Understanding the role of physician attire on patient perceptions: a systematic review of the literature—targeting attire to improve likelihood of rapport (TAILOR) investigators

Christopher Michael Petrilli,1 Megan Mack,1,2 Jennifer Janowitz Petrilli,1 Andy Hickner,1,3 Sanjay Saint,1,2 Vineet Chopra1,2

ABSTRACT

Objectives: Despite a growing body of literature, uncertainty regarding the influence of physician dress on patients’ perceptions exists. Therefore, we performed a systematic review to examine the influence of physician attire on patient perceptions including trust, satisfaction and confidence.

Setting, participants, interventions and outcomes: We searched MEDLINE, Embase, Biosis Previews and Conference Papers Index. Studies that: (1) involved participants ≥18 years of age; (2) evaluated physician attire; and (3) reported patient perceptions related to attire were included. Two authors determined study eligibility. Studies were categorised by country of origin, clinical discipline (eg, internal medicine, surgery), context (inpatient vs outpatient) and occurrence of a clinical encounter when soliciting opinions regarding attire. Studies were assessed using the Downs and Black Scale risk of bias scale. Owing to clinical and methodological heterogeneity, meta-analyses were not attempted.

Results: Of 1040 citations, 30 studies involving 11 533 patients met eligibility criteria. Included studies featured patients from 14 countries. General medicine, procedural (eg, general surgery and obstetrics), clinic, emergency departments and hospital settings were represented. Preferences or positive influence of physician attire on patient perceptions were reported in 21 of the 30 studies (70%). Formal attire and white coats with other attire not specified was preferred in 18 of 30 studies (60%). Preference for formal attire and white coats was more prevalent among older patients and studies conducted in Europe and Asia. Four of seven studies involving procedural specialties reported either no preference for attire or a preference for scrubs; four of five studies in intensive care and emergency settings also found no attire risk of bias scale. Owing to clinical and methodological heterogeneity, meta-analyses were not attempted.

Conclusions: Although patients often prefer formal physician attire, perceptions of attire are influenced by age, locale, setting and context of care. Policy-based interventions that target such factors appear necessary.

Strengths and limitations of this study

- Comprehensive review of the topic strengthened by robust methodology, expansive literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies.
- Filtering studies by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions allows for unique insight regarding whether and how physician attire influences perceptions.
- Unique findings including the fact that attire preferences vary by geographic location, patient age and context of care.
- The inclusion of a diverse number of study designs and patient populations introduces potential for unmeasured confounding or bias.
- Although we created uniform measures to apply across all studies, diverse outcomes reporting related but ill-defined patient perceptions or preferences may limit inferential insights.

INTRODUCTION

The foundation of a positive patient–physician relationship rests on mutual trust, confidence and respect. Patients are not only more compliant when they perceive their doctors as being competent, supportive and respectful, but also more likely to discuss important information such as medication compliance, end-of-life wishes or sexual histories.1 2 Several studies have demonstrated that such relationships positively impact patient outcomes, especially in chronic, sensitive, stigmatising problems such as diabetes mellitus, cancer or mental health disorders.3 4

In the increasingly rushed patient–physician encounter, the ability to gain a patient’s
confidence with the goal to optimise health outcomes has become a veritable challenge. Therefore, strategies that help in gaining patient trust and confidence are highly desirable. A number of studies have suggested that physician attire may be an important early determinant of patient confidence, trust and satisfaction.\textsuperscript{5–7} This insight is not novel; rather, interest in the influence of attire on the physician–patient experience dates back to Hippocrates.\textsuperscript{8} However, targeting physician attire to improve the patient experience has recently become a topic of considerable interest driven in part by efforts to improve patient satisfaction and experience.\textsuperscript{9, 10}

For physician attire to positively influence patients, an understanding of when, why and how attire may influence such perceptions is necessary. While several studies have examined the influence of physician attire on patients, few have considered whether or how physician specialty, context of care and geographic locale and patient factors such as age, education or gender may influence findings. This knowledge gap is important because such elements are likely to impact patient perceptions of physicians. Furthermore, the existing literature stands conflicted on the importance of physician attire. For instance, in a seminal review, Bianchi\textsuperscript{11} suggest “patients are more flexible about what they consider ‘professional dress’ than the professionals who are setting standards.” However, a more recent review reported that patients prefer formal attire and a white coat, noting that “these partialities had a limited overall impact on patient satisfaction and confidence in practitioners.”\textsuperscript{11} This dissonance remains unexplained and represents a second important knowledge gap in this area of research.

Therefore, to shed light on these issues, we conducted a systematic review of the literature hypothesising that patients will prefer formal attire in most settings. Additionally, we postulated that context of care will influence patient perceptions on attire, such that patients receiving care in acute-based or procedure-based settings are less likely to be influenced by attire.

METHODS

Information sources and search strategy
We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) when performing this systematic review.\textsuperscript{15} With the assistance of a medical reference librarian (AH), we performed serial searches for English and non-English studies that reported patient perceptions related to physician attire. MEDLINE via Ovid (1950–present), Embase (1946–present), and Biosis Previews via ISI Web of Knowledge (1926–present) and Conference Proceedings Index (dates) were systematically searched using controlled vocabularies for key words including a range of synonyms for clothing, physician and patient satisfaction (see online supplementary appendix). All human studies published in full-text, abstract or poster form were eligible for inclusion. No publication date, language or status restrictions were placed on the search. Additional studies of interest were identified manually searches of bibliographies. Serial searches were conducted between 2 July 2013 and May 2014; the search was last updated 15 May 2014.

Eligibility criteria and study selection
Two authors (CMP and MM) independently determined study eligibility; any differences in opinion regarding eligibility were resolved by a third author (VC). Studies were included if they: (1) involved adults ≥18 years of age; (2) evaluated physician attire; (3) reported patient-centered outcomes such as satisfaction, perception, trust, attitudes or comfort; and, (4) studied the impact of attire on these outcomes. We excluded studies involving only paediatric and psychiatric patients because perceptions of attire were felt unreliable in these settings.

Data extraction and synthesis
Data were extracted from all included studies independently and in duplicate on a template adapted from the Cochrane Collaboration.\textsuperscript{15} For all studies, we abstracted the number of patients, context of clinical care, physician specialty, type of attire tested, method of assessing the impact of attire and outcomes including patient trust, satisfaction, confidence or synonyms thereof. When studies included paediatric and adult patients, we included the study but abstracted data only on adult patients when possible. Study authors were contacted to obtain missing or additional data via electronic mail. Owing to clinical and methodological heterogeneity in the design, conduct and outcomes reported within the included studies, formal meta-analyses were not attempted. Descriptive statistics were used to report data. Inter-rater agreement for study abstraction was calculated using Cohen’s \(\kappa\) statistic.

Definitions and classification
Physician attire was defined as either personal or hospital-issued clothing, with or without the donning of a white physician coat (recorded separately whenever possible). We considered formal attire as a collared shirt, tie and slacks for male physicians and blouse (with or without a blazer), skirt or suit pants for female physicians. Attire that did not meet these criteria was defined as casual (eg, polo shirts and blue jeans). Donning of hospital-issued or physician-owned ‘scrubs’ was recorded when these data were available.

To understand whether culture-influenced perceptions of physician attire, we assessed study outcomes by country and region of origin. Studies were also further categorised as follows: context of care was defined as the location where the patient was receiving care (eg, intensive care, urgent care, hospital or clinic). A clinical encounter was defined as a face-to-face clinical interaction between physician and patient during which the physician was wearing the study specific attire or the
attire of interest. Acute care was defined as care provided in an emergency department, intensive care unit or urgent care unit; all other settings were classified non-acute. We defined family medicine, internal medicine, private practice clinics and inpatient medicine wards as studies involving medicine populations whereas studies that included patients from various specialties (eg, internal medicine and surgery) or various locations (eg, clinic, hospital were classified as being ‘mixed.’ Reports that included dermatology, orthopaedics, obstetrics and gynaecology, podiatry and surgical populations were classified as ‘procedural’ studies.

To standardise and compare outcomes across studies, the following terms were used to indicate positive perceptions or preference for a particular attire: satisfaction, professionalism, competence, comfort, trust, confidence, empathy, authoritative, scientific, knowledgeable, approachable, ‘easy to talk to’, friendly, courteous, honest, caring, respect, kind, ‘spent enough time’, humorous, sympathetic, polite, clean, tidy, responsible, concerned, ‘ability to answer questions’ and ‘took problem seriously.’ Conversely, terms such as scruffy, aloof, unkempt, untidy, unpleasant, relaxed, intimidating, impolite, rushed were considered negative outcomes denoting non-preference for the tested attire.

**Risk of bias in individual studies**

As recommended by the Cochrane Collaboration, two authors independently assessed risk of study bias using the Downs and Black Scale. This instrument uses a point-based system to estimate the quality of a given study by rating domains such as internal and external validity, bias and statistical power. A priori, studies that received a score of 12 or greater were considered high validity, bias and statistical power. A priori, studies that included patients from various specialties (eg, internal medicine and surgery) or various locations (eg, clinic, hospital were classified as being ‘mixed.’ Reports that included dermatology, orthopaedics, obstetrics and gynaecology, podiatry and surgical populations were classified as ‘procedural’ studies.

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RESULTS

Of 1040 citations, 45 studies met initial inclusion criteria. Following exclusion of duplicate and ineligible articles, 30 studies were included in the systematic review (figure 1). Included studies ranged in size from 77 to 1506 patients. Although many studies did not provide gender information, when identified, a similar number of male and female participants were included across studies (33% male vs 67% female in 25 studies). Three studies performed in obstetric and gynaecology populations included only female patients. Inter-rater agreement for adjudication of study quality was calculated using Cohen’s κ statistic.

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Many of the included studies were conducted in the USA (n=10); however, other geographic locations including Canada (n=2), UK, Ireland and Scotland (n=5), other European nations (n=5), Asia (n=4), Australia and New Zealand (n=2), the Middle East (n=1) and Brazil (n=1) were also represented. With respect to temporality, 22 of the 30 included studies were published within the last decade; however, several studies were published more than 10 years ago. Seven studies specified the inclusion of patients who had at least a high school or college-level education; however, the remaining studies did not report the educational level of their population.

With respect to the specialties where studies were performed, a number of medical disciplines including internal medicine, surgery, obstetrics and gynaecology, family practice, dermatology, podiatry and orthopaedics were represented. The context of care within the 30 individual studies varied substantially and spanned hospitalised and outpatient settings. Medical and surgical clinics, emergency departments, hospital wards, private family practice clinics, urgent and intensive care units, and military-based clinics were also featured in the included studies (table 1).

Of the 30 included studies, 28 studied specific patient perceptions and preferences regarding physician attire, 15–31, 33–37, 39–42 while 2 only measured preference attire. In total, more than 32 unique patient perceptions were reported across the included studies. The most common patient perceptions studied were confidence in their physician (n=12), satisfaction (n=9), professionalism (n=7), perceived competence (n=7), comfort (n=6) and knowledge (n=6). Studies obtained input from patients regarding how attire influenced their perceptions of physicians through a variety of measures, including written questionnaires, face-to-face question/answer sessions, and surveys either before or following clinical care episodes. The instruments used to obtain patient input regarding physician attire included pictures of male and female models dressed in various attire, written descriptions of attire, as well as feedback regarding physician encounters either before or after a clinical service was provided to the patient.

A preference for specific physician attire or positive influence of physician attire on patient perceptions was reported in 21 of the 30 studies (70%). When patients voiced a preference or were influenced by physician attire, formal attire was almost always preferred followed closely by white coats either with or without formal attire. In studies from the Far East, traditional attire was associated with increased patient comfort with their physician; however, this was not the case in the single study from the Middle East where traditional apparel was not preferred by patients over formal attire. Notably, patient age was often predictive of attire preference with patients older than 40 years of age uniformly preferring formal attire compared to younger patients in seven studies. Conversely, younger patients often felt that scrubs were perfectly appropriate or preferred over formal attire. These preferences extended to items such as facial piercings, tattoos, loose
hair, training shoes and informal foot wear in three studies among younger patients.\textsuperscript{19, 32, 41} Regardless of attire, being well-groomed in appearance and displaying visible nametags were viewed favorably by patients when this question was specifically asked in the included studies.

**Influence of geography on attire preferences**

Geography was found to influence perceptions of attire, perhaps reflecting cultural, fashion or ethnic expectations. For instance, only 4 of the 10 US-based studies reported that attire influenced patient perceptions regarding their physician. In comparison, Canadian studies reported a preference for formal attire and a white coat.\textsuperscript{16, 35} Similarly, among five studies from the UK, Scotland and Ireland,\textsuperscript{18, 25, 26, 34, 39} four reported that patients preferred formal attire or white coats.\textsuperscript{25, 26, 34, 39} Similarly, four of five studies from other European nations found that patient preferences, trust or satisfaction were influenced by physician attire.\textsuperscript{30, 33, 38, 40} Of these four studies, three studies found a preference for formal attire or white coats\textsuperscript{30, 33, 40} compared to one where scrubs were preferred\textsuperscript{38} (figure 2).

Six studies included patients from Asia, Australia and New Zealand.\textsuperscript{5, 21, 27, 28, 32, 41} Of the four Asian studies,\textsuperscript{5, 21, 26, 41} two were performed in Korea\textsuperscript{5, 21} and two in Japan.\textsuperscript{26, 41} Both studies from Korea concluded that physician attire and white coats positively influenced
### Table 1: Characteristics of included studies

<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>Patient characteristics</th>
<th>Attire compared</th>
<th>White coat specified</th>
<th>Clinical encounter (Y/N)</th>
<th>Perceptions/preferences measured</th>
<th>Influence/preference expressed for attire</th>
<th>Pertinent results and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Ghobain et al, 2012, Riyadh, Saudi Arabia</td>
<td>Picture-based survey and face-to-face interview of patients awaiting care</td>
<td>General medicine clinic (outpatient)</td>
<td>399 37.2 66% were at least high-school educated</td>
<td>Males: formal attire, scrubs, national attire Females: formal attire, Scrubs</td>
<td>Yes</td>
<td>No</td>
<td>Confidence Knowledge respect</td>
<td>Yes; formal attire</td>
<td>Male and female patients preferred formal attire</td>
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<tr>
<td>Au et al, 2013, Alberta, Canada</td>
<td>Cross-sectional, picture-based survey; family members reviewed pictures and rated factors such as age, sex, grooming, tattoos, etc</td>
<td>Three intensive care units (acute care)</td>
<td>337 N/R 60% College or university educated</td>
<td>Formal attire+white coat, suit, casual attire, scrubs</td>
<td>Yes No Caring competence Honesty knowledge</td>
<td>Yes; formal attire and white coat</td>
<td>No</td>
<td>Yes; formal attire+white coat was rated as being most important when first meeting a physician</td>
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<tr>
<td>Baevsky et al, 1998, Massachusetts, USA</td>
<td>Prospective encounter-based, non-randomised exit-survey of patients conducted after receiving care. Physicians alternated attire on daily basis</td>
<td>Urban urgent care clinic (acute care)</td>
<td>596 N/R N/R</td>
<td>Formal attire+white coat, scrubs+white coat</td>
<td>Yes Yes Degree of concern knowledge Polite/courteous Satisfaction</td>
<td>No preference</td>
<td>No preference</td>
<td>No differences seen between attires with regard to patient satisfaction</td>
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<tr>
<td>Boon et al, 1994, Sheffield, England</td>
<td>Prospective questionnaire following clinical interaction</td>
<td>Accident and emergency department (acute care)</td>
<td>329 N/R N/R</td>
<td>White coat, casual attire, scrubs</td>
<td>Yes Yes Professionalism Neat scruffy</td>
<td>No preference</td>
<td>No preference</td>
<td>18% of physicians broke from attire protocol during the study</td>
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<tr>
<td>Budny et al, 2006, Iowa and NY USA</td>
<td>Description-based survey of patients awaiting care</td>
<td>Podiatric clinics in private practice and hospital-based settings (procedural)</td>
<td>155 18–25: 7% 26–40: 15% 41–55: 32% 56–70: 19% &gt;70: 26%</td>
<td>Formal attire, casual attire, scrubs</td>
<td>Yes No Confidence</td>
<td>Yes; formal attire</td>
<td>No preference</td>
<td>68% of all patients reported more confidence if physicians donned formal attire</td>
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<tr>
<td>Authors, year, location</td>
<td>Study design</td>
<td>Clinical setting (context)</td>
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<td>Edwards et al. 2012, TX, USA</td>
<td>Prospective, non-randomised, clinical encounter-based survey</td>
<td>Orthopaedic clinic at a military teaching hospital</td>
<td>Approximately 66% of patients aged ≤25 years</td>
<td>White coat, traditional attire, scrubs, casual attire</td>
<td>White coat + traditional attire, casual attire</td>
<td>White coat specified</td>
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<tr>
<td>Chung et al. 2014, OH, USA</td>
<td>Picture-based survey regarding patient preferences for attire</td>
<td>Obstetrics and Gynaecology Clinic at an academic medical centre (procedural)</td>
<td>Approximately 66% at least high-school educated</td>
<td>White coat + traditional attire, casual attire</td>
<td>White coat + traditional attire, casual attire</td>
<td>White coat specified</td>
<td></td>
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<tr>
<td>Chang et al. 2011, Seoul, Republic of Korea</td>
<td>Picture-based survey regarding patient preferences for attire</td>
<td>Alternative Medicine Clinic at an academic medical centre (outpatient)</td>
<td>43.3%</td>
<td>White coat, formal attire, traditional attire, casual attire</td>
<td>White coat, traditional attire, formal attire</td>
<td>White coat specified</td>
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<tr>
<td>Chung et al. 2012, Republic of Korea</td>
<td>Prospective, non-randomised, clinical encounter-based survey</td>
<td>Traditional Korean Medical Clinic (outpatient)</td>
<td>37.7%</td>
<td>White coat, traditional attire, casual attire</td>
<td>White coat, traditional attire, formal attire</td>
<td>White coat specified</td>
<td></td>
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<tr>
<td>Edwards et al. 2012, TX, USA</td>
<td>Prospective, non-randomised, clinical encounter-based survey</td>
<td>Outpatient Surgical Clinic at a military teaching hospital</td>
<td>N/R</td>
<td>Scrubs + traditional attire, scrubs + white coat</td>
<td>Scrubs + traditional attire, scrubs + white coat</td>
<td>Scrubs + white coat specified</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrelli CM, et al. BMJ Open 2015;5:e006578</td>
<td>Prospective, non-randomised, clinical encounter-based survey</td>
<td>Outpatient Surgical Clinic at a military teaching hospital</td>
<td>N/R</td>
<td>Scrubs + white coat, traditional attire</td>
<td>Scrubs + white coat, traditional attire</td>
<td>Scrubs + white coat specified</td>
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<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>N</th>
<th>Mean age (years)</th>
<th>Education level</th>
<th>% Male</th>
<th>Types of attire</th>
<th>White coat specified</th>
<th>Clinical encounter (Y/N)</th>
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<tr>
<td>Fischer et al, 2007, New Jersey, USA</td>
<td>Prospective non-randomised, clinical encounter-based questionnaire; physicians were randomly assigned to wear one of three attire types each week.</td>
<td>Outpatient obstetrics and gynaecology clinics at a university hospital (procedural)</td>
<td>1116</td>
<td>37.3</td>
<td>N/R</td>
<td>0</td>
<td>Formal attire + white coat, casual attire + white coat, scrubs</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Comfort competence, friendly and courteous, hurried, knowledge listened to concerns, professionalism, satisfaction, confidence, neatness, sympathy</td>
<td>Patient satisfaction with their physicians was high; attire did not influence satisfaction. Physicians in all three groups were viewed as professional, competent and knowledgeable. Among 20 physician providers, 8 preferred casual attire, 7 preferred formal attire, and 5 preferred scrubs. Most patients voiced no attire preference; however, 64% said neatness of dress was moderately to very important. Variances between clinical settings: ward patients more frequently said female physicians should wear a white coat and skirt (27% vs 5%, p &lt; .01). While participating physicians were all residents, level of resident training was not taken into account by the survey.</td>
</tr>
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<td>Friis and Tilles, 1988, California, USA</td>
<td>Picture-based survey; patients who had received care from a resident physician during a prior visit were surveyed regarding their preferences for physician attire</td>
<td>Internal medicine clinic, emergency room, internal medicine ward, community-based internal medicine clinic (mixed)</td>
<td>200</td>
<td>N/R (Mode: 20–29)</td>
<td>N/R</td>
<td>40</td>
<td>White coat, formal attire, casual attire, scrubs</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Comfort, neatness, satisfaction, confidence, sympathy</td>
<td>Most patients voiced no attire preference; however, 64% said neatness of dress was moderately to very important. 78% rated their physician as neat or very neat. Variances between clinical settings: ward patients more frequently said female physicians should wear a white coat and skirt (27% vs 5%, p &lt; .01). While participating physicians were all residents, level of resident training was not taken into account by the survey. White coat was most often preferred by both male and female patients. Scrubs and casual attire were least preferred. Limited description of casual attire worn by both genders of physicians and formal attire worn by female physicians were provided. White coat was the most confidence-inspiring attire in all hospital settings. Younger patients more tolerant of scrubs. Patients had most confidence in physicians wearing Scrubs in the emergency department vs other settings. White coat was worn with formal attire limiting ability to parse out impact of each element; survey conducted in a brief time frame.</td>
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<tr>
<td>Gallagher et al, 2008, Dublin, Ireland</td>
<td>Picture-based survey of patients awaiting care</td>
<td>Outpatient endocrinology clinic in a tertiary referral hospital (outpatient)</td>
<td>124</td>
<td>52.3</td>
<td>N/R</td>
<td>50</td>
<td>White coat, formal attire, suit, casual attire, scrubs</td>
<td>Yes</td>
<td>No</td>
<td>Appropriateness of attire</td>
<td>Comfort, yes; White coat</td>
<td></td>
</tr>
<tr>
<td>Gherardi et al, 2009, West Yorkshire, England</td>
<td>Picture-based survey in multiple care settings</td>
<td>Outpatient clinics, inpatient wards, emergency departments (mixed)</td>
<td>511</td>
<td>N/R</td>
<td>N/R</td>
<td>44</td>
<td>White coat, formal attire, suit, casual attire, scrubs</td>
<td>Yes</td>
<td>No</td>
<td>Confidence</td>
<td>Yes; White coat</td>
<td>White coat was the most confidence-inspiring attire in all hospital settings. Younger patients more tolerant of scrubs. Patients had most confidence in physicians wearing Scrubs in the emergency department vs other settings. White coat was worn with formal attire limiting ability to parse out impact of each element; survey conducted in a brief time frame.</td>
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<tr>
<td>Gooden et al, 2001, Sydney, Australia</td>
<td>Cross-sectional, clinical encounter-based survey of hospitalised patients</td>
<td>Medical and surgical wards of two teaching hospitals (inpatient)</td>
<td>154</td>
<td>Median 54</td>
<td>N/R</td>
<td>58</td>
<td>White coat, no white coat</td>
<td>Yes</td>
</tr>
<tr>
<td>Hartmans et al, 2014, Leuven, Belgium</td>
<td>Picture-based, cross-sectional survey administered online through social media as well as in-person in waiting rooms</td>
<td>University hospital-based outpatient clinic and related offsite clinics (outpatient)</td>
<td>1506</td>
<td>38.4</td>
<td>70.1% completed at least high school</td>
<td>32</td>
<td>Formal attire+white coat, formal attire – white coat, semi-formal attire, casual attire</td>
<td>Yes</td>
</tr>
<tr>
<td>Ikusaka et al, 1999, Tokyo, Japan</td>
<td>Clinical encounter-based questionnaire; physician rotated wearing a white coat weekly</td>
<td>University hospital outpatient clinic (outpatient)</td>
<td>599</td>
<td>White coat group: 50 No white coat group: 47.8</td>
<td>N/R</td>
<td>45</td>
<td>Formal attire+white coat, formal attire – white coat, semi-formal attire, casual attire</td>
<td>Yes</td>
</tr>
<tr>
<td>Kersnik et al, 2005, Krapinska Gora, Slovenia</td>
<td>Patient allocation-blinded, clinical encounter-based survey; physicians alternated wearing a white coat daily</td>
<td>Outpatient, urban family practice (outpatient)</td>
<td>259</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>White coat, no white coat</td>
<td>Yes</td>
</tr>
</tbody>
</table>

continued
<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>Patients were interviewed at home; professionals were given a written survey at a symposium (mixed)</th>
<th>N</th>
<th>Mean age (years)</th>
<th>Education level</th>
<th>% Male</th>
<th>Types of attire</th>
<th>White coat specified (Y/N)</th>
<th>Perceptions/preferences measured</th>
<th>Influence/preference expressed for attire</th>
<th>Pertinent results and comments</th>
</tr>
</thead>
</table>
| Kocks et al, 2010, Groningen, Netherlands | Picture-based survey of patient preferences | Patients were interviewed at home; professionals were given a written survey at a symposium (mixed) | 116  | 78  | N/R  | 56.9 | Formal attire, suit, business-casual attire, casual attire | No | No | Preference | Yes; Formal attire and suit over other attires  
Professionalism preferred formal attire and business-casual attire over casual attire  
In general, patients were more tolerant of casual attire and less likely to have style preference than professionals  
Formal attire+white coat was considered the most appropriate style of clothing followed by scrubs  
Formal attire without a white coat for female physicians was felt to be inappropriate in 73% of patients vs 24% who felt that formal attire without a white coat was inappropriate for male physicians  
73% of respondents felt that casual dress was inappropriate for male physicians vs 79.8% for male physicians  
There was a statistically significant increase in the number of subjects over 50 years of age who thought scrubs were inappropriate compared to those aged 20–34 years.  
Study survey response rate was 35%  
Physician attire was not associated with satisfaction or professionalism in the emergency department during the study  
No difference in attire preferences by patient age, gender, race, or physician gender and race were noted  
Hawthorne effect possible as physicians were aware of patient ratings and observations  
Semi-formal attire with a smile was preferred by patients  
Older patients preferred male and female physicians with white coats more than other age groups |
| Kurihara et al, 2014, Ibaraki, Niigata and Tokyo, Japan | Picture-based, self-administered questionnaires | Outpatients at 5 pharmacies across Japan | 491  | 51.9 | N/R  | 40.3 | Formal attire+white coat, formal attire – white coat, casual attire, scrubs | Yes | No | Appropriateness | Yes; Formal attire+white coat |
| Li and Haber, 2005, New York, USA | Patient-allocation blinded, picture-based, quasi-experimental before-and-after study; physicians alternated attire weekly | Urban emergency department in a university medical centre (acute care) | 111  | 42  | N/R  | 53 | Formal attire+white coat, scrubs | Yes | Yes | Professionalism | Satisfaction |
| Lill and Wilkinson, 2005, Christchurch, New Zealand | Picture-based survey of patient preferences | Inpatients and outpatients from a wide range of wards, medical and surgical clinics (mixed) | 451  | 55.9 | N/R  | 47 | White coat, formal attire, semiformal attire with smile | Yes for patients (survey administered before clinical encounter in outpatients) | Preference for physician based on attire displayed in pictures | Yes; Semiformal attire with smile |

Table 1 Continued
<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>Patient characteristics</th>
<th>Attire compared</th>
<th>Clinical encounter (Y/N)</th>
<th>Perceptions/preferences measured</th>
<th>Influence/preference expressed for attire</th>
<th>Pertinent results and comments</th>
</tr>
</thead>
</table>
| Maruani et al, 2013, Tours, France | Picture-based, prospective cross-sectional study | Outpatient dermatology patients of a tertiary care hospital, 2 dermatological private consulting rooms (procedural) | 329 | 52.3 | N/R | 43.8 | White coat, formal attire, business-casual attire, casual attire | Yes | No | Confidence | Importance of attire | Yes; White coat | ▸ Most patients thought physicians should always wear a badge  
▸ Smiling option in pictures may have introduced bias as this was not used equally for all categories  
▸ White coats were preferred by hospital and private practice outpatients significantly more than other attires, for both male and female physicians  
▸ 60% of adult patients in either setting considered physician attire important |
| McKinstry and Wang, 1991, West Lothian and Edinburgh, Scotland | Picture-based, interviewer-led surveys of patients using eight standardised photographs of physicians in different attires | 5 outpatient general medicine clinics (outpatient) | 475 | N/R | 30.9 | Males: formal attire + white coat, formal attire  
Females: formal attire + white coat, business-casual attire  
Business-casual attire | Yes | No | Acceptability | Confidence | Yes; Formal attire + white coat | ▸ Male physicians: formal attire + white coat was preferred followed by formal attire  
▸ Female physicians: casual attire scored significantly lower patients and higher socioeconomic levels preferred formal attire + white coat to a greater extent than others.  
▸ Majority of patients felt that the way their doctor's dress is very important or quite important.  
▸ Significant variations noted across sites suggest underlying patient or site-level confounding |
| McLean et al, 2005, Surrey, England | Clinical encounter-based questionnaire with one of two providers dressed in military uniform or civilian formal attire | Fracture clinic in a 'District Hospital' (procedural) | 77 | 39 | N/R | 62 | Military uniform, formal attire | No | Yes | Approachable | Confidence  
Humorous  
Hurried  
Intimidation  
Kindness  
Polite/courteous  
Professionalism | Yes; Formal attire | ▸ Civilian formal attire was felt more professional by patients  
▸ No statistical differences were noted with respect to other dimensions including kindness, approachability, or confidence across attires  
▸ This is small study with a small number of patients and only two providers; generalisability appears limited  
▸ Majority of patients surveyed believed formal attire + white coats in male physicians would be more likely to inspire trust & confidence.  
▸ Preferred attire for female physicians was less clear  
▸ Most physicians opined that they should dress |
| McNaughton-Filion et al, 1991, Ontario, Canada | Picture and description based-survey administered by a research-assistant or resident to both patients and physicians | Urban, university hospital family practice and community-based family practice clinic (Outpatient) | 80 | N/R | 54% College or university educated | 41 | Formal attire + white coat, formal attire + white coat, casual attire + white coat, casual attire + white coat, scrubs + white coat | Yes | No | Professionalism  
Trust and confidence | Yes; Formal attire + white coat | ▸ Most patients thought physicians should always wear a badge  
▸ Smiling option in pictures may have introduced bias as this was not used equally for all categories  
▸ White coats were preferred by hospital and private practice outpatients significantly more than other attires, for both male and female physicians  
▸ 60% of adult patients in either setting considered physician attire important |
<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>Patient characteristics</th>
<th>Attire compared</th>
<th>Influence/preference expressed for attire</th>
<th>Pertinent results and comments</th>
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</thead>
<tbody>
<tr>
<td>Niederhauser et al, 2009, Virginia, USA</td>
<td>Picture and description-based survey of patient preferences</td>
<td>Hospital-based obstetrics and gynaecology clinics (procedural)</td>
<td>328</td>
<td>26.4</td>
<td>N/R</td>
<td>Military uniform + white coat; military uniform − white coat, scrubs + white coat, scrubs − white coat</td>
</tr>
<tr>
<td>Pronchik et al, 1998, Pennsylvania, USA</td>
<td>Clinical encounter-based, prospective survey; All male students, residents and attendings assigned to wear or not wear a necktie according to a specified schedule; female providers were excluded</td>
<td>Emergency department of a community teaching hospital (Acute care)</td>
<td>316</td>
<td>N/R</td>
<td>N/R</td>
<td>Necktie, no necktie</td>
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<tr>
<td>Rehman et al, 2005, South Carolina, USA</td>
<td>Picture-based, randomised, cross-sectional descriptive survey</td>
<td>Outpatient medicine clinic at a Veterans-Affairs Medical Center (outpatient)</td>
<td>400</td>
<td>52.4</td>
<td>42.8% at least high school educated</td>
<td>Formal attire + white coat; formal attire − white coat, casual attire, scrubs</td>
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<tr>
<td>Sotgiu et al, 2012, Sassari, Italy</td>
<td>Picture and description-based questionnaire</td>
<td>Medical and surgical outpatient clinics (mixed)</td>
<td>765</td>
<td>43.2</td>
<td>45.8% finished high school or college-level</td>
<td>Formal attire + white coat, casual attire + white coat, scrubs + white coat</td>
</tr>
</tbody>
</table>

continued
While one Japanese study reported that the majority of patients older than 70 years preferred white coats, satisfaction was not statistically affected by white coats during consultations. Conversely, another study from Japan found that formal attire with a white coat was considered the most appropriate style of dress for a physician. However, the two studies conducted in Australia and New Zealand found that patients preferred white coats and formal attire when rating physicians. Similarly, the single study from the Middle-East found that 62% of patients preferred male physicians to wear formal attire whereas 73% preferred female physicians to wear a long skirt. As with the single study from Brazil, there was also a significant preference for a white coat to be worn, regardless of physician gender.

### Influence of clinical encounters on attire preference

Of the 30 included studies, 12 studies surveyed patients regarding their opinions about physician attire following a clinical encounter. Within these 12 studies, only 3 (25%) reported that attire influenced patient perceptions of their physician. Formal attire without white coat was preferred in one of the three studies; a white coat with other attire not specified was preferred in two studies. However, in the remaining nine studies, patients did not voice any attire preference following a clinical encounter suggesting that attire may be less likely to influence patients in the context of receiving care.

Conversely, clear preferences regarding physician attire were reported in 16 of 18 studies where patients received either written descriptions or pictures of physician attire without a corresponding clinical interaction with a physician. The majority of these studies (n=10) preferred formal attire either with or without a white coat; three studies reported a preference for scrubs with or without white coats whereas a white coat with other attire not specified was preferred in five studies (figure 3).

### Influence of context of care on patient preferences for attire

Context of care also influenced attire preference. For example, six studies conducted in general medicine outpatient clinics reported that patients preferred formal attire with or without a white coat while three reported preference for a white coat with other attire not specified. Only two studies reported no attire preferences in this specific medical discipline in this setting. Conversely, four of five studies conducted in acute care settings reported no attire preferences; only one study reported a preference of formal attire with or without a white coat. Of the seven procedural studies that included patients from obstetrics and gynecology, gastroenterology, emergency care and surgery, three reported either

---

**Table 1**

<table>
<thead>
<tr>
<th>Authors, year, location</th>
<th>Study design</th>
<th>Clinical setting (context)</th>
<th>Patient characteristics</th>
<th>Attire compared</th>
<th>Attire specified</th>
<th>Clinical encounters (YN)</th>
<th>Perceptions/preferences measured</th>
<th>Influence/preference expressed for attire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yokota et al., 2013, Sao Paulo, Brazil</td>
<td>Picture-based survey of patient preferences</td>
<td>Inpatients and outpatients at a university hospital</td>
<td>259</td>
<td>47.8</td>
<td>N/R</td>
<td>42.9</td>
<td>White coat, formal attire, +white coat, traditional attire, casual attire, scrubs</td>
<td>Yes; White coat</td>
</tr>
</tbody>
</table>

---
Figure 2  Stacked bar chart showing variation in patient preference for physician attire across geographic regions.

Figure 3  Stacked bar chart showing variation in patient preference for physician attire with clinical encounters.
no specific preference for attire \textsuperscript{22,23,39} or preference for
scrubs over other attire.\textsuperscript{20,36} Only two of the seven
studies reported preference for formal attire or white
coats in these settings.\textsuperscript{19,33} Studies categorised as being
‘mixed’ in context (n=6) correspondingly reported het-
erogeneous preferences, spanning no preference for
attire, to preference for formal attire, white coat and
scrubs with white coats only.\textsuperscript{24,26,30,32,38,42} (figure 4).

Risk of bias within included studies
We assessed risk of bias within the included 30 studies
using the Downs and Black Quality Scale. Studies with
higher quality were characterised by the fact that they
more commonly reported characteristics of included and
excluded patients and provided more accurate descriptions
of attire based interventions. Using this scale, 8 of
the 30 included studies were associated with higher method-
odological quality (table 2). Inter-rater agreement for
study quality adjudication was excellent (κ=0.87).

DISCUSSION
In this systematic review examining the influence of
physician attire on a number of patient perceptions, we
found that formal attire with or without white coats, or
white coat with other attire not specified was preferred
in 60% of the 30 included studies.\textsuperscript{1,5,15,16,19,21,25–27,30,32–35,39–42} However, no specific preference for
physician attire was demonstrated in nine studies and
preference for scrubs was noted in three procedural
studies. Importantly, we found that elements such as
patient age and context of care in addition to geography
and population appear to influence perceptions regarding
attire. For example, patients who received clinical
care were less likely to voice preference for any type
attire than patients that did not, perhaps exemplifying
the importance of interaction over appearance. Similarly, older patients and those in European or Asian
nations were more likely to prefer formal attire than
those from the USA. Collectively, these findings shed new
light on this topic and suggest that although professional
attire may be an important modifiable aspect of the
physician–patient relationship, finding a ‘one-size-fits-all’
approach to optimal physician dress code is improbable.
Rather, ‘tailored’ approaches to physician attire that take
into account patient, provider and contextual factors
appear necessary.

In an ever-changing medical landscape, patient satis-
faction has become a focal point for providers and
health-systems. Therefore, preferences regarding phys-
ician attire have become a topic of considerable interest
as a means to improve first-impressions and perceptions
regarding quality of care. Why may patient perceptions
and preferences vary so greatly across studies? Multiple
reasons are possible. First, our review supports the
notion that patients often harbour conscious and uncon-
scious biases when it comes to their preferences regard-
ing physician attire.\textsuperscript{7,37} For example, while many
patients did not report an attire preference when direc-
tively surveyed, several of our included studies found that
images of patients dressed in white coats or formal suits
were more often associated with perceptions of trust and
confidence even if patients also expressed no specific
preferences regarding attire.\textsuperscript{16,17,37} In support, studies
<table>
<thead>
<tr>
<th>Author, year, location</th>
<th>Clinical interaction?</th>
<th>Group</th>
<th>Does the study provide estimates of the random variability in the data for the main outcomes?</th>
<th>Have the characteristics of the patients included and excluded been described?</th>
<th>Were study subjects in different intervention groups recruited over the same period of time?</th>
<th>Were incomplete questionnaires excluded?</th>
<th>Reviewer scores</th>
<th>Risk of bias adjudication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fischer et al, 2007, New Jersey, USA</td>
<td>Yes</td>
<td>Surgery/procedural</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>14 of 27</td>
<td>Low</td>
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<tr>
<td>Hartmans et al, 2014, Leuven, Belgium</td>
<td>No</td>
<td>Outpatient</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>14 of 27</td>
<td>Low</td>
</tr>
<tr>
<td>Gooden et al, 2001, Sydney, Australia</td>
<td>No</td>
<td>Mixed</td>
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<td>1</td>
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<td>13 of 27</td>
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<tr>
<td>Baesky et al, 1998, Massachusetts, USA</td>
<td>Yes</td>
<td>Acute care</td>
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<td>12 of 27</td>
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<tr>
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<td>1</td>
<td>12 of 27</td>
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</tr>
<tr>
<td>Lill and Wilkinson, 2005, Christchurch, New Zealand</td>
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<tr>
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<td>12 of 27</td>
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<tr>
<td>Rehman et al, 2005, South Carolina, USA</td>
<td>No</td>
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<tr>
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<td>1</td>
<td>0</td>
<td>11.5 of 27</td>
<td>Moderate</td>
</tr>
<tr>
<td>Au et al, 2013, Alberta, Canada</td>
<td>No</td>
<td>Acute care</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>11.5 of 27</td>
<td>Moderate</td>
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<tr>
<td>Li and Haber 2005, New York, USA</td>
<td>Yes</td>
<td>Acute care</td>
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<td>1</td>
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<td>0</td>
<td>11.5 of 27</td>
<td>Moderate</td>
</tr>
<tr>
<td>Al-Ghobain et al, 2012, Riyadh, Saudi Arabia</td>
<td>No</td>
<td>Medicine</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>11 of 27</td>
<td>Moderate</td>
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<tr>
<td>Boon et al, 1994, Sheffield, England</td>
<td>Yes</td>
<td>Acute care</td>
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<td>11 of 27</td>
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</tr>
<tr>
<td>Chung et al, 2012, Kyunggido, Republic of Korea</td>
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<td>Medicine</td>
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<td>11 of 27</td>
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<tr>
<td>Edwards et al, 2012, Texas, USA</td>
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<tr>
<td>Kersnik et al, 2005, Krajnska Gora, Slovenia</td>
<td>Yes</td>
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<td>Yonekura et al, 2013, Sao Paulo, Brazil</td>
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<tr>
<td>Maruani et al, 2013, Tours, France</td>
<td>No</td>
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<td>10.5 of 27</td>
<td>Moderate</td>
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<tr>
<td>Cha et al, 2004, Ohio, USA</td>
<td>No</td>
<td>Surgery/procedural</td>
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<td>1</td>
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<td>10.5 of 27</td>
<td>Moderate</td>
</tr>
<tr>
<td>Chang et al, 2011, Seoul, Republic of Korea</td>
<td>No</td>
<td>Medical</td>
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<td>0</td>
<td>10.5 of 27</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Table 2** Risk of bias within included studies
<table>
<thead>
<tr>
<th>Author, year, location</th>
<th>Clinical interaction?</th>
<th>Group</th>
<th>Does the study provide estimates of the random variability in the data for the main outcomes?</th>
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<th>Were study subjects in different intervention groups recruited over the same period of time?</th>
<th>Were incomplete questionnaires excluded?</th>
<th>Reviewer scores</th>
<th>Risk of bias adjudication</th>
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<tbody>
<tr>
<td>Budny et al, 2006, Iowa and NY, USA</td>
<td>No</td>
<td>Surgery/procedural Medicine</td>
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<td>Moderate</td>
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<tr>
<td>Ikusaka et al, 1999, Tokyo, Japan</td>
<td>Yes</td>
<td>Medicine</td>
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<td>Moderate</td>
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<tr>
<td>McLean et al, 2005, Surrey, England</td>
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<tr>
<td>Kurihara et al, 2014, Ibaraki, Niigata and Tokyo, Japan</td>
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<td>Friis and Tilles, 1988, California, USA</td>
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<td>Sotgiu et al, 2012, Sassari, Italy</td>
<td>No</td>
<td>Mixed</td>
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<tr>
<td>Gallagher et al, 2008, Dublin, Ireland</td>
<td>No</td>
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<td>Kocks et al, 2010, Groningen, Netherlands</td>
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<tr>
<td>McNaughton-Filion et al, 1991, Ontario, Canada</td>
<td>No</td>
<td>Medicine</td>
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<tr>
<td>McKinstry and Wang, 1991, West Lothian and Edinburgh, Scotland</td>
<td>No</td>
<td>Medicine</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7 of 27</td>
<td>High</td>
</tr>
</tbody>
</table>

A priori, studies that received a score of 12 or greater were considered to be at low risk of bias; scores of 10–12 moderate risk of bias; and scores less than 10 at high risk of bias. Scores for key questions that differentiated studies at high versus moderate and low risk of bias are shown. Scores shown represent independently rated and agreed-on ratings by two reviewers.
that included physician encounters were less likely to find specific preferences (3/12 studies) compared to studies conducted outside of a physician–patient meeting (18/18 studies). These likely subconscious beliefs are important to acknowledge, first, especially patients from a ‘baby-boomer’ generation who often conflate formal attire with physician competence and confidence. Second, the influence of cultural aspects on attire expectations is likely to be substantial on attire preferences. As noted in our review, studies originating from the UK, Asia, Ireland and Europe most often expected formal attire with or without white coats; attire that did not include these dress-codes were least preferred. Third, the influence of context of care on expectations regarding physician dress is important to acknowledge. A defined ‘uniform’ for physicians may be an expectation for certain patients and/or specific settings. Finally, it is important to remember that sartorial style is but skin-deep and not a surrogate for medical knowledge or competence. Even the best-dressed physicians are likely to fare poorly in the eyes of their patients if medical expertise is perceived absent.

Our results must be interpreted in the context of important limitations. First, like all systematic reviews, this is an observational study that can only assess trends, not causality, using available data. Second, the inclusion of a diverse number of study designs and patient populations creates a high likelihood of unmeasured confounding and bias. Third, only eight of the included studies were rated as being at low risk-of-bias using the Downs and Black scale. This finding reflects in general the limited quality of this literature and suggests that while physician attire may be important, more methodologically rigorous studies are needed to better understand and truly harness this aspect to improve patient satisfaction. Fourth, a wide variety of related but often ill-defined patient perceptions or preferences were measured within the included studies; although we collapsed these categories into more uniform measures, our ability to draw insights from these diverse outcomes is limited. Finally, we specifically did not take into consideration risk of infection associated with attire. Since a recent study examined this in considerable detail, our review complements the literature in this regard.

Despite these limitations, our review has notable strengths including a thorough literature search, stringent inclusion and exclusion criteria, and use of an externally validated quality-tool to rate studies. Second, our review was guided by the conceptual understanding that culture, tradition, patient expectations and settings influence perceptions related to physician attire. Filtering and assessing studies in this fashion provided us with insights when, if and how physician attire influences patient perceptions. Finally, we also included 16 new articles that have been published since the last comprehensive review of this topic; inclusion of these new studies (including a substantial number of studies from diverse countries and healthcare settings) lends greater external validity and importance to our findings.

How may hospitals and healthcare facilities use these data to effect policy decisions? Our review suggests that formal attire is almost always preferred with respect to physician attire may be undue given the heterogeneous evidence-base and methodological quality of available data. After contacting human resource professionals, other administrators and researching information available on their public websites at all 10 of the top 10 2013–2014 US News & World Report Best Hospitals, we found that 5 had written guidelines calling for formal and professional attire throughout their institutions. Our findings suggest that such sweeping policies that apply to all healthcare specialties, settings and acuities of care may paradoxically not improve patient satisfaction, trust or confidence. Rather, interventions that test the impact of when and how care is delivered, types of patients encountered, and approaches used to measure patient preferences are needed. In order to better tailor physician attire to patient preferences and improve available evidence, we would recommend that healthcare systems capture the ‘voice of the customer’ in individual care locations (eg, intensive care units and emergency departments) during clinical care episodes. The use of a standardised tool that incorporates variables such as patient age, educational level, ethnicity and background will help contextualise these data in order to derive individualised policies not only for each area of the hospital, but also for similar health systems in the world.

In summary, the influence of physician attire on patient perceptions is complex and multifactorial. It is likely that patients harbour a number of beliefs regarding physician dress that are context and setting-specific. Studies targeting the influence of such elements represent the next logical step in improving patient satisfaction. Hospitals and healthcare facilities must begin the hard work of examining these preferences using standardised approaches in order to improve patient satisfaction, trust and clinical outcomes.

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