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# Can Physicians Transfer Bacteria onto Patients through their Neckties?

Alexandra Pinkhas

Alexandra Pinkhas will graduate with a Bachelor of Science degree in Biology in June 2023

## Abstract

*Hospital-acquired infections are exacerbated by the presence of transmission agents such as bacteria on neckties. Physicians can put patients at risk of infections if bacteria contaminate their ties during their normal hospital routines. In the hospital setting, some of the most common bacteria include Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Staphylococcus epidermidis, Enterococcus, Streptococcus pneumoniae, Methicillin-resistant Staphylococcus aureus (MRSA) and Clostridioides difficile. Studies have shown that neckties can act as transmission agents, especially when they come into contact with patients. Additionally, the type of material used to make a necktie determines the viability of bacteria. Wearing neckties increases risk for immunocompromised patients which can lead to prolonged hospital stay and increased mortality. Given that the issue contributes to poor health outcomes and increased healthcare costs, new policies must be implemented. Researchers have suggested a complete ban on physician neckties or impregnation of fabrics in ties with metals such as copper and silver which can aid in the reduction of nosocomial infections.*

## Introduction

Most people are aware of the dangers posed by hospital environments but rarely consider doctors' attire as the source. White coats, wristwatches, neckties, stethoscopes and other medical instruments are potential vehicles for germ transfer from doctor to patient (Mehta et al., 2014). Neckties are an interesting piece of clothing as they are considered a mark of professionalism. Mostly worn by male doctors, they add to the professional appeal. However, neckties do not serve any functional role and could contribute to nosocomial infections. In hospitals, doctors caring for patients and doing rounds come into contact with various pathogens. While hand washing removes most pathogens that could be transmitted through touch, neckties may pose a greater health risk. There is no evidence that neckties add to the patient-doctor relationship, and they likely contribute to bacterial transmission in the hospital setting. Traditionally hospitals have relied on disinfection of surfaces and objects to curb the spread of illnesses. However, these measures might not be enough given that doctors walk around with germs swinging from their necks. An understanding of hospital microbiology is critical to solving the issue of hospital acquired infections.

In healthcare settings bacteria are prevalent, and measures must be taken to reduce the chances of hospital-acquired infections. Bacteria are living single-celled organisms found everywhere in the environment. While some microscopic organisms can be beneficial or harmless, others can cause infections leading to hospitalizations and even death. Even worse, when bacteria become antibiotic-resistant, infections are very difficult to treat. Susceptible patients, such as those with compromised immunity, are at increased risk of infection even from minor exposure. Some common bacterial infections can cause diphtheria, pneumonia, sepsis, and urinary tract infections, bloodstream and gastrointestinal infection. The bacteria associated with do these illnesses include Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Staphylococcus epidermidis, Enterococcus, Streptococcus pneumoniae, Methicillin-resistant Staphylococcus Aureus and Clostridioides difficile

(Mehta et al., 2014). Hospital-acquired infections contribute to increased costs of treatment and longer hospital stays. Fomites should be removed from the hospital setting to ensure that bacteria do not spread.

The fabric used in a necktie can provide a rich environment for bacteria to thrive. If neckties go unwashed, exposing patients to them will likely contribute to the spread of infection. Depending on the colony forming units formed on neckties, transmission of bacteria from physician to patient is possible. Therefore, researchers have proposed that physicians get rid of their neckties due to the possibility of transferring bacteria.

According to the Center for Disease Control and Prevention (CDC), about 5% of patients acquire infections during healthcare visits. Infections come with a high price tag, costing about 30 to 40 billion dollars, and reducing infections could bring huge savings, as complications associated with care are to blame for the excess costs (Haque et al., 2018). The costs are incurred because of longer hospital stays and the possibility of antibiotic-resistant bacteria. To reduce the chance of acquiring opportunistic infections, immunocompromised patients might be isolated. In addition, sterile gloves should be worn, especially when doctors touch areas that might be infested with bacteria. Gowning, masks, and eye protections ensure that body fluids, secretions, and splashes do not contaminate the physician during care, especially when respiratory diseases occur. Additionally, shoe coverings and head coverings might be required in some cases. One measure is isolation, which involves physically separating the patient from others. Infections are serious and life-threatening, and hospitals have guidelines for dealing with them.

Healthcare workers also ensure that patient care items are handled properly, and one-time-use items are disposed of properly. Airborne precautions must also be considered, and respiratory protection protects from bacterial droplets in the air. Healthcare professionals must play a role in reducing nosocomial infections which results in reduced quality of care. They must identify all possible avenues through which infections can be spread, including

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beds, rails, textiles, and physician attire (Mehta et al. 2014). Hospital staff cleans and disinfects items, making them safe for use. Physicians also engage in practices that ensure that germs are not transmitted to unsuspecting patients, such as washing hands, gowning, and wearing masks and gloves.

Even though doctors wash their hands regularly, neckties are mobile fomites that professionals rarely consider even though they frequently come into contact with human secretions and germs. Also, as they are considered clean, neckties are rarely washed making them mobile germ carriers. Exposure to these fomites can introduce disease-causing organisms that increase the likelihood of mortality, especially for immunocompromised patients. Therefore, minimizing exposure to neckties is critical to the reduction of nosocomial infections.

Neckties are considered a professional piece of attire. However, questions have started to emerge. In the medical field, the connection between the transmission of germs and neckties is still controversial, and their usefulness in medical practice is questionable. Given that new medical outfits are being embraced, for instance scrubs are now commonly worn, which can still afford doctors the benefit of being identified as professional. If the item contributes to an increase in hospital-acquired infections, then a call to ban them should be enforced. However, if they are not potential hosts for pathogens, then doctors should be able to wear ties without objection.

### Method

The research employed a literature review of ten preselected articles covering the topic. These articles were obtained from recognized databases such as PubMed, Science Direct, Embase, and Cochrane Library. The search terms physician, neckties, and bacteria were included in the initial search which yielded more than fifty articles. In addition, terms such as textiles and bacterial survival were added to the search. A review of the abstracts identified the best articles for this study. The process led to the selection of ten relevant articles that would be used to determine whether physicians can transmit bacteria to patients.

### Discussion

The bacterial content and count differ depending on the practices employed by physicians. McGovern et al. (2010) employed a literature review of various studies to make these conclusions. For instance, an examination of pathogens present in neckties was conducted in a study by the UK Department of Health. The study was to determine if wearing neckties had any beneficial function to patient care. In one of the studies, neckties from 40 doctors in a Scottish hospital were sampled to determine

the bacterial content. *Staphylococcus aureus* was isolated from eight doctor's neckties. In yet another study, it was established that two out of the five doctors working in intensive care units had coagulase-negative staphylococci (CoNS). The results were constant with the hypothesis that neckties were rarely laundered and colonized by pathogens. McGovern et al. (2010) also discussed another study conducted in London that indicated physician neckties had higher bacterial count than their shirt pockets. While shirts were frequently laundered, neckties were considered less dirty as they never came into contact with the body. These notions led to less frequent laundering of neckties, even among physicians. The same research also compared bow ties and neckties that gynecologists and obstetricians wore. The results indicated that there was no difference, and the ties had similar levels of bacterial infestation. The bacterial levels were collected in the study on the third day of wearing the ties.

Antibiotic-resistant bacteria were prevalent in physician neckties. Methicillin-resistant *Staphylococcus aureus* (MRSA) is hard to treat as it has become resistant to most antibiotics. The bacteria were isolated from most neckties during some of the studies. In another study involving 95 male physicians, only 20% objected to not wearing a tie (McGovern et al., 2010). Skin flora found on the sampled ties suggested that laundering was ineffective in eliminating all bacteria (McGovern et al., 2010). Ties were handled regularly, and pathogenic organisms colonized one in five. The conclusion is that ties can be reservoirs for healthcare-associated infections and should be eliminated from healthcare practices.

The spread of nosocomial infections, common in intensive care units, can be addressed by determining potential vectors. According to Dixon (2000), heavy growths of coagulase-negative staphylococcus were identified in two of the five ties tested in their study. During the research, the ends of five neckties, from male doctors working in the intensive care unit, were blotted and then placed on blood agar plates. The plates were incubated for a forty-eight hour period, and then the number of bacterial colony-forming units were counted. Heavy growth in two neckties was noted, with more than three colony-forming units observed after forty-eight hours. Given the bacterial count, results indicated that neckties are a potential source of infection.

Fifty doctors were enrolled in a study, half of whom were surgeons. Of the group, sixteen never cleaned their ties, while twenty did not account for when they had last cleaned their ties. Another fourteen estimated that the last time their ties had been cleaned was seventy-three days earlier (Lopez et al. 2009). The data is concerning,

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especially because they reported wearing their shirts for less than two days after a wash. The colony-forming units on ties ranged from 13 to 950 compared to shirts with 2 to 51 colony-forming units. The most abundant bacteria, *Staphylococcus aureus*, was isolated in thirteen of the ties. The colony-forming units for this bacterium were zero to eighty-six colony-forming units.

The goal to decrease hospital-acquired infections also led to a study to investigate the effect of shirt sleeves and ties on the transmission of bacteria from doctors to patients. The controlled investigation was well designed, as ties and sleeves were inoculated with *Micrococcus luteus* using a swab, and cultures were obtained immediately after inoculation. Cultures were obtained from the simulated patients' cheeks, right hand, and abdomen area. Before the stimulated examination, the patients had no micrococcus growth. The physicians wore the inoculated clothing as they examined mannequins dressed in hospital gowns. The simulated patients were laid on hospital beds, simulating the exact patient/doctor interactions. The ties were unsecured, allowing them to come into contact with patients. Cultures were collected before doctors' standard history and physical examination during visits. After the simulated encounters, the clothes were again cultured to determine their bacterial contamination levels. The tie was also deliberately touched on the mannequin, and the site was cultured. After the encounters, results indicated more than 300 colony-forming units on each article of clothing. Cultures taken from cheeks, abdomen, and hand sites also showed at least a five unit growth in colony-forming units. Patients were contaminated after encounters. Four of the five patients had bacterial colonization when physicians wore a long-sleeved shirt with a tie. Source (Weber et al., 2012).

Two of the five patients had bacterial colonization when the physician wore a short sleeve shirt. There was higher colonization when the physician wears long-sleeved shirts and ties (Weber et al., 2012). Bacteria are often transmitted from the physician to the patient, a factor that increases the likelihood of nosocomial infections.

Another study investigated patients' attitudes regarding physicians attire. The researchers conducted 160 surveys, in which patients were asked about their preference for medical attire to see whether there is a link to hospital infections. Most patients preferred doctors in scrubs or professional outfits, including a long-sleeved shirt and a necktie. One of the proposed medical attires was a bare below-the-elbow outfit, which got the lowest votes in all categories. Younger people did not show any preference and would accept it if physicians wore any of the uniforms. On the other hand, older people preferred the

long sleeve and tie look. Notably, scrubs were considered the most hygienic of the three attire choices while those with a bare below-the-elbow outfit were considered the least hygienic. Scrubs also scored high when it came to physicians being identifiable. Source (Bond et al., 2010).

Given that over 200,000 patients contract nosocomial infections, while 8,000 die, healthcare-acquired infections must be curbed. The cost of healthcare is estimated to be upwards of 45 billion dollars. A systematic review noted that healthcare workers, patients, and visitors are responsible for the spread of infection in hospital settings. The study reviewed articles from 1966 to 2017 and only considered neckties or a comparison with other vectors such as stethoscopes and identification badges to be the reason for the spread. The studies revealed that neckties were likely contaminated with *S. aureus*, methicillin-resistant *S. aureus*, and *S. citreus* (Pace-Asciak et al., 2018). Heavy growth of pathogenic bacteria was detected on most neckties, a factor that could compromise the health of immune-competent patients. The same studies also noted that most patients preferred that doctors be dressed in professional attire that aids in identifying them. Various researchers investigated the influence of the type of fabric on the spread of bacteria. They showed data on the survival of bacteria on textiles. The evaluation was critical as it advanced understanding the role of specific fabrics as sources of transmission. The materials investigated in the study were cotton, synthetic, and mixed fibers. In cotton, widely used in neckties, bacterial survival rates ranged from less than an hour to more than ninety days. *Enterococcus* spp. survives ninety days and is most commonly associated with urinary tract infections in hospitalized patients. *E. coli*, associated with stomach pains, vomiting, and bloody diarrhea, lives up to forty-five days on cotton fabric. Other bacteria, such as *V. cholerae*, *Salmonella* spp., and *C. jejuni*, are viable for eight, five, and three hours respectively. With an increase in humidity, the survival rates for some bacteria, such as *S. aureus* and *S. pyogenes*, increased. Synthetic fibers, such as polyester, had very high bacteria survival rates compared to cotton. Bacteria survival rate ranged from seven to one hundred and six days. When the bacterial count was low, the number of survival days were lower. As in cotton, humidity increased the survival rate for *E. coli*, *S. prognos*, and *S. aureus*. In mixed fibers, bacteria were able to survive for up to ninety days. The greatest survivability was for *Enterococcus* spp., *E. coli*, and *S aureus*, which reported forty-nine, forty-five, and forty-one days, respectively (Kampf, 2020). The results presented note that most nosocomial pathogens are equipped to survive on surfaces such as textiles and fabrics.

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Koca et al. (2012) also conducted a study reviewing the survival rates of nosocomial pathogens on textiles and fabrics. Fabrics are common in hospitals and most likely have a place in the chain of infection. Koca et al. (2012) isolated the bacteria used in the test from patients at a hospital in Turkey and Israel. Test fabrics included wool, cotton, polyester, and silk. Bacteria were then introduced to the materials, and survival rates were determined. The materials were placed at room temperature, and survival time was counted. Colony-forming units with loads of 106 to 108 per 100cm<sup>2</sup> were likely to contaminate patients and any items in the environment. Figure 2 summarizes the results collected during the three-month study.

Some bacteria had higher survival rates on the materials. This study confirms that textiles can transmit bacteria to surfaces and patients. Therefore, the choice of material does influence whether a necktie will spread infections from physician to patient.

**Figure 2**

*The survival of bacterial and fungal isolates on various fabrics*

Microorganism	Length of survival (no. of days) of individual isolates on			
	Cotton-Polyester	Cotton	Wool	Silk
<i>E. faecium</i>	51	49	49	49
<i>S. aureus</i>	37	37	41	37
<i>E. coli</i>	37	45	45	45
<i>P. aeruginosa</i>	23	13	33	33
<i>A. baumannii</i>	19	19	7	19
<i>S. maltophilia</i>	7	7	7	7
<i>C. albicans</i>	6	6	12	12
<i>C. tropicalis</i>	9	3	>30	24
<i>C. krusei</i>	6	3	>30	21
<i>C. glabrata</i>	>30	>30	>30	>30
<i>C. parapsilosis</i>	>30	>30	>30	>30
<i>G. candidum</i>	6	21	12	6
<i>A. fumigatus</i>	>30	>30	>30	27
<i>C. neoformans</i>	>30	>30	>30	>30

**Figure 3:**

*The bacteria binding ratios to fibers and cloths*

Bacteria	Average binding ratios of the 5 strains				
	Acrylic % (SE)	Cotton % (SE)	Nylon % (SE)	Polyester % (SE)	Wool % (SE)
<b>Staphylococcus aureus</b>					
<b>Methicillin-sensitive</b>	87.6 (3.6)	2.0 (2.0)	0.9 (1.8)	96.2 (2.7)	63.2 (23.6)
<b>Methicillin-resistant</b>	86.9 (5.5)	1.0 (1.7)	0.7 (1.4)	87.6 (19.1)	49.5 (29.0)
<b>Pseudomonas aeruginosa</b>	95.4 (4.5)	8.1 (12.0)	14.9 (9.0)	99.9 (0.2)	84.7 (13.2)
<b>SE, Standard error.</b>					

The type of material used in making hospital attires, such as neckties, is critical. As noted, materials like wool, polyester, and acrylic had high binding properties for some species of bacteria. On the other hand, nylon and cotton had lower binding properties making them preferable for neckties. The evidence presented should guide the physicians' decision-making during the purchase of neckties. Lower binding properties mean neckties are less likely to carry and transmit bacteria to patients even when exposed to bacteria. Under the appropriate moisture and temperature conditions, some textiles support microbial growth. They become an important source of bacteria that can contaminate patients and personnel. Physicians always contaminate their work attire, including neckties, when performing activities on patients with bacteria in wounds or urine (Borkow & Gabbay, 2008). As such, prevention is critical, and several strategies have been proposed. Biocidal materials are especially critical in the hospital setting and should have antimicrobial properties. They should also be effective against antibiotic-resistant bacteria such as Methicillin-resistant *S. aureus*. Impregnation using copper oxide is a proposed strategy, as it reduces the transmission properties of different textiles. The oxidation of copper atoms is meant to weaken bacteria as they pull electrons from the atoms making up the cell wall. Eventually, the cell wall breaks, leading to the death of the bacteria. The method has been widely applied, and hospitals embrace copper surfaces in what is known as contact killing. Other heavy metals, such as gold and silver, have extra killing power as they disrupt cell membranes. These metals are more expensive, making copper the most preferable because of its abundance. Its use might reduce the number of hospital-acquired infections, which puts immune-compromised individuals at risk.

A comparison of bacteria-binding properties on different materials was also conducted. In a laboratory setting, researchers used different types of bacteria and materials purchased from the market. Strains of bacteria were introduced into the fabrics, and colony-forming units were then determined after the initial introduction. The results indicated that acrylic and polyester fibers had the highest binding ratios of about 87 and 96 percent, respectively. Figure 3 summarizes the results collected from the five strains of bacteria.

*Pseudomonas aeruginosa*, mostly associated with infections of the blood and lungs after surgery, had the highest binding properties in acrylic, polyester, and wool. Methicillin-resistant *S. aureus* had the highest binding in wool, polyester, and acrylic, indicating that items such as



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ties made with those material could be easily contaminated. Cotton and nylon had the smallest binding ratios, indicating that they might be preferable for attire worn while attending patients. Source (Takashima et al., 2004).

### Discussion

Physician attire should be functional and not endanger patients, but this is not always the case. Patients' attitudes influence how physicians choose to dress. For instance, one study showed that patients preferred formal wear and reported higher satisfaction levels. While scrubs can protect regular clothing from stains and patients from infection, it is not always the attire choice. Doctors choose to project the professional and conservative image associated with a medical practice and don the white coat, shirt, and tie, which has become the physician uniform. For over 100 years, the necktie has been an icon for professionalism. The white coat is symbolic of purity, and in combination with a button-down shirt and necktie is standard formal attire for doctors (Pace-Asciak et al., 2018). Physicians also touch their ties, ensuring that bacteria will be transferred to doctors. However, the concern is that doctor attire can contribute to hospital-acquired infections, with neckties especially concerning because they dangle precariously over places where bacteria lurk.

Nosocomial infections are a problem in most healthcare settings and are especially concerning for immunocompromised individuals. In these settings, the presence of bacteria can result in illnesses contracted in the hospital, which includes blood infections, surgical site infections, respiratory tract infections, and gastrointestinal issues. Nosocomial infections contribute to increased rates of mortality. Extended hospital stays, due to infections, increase healthcare costs that could have been avoided. In addition, some infections are antibiotic-resistant and very hard to treat. Gram-positive bacteria, *E. coli*, *Klebsiella*, *Acinetobacter*, and Methicillin-resistant *S aureus*, pass on genetic material that allows future bacteria to become drug resistant. Concern about the spread of the bacteria warrants the elimination of objects that might be considered fomites and have no function in a hospital setting. Given that getting rid of neckties does not undermine most patients' confidence in their physicians, it is prudent to eliminate them.

Evidence from research indicates that in the hospital setting, coughs, sneezes, touching with hands, food particles, and patients contribute to bacterial infestation. Most articles analyzed reveal that neckties are rarely laundered as they are considered clean even when they are contaminated. Some physicians could not remember the last time they had washed their neckties, while those that could estimate mentioned seventy-three days. Wearing a necktie

for two months is cause for alarm. The colony-forming bacterial units on the ties were higher than those on shirts which represents a greater risk of potential infection (Lopez et al., 2009). In addition, ties come into contact with patients during routine checkups, a factor that could contribute to increased infections among patients. Even with rigorous sanitation protocols in hospital settings, failure to take care of the doctor's attire might contribute to hospital-acquired infections.

Having determined that ties do have bacterial infestations, it was critical to determine whether the germs can be transmitted to patients. The study by Weber et al. (2012) simulated physician-patient interaction and determined that microorganisms can be transmitted from physician to patient. Even though hand washing has been instrumental in decreasing the incidence of bacterial transmission, ties do contribute to the process. Hanging objects such as lanyards and stethoscopes can also be colonized. When patients touch the objects, bacteria are introduced, thus increasing the likelihood of infection. In the Weber et al. (2012) study, deliberate contamination was accomplished by touching the tie to the dummy which resulted in a significant increase in colony-forming units. While conducting examinations, clinical activities often involve touching and leaning over the patient, increasing the probability of bacterial transfer.

Survival of bacteria at room temperature also affects bacterial transfer. Polyester proved to be the most dangerous material to be used in a hospital setting; some species of bacteria survived for two hundred and six days. On cotton, bacterial survival was as long as 90 days. With elevated humidity levels, bacterial survival rate increased. Contaminated textiles are a transmission source. Changing the material to copper may be more expensive, but it is most preferable because of its abundance. Its use might reduce the number of hospital-acquired infections.

Putting a halt to nosocomial infections involves tough measures in disinfection and eliminating fomites, especially ones not needed for service delivery. The hospital setting had different fomites which attribute to the spread of bacteria from physicians to patients. Neckties are especially concerning as they seem to be unnecessary objects that increase the chances of infection. Doctors who rarely wash their ties pose a great risk to patients who are already immune compromised. The call to ban neckties is to protect vulnerable individuals exposed to hospital-acquired infections. Given that patients do not have a problem with physicians losing their neckties, enforcing this measure and protecting those visiting hospitals from infections is prudent.

### Future Research

The research covered most issues related to bacterial contamination from physician neckties. These include reasons for the difficulties in changing the dress code worn by doctors for centuries. Other issues found were how neckties contributed to the spread of bacteria in the hospital setting. In addition, there was an exploration of how different textiles used in making ties contribute to bacteria survival rates. Other factors, such as bacterial binding, were also explored in the research.

Since the study is directed toward nosocomial infections by bacterial contamination, future research should also cover viruses and fungi. Given the recent pandemic, the Covid-19 virus became a reason for increased mortality, especially among patients with comorbidities. Chances of physician-to-patient virus transfer are high, given that it can stay on surfaces for a long time. An investigation into neckties' role in spreading viral and fungal infections would serve as an important point for the debate on eliminating neckties in the hospital setting. Further research may include other common objects such as pens, lanyards, stethoscopes, and blood pressure machine cuffs used from patient to patient. Their ability to spread bacteria might contribute to increased hospital infections.

In addition, methods of preventing bacterial contamination should be explored. In this study, the impregnation of textiles with metals such as copper and silver was somewhat effective in eliminating some bacteria. Further research can establish ways that can be used to reduce bacterial infestation, especially antibiotic-resistant.

### Conclusion

The patient-physician relationship dynamic is based on trust and the Hippocratic Oath. Patients trust that physicians will deliver the appropriate care and not harm them during healthcare visits. Neckties are crucial for physicians to represent themselves professionally. However, they do not add to physicians' trust levels. Their ability to carry disease-causing pathogens makes them likely to hinder patients' trust in their doctors. Nosocomial infections can be costly for healthcare and lead to increased morbidities and mortalities. Therefore, physicians should avoid neckties that contribute to increased infections because of the pressure to reduce hospital-acquired infections. While other vectors of pathogen delivery can be disinfected through cleaning and antiseptics, neckties pose a challenge. Physicians move with the neckties from patient to patient, making it likely that bacteria will be acquired. In addition, the materials used have properties that make neckties possible bacterial breeding grounds.

The survival rate of bacteria also varied with the type of material and the species of bacteria. Bacteria that can survive up to three months can infect more patients. If physicians are to wear neckties, selecting materials that do not allow the survival of bacteria is the best choice. These include materials such as cotton and nylon that had the lowest bacterial binding ratios of all the materials. The introduction of silver and copper oxide nanoparticles into different materials is meant to reduce the antimicrobial load on health worker uniforms. The procedure is effective on some strains of bacteria and can be used on neckties to make them bacterial-resistant. Cotton and polyester neckties can be coated with cationic copper that endows them with potent broad-spectrum antibacterial properties. The process makes it safer for doctors to have neckties in the workplace as it is an innovative weapon in fighting against hospital-acquired infections. The downside is that such neckties might be more expensive and ineffective when bacteria become resistant. Factors that make it possible for bacteria to thrive, such as high moisture content and lower temperatures, should also be checked. Physicians should avoid situations that result in increased colonization of bacteria.

The remaining alternative is the ban on wearing neckties. It has been proven beyond reasonable doubt that neckties can harbor and aid in transmitting bacteria between physician and patient. These healthcare workers become mobile spreaders of infection and can affect even the most vulnerable patients. The call to ban neckties is well-informed and should be implemented for the safety of patients. Physicians should also not dwell on the traditional professional look, as safety comes first in healthcare settings.

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