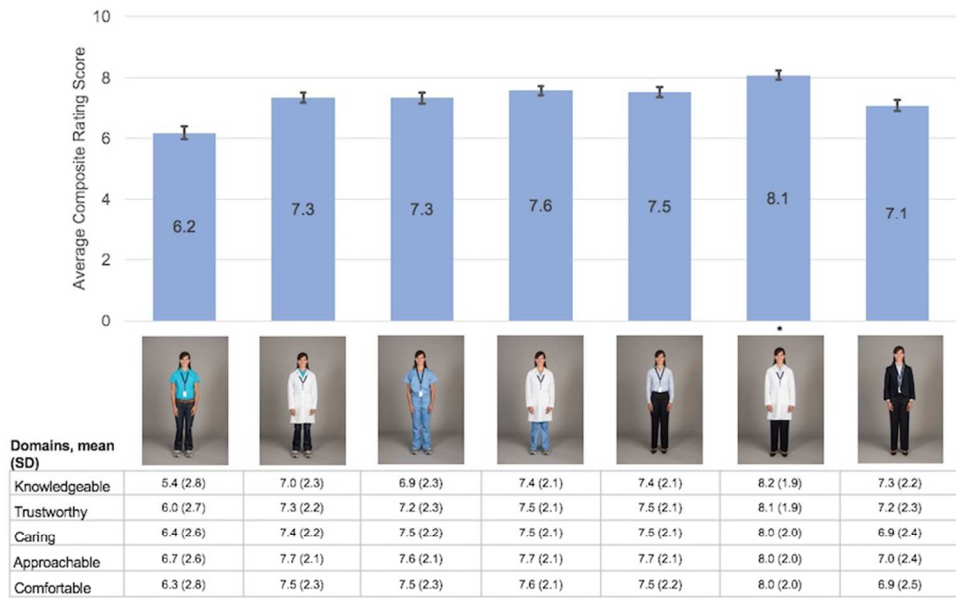


Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument

80x50mm (300 x 300 DPI)

Review only



*All comparisons of the composite score are significantly different when compared to the referent group (formal attire + white coat) at p<0.05.
 Note: Female model is pictured for illustrative purposes. The data reflects ratings of physician attire for both male and female physician models.

Figure 2. Rating of Physician Attire Across Preference Domains

80x50mm (300 x 300 DPI)

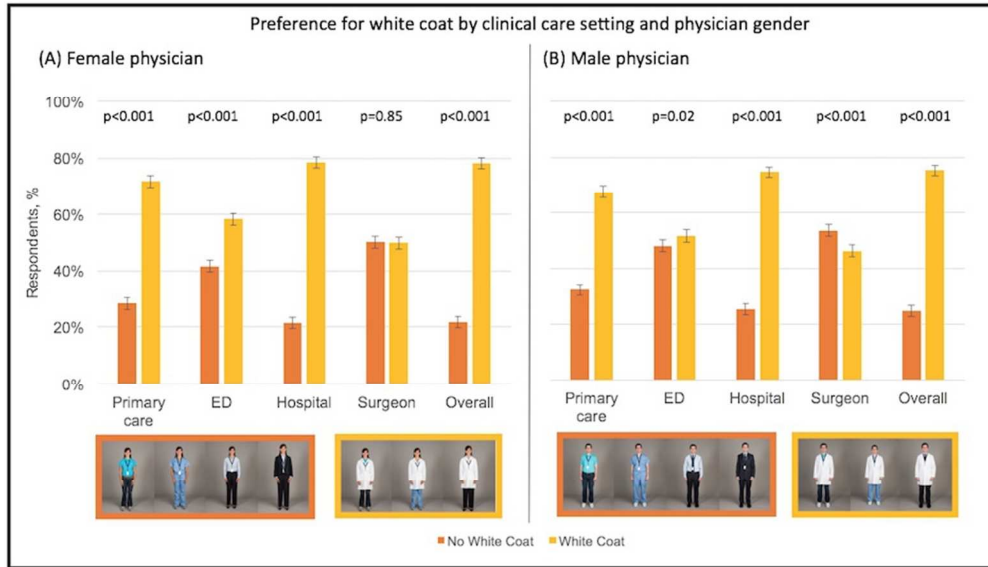


Figure 3. Preference for white coat by clinical care setting and physician gender

80x45mm (300 x 300 DPI)

Understanding the Role of Physician Clothing on Patient Opinion

Thank you for taking the time to complete this survey. Your answers will help us better understand whether physician dress influences patients' opinions of their doctor.

Your responses are very important to us. There are no right or wrong answers and we are interested only in your honest opinions. This survey is brief and should take no more than 5 minutes to complete.

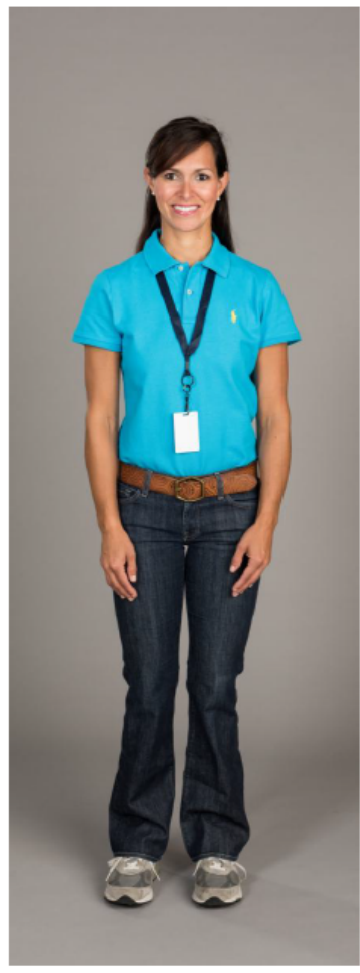
In Section A please provide a rating by circling the number on the scale that corresponds to your answer.

In Sections B, C, and D, please provide your one best answer to each question.

All of your answers will be kept confidential. We will not use names in any notes, reports, or summaries. Your responses will also not be shared with any of your doctors or care providers.

Section A – Physician Attire - Ratings

Please rate the doctor for each of the following questions by circling the number that corresponds to your answer.

	<p>1) How knowledgeable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>2) How trustworthy does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>3) How caring does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>4) How approachable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>5) How comfortable does this doctor make you feel?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>

Section B – Physician Attire - Preferences

Please provide your ONE best answer to each of the following questions



A B C D E F G

6) Which doctor would you prefer for your **primary care doctor**? (Please select only ONE option)

A **B** **C** **D** **E** **F** **G**

7) Which doctor would you prefer to see when visiting the **emergency room**? (Please select only ONE option)

A **B** **C** **D** **E** **F** **G**

8) Which doctor would you prefer to see when **in the hospital**? (Please select only ONE option)

A **B** **C** **D** **E** **F** **G**

9) Which doctor would you prefer for your **surgeon**? (Please select only ONE option)

A **B** **C** **D** **E** **F** **G**

10) **Overall**, which clothes do you feel doctors should wear? (Please select only ONE option)

A **B** **C** **D** **E** **F** **G**

Section C – General Physician Attire

Please indicate your level of agreement with the following statements by checking ONE box to the left of your answer.

11) How my doctor dresses is important to me.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

12) How my doctor dresses influences how happy I am with the care I receive.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

13) It is appropriate for a doctor to dress casually when seeing patients **over the weekend**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

14) Doctors should wear a white coat when seeing patients **in their office or clinic**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

15) Doctors should wear a white coat when seeing patients in the **emergency room**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

16) Doctors should wear a white coat when seeing patients **in the hospital**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

17) Doctors should always wear a white coat when seeing patients **in any setting**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

Section D – Demographics

Please remember that all of your answers will be kept confidential.

18) How old are you?

- 18-25 26-34 35-54 55-64 65 or older

19) What is your gender?

- Male Female

20) What is the highest level of education you have completed?

- Less than High School High School Some College College Graduate Degree

21) What is your race?

- American Indian/Alaska Native Asian Native Hawaiian or Other Pacific Islander
 Black or African American White Hispanic
 Other (Please specify) _____

22) How many different doctors have you seen in the past year?

- 0 1 2 3 4 5 6 or more

**Thank you for taking the time to fill out our survey.
Your input is greatly appreciated.**

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	3
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	7
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	9
		(c) Explain how missing data were addressed	9
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9-10
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9-10
		(b) Indicate number of participants with missing data for each variable of interest	Table 1-3
Outcome data	15*	Report numbers of outcome events or summary measures	10-13
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-13
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	10-13
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A – No funding

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Understanding Patient Preference for Physician Attire: A Cross-Sectional Observational Study of Ten Academic Medical Centers in the United States

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Manuscripts

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3 **Understanding Patient Preference for Physician Attire: A Cross-Sectional**
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5 **Observational Study of Ten Academic Medical Centers in the United States**
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3 **OBJECTIVE:** Several large studies have shown that improving the patient experience is
4 associated with higher reported patient satisfaction, increased adherence to treatment
5 and clinical outcomes. Whether physician attire can affect the patient experience—and
6 how this influences satisfaction— is unknown. Therefore, we performed a national,
7 cross-sectional study to examine patient perceptions, expectations and preferences
8 regarding physicians dress.
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19 **SETTING:** Ten academic hospitals in the United States.
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24 **PARTICIPANTS:** Convenience sample of 4,062 patients recruited from June 1, 2015 to
25 October 31, 2016.
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31 **PRIMARY AND SECONDARY OUTCOMES MEASURED:** We conducted a questionnaire-based
32 study of patients across ten academic hospitals in the United States. The questionnaire
33 included photographs of a male and female physician dressed in seven different forms
34 of attire. Patients were asked to rate the provider pictured in various clinical settings.
35 Preference for attire was calculated as the composite of responses across five domains
36 (knowledgeable, trustworthy, caring, approachable, and comfortable) via a standardized
37 instrument. Secondary outcome measures included variation in preferences by
38 respondent characteristics (e.g., gender), context of care (e.g., inpatient vs. outpatient)
39 and geographic region.
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3 **RESULTS:** Of 4,062 patient responses, 53% indicated that physician attire was important
4 to them during care. Over one third agreed that it influenced their satisfaction with care.
5
6 Compared to all other forms of attire, formal attire with a white coat was most highly
7
8 rated ($p=0.001$ vs. scrubs with white coat; $p<0.001$ all other comparisons). Important
9
10 differences in preferences for attire by clinical context and respondent characteristics
11
12 were noted. For example, respondents ≥ 65 years preferred formal attire with white
13
14 coats ($p<0.001$) while scrubs were most preferred for surgeons.
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21 **CONCLUSIONS:** Patients have important expectations and perceptions for physician dress
22
23 that vary by context, and region. Nuanced policies addressing physician dress code to
24
25 improve patient satisfaction appear important.
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31 **TRIAL REGISTRATION:** Observational study, not registered
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STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the largest study to date that examines patient preferences for physician attire.
- The study design and survey instrument were carefully designed to limit biases associated with physician images.
- Our findings show that patients appear to care about attire and may expect to see their doctor dress in a certain way, which has policy implications for institutional dress codes.
- The providers pictured in our survey instrument were young, slender, and Caucasian, which may limit generalizability of findings.
- While soliciting patient responses while hospitalized helps generate validity, it is possible that reported impressions may not reflect actual preferences.

INTRODUCTION

At its core, the practice of medicine hinges on the patient-physician relationship. From initial introductions, physicians work to build rapport to foster a partnership to provide patient-centered care, defined as that which is: “respectful of, and responsive to, individual patient preferences, needs and values.”¹ Not surprisingly, medical school curricula often include courses aimed at improving the patient experience.² Similarly, since 2007, the Centers for Medicare and Medicaid have required hospitals to collect, submit and publicly report the results of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey or risk financial penalties.³ These data are also important because they have been linked to clinical outcomes. For example, a positive correlation between patient satisfaction, improved mortality and reduced 30-day readmissions have been reported.⁴⁻⁸

Although improving the patient experience, and consequently satisfaction, is an important target for many hospitals, how best to do this is unclear. One approach is to understand how physician attire influences the patient experience and develop guidelines based on patients’ preferences. Indeed, some healthcare systems across the country have adopted stringent dress codes. In a recently published article, we contacted human resource professionals and administrators at top US News & World Report Hospitals,⁹ and found that five had written guidelines endorsing formal and professional attire. Yet patient preferences for physician attire are not straightforward. In a systematic review, we found that while patients preferred formal attire and white coats overall, attire such as scrubs or casual dress were preferred in specific settings.⁹ These findings make intuitive sense: patients often have notions of how a “professional” should

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3 dress and are more likely to respond positively to those that meet these stereotypes.
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5 Strategies targeting physician dress may therefore enhance trust and satisfaction.
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8 Therefore, we performed a cross-sectional survey of patients receiving care
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10 across the US using a standardized questionnaire to better understand the impact of
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12 physician attire across different clinical settings (e.g., hospitalized vs. ambulatory clinic
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14 visits). In addition, we aimed to analyze a larger sample of patients from multiple health
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16 systems than has been previously reported in the literature.
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21 **METHODS**

22 *Study design and population*

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26 Between June 1, 2015 to October 31, 2016, a total of 6,280 surveys
27
28 were provided to ten academic medical centers in the United States (US) of
29
30 which 4,062 surveys were filled and available for analyses (response rate = 65%). The
31
32 participating sites spanned four main geographic regions of the US. The questionnaire
33
34 consisted of 22 questions and included photographs of a male and a female physician
35
36 in various forms of attire. The questionnaire was administered to adult patients that
37
38 were receiving care in clinics (outpatients) or admitted to the hospital (inpatients).
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40 Outpatients were approached in waiting rooms of general medicine and medical
41
42 subspecialty clinics, while inpatients were approached in their hospital rooms when
43
44 admitted to non-surgical units. At all sites, the questionnaire was administered by
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46 research staff using paper instruments. The surveys were administered during normal
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48 business hours at times convenient to each sites' research staff. Respondents were
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50 allowed to request help filling out the form from any visitor accompanying them. The
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3 research staff delivered the paper instrument and returned approximately 5-10 minutes
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5 later to pick-up the completed form. Respondents provided verbal consent. No
6
7 identifying information was collected from those that completed the study.
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10 11 12 *Sample size calculation* 13

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15 It was assumed that responses between two attire forms would be normally
16
17 distributed on the 1-10 scale between attire types. An estimated standard deviation of
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19 2.2 was used. If our study included at least 816 patients, (assuming a two-sided alpha
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21 error of 0.05), we expected to have 90% power to detect differences for effect sizes of
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23 0.50 on the 1-10 scale. Fewer subjects would be needed if the standard deviation were
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25 smaller.
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28 29 30 31 *Patient and Public Involvement* 32

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34 The study was designed to understand patient experience and preferences.
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36 However, patients were not included in the design of the survey instrument, recruitment,
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38 or conduct of the study. Patients who participated did so anonymously, and therefore
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40 the study team will be unable to disseminate the results to study participants.
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47 48 *Study design and data collection* 49

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51 The questionnaire was developed from a systematic review that examined the
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53 role of physician attire on patient preferences and satisfaction.⁹ A multidisciplinary team
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55 of psychometricians, research scientists, choice architects, survey experts, and
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3 bioethicists developed the study instrument. Each question sought to elicit preferences
4 regarding various forms of physician attire, including: casual, casual with white coat,
5 scrubs, scrubs with white coat, formal, formal with white coat, and business suit (**Figure**
6
7
8 **1**). Photographs of the same Caucasian male and female physician donning such attire
9
10 were taken by a professional photographer with strict attention to facial expressions,
11
12 pose, lighting, and other non-verbal cues as these may influence preference or likability.
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16 To avoid bias, 14 different versions of the study instrument were created, and
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18 distribution of the questionnaires was randomized to participants. In each version, the
19
20 gender and attire of the first physician model varied to prevent ordering, priming or
21
22 anchoring effects (**Supplementary File**). The questionnaire had four sections: in the
23
24 first section, respondents were asked to rate the physician depicted across five domains
25
26 including knowledge, trust, care, approachability, and comfort. In the second section,
27
28 respondents were presented with seven photographs of the same physician wearing
29
30 different attire and asked to select their preference in various clinical settings. The third
31
32 and fourth sections sought respondents' general opinions regarding physician attire,
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34 demographic data and frequency of interactions with physicians.
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40 Before administration, the survey instrument was pilot-tested with a convenience
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42 sample of patients at the lead site to ensure photographs, questions, ratings, and
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44 randomly generated order of the 14 surveys at each site would functioned as desired.
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49 *Measurements*

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51 Ratings regarding how knowledgeable, trustworthy, caring, and approachable
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53 each physician appeared, as well as how comfortable the physician made the
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3 respondent feel, were measured using a 1-10 scale, where 1 indicated “somewhat
4 preferred” vs. 10 “extremely preferred.” Preference of attire within specific care settings
5 (e.g., primary care, emergency room, hospital, surgery, and overall) was assessed
6 using photos for each of the 7 attire categories. Respondent opinions regarding
7 importance of dress and white coats were collected using a 1-5 Likert scale, where 1
8 indicated “strongly disagree” and 5 indicated “strongly agree.” We assessed patient
9 satisfaction based on agreement with two questions: “How my doctor dresses is
10 important to me,” and “How my doctor dresses influences how happy I am with the care
11 received.” For analyses, responses were trichotomized as follows: agreement =
12 strongly agree and agree; neither agree nor disagree; and disagreement = disagree or
13 strongly disagree. Demographics including age, gender, education level, race, and
14 number of physician encounters were collected. Preferences for attire and
15 demographics were dichotomized for bivariate comparison. Questions that were
16 unanswered or where more than one response was entered were excluded.
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38 *Outcomes*

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40 The primary outcome of interest – preference for attire -- was calculated as the
41 composite average of the five individual rating domains (knowledgeable, trustworthy,
42 caring, approachable, and comfortable). Additionally, variation in preferences for
43 physician attire by respondent characteristics (e.g., gender, age), context of care (e.g.,
44 inpatient vs. outpatient) and geographical region (e.g., Northeast, Midwest, South, and
45 West) were also assessed.
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Statistical analyses

Data from paper questionnaires were entered independently and in duplicate. Since respondents were not required to answer all questions, the denominator for individual questions (and associated response rate) varied. Descriptive statistics (means, percentage) and standard deviation (SD) were initially used to tabulate results. Differences in the mean composite rating scores from the physician ratings section were assessed using one-way ANOVA. To reduce the potential for Type I error, post-estimation pairwise comparisons were performed using the Tukey-Kramer method.² Differences in proportions for categorical data were compared using the Z-test. Bivariate comparisons between respondent age, gender, and level of education and corresponding respondent preferences for attire were assessed using Chi-squared tests. A two-sided p-value of less than 0.05 was considered statistically significant. All analyses were performed using Stata 14 MP/SE (StataCorp, College Station, TX).

Ethical and Regulatory Oversight

The study was reviewed and deemed exempt from regulation by the University of Michigan Institutional Review Board (HUM00085305).

RESULTS

A total of 4,062 questionnaires were completed by patients across ten academic medical centers in the United States. Respondents represented all parts of the United States including the Northeast, Midwest, South and West. Most patients were surveyed while admitted to the hospital (n=2,616 [64%]); however, a substantial proportion of

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3 outpatients were also included (n=1,446 [36%]). Respondents were most often white
4 (71%) and male (65%). The plurality of patients was 65 years of age or older (36%).
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7 Seventy percent of those surveyed indicated having attended some college or having
8 college degrees. With respect to interactions with the health system, 38% of
9
10 respondents reported having seen 6 or more physicians in the past year (**Table 1**).
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17 *Ratings of Physician Attire*

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19 Respondents rated formal attire with white coat for both male and female
20 physician models as the most preferred form of dress compared to other forms of attire
21 with a mean composite score of 8.1 (SD 1.8) [all pairwise comparisons $p < 0.001$].
22
23 Cronbach's alpha for the 5-items included in the composite score was 0.96.. Ratings for
24 formal attire with white coat were greatest across all domains including how
25 knowledgeable, trustworthy, caring, and approachable the physician appeared as well
26 as how comfortable the physician made the respondent feel. Moreover, these findings
27 were significant in the domains of trustworthiness, caring and how comfortable the
28 physician made the respondent feel in all pairwise comparison testing to other forms of
29 attire ($p < 0.05$). For the rating of approachability, formal attire with a white coat was not
30 statistically different from scrubs with a white coat or formal without a white coat in
31 pairwise comparison. Scrubs with white coat ranked second overall, with a mean
32 composite score of 7.6 (SD=1.9) followed by formal attire without a white coat with a
33 mean composite score of 7.5 (SD=2.0) (**Figure 2**).
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Preferences for Physician Attire by Care Settings

When examining preferences for physician attire by care setting, important differences emerged. Formal attire with white coat was preferred by respondents for their primary care (44%) and hospital physician (39%). Conversely, scrubs were rated highest for emergency room physicians (40%) and surgeons (42%). In both emergency and surgery settings, scrubs alone were followed in preference by scrubs with white coats (34% and 23%, respectively). When asked, "Overall, which clothes do you feel that your doctor should wear?" most respondents preferred formal attire with white coat (44%) followed by scrubs with white coat (26%) (**Table 2**). Excluding surgeons, respondents universally preferred physicians in white coats over no white coats. When evaluating surgeons, respondents indicated no preference for a white coat on female physicians ($p=0.85$), but preferred male physicians without white coats ($p<0.001$). No differences in preference by physician gender in other clinical care settings were noted (**Figure 3**).

Perceived Influence on Satisfaction, Importance and Appropriateness of Physician Attire

More than half (53%) of the patients surveyed agreed with the statement that how their doctor dresses was important to them, while 36% of respondents agreed with the statement that physician attire influenced how happy they were with the care they received. Views regarding appropriateness of casual attire when physicians see patients on the weekends were mixed: 44% of respondents stated this was appropriate while 56% were either neutral or disagreed with the practice.

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3 Specific questions regarding when physicians should don a white coat elicited
4 various preferences. Most respondents (55%) indicated that they agreed or strongly
5 agreed with the statement that doctors should wear a white coat when seeing patients
6 in the office. In the emergency room, however, 44% agreed with the statement that
7 physicians should wear a white coat when seeing patients vs. 56% that indicated either
8 no preference (38%) or disagreement (18%). When asked whether doctors should wear
9 a white coat when seeing patients in the hospital, the majority of respondents (62%)
10 agreed or strongly agreed with this statement (**Table 3**).

21 22 23 *Variations in Patient Preferences of Physician Attire*

24
25 Important variations in patient preferences for attire were noted. For example,
26 female respondents more often preferred scrubs with white coats in emergency room
27 and hospital settings than males (41% vs. 31% [$p<0.001$] and 32% vs. 27% [$p=0.001$],
28 respectively). However, both genders indicated formal attire with white coat was overall
29 most preferred (43% and 44%, respectively). In hospital settings, respondents 65 years
30 of age or older frequently preferred formal attire with white coats than younger patients
31 (44% vs. 36%, $p<0.001$). Conversely, younger patients more often preferred scrubs and
32 white coats than formal attire overall (28% vs. 21%, $p<0.001$). Some differences in
33 preferences regarding physician dress based on respondent education level were also
34 noted. Specifically, respondents with a college degree preferred formal and white coat
35 for their primary care provider more often than those without a college degree (48% vs.
36 42%, $p<0.001$).

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3 No differences in preferences between those with three or more physician visits
4 in the preceding year vs. those with less frequent visits were noted. Similarly,
5 preferences for attire did not vary by setting in which respondents were polled, although
6 respondents in the outpatient setting more often preferred doctors in the hospital to
7 wear scrubs and a white coat compared to hospitalized respondents (32% vs. 27%,
8 $p=0.002$). However, preferences for attire did vary by geographic region. For example,
9 while formal attire and white coats were preferred across all regions, 50% of
10 respondents in the West and 51% in the South selected this as their preferred option
11 compared to 38% and 40% in the Northeast and Midwest, respectively. Conversely,
12 over half of all respondents in the Northeast selected scrubs as their preferred attire for
13 surgeons compared to a quarter of respondents in the South (54% vs. 25%, $p<0.001$).
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30 **DISCUSSION**

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33 This study of over 4,000 patients receiving medical care in diverse academic
34 medical centers is the largest to report preferences regarding physician attire in the US.
35 Over half of the participants indicated that how a physician dresses was important to
36 them, with over one in three stating that this influenced how happy they were with care
37 received. Overall, respondents indicated that formal attire with white coats was the most
38 preferred form of physician dress. However, in settings such as surgery or emergency
39 rooms, scrubs with white coats were most preferred. Although variation in preferences
40 by respondent age, gender, education and geography were noted, these findings
41 indicate that not only do most patients have expectations regarding doctor attire, but
42 that a “professional” look matters most. Given the size, methodological rigor and
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3 representativeness of these data, policies addressing physician attire should be
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5 considered to improve patient satisfaction.
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8 Previous studies have shown that patients harbor conscious and unconscious
9
10 biases when it comes to provider dress.^{10 11} Thus, our finding that patients have specific
11
12 preferences regarding physician attire was not surprising. What this study highlights,
13
14 however, is the potential importance of physician attire to the physician-patient
15
16 relationship. Indeed, specific clinical and contextual aspects appear to influence a
17
18 patient's preconceived notion of 'professional attire'. For instance, we found that the
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20 locale where care is delivered (e.g., hospital vs. clinic) as well as context of care (e.g.,
21
22 emergency room or surgery) affected preferences. Similarly, we observed that certain
23
24 respondent characteristics such as age, gender, and education also influenced their
25
26 preferences. These findings can potentially be used to improve the patient experience.
27
28 For instance, providers engaged in care of elderly patients (e.g., geriatric clinics,
29
30 hospital settings or extended-care facilities) may consider donning formal attire more so
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32 than surgeons or emergency room physicians where scrubs may be more important.
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34 Similarly, hospitals in southern regions of the US may wish to endorse formal attire and
35
36 white coats as their preferred policy. For providers in the emergency room and surgical
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38 arenas, such attire may in fact be viewed as out of place – and thus different rules might
39
40 be necessary. These examples illustrate how policies for specific doctors, settings or
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42 patients can be leveraged to focus on patient-centered care.
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49 How should one interpret these findings given concerns for infection transmission
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51 associated with physician dress? Previous studies have shown that bacteria and
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53 pathogens can be isolated from white coats, neckties and sleeves of medical
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3 providers.¹²⁻²⁰ These studies are one of the reasons why a “bare below the elbows”
4
5 (BBE) policy exists in some countries. While we did not specifically ask respondents to
6
7 consider this risk when choosing attire preferences, three aspects deserve discussion.
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9
10 First, despite the abundance of literature on infection prevention, we are unaware of any
11
12 study that links physician dress to source or transmission of infection. Rather, one study
13
14 randomly sampled physicians’ fingertips and reported no association between BBE-
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16 compliant versus non-compliant attire and presence of bacterial colony-forming units or
17
18 clinically significant organisms.²¹ Second, evidence suggests that other practices (e.g.,
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20 hand hygiene) may be more relevant than physician dress in preventing infection. In an
21
22 institution-wide study at Vanderbilt University Medical Center, direct observation
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24 combined with financial incentives for appropriate hand hygiene increased compliance
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26 with hand hygiene policies and decreased device-associated standardized infection
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28 ratios.²² Conversely, wearing a white coat has been associated with increased selective
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30 and sustained attentiveness to tasks.²³ These findings suggest that clothing may
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32 influence the wearer’s own psychological processes, a phenomenon coined “enclothed
33
34 cognition.”²⁴ Therefore, attentiveness to hand hygiene may, in fact, be increased when
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36 physicians wear white coats or formal attire – improving patient care and satisfaction.²⁵
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26
26 Third, we add to the growing body of evidence that suggests patients have important
preferences regarding attire.^{9 10 27-47} As further demonstrated by a recent study, these
preferences may evolve over time, as demonstrated by variation in preferences by
respondent age.⁴⁸ Physician attire may offer an important modifiable variable in the
doctor-patient relationship that could improve patient experience and satisfaction and
ultimately produce better outcomes.⁴⁹⁻⁵¹

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3 Our study has limitations. First, as with other studies of physician attire, we
4 showed respondents pictures of providers and elicited preferences via a paper
5 questionnaire. Our providers were young, slender, Caucasian and all cared for in
6 academic settings, which may have introduced bias into responses. Similarly, we did
7 not record information for patients who refused to participate in the study, also
8 potentially introducing bias. Second, while approaching patients as they were receiving
9 care helps generate validity, it is possible that reported impressions may not reflect
10 actual preferences on attire but rather current feelings related to their care. Prior studies
11 have shown that the impact of attire on patient satisfaction has to be considered in the
12 context of the behaviors and attitude of the physician during the encounter. The survey
13 did not have questions to capture the other dynamics of the doctor-patient relationship,
14 which may help further explicate responses.⁹ Third, we asked patients to report
15 preferences via Likert scales and predefined categories. Although this allows for a
16 range of answers (including a neither agree or disagree option), such categorizations
17 may force respondents to answer in ways that do not capture their true feelings. Fourth,
18 while the proportion of Caucasian respondents were similar to 2010 Census data
19 estimates, a lower than expected number of Hispanic respondents (5% compared with
20 16% estimated by the Census data) participated.⁵² Thus, whether our findings will hold
21 true across race or ethnicity is not known. Finally, we did not include questions
22 regarding infection transmission given the lack of evidence supporting the notion that
23 white coats or attire is associated with infections.

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25 Our study also has important strengths. First, this is the largest study to examine
26 patient preferences for physician attire. Given methodological strengths including
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3 randomization of instrument sequence, as well as inclusion of diverse regions and
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5 patient populations, our findings clarify possible dress codes in various healthcare
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7 settings. Second, in contrast to other studies, we specifically designed our study and
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9 survey instrument to avoid biases associated with images. For example, we hired a
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11 professional photographer and studio to ensure photographs of physicians were
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13 otherwise identical. Similarly we also used models of the same race (Caucasian) with
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15 identical postures and facial expressions so as to limit confounding associated with
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17 models of different backgrounds or appearance as has occurred in previous studies.^{29 36}
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21 ^{37 39 45} Additionally, we implemented strategies during survey collection such as
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23 randomizing order of delivery and images to minimize bias. These approaches help lend
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25 a high degree of internal validity to our findings. Third, our findings have policy
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27 implications: namely, patients appear to care about attire and may expect to see their
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29 doctor in certain ways. Hospitals, clinics, emergency departments and ambulatory
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31 surgical centers should consider using these data to set dress codes for physicians
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33 providing care in these settings.
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38 In summary, while physician attire cannot replace excellent clinical care, our data
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40 suggest that it may impact how patients perceive care and perhaps how willing they are
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42 to trust their doctors. In an era of patient-centeredness and patient satisfaction,
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44 physician attire may be an important, modifiable component of patient care. As
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46 perceptions and expectations regarding physician dress by patients, context, and region
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48 exist, nuanced policies that target such factors appear relevant. Future studies
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50 implementing such policies in both hospital, clinic and emergency room settings appear
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52 necessary.
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TABLES

TABLE 1. Characteristics of Study Respondents and Sites*

Characteristics	N (%)
Age	N=3998
18-25	151 (4)
26-34	340 (9)
35-54	952 (24)
55-64	1103 (28)
65+	1452 (36)
Gender	N=3946
Female	1374 (35)
Male	2572 (65)
Education	N=3970
Less than High School	110 (3)
High School	1080 (27)
Some College	1101 (28)
College	1052 (27)
Graduate Degree or Above	627 (16)
Race	N=3974
White	2802 (71)
African American	731 (18)
Asian	79 (2)
Hispanic	181 (5)
Other/Mixed Race	181 (5)
Number of Different Doctors Seen in the Past Year	N=3987
0	29 (1)
1	250 (6)
2	496 (12)
3	637 (16)
4	606 (15)
5	440 (11)
6 or more	1529 (38)
Geographic Region	N =4062
Midwest	2225
Northeast	449
West	257
South	1131

TABLE 2. Respondent Preferences for Physician Attire (By Setting)

Preference for Physician Attire [by Setting]	Total no. (%)
<i>Which doctor would you prefer for your primary care physician?</i>	N=3959
Casual	133 (3)
Casual & White Coat	417 (11)
Scrubs	201 (5)
Scrubs & White Coat	586 (15)
Formal	610 (15)
Formal & White coat	1758 (44)
Business Suit	254 (6)
<i>Which doctor would you prefer to see when visiting the ER?</i>	N=3966
Casual	54 (1)
Casual & White Coat	240 (6)
Scrubs	1577 (40)
Scrubs & White Coat	1351 (34)
Formal	113 (3)
Formal & White coat	592 (15)
Business Suit	39 (1)
<i>Which doctor would you prefer when in the hospital?</i>	N=3946
Casual	61 (2)
Casual & White Coat	351 (9)
Scrubs	412 (10)
Scrubs & White Coat	1126 (29)
Formal	280 (7)
Formal & White coat	1546 (39)
Business Suit	170 (4)
<i>Which doctor would you prefer for your surgeon?</i>	N=3952
Casual	32 (1)
Casual & White Coat	151 (4)
Scrubs	1648 (42)
Scrubs & White Coat	926 (23)
Formal	150 (4)
Formal & White coat	824 (21)
Business Suit	221 (6)
<i>Overall, which clothes do you feel your doctor should wear?</i>	N=3924
Casual	60 (2)
Casual & White Coat	292 (7)
Scrubs	329 (8)
Scrubs & White Coat	1013 (26)
Formal	340 (9)
Formal & White coat	1708 (44)
Business Suit	182 (5)

TABLE 3. Respondent Opinions Regarding Importance of Physician Attire

Opinions Regarding Influence and Appropriateness of Physician Dress	Total no. (%)
<i>How my doctor dresses is important to me.</i>	N=4016
Disagree or Strongly Disagree	593 (15)
Neither Agree nor Disagree	1286 (32)
Agree or Strongly Agree	2,137 (53)
<i>How my doctor dresses influences how happy I am with the care I receive.</i>	N=4010
Disagree or Strongly Disagree	931 (23)
Neither Agree nor Disagree	1620 (40)
Agree or Strongly Agree	1,459 (36)
<i>It is appropriate for a doctor to dress casually when seeing patients over the weekend.</i>	N=4003
Disagree or Strongly Disagree	857 (21)
Neither Agree nor Disagree	1372 (34)
Agree or Strongly Agree	1,774 (44)
<i>Doctors should wear a white coat when seeing patients in their office.</i>	N=4007
Disagree or Strongly Disagree	485 (12)
Neither Agree nor Disagree	1321 (33)
Agree or Strongly Agree	2,201 (55)
<i>Doctors should wear a white coat when seeing patient in the ER.</i>	N=4005
Disagree or Strongly Disagree	704 (18)
Neither Agree nor Disagree	1519 (38)
Agree or Strongly Agree	1,782 (44)
<i>Doctors should wear a white coat when seeing patients in the hospital.</i>	N=4006
Disagree or Strongly Disagree	346 (9)
Neither Agree nor Disagree	1188 (30)
Agree or Strongly Agree	2,472 (62)
<i>Doctors should always wear a white coat when seeing patients in any setting.</i>	N=4007
Disagree or Strongly Disagree	1,022 (26)
Neither Agree nor Disagree	1641 (41)
Agree or Strongly Agree	1,344 (34)

Note: Percentages may not add up to 100 due to rounding.

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3 **FIGURES**
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8 **Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument**
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Figure 2. Rating of Physician Attire Across Preference Domains

For peer review only

Figure 3. Preference for white coat by clinical care setting and physician gender

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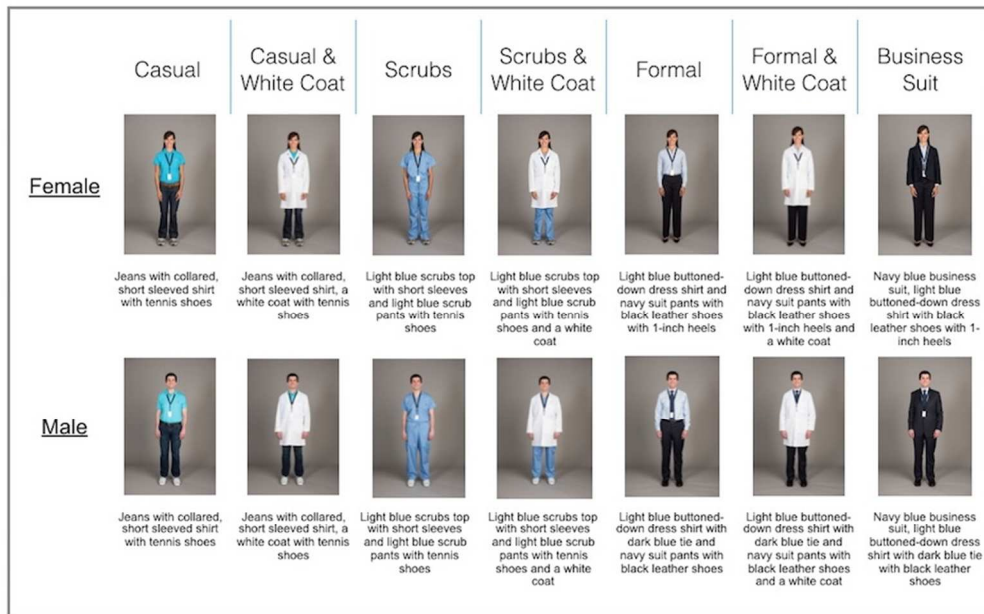


Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument

80x50mm (300 x 300 DPI)

Review only



*All comparisons of the composite score are significantly different when compared to the referent group (formal attire + white coat) at p<0.05.

Figure 2. Rating of Physician Attire Across Preference Domains

338x190mm (300 x 300 DPI)

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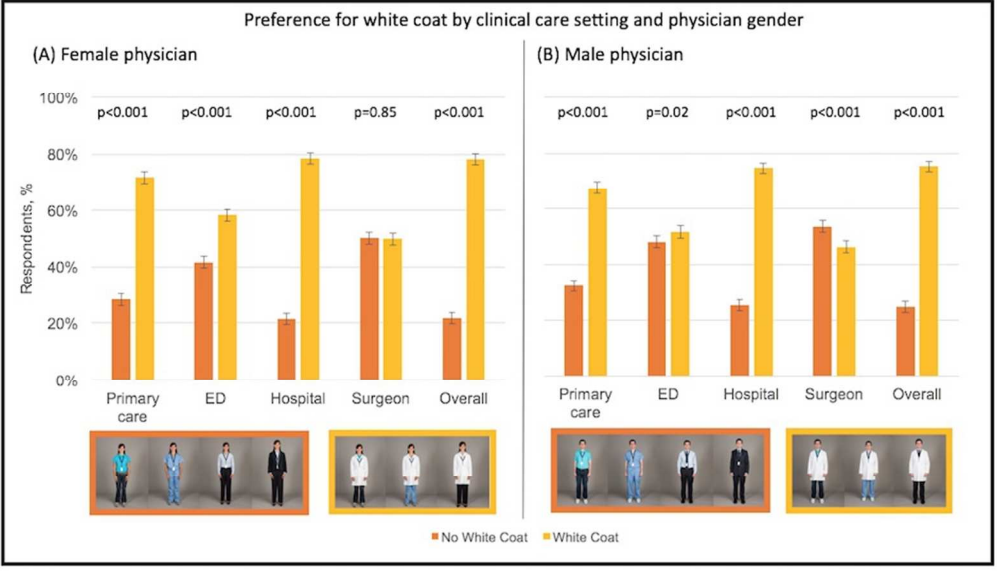


Figure 3. Preference for white coat by clinical care setting and physician gender
80x45mm (300 x 300 DPI)

Review only

Understanding the Role of Physician Clothing on Patient Opinion

Thank you for taking the time to complete this survey. Your answers will help us better understand whether physician dress influences patients' opinions of their doctor.

Your responses are very important to us. There are no right or wrong answers and we are interested only in your honest opinions. This survey is brief and should take no more than 5 minutes to complete.

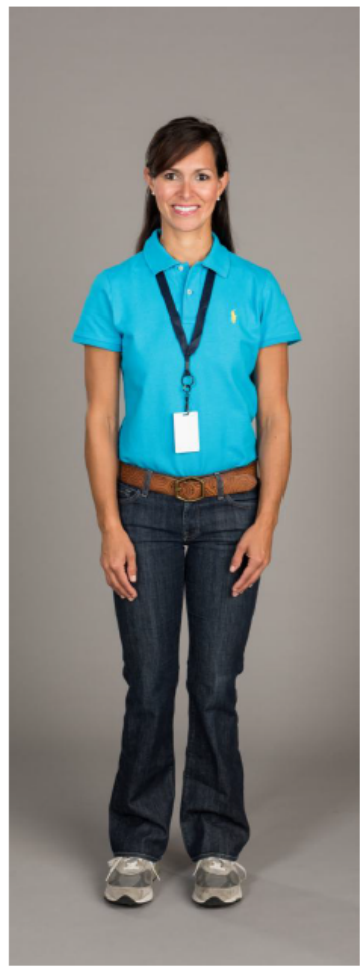
In Section A please provide a rating by circling the number on the scale that corresponds to your answer.

In Sections B, C, and D, please provide your one best answer to each question.

All of your answers will be kept confidential. We will not use names in any notes, reports, or summaries. Your responses will also not be shared with any of your doctors or care providers.

Section A – Physician Attire - Ratings

Please rate the doctor for each of the following questions by circling the number that corresponds to your answer.

	<p>1) How knowledgeable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>2) How trustworthy does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>3) How caring does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>4) How approachable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>5) How comfortable does this doctor make you feel?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>

Section B – Physician Attire - Preferences

Please provide your ONE best answer to each of the following questions



A B C D E F G

6) Which doctor would you prefer for your **primary care doctor**? (Please select only ONE option)

A B C D E F G

7) Which doctor would you prefer to see when visiting the **emergency room**? (Please select only ONE option)

A B C D E F G

8) Which doctor would you prefer to see when **in the hospital**? (Please select only ONE option)

A B C D E F G

9) Which doctor would you prefer for your **surgeon**? (Please select only ONE option)

A B C D E F G

10) **Overall**, which clothes do you feel doctors should wear? (Please select only ONE option)

A B C D E F G

Section C – General Physician Attire

Please indicate your level of agreement with the following statements by checking ONE box to the left of your answer.

11) How my doctor dresses is important to me.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

12) How my doctor dresses influences how happy I am with the care I receive.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

13) It is appropriate for a doctor to dress casually when seeing patients **over the weekend**.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

14) Doctors should wear a white coat when seeing patients **in their office or clinic**.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

15) Doctors should wear a white coat when seeing patients in the **emergency room**.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

16) Doctors should wear a white coat when seeing patients **in the hospital**.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

17) Doctors should always wear a white coat when seeing patients **in any setting**.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Section D – Demographics

Please remember that all of your answers will be kept confidential.

18) How old are you?

- 18-25 26-34 35-54 55-64 65 or older

19) What is your gender?

- Male Female

20) What is the highest level of education you have completed?

- Less than High School High School Some College College Graduate Degree

21) What is your race?

- American Indian/Alaska Native Asian Native Hawaiian or Other Pacific Islander
 Black or African American White Hispanic
 Other (Please specify) _____

22) How many different doctors have you seen in the past year?

- 0 1 2 3 4 5 6 or more

**Thank you for taking the time to fill out our survey.
Your input is greatly appreciated.**

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	3
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	7
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	9
		(c) Explain how missing data were addressed	9
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9-10
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9-10
		(b) Indicate number of participants with missing data for each variable of interest	Table 1-3
Outcome data	15*	Report numbers of outcome events or summary measures	10-13
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-13
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	10-13
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A – No funding

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Understanding Patient Preference for Physician Attire: A Cross-Sectional Observational Study of Ten Academic Medical Centers in the United States

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Manuscripts

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3 **Understanding Patient Preference for Physician Attire: A Cross-Sectional**
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5 **Observational Study of Ten Academic Medical Centers in the United States**
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For peer review only

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3 **OBJECTIVE:** Several large studies have shown that improving the patient experience is
4 associated with higher reported patient satisfaction, increased adherence to treatment
5 and clinical outcomes. Whether physician attire can affect the patient experience—and
6 how this influences satisfaction— is unknown. Therefore, we performed a national,
7 cross-sectional study to examine patient perceptions, expectations and preferences
8 regarding physicians dress.
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19 **SETTING:** Ten academic hospitals in the United States.
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24 **PARTICIPANTS:** Convenience sample of 4,062 patients recruited from June 1, 2015 to
25 October 31, 2016.
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31 **PRIMARY AND SECONDARY OUTCOMES MEASURED:** We conducted a questionnaire-based
32 study of patients across ten academic hospitals in the United States. The questionnaire
33 included photographs of a male and female physician dressed in seven different forms
34 of attire. Patients were asked to rate the provider pictured in various clinical settings.
35 Preference for attire was calculated as the composite of responses across five domains
36 (knowledgeable, trustworthy, caring, approachable, and comfortable) via a standardized
37 instrument. Secondary outcome measures included variation in preferences by
38 respondent characteristics (e.g., gender), context of care (e.g., inpatient vs. outpatient)
39 and geographic region.
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3 **RESULTS:** Of 4,062 patient responses, 53% indicated that physician attire was important
4 to them during care. Over one third agreed that it influenced their satisfaction with care.
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6 Compared to all other forms of attire, formal attire with a white coat was most highly
7
8 rated ($p=0.001$ vs. scrubs with white coat; $p<0.001$ all other comparisons). Important
9
10 differences in preferences for attire by clinical context and respondent characteristics
11
12 were noted. For example, respondents ≥ 65 years preferred formal attire with white
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14 coats ($p<0.001$) while scrubs were most preferred for surgeons.
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21 **CONCLUSIONS:** Patients have important expectations and perceptions for physician dress
22
23 that vary by context, and region. Nuanced policies addressing physician dress code to
24
25 improve patient satisfaction appear important.
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31 **TRIAL REGISTRATION:** Observational study, not registered
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STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the largest study to date that examines patient preferences for physician attire.
- The study design and survey instrument were carefully designed to limit biases associated with physician images.
- The providers pictured in our survey instrument were young, slender, and Caucasian, which may limit generalizability of findings.
- While soliciting patient responses while hospitalized helps generate validity, it is possible that reported impressions may not reflect actual preferences.

INTRODUCTION

At its core, the practice of medicine hinges on the patient-physician relationship. From initial introductions, physicians work to build rapport to foster a partnership to provide patient-centered care, defined as that which is: “respectful of, and responsive to, individual patient preferences, needs and values.”¹ Not surprisingly, medical school curricula often include courses aimed at improving the patient experience.² Similarly, since 2007, the Centers for Medicare and Medicaid have required hospitals to collect, submit and publicly report the results of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey or risk financial penalties.³ These data are also important because they have been linked to clinical outcomes. For example, a positive correlation between patient satisfaction, improved mortality and reduced 30-day readmissions have been reported.⁴⁻⁸

Although improving the patient experience, and consequently satisfaction, is an important target for many hospitals, how best to do this is unclear. One approach is to understand how physician attire influences the patient experience and develop guidelines based on patients’ preferences. Indeed, some healthcare systems across the country have adopted stringent dress codes. In a recently published article, we contacted human resource professionals and administrators at top US News & World Report Hospitals,⁹ and found that five had written guidelines endorsing formal and professional attire. Yet patient preferences for physician attire are not straightforward. In a systematic review, we found that while patients preferred formal attire and white coats overall, attire such as scrubs or casual dress were preferred in specific settings.⁹ These findings make intuitive sense: patients often have notions of how a “professional” should

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3 dress and are more likely to respond positively to those that meet these stereotypes.
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5 Strategies targeting physician dress may therefore enhance trust and satisfaction.
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8 To date, no studies have examined expressed preferences to physician attire,
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10 association to satisfaction, and influencing contextual factors. Therefore, we performed
11
12 a cross-sectional survey of patients receiving care across the US using a standardized
13
14 questionnaire to better understand patients' perceived preferences of physician attire
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16 across different clinical settings (e.g., hospitalized vs. ambulatory clinic visits). In
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18 addition, we aimed to analyze a larger sample of patients from multiple health systems
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20 than has been previously reported in the literature.
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26 **METHODS**

27 *Study design and population*

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30 Between June 1, 2015 to October 31, 2016, a total of 6,280 surveys
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32 were provided to ten academic medical centers in the United States (US) of
33
34 which 4,062 surveys were filled and available for analyses (response rate = 65%). The
35
36 participating sites spanned four main geographic regions of the US. The questionnaire
37
38 consisted of 22 questions and included photographs of a male and a female physician
39
40 in various forms of attire. The questionnaire was administered to adult patients that
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42 were receiving care in clinics (outpatients) or admitted to the hospital (inpatients).
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44 Outpatients were approached in waiting rooms of general medicine and medical
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46 subspecialty clinics, while inpatients were approached in their hospital rooms when
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48 admitted to non-surgical units. At all sites, the questionnaire was administered by
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50 research staff using paper instruments. The surveys were administered during normal
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3 business hours at times convenient to each sites' research staff. Respondents were
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5 allowed to request help filling out the form from any visitor accompanying them. The
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7 research staff delivered the paper instrument and returned approximately 5-10 minutes
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9 later to pick-up the completed form. Respondents provided verbal consent. No
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11 identifying information was collected from those that completed the study.
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16 17 *Sample size calculation*

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19 It was assumed that responses between two attire forms would be normally
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21 distributed on the 1-10 scale between attire types. An estimated standard deviation of
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23 2.2 was used. If our study included at least 816 patients, (assuming a two-sided alpha
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25 error of 0.05), we expected to have 90% power to detect differences for effect sizes of
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27 0.50 on the 1-10 scale. Fewer subjects would be needed if the standard deviation were
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29 smaller.
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35 36 *Patient and Public Involvement*

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38 The study was designed to understand patient experience and preferences.
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40 However, patients were not included in the design of the survey instrument, recruitment,
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42 or conduct of the study. Patients who participated did so anonymously, and therefore
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44 the study team will be unable to disseminate the results to study participants.
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52 53 *Study design and data collection*

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3 The questionnaire was developed from a systematic review that examined the
4 role of physician attire on patient preferences and satisfaction.⁹ A multidisciplinary team
5 of psychometricians, research scientists, choice architects, survey experts, and
6 bioethicists developed the study instrument. Each question sought to elicit preferences
7 regarding various forms of physician attire, including: casual, casual with white coat,
8 scrubs, scrubs with white coat, formal, formal with white coat, and business suit (**Figure**
9 **1**). Photographs of the same Caucasian male and female physician donning such attire
10 were taken by a professional photographer (Scott Soderberg, Michigan Photography,
11 University of Michigan) with strict attention to facial expressions, pose, lighting, and
12 other non-verbal cues as these may influence preference or likability. The male and
13 female physician models were volunteer members of the research team, and each
14 provided expressed written consent to allow the publication of their photographs.

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31 To avoid bias, 14 different versions of the study instrument were created, and
32 distribution of the questionnaires was randomized to participants. In each version, the
33 gender and attire of the first physician model varied to prevent ordering, priming or
34 anchoring effects (**Supplementary File**). The questionnaire had four sections: in the
35 first section, respondents were asked to rate the physician depicted across five domains
36 including knowledge, trust, care, approachability, and comfort. In the second section,
37 respondents were presented with seven photographs of the same physician wearing
38 different attire and asked to select their preference in various clinical settings. The third
39 and fourth sections sought respondents' general opinions regarding physician attire,
40 demographic data and frequency of interactions with physicians.
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3 Before administration, the survey instrument was pilot-tested with a convenience
4 sample of patients at the lead site to ensure photographs, questions, ratings, and
5 randomly generated order of the 14 surveys at each site would functioned as desired.
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11 12 *Measurements*

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14 Ratings regarding how knowledgeable, trustworthy, caring, and approachable
15 each physician appeared, as well as how comfortable the physician made the
16 respondent feel, were measured using a 1-10 scale, where 1 indicated “somewhat
17 preferred” vs. 10 “extremely preferred.” Preference of attire within specific care settings
18 (e.g., primary care, emergency room, hospital, surgery, and overall) was assessed
19 using photos for each of the 7 attire categories. Respondent opinions regarding
20 importance of dress and white coats were collected using a 1-5 Likert scale, where 1
21 indicated “strongly disagree” and 5 indicated “strongly agree.” We assessed patient
22 satisfaction based on agreement with two questions: “How my doctor dresses is
23 important to me,” and “How my doctor dresses influences how happy I am with the care
24 received.” For analyses, responses were trichotomized as follows: agreement =
25 strongly agree and agree; neither agree nor disagree; and disagreement = disagree or
26 strongly disagree. Demographics including age, gender, education level, race, and
27 number of physician encounters were collected. Preferences for attire and
28 demographics were dichotomized for bivariate comparison. Questions that were
29 unanswered or where more than one response was entered were excluded.
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53 *Outcomes*

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3 The primary outcome of interest – preference for attire -- was calculated as the
4 composite average of the five individual rating domains (knowledgeable, trustworthy,
5 caring, approachable, and comfortable). Additionally, variation in preferences for
6 physician attire by respondent characteristics (e.g., gender, age), context of care (e.g.,
7 inpatient vs. outpatient) and geographical region (e.g., Northeast, Midwest, South, and
8 West) were also assessed.
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19 *Statistical analyses*

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21 Data from paper questionnaires were entered independently and in duplicate.
22 Since respondents were not required to answer all questions, the denominator for
23 individual questions (and associated response rate) varied. Descriptive statistics
24 (means, percentage) and standard deviation (SD) were initially used to tabulate results.
25 Differences in the mean composite rating scores from the physician ratings section were
26 assessed using one-way ANOVA. To reduce the potential for Type I error, post-
27 estimation pairwise comparisons were performed using the Tukey-Kramer method.²
28 Differences in proportions for categorical data were compared using the Z-test. Bivariate
29 comparisons between respondent age, gender, and level of education and
30 corresponding respondent preferences for attire were assessed using Chi-squared
31 tests. A two-sided p-value of less than 0.05 was considered statistically significant. All
32 analyses were performed using Stata 14 MP/SE (StataCorp, College Station, TX).
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51 *Ethical and Regulatory Oversight*

52 The study was reviewed and deemed exempt from regulation by the University
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of Michigan Institutional Review Board (HUM00085305).

RESULTS

A total of 4,062 questionnaires were completed by patients across ten academic medical centers in the United States. Respondents represented all parts of the United States including the Northeast, Midwest, South and West. Most patients were surveyed while admitted to the hospital (n=2,616 [64%]); however, a substantial proportion of outpatients were also included (n=1,446 [36%]). Respondents were most often white (71%) and male (65%). The plurality of patients was 65 years of age or older (36%). Seventy percent of those surveyed indicated having attended some college or having college degrees. With respect to interactions with the health system, 38% of respondents reported having seen 6 or more physicians in the past year (**Table 1**).

Ratings of Physician Attire

Respondents rated formal attire with white coat for both male and female physician models as the most preferred form of dress compared to other forms of attire with a mean composite score of 8.1 (SD 1.8) [all pairwise comparisons $p < 0.001$]. Cronbach's alpha for the 5-items included in the composite score was 0.96. Ratings for formal attire with white coat were greatest across all domains including how knowledgeable, trustworthy, caring, and approachable the physician appeared as well as how comfortable the physician made the respondent feel. Moreover, these findings were significant in the domains of trustworthiness, caring and how comfortable the physician made the respondent feel in all pairwise comparison testing to other forms of

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3 attire ($p<0.05$). For the rating of approachability, formal attire with a white coat was not
4 statistically different from scrubs with a white coat or formal without a white coat in
5 pairwise comparison. Scrubs with white coat ranked second overall, with a mean
6 composite score of 7.6 (SD=1.9) followed by formal attire without a white coat with a
7 mean composite score of 7.5 (SD=2.0) (**Figure 2**).

16 17 *Preferences for Physician Attire by Care Settings*

18
19 When examining preferences for physician attire by care setting, important
20 differences emerged. Formal attire with white coat was preferred by respondents for
21 their primary care (44%) and hospital physician (39%). Conversely, scrubs were rated
22 highest for emergency room physicians (40%) and surgeons (42%). In both emergency
23 and surgery settings, scrubs alone were followed in preference by scrubs with white
24 coats (34% and 23%, respectively). When asked, "Overall, which clothes do you feel
25 that your doctor should wear?" most respondents preferred formal attire with white coat
26 (44%) followed by scrubs with white coat (26%) (**Table 2**). Excluding surgeons,
27 respondents universally preferred physicians in white coats over no white coats. When
28 evaluating surgeons, respondents indicated no preference for a white coat on female
29 physicians ($p=0.85$), but preferred male physicians without white coats ($p<0.001$). No
30 differences in preference by physician gender in other clinical care settings were noted
31 (**Figure 3**).

32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 *Perceived Influence on Satisfaction, Importance and Appropriateness of Physician Attire*

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3 More than half (53%) of the patients surveyed agreed with the statement that
4 how their doctor dresses was important to them, while 36% of respondents agreed with
5 the statement that physician attire influenced how happy they were with the care they
6 received. Views regarding appropriateness of casual attire when physicians see
7 patients on the weekends were mixed: 44% of respondents stated this was appropriate
8 while 56% were either neutral or disagreed with the practice.
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12 Specific questions regarding when physicians should don a white coat elicited
13 various preferences. Most respondents (55%) indicated that they agreed or strongly
14 agreed with the statement that doctors should wear a white coat when seeing patients
15 in the office. In the emergency room, however, 44% agreed with the statement that
16 physicians should wear a white coat when seeing patients vs. 56% that indicated either
17 no preference (38%) or disagreement (18%). When asked whether doctors should wear
18 a white coat when seeing patients in the hospital, the majority of respondents (62%)
19 agreed or strongly agreed with this statement (**Table 3**).
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38 *Variations in Patient Preferences of Physician Attire*

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40 Important variations in patient preferences for attire were noted. For example,
41 female respondents more often preferred scrubs with white coats in emergency room
42 and hospital settings than males (41% vs. 31% [$p<0.001$] and 32% vs. 27% [$p=0.001$],
43 respectively). However, both genders indicated formal attire with white coat was overall
44 most preferred (43% and 44%, respectively). In hospital settings, respondents 65 years
45 of age or older frequently preferred formal attire with white coats than younger patients
46 (44% vs. 36%, $p<0.001$). Conversely, younger patients more often preferred scrubs and
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3 white coats than formal attire overall (28% vs. 21%, $p<0.001$). Some differences in
4 preferences regarding physician dress based on respondent education level were also
5 noted. Specifically, respondents with a college degree preferred formal and white coat
6 for their primary care provider more often than those without a college degree (48% vs.
7 42%, $p<0.001$).
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15 No differences in preferences between those with three or more physician visits
16 in the preceding year vs. those with less frequent visits were noted. Similarly,
17 preferences for attire did not vary by setting in which respondents were polled, although
18 respondents in the outpatient setting more often preferred doctors in the hospital to
19 wear scrubs and a white coat compared to hospitalized respondents (32% vs. 27%,
20 $p=0.002$). However, preferences for attire did vary by geographic region. For example,
21 while formal attire and white coats were preferred across all regions, 50% of
22 respondents in the West and 51% in the South selected this as their preferred option
23 compared to 38% and 40% in the Northeast and Midwest, respectively. Conversely,
24 over half of all respondents in the Northeast selected scrubs as their preferred attire for
25 surgeons compared to a quarter of respondents in the South (54% vs. 25%, $p<0.001$).
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42 **DISCUSSION**

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44 This study of over 4,000 patients receiving medical care in diverse academic
45 medical centers is the largest to report preferences regarding physician attire in the US.
46 Over half of the participants indicated that how a physician dresses was important to
47 them, with over one in three stating that this influenced how happy they were with care
48 received. Overall, respondents indicated that formal attire with white coats was the most
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3 preferred form of physician dress. However, in settings such as surgery or emergency
4 rooms, scrubs with white coats were most preferred. Although variation in preferences
5 by respondent age, gender, education and geography were noted, these findings
6 indicate that not only do most patients have expectations regarding doctor attire, but
7 that a “professional” look matters most. Given the size, methodological rigor and
8 representativeness of these data, policies addressing physician attire should be
9 considered to improve patient satisfaction.

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19 Previous studies have shown that patients harbor conscious and unconscious
20 biases when it comes to provider dress.^{10 11} Thus, our finding that patients have specific
21 preferences regarding physician attire was not surprising. What this study highlights,
22 however, is the potential importance of physician attire to the physician-patient
23 relationship. Indeed, specific clinical and contextual aspects appear to influence a
24 patient’s preconceived notion of ‘professional attire’. For instance, we found that the
25 locale where care is delivered (e.g., hospital vs. clinic) as well as context of care (e.g.,
26 emergency room or surgery) affected preferences. Similarly, we observed that certain
27 respondent characteristics such as age, gender, and education also influenced their
28 preferences. These findings can potentially be used to improve the patient experience.
29 For instance, providers engaged in care of elderly patients (e.g., geriatric clinics,
30 hospital settings or extended-care facilities) may consider donning formal attire more so
31 than surgeons or emergency room physicians where scrubs may be more important.
32 Similarly, hospitals in southern regions of the US may wish to endorse formal attire and
33 white coats as their preferred policy. For providers in the emergency room and surgical
34 arenas, such attire may in fact be viewed as out of place – and thus different rules might
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3 be necessary. These examples illustrate how policies for specific doctors, settings or
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5 patients can be leveraged to focus on patient-centered care.
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8 How should one interpret these findings given concerns for infection transmission
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10 associated with physician dress? Previous studies have shown that bacteria and
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12 pathogens can be isolated from white coats, neckties and sleeves of medical
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14 providers.¹²⁻²⁰ These studies are one of the reasons why a “bare below the elbows”
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16 (BBE) policy exists in some countries. While we did not specifically ask respondents to
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18 consider this risk when choosing attire preferences, three aspects deserve discussion.
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20 First, despite the abundance of literature on infection prevention, we are unaware of any
21
22 study that links physician dress to source or transmission of infection. Rather, one study
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24 randomly sampled physicians’ fingertips and reported no association between BBE-
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26 compliant versus non-compliant attire and presence of bacterial colony-forming units or
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28 clinically significant organisms.²¹ Second, evidence suggests that other practices (e.g.,
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30 hand hygiene) may be more relevant than physician dress in preventing infection. In an
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32 institution-wide study at Vanderbilt University Medical Center, direct observation
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34 combined with financial incentives for appropriate hand hygiene increased compliance
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36 with hand hygiene policies and decreased device-associated standardized infection
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38 ratios.²² Conversely, wearing a white coat has been associated with increased selective
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40 and sustained attentiveness to tasks.²³ These findings suggest that clothing may
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42 influence the wearer’s own psychological processes, a phenomenon coined “enclothed
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44 cognition.”²⁴ Therefore, attentiveness to hand hygiene may, in fact, be increased when
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46 physicians wear white coats or formal attire – improving patient care and satisfaction.²⁵
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26 Third, we add to the growing body of evidence that suggests patients have important

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3 preferences regarding attire.^{9 10 27-47} As further demonstrated by a recent study, these
4 preferences may evolve over time, as demonstrated by variation in preferences by
5 respondent age.⁴⁸ Physician attire may offer an important modifiable variable in the
6 doctor-patient relationship that could improve patient experience and satisfaction and
7 ultimately produce better outcomes.⁴⁹⁻⁵¹
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14 Our study has limitations. First, as with other studies of physician attire, we
15 showed respondents pictures of providers and elicited preferences via a paper
16 questionnaire. Our providers were young, slender, Caucasian and all cared for in
17 academic settings, which may have introduced bias into responses. Similarly, we did
18 not record information for patients who refused to participate in the study, also
19 potentially introducing bias. Second, while approaching patients as they were receiving
20 care helps generate validity, it is possible that reported impressions may not reflect
21 actual preferences on attire but rather current feelings related to their care. Prior studies
22 have shown that the potential impact of attire on patient satisfaction has to be
23 considered in the context of the behaviors and attitude of the physician during the
24 encounter. The survey did not have questions to capture the other dynamics of the
25 doctor-patient relationship, which may help further explicate responses.⁹ Third, we
26 asked patients to report preferences via Likert scales and predefined categories.
27 Although this allows for a range of answers (including a neither agree or disagree
28 option), such categorizations may force respondents to answer in ways that do not
29 capture their true feelings. Fourth, while the proportion of Caucasian respondents were
30 similar to 2010 Census data estimates, a lower than expected number of Hispanic
31 respondents (5% compared with 16% estimated by the Census data) participated.⁵²
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3 Thus, whether our findings will hold true across race or ethnicity is not known. Finally,
4 we did not include questions regarding infection transmission given the lack of evidence
5 supporting the notion that white coats or attire is associated with infections.
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10 Our study also has important strengths. First, this is the largest study to examine
11 patient preferences for physician attire. Given methodological strengths including
12 randomization of instrument sequence, as well as inclusion of diverse regions and
13 patient populations, our findings clarify possible dress codes in various healthcare
14 settings. Second, in contrast to other studies, we specifically designed our study and
15 survey instrument to avoid biases associated with images. For example, we hired a
16 professional photographer and studio to ensure photographs of physicians were
17 otherwise identical. Similarly we also used models of the same race (Caucasian) with
18 identical postures and facial expressions so as to limit confounding associated with
19 models of different backgrounds or appearance as has occurred in previous studies.^{29 36}
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37 39 45 Additionally, we implemented strategies during survey collection such as
randomizing order of delivery and images to minimize bias. These approaches help lend
a high degree of internal validity to our findings. Third, our findings have policy
implications: namely, patients appear to care about attire and may expect to see their
doctor in certain ways. Hospitals, clinics, emergency departments and ambulatory
surgical centers should consider using these data to set dress codes for physicians
providing care in these settings.

In summary, while physician attire cannot replace excellent clinical care, our data
suggest that it may influence how patients perceive care and perhaps how willing they
are to trust their doctors. In an era of patient-centeredness and patient satisfaction,

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3 physician attire may be an important, modifiable component of patient care. As
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5 perceptions and expectations regarding physician dress by patients, context, and region
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7 exist, nuanced policies that target such factors appear relevant. Future studies
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9 implementing such policies in both hospital, clinic and emergency room settings appear
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11 necessary.
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TABLES

TABLE 1. Characteristics of Study Respondents and Sites*

Characteristics	N (%)
Age	N=3998
18-25	151 (4)
26-34	340 (9)
35-54	952 (24)
55-64	1103 (28)
65+	1452 (36)
Gender	N=3946
Female	1374 (35)
Male	2572 (65)
Education	N=3970
Less than High School	110 (3)
High School	1080 (27)
Some College	1101 (28)
College	1052 (27)
Graduate Degree or Above	627 (16)
Race	N=3974
White	2802 (71)
African American	731 (18)
Asian	79 (2)
Hispanic	181 (5)
Other/Mixed Race	181 (5)
Number of Different Doctors Seen in the Past Year	N=3987
0	29 (1)
1	250 (6)
2	496 (12)
3	637 (16)
4	606 (15)
5	440 (11)
6 or more	1529 (38)
Geographic Region	N =4062
Midwest	2225
Northeast	449
West	257
South	1131

TABLE 2. Respondent Preferences for Physician Attire (By Setting)

Preference for Physician Attire [by Setting]	Total no. (%)
<i>Which doctor would you prefer for your primary care physician?</i>	N=3959
Casual	133 (3)
Casual & White Coat	417 (11)
Scrubs	201 (5)
Scrubs & White Coat	586 (15)
Formal	610 (15)
Formal & White coat	1758 (44)
Business Suit	254 (6)
<i>Which doctor would you prefer to see when visiting the ER?</i>	N=3966
Casual	54 (1)
Casual & White Coat	240 (6)
Scrubs	1577 (40)
Scrubs & White Coat	1351 (34)
Formal	113 (3)
Formal & White coat	592 (15)
Business Suit	39 (1)
<i>Which doctor would you prefer when in the hospital?</i>	N=3946
Casual	61 (2)
Casual & White Coat	351 (9)
Scrubs	412 (10)
Scrubs & White Coat	1126 (29)
Formal	280 (7)
Formal & White coat	1546 (39)
Business Suit	170 (4)
<i>Which doctor would you prefer for your surgeon?</i>	N=3952
Casual	32 (1)
Casual & White Coat	151 (4)
Scrubs	1648 (42)
Scrubs & White Coat	926 (23)
Formal	150 (4)
Formal & White coat	824 (21)
Business Suit	221 (6)
<i>Overall, which clothes do you feel your doctor should wear?</i>	N=3924
Casual	60 (2)
Casual & White Coat	292 (7)
Scrubs	329 (8)
Scrubs & White Coat	1013 (26)
Formal	340 (9)
Formal & White coat	1708 (44)
Business Suit	182 (5)

TABLE 3. Respondent Opinions Regarding Importance of Physician Attire

Opinions Regarding Influence and Appropriateness of Physician Dress	Total no. (%)
<i>How my doctor dresses is important to me.</i>	N=4016
Disagree or Strongly Disagree	593 (15)
Neither Agree nor Disagree	1286 (32)
Agree or Strongly Agree	2,137 (53)
<i>How my doctor dresses influences how happy I am with the care I receive.</i>	N=4010
Disagree or Strongly Disagree	931 (23)
Neither Agree nor Disagree	1620 (40)
Agree or Strongly Agree	1,459 (36)
<i>It is appropriate for a doctor to dress casually when seeing patients over the weekend.</i>	N=4003
Disagree or Strongly Disagree	857 (21)
Neither Agree nor Disagree	1372 (34)
Agree or Strongly Agree	1,774 (44)
<i>Doctors should wear a white coat when seeing patients in their office.</i>	N=4007
Disagree or Strongly Disagree	485 (12)
Neither Agree nor Disagree	1321 (33)
Agree or Strongly Agree	2,201 (55)
<i>Doctors should wear a white coat when seeing patient in the ER.</i>	N=4005
Disagree or Strongly Disagree	704 (18)
Neither Agree nor Disagree	1519 (38)
Agree or Strongly Agree	1,782 (44)
<i>Doctors should wear a white coat when seeing patients in the hospital.</i>	N=4006
Disagree or Strongly Disagree	346 (9)
Neither Agree nor Disagree	1188 (30)
Agree or Strongly Agree	2,472 (62)
<i>Doctors should always wear a white coat when seeing patients in any setting.</i>	N=4007
Disagree or Strongly Disagree	1,022 (26)
Neither Agree nor Disagree	1641 (41)
Agree or Strongly Agree	1,344 (34)

Note: Percentages may not add up to 100 due to rounding.

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For peer review only

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FIGURES

Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument

For peer review only

Figure 2. Rating of Physician Attire Across Preference Domains

For peer review only

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Figure 3. Preference for white coat by clinical care setting and physician gender

For peer review only

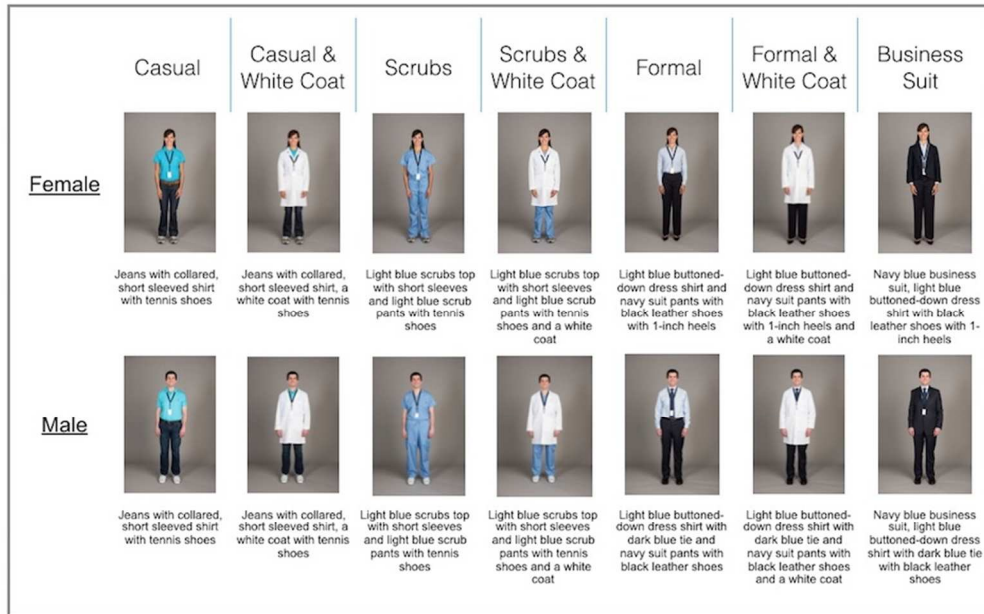


Figure 1. Photographs of Model Male and Female Physician in Various Attire Used in Survey Instrument. (Photo by Scott Soderberg, Michigan Photography, University of Michigan)

80x50mm (300 x 300 DPI)

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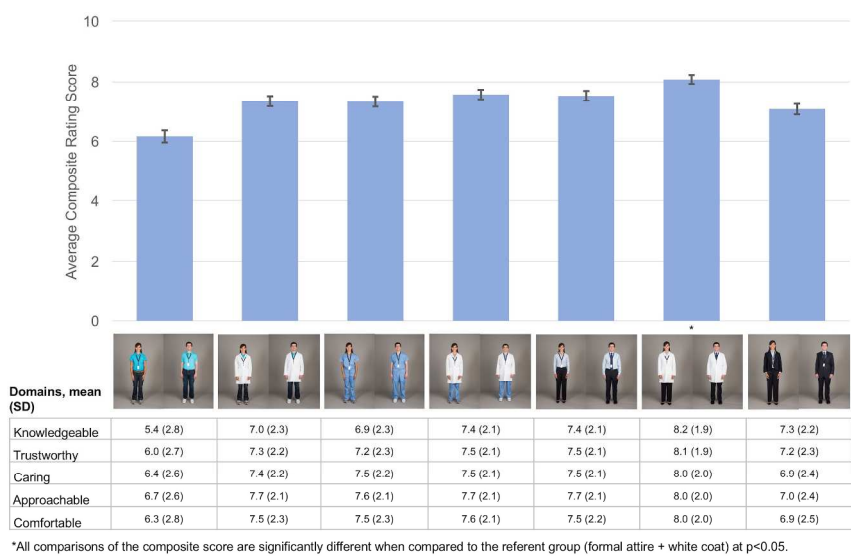


Figure 2. Rating of Physician Attire Across Preference Domains. (Photo by Scott Soderberg, Michigan Photography, University of Michigan)

338x190mm (300 x 300 DPI)

Review only



Figure 3. Preference for white coat by clinical care setting and physician gender. (Photo by Scott Soderberg, Michigan Photography, University of Michigan)

80x45mm (300 x 300 DPI)

Understanding the Role of Physician Clothing on Patient Opinion

Thank you for taking the time to complete this survey. Your answers will help us better understand whether physician dress influences patients' opinions of their doctor.

Your responses are very important to us. There are no right or wrong answers and we are interested only in your honest opinions. This survey is brief and should take no more than 5 minutes to complete.

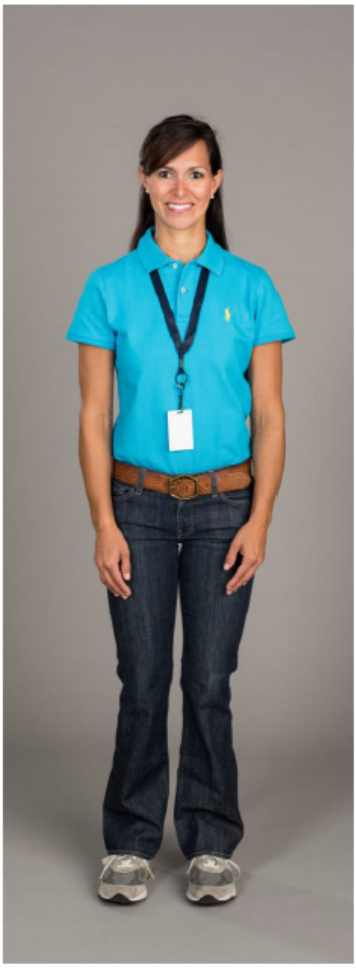
In Section A please provide a rating by circling the number on the scale that corresponds to your answer.

In Sections B, C, and D, please provide your one best answer to each question.

All of your answers will be kept confidential. We will not use names in any notes, reports, or summaries. Your responses will also not be shared with any of your doctors or care providers.

Section A – Physician Attire - Ratings

Please rate the doctor for each of the following questions by circling the number that corresponds to your answer.

	<p>1) How knowledgeable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>2) How trustworthy does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>3) How caring does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>4) How approachable does this doctor appear?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>
	<p>5) How comfortable does this doctor make you feel?</p>	<p>1 2 3 4 5 6 7 8 9 10</p> <p>Somewhat Extremely</p>

Section B – Physician Attire - Preferences

Please provide your ONE best answer to each of the following questions



A B C D E F G

6) Which doctor would you prefer for your **primary care doctor**? (Please select only ONE option)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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A B C D E F G

7) Which doctor would you prefer to see when visiting the **emergency room**? (Please select only ONE option)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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A B C D E F G

8) Which doctor would you prefer to see when **in the hospital**? (Please select only ONE option)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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A B C D E F G

9) Which doctor would you prefer for your **surgeon**? (Please select only ONE option)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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A B C D E F G

10) **Overall**, which clothes do you feel doctors should wear? (Please select only ONE option)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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A B C D E F G

Section C – General Physician Attire

Please indicate your level of agreement with the following statements by checking ONE box to the left of your answer.

11) How my doctor dresses is important to me.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

12) How my doctor dresses influences how happy I am with the care I receive.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

13) It is appropriate for a doctor to dress casually when seeing patients **over the weekend**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

14) Doctors should wear a white coat when seeing patients **in their office or clinic**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

15) Doctors should wear a white coat when seeing patients in the **emergency room**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

16) Doctors should wear a white coat when seeing patients **in the hospital**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

17) Doctors should always wear a white coat when seeing patients **in any setting**.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

Section D – Demographics

Please remember that all of your answers will be kept confidential.

18) How old are you?

- 18-25
- 26-34
- 35-54
- 55-64
- 65 or older

19) What is your gender?

- Male
- Female

20) What is the highest level of education you have completed?

- Less than High School
- High School
- Some College
- College
- Graduate Degree

21) What is your race?

- American Indian/Alaska Native
- Asian
- Native Hawaiian or Other Pacific Islander
- Black or African American
- White
- Hispanic
- Other (Please specify) _____

22) How many different doctors have you seen in the past year?

- 0
- 1
- 2
- 3
- 4
- 5
- 6 or more

**Thank you for taking the time to fill out our survey.
Your input is greatly appreciated.**

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	3
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	7
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	9
		(c) Explain how missing data were addressed	9
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9-10
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9-10
		(b) Indicate number of participants with missing data for each variable of interest	Table 1-3
Outcome data	15*	Report numbers of outcome events or summary measures	10-13
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-13
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	10-13
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A – No funding

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.