

The potential role of accessories and mobile communication devices in the transmission of nosocomial pathogens

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Tuen Mun Hospital

Contact transmission

- Hands of HCWs => Hand hygiene

 - Patient-care devices
 (eg. thermometers)
 - Instruments => Disinfection and
 sterilization
 - Environment
-

Personal accessories

- ❑ ? Harbour nosocomial pathogens
 - ❑ ? Prevent proper hand hygiene practices
 - ❑ ? Cannot be effectively disinfected
 - ❑ Common accessories Eg. Watches, rings
-

Wristwatches in Healthcare settings



Wristwatches in Healthcare settings



“BARE BELOW THE ELBOWS”

Clinical value of a wristwatch

Trusts are about to implement a “bare below the elbows” dress code policy for doctors. This includes the banishing of wristwatches from “clinical areas.”^{1 2} There is no evidence that wristwatches are carriers of infection. It has been proposed, but not shown, that watches may impair handwashing.¹ Little account has been made of the clinical benefits of a wristwatch. Most beds and examination couches in hospitals do not currently allow sight of a clock.

- ❑ 20 HCWs were assessed for their ability to carry out basic clinical observations (Pulse and RR) without the use of a second hand
- ❑ 9 senior medical students, 6 junior doctors, 1 consultant, and 4 trained nurses
- ❑ All participants would have failed an undergraduate objective structured clinical examination (OSCE) station
- ❑ Only one participant gave values for each reading that would not have been potentially dangerous in a clinical setting

Wristwatches in Healthcare settings



MMWRTM

Morbidity and Mortality Weekly Report

Recommendations and Reports

October 25, 2002 / Vol. 51 / No. RR-16

Guideline for Hand Hygiene in Health-Care Settings

**Recommendations of the Healthcare Infection Control Practices
Advisory Committee and the HICPAC/SHEA/APIC/IDSA
Hand Hygiene Task Force**



**World Health
Organization**

Patient Safety

A World Alliance for Safer Health Care

WHO Guidelines on Hand Hygiene in Health Care

**First Global Patient Safety Challenge
Clean Care is Safer Care**

World Health Organization (WHO) Hand Hygiene Guideline Recommendations Comparison with Centers for Disease Control and Prevention (CDC) Guidelines

II. Hand hygiene technique (non-surgical) (continued)			
Recommendation	CDC Guideline	WHO Guideline	Key Points of WHO Guideline
F. Use of antimicrobial-impregnated wipes as hand hygiene alternative	F. (IB) May use as alternative to non-antimicrobial soap and water. Do not use as alternative to antimicrobial soap and water or to alcohol hand rub	F. No comment	
G. Use of bar, liquid, leaf, or powder soaps. May use if using non-antimicrobial soap and water. Bar soap should be small size and sit on drainage rack.	G. (II) Recommend	G. (II) Recommend	
III. Surgical hand preparation			
Recommendation	CDC Guideline	WHO Guideline	Key Points of WHO Guideline
A. Remove visible dirt before preparation	A. No comment	A. (II) Wash hands with soap and water	Emphasizes removal of visible dirt prior to surgical preparation
B. Clean fingernails using nail cleaner before preparation	B. (II) Recommend	B. (II) Recommend; clean under running water	
C. Design handwashing sink to minimize splashing	C. No comment	C. (II) Recommend	Recommends evaluating sink design; faulty faucet aerators have been associated with contamination of handwashing water
D. Remove rings, watches, and bracelets before preparation	D. (II) Recommend	D. (II) Recommend	
E. Artificial nails prohibited	E. Recommend; for high-risk patients (e.g., in intensive-care unit or operating room)	E. (IA) Recommend; for direct contact with all patients	Expands prohibition of artificial nails; associated with changes in normal flora and impede proper hand hygiene

Uniforms and workwear: Guidance on uniform and workwear policies for NHS employers

Published date:
26 March 2010

Poor practice – evidence-based

Poor practice	Why	Source
Go shopping in uniform, or engage in other activities outside work.	Even though there is no evidence of infection risk, people perceive there is one.	TVU2
Wear false nails during patient care activity.	False nails harbour micro-organisms and make effective hand hygiene more difficult.	HHTF
Wear any jewellery, including a wrist-watch, on the hands or wrists during direct patient care activity (local policies may allow a plain ring such as a wedding ring).*	Jewellery and watches can harbour micro-organisms and make effective hand hygiene more difficult.	HHTF

Wristwatches in Healthcare settings

Bacterial colonization of wristwatches worn by health care personnel

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We examined bacterial colonization of wristwatches worn by 100 health care personnel in a community-teaching hospital. Seventy-eight percent of the wristwatches were colonized with bacterial skin flora, with only 1 of the 100 watches growing a potential pathogen, *Staphylococcus aureus*. Watches are unlikely to be sources of health-care associated pathogens.

Key Words: Wristwatches; bacterial colonization; health care personnel.

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(*Am J Infect Control* 2009;37:476-7.)

Bacterial colonization with potential health care-associated pathogens of a variety of objects worn or used by health care personnel (HCP) has been extensively documented in the literature over the past 2 decades. In most instances, none of these colonized objects has been epidemiologically linked to outbreaks of health care-associated infections.¹ Only bacterial colonization of artificial fingernails has been implicated in outbreaks of infection.²

Several studies, however, have demonstrated that skin underneath rings is more heavily colonized than comparable areas of skin on fingers without rings.^{3,4} With these data in mind, Hartley et al have suggested that wristwatches may not only be colonized with pathogens but may also impair important and appropriate hand hygiene.⁵

In 2007, the British Department of Health, which sets standards for infection prevention practices in the United Kingdom, implemented a "bare below the elbows" dress code policy for HCP.⁶ The policy specifically prohibits the wearing of wristwatches in clinical areas. No epidemiologic study in the hospital setting has supported this new policy to the best of our

knowledge, and data on bacterial colonization of wristwatches are sparse, with no study available from the hospital setting. One small study of wristwatches of 20 dentists found that 7 of their wristwatches were colonized with *Staphylococcus aureus*. No direct association with clinical infection was mentioned.⁷ The issue of bacterial colonization of wristwatches is not trivial because they are worn close to the hands by design and could serve as unrecognized reservoirs of bacteria that would likely be unaffected by usual hand hygiene. We report a study of bacterial colonization of wristwatches among HCP in a 550-bed community-teaching hospital.

METHODS

A convenience sample of 100 HCP that included attending physicians, resident physicians, floor nurses, and intensive care unit nurses volunteered for this study in 2007. The Institutional Review Board of the Moses Cone Health System approved the study and exempted it from informed consent. All results were deidentified for each volunteer. The study subjects completed a questionnaire about their hand hygiene

Wristwatches in Healthcare settings

- ❑ 100 HCWs recruited (12 attending physicians, 39 resident physicians, 24 intensive care unit nurses, and 25 floor nurses)
 - ❑ Completed a questionnaire about their hand hygiene and wristwatch-wearing practices
 - ❑ Removed the wristwatch, and the front and back of the watches were cultured separately
-

Wristwatches in Healthcare settings

- ❑ 80% worn the tested watches for >6 months
 - ❑ 89% wearing them every day at work
 - ❑ 72% used the same wristwatches daily
-

Wristwatches in Healthcare settings

Table 1. Bacterial colonization of wristwatches worn by 100 health care personnel

Type of bacterial growth	No. of wristwatches with bacterial growth from 100 HCP
Bacterial skin colonizers*	77
Methicillin-susceptible <i>Staphylococcus aureus</i> (MSSA)	1
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	None
Aerobic gram-negative bacilli	None
No growth	22

*Coagulase-negative staphylococcus/diphtheroids/alpha hemolytic streptococci/bacillus species.

Table 2. Type of common bacterial skin organisms colonizing health care personnel wristwatches

Bacterial organisms	Percentage of the 100 cultured wristwatches
Coagulase-negative staphylococcus	26
Diphtheroids	12
Alpha hemolytic streptococci	23
Bacillus species	16

- 78% watches cultured had bacterial growth
- 77 was common skin colonizers
 - Eg. CoNS, alpha hemolytic streptococci, diphtheroids, and bacillus species
- No GNR were isolated
- The only potential pathogen recovered was MSSA from a single watch

Wristwatches in Healthcare settings

- ❑ Wristwatches worn by HCWs appear to be colonized with bacteria of low pathogenicity
 - ❑ May not be an important sources for HAIs in usual clinical settings
-

Wristwatches in Healthcare settings

Journal of Hospital Infection (2010) 74, 16–21



Available online at www.sciencedirect.com



www.elsevierhealth.com/journals/jhin

Wristwatch use and hospital-acquired infection

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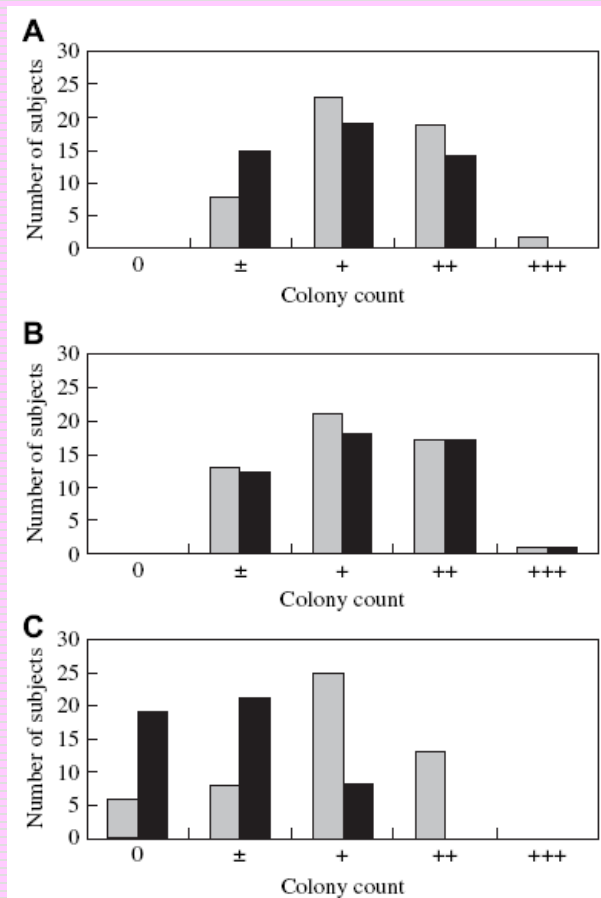
Wristwatches in Healthcare settings

- To determine the contamination of wrists and hands among wristwatch (ww) wearers and non-wristwatch (n-ww) wearers
 - In the first part (N=100; 52 ww wearers and 48 n-ww wearers), wrists were sampled by swabs and hands by direct plate inoculation
 - In the second part (N=155; 85 ww wearers and 70 n-ww wearers), wrists and hands were sampled after each HCW removed the watch immediately prior to sampling
-

Wristwatches in Healthcare settings

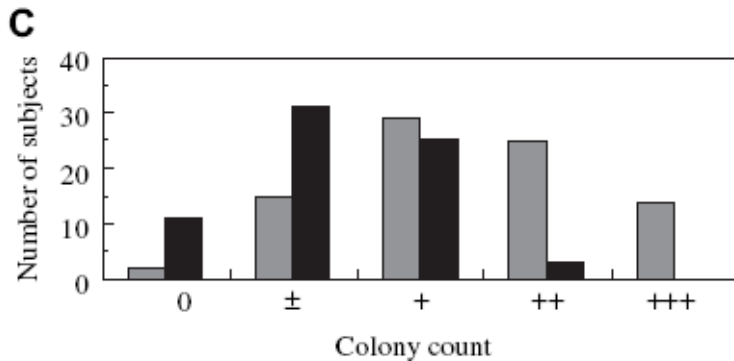
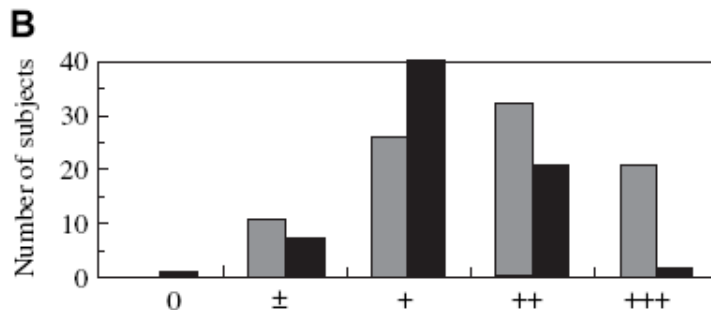
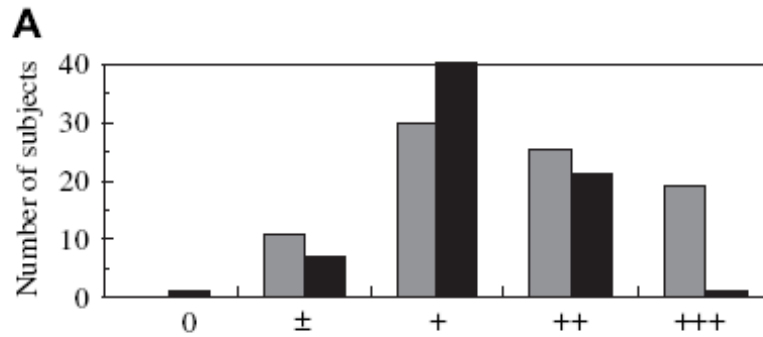
- Semi-quantitative bacterial colony counts recorded in comparison with a visual scale
 - '0' indicated no bacterial growth
 - '+ -' scanty growth
 - '+' light growth
 - '+ +' moderate growth and
 - '+ + +' heavy growth
-

First part



- Watch wearers had a greater no. of bacteria on their wrist ($P < 0.001$)
- The no. of bacteria on their hands was not significantly increased

Second part



- The watches were removed by the HCW immediately before sampling
- The amount of bacteria on both hands and the watch wrist was significantly increased in watch wearers compared with non-watch wearers ($P < 0.001$)

Wristwatches in Healthcare settings

- ❑ Wristwatch wearing in HCWs is associated with increased bacterial colonisation of wrists, but not of the hands
 - ❑ Removing the watch may easily transfers wrist bacteria on to the hands
 - ❑ The risk of hand contamination stems from manipulating the watch
-

Summary-wristwatches

- Wristwatches are useful for HCWs in estimating important vital signs
 - Further studies would be required to determine the role in HAIs
 - A ban on wristwatches must be provided with adequate resources
 - Eg. Sight of a clock at bedside
 - Otherwise may increase the use of devices such as watch fobs or pocket watches
-

Rings



- Fashion
 - Sentimental reasons
-

CDC

- No recommendation can be made regarding wearing rings in health-care settings. Unresolved issue.
-

WHO Guideline

The consensus recommendation is to strongly discourage the wearing of rings or other jewellery during health care. If religious or cultural influences strongly condition the HCW's attitude, the wearing of a simple wedding ring (band) during routine care may be acceptable, but in high-risk settings, such as the operating theatre, all rings or other jewellery should be removed.²⁶⁰ A

simple and practical solution allowing effective hand hygiene is for HCWs to wear their ring(s) around their neck on a chain as a pendant.

Uniforms and workwear: Guidance on uniform and workwear policies for NHS employers

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Wear any jewellery, including a wrist-watch, on the hands or wrists during direct patient care activity (local policies may allow a plain ring such as a wedding ring).*	Jewellery and watches can harbour micro-organisms and make effective hand hygiene more difficult.	HHTF

Rings in Healthcare settings

MAJOR ARTICLE

Impact of Ring Wearing on Hand Contamination and Comparison of Hand Hygiene Agents in a Hospital

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Hand Hygiene in a Hospital • CID 2003:36 (1 June) • 1383

Rings in Healthcare settings

- Rush Presbyterian Saint Luke's Medical Center's (Chicago, IL) 27-bed surgical ICU from 21 November 2000 through 5 March 2001 were eligible for enrollment.
 - A sealed envelope was opened that randomly determined the first hand to be sampled and the method of hand hygiene to be used
 - The first hand was sampled by means of a modified "glove juice" method, rinsed, and dried.
 - Then the nurse performed hand hygiene by one of the following methods:
 - 1) unmedicated soap, rinsed, and then dried with paper towels;
 - 2) 2.0 mL of a 62% ethyl alcohol-based gel was applied to the hands, and hands were rubbed until dry;
 - 3) a medicated hand wipe included 0.1% benzalkonium chloride (Procter&Gamble). was rubbed on the hands for 30 s.
 - Glove juice bags were prepared by aseptically transferring 75 mL of autoclaved sampling solution into sterile sample bags
 - The nurse's hand was immersed in the bag, and the palm and each finger were massaged through the bag for 30 s. After sampling, the sampling solution was filtered. The filter was moistened with 2 mL of PBS (pH, 7.2), and the retained organisms were resuspended by means of a sterile loop
 - Data were collected:
 - skin condition (hands were visually inspected and scored on a scale from 1 ["no scaling"] to 5 ["very scaly"])
 - dominant hand
 - glove use immediately before sampling
 - presence of cuts on the hand,
 - fingernail length (classified as long [i.e., extending beyond the fingertip] or short])
 - presence of fingernail applications
 - number of assigned patients
 - contact with the patient's skin during the care episode immediately before hand sampling
 - duration of time worked during the shift when hand sampling was performed
 - self-reported time of most recent hand washing episode.
-

Rings in Healthcare settings

- Assess the risk factors for hand contamination and compare the efficacy of 3 hand hygiene agents among surgical ICU nurses
 - The hands of 66 nurses had been sampled for a total of 282 sampling episodes

 - Detailed ring information available for 464 (82%) of 564 hands sampled
 - Presence and number of rings (No ring, 1 ring, >1 ring)
 - Frequency of ring wearing: Worn at home and removed at work OR at both home and work
 - Ring characteristics (Smooth, Set with gemstones, etched with a pattern)
-

Rings in Healthcare settings

- Ring wearing was found to be a risk factor for hand contamination for each organism category (except MRCNS)
 - A stepwise increase in the risk by any transient organism with the number of rings worn

 - “Transient organisms” -those present on <50% of all nurses’ hands (all organisms except MRCoNS)
-

Rings in Healthcare settings

Table 3. Results of multivariable analysis of the efficacy of 3 hand hygiene methods and of independent risk factors for hand carriage of potential pathogens, by organism category, in a group of surgical intensive care unit nurses.

Variable	Yeast		<i>Staphylococcus aureus</i>		Gram-negative bacilli		Any transient organism ^a	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Evaluation of hand hygiene methods (n = 282)								
Plain soap and water	1.0	—	1.0	—	1.0	—	1.0	—
Medicated hand wipe ^b	1.2 (0.4–3.6)	.74	1.8 (0.5–5.9)	.36	0.7 (0.2–2.3)	.52	0.9 (0.5–1.6)	.79
Alcohol hand rub ^b	0.4 (0.1–1.5)	.16	0.9 (0.3–2.3)	.75	0.2 (0.1–0.9)	.04	0.3 (0.1–0.8)	.02
Contamination of opposite hand	17 (6.8–42)	<.001	10 (3.3–31)	<.001	6.2 (1.8–22)	.004	3.8 (1.8–8.0)	<.001
Presence of >1 ring	—	—	—	—	2.6 (0.9–7.5)	.08	2.0 (0.9–4.7)	.10
Risk factors for hand contamination (n = 564)								
Ring(s) present	2.8 (1.3–6.2)	.01	2.1 (1.0–4.4)	.05	2.9 (1.5–5.8)	.002	3.0 (1.8–4.9)	<.001
Touched patient	2.8 (1.7–4.6)	<.001	—	—	—	—	—	—
Poor skin condition	—	—	1.6 (1.0–2.7)	.07	—	—	1.5 (1.0–2.2)	.04
Use of alcohol hand rub	0.3 (0.1–0.9)	.03	—	—	0.4 (0.1–1.1)	.09	0.3 (0.2–0.6)	<.001

^a Included all organisms except methicillin-resistant coagulase-negative staphylococci.

^b Results for medicated hand wipe use and alcohol-based hand rub use were compared with results for hand washing with plain soap and water.

Rings in Healthcare settings

- ❑ Wearing rings only at home was not a risk factor for contamination with any transient organism (OR, 0.7; 95% CI, 0.4–1.3)
 - ❑ Wearing rings at home and work was an independent risk factor (OR, 2.6; 95% CI, 1.6–4.3)
 - ❑ Hand contamination was not associated with any ring characteristic
 - ❑ After hand hygiene, hand contamination with any transient organism was more likely among nurses who wore rings
-

Rings in Healthcare settings



Available online at www.sciencedirect.com



International Journal of Nursing Studies 45 (2008) 1572–1576

INTERNATIONAL JOURNAL OF
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A prospective comparative study of the relationship between
different types of ring and microbial hand colonization
among pediatric intensive care unit nurses

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Rings in Healthcare settings

- 84 ICU nurses were recruited (n=28 each)
 - Without a ring
 - Wearing a plain type wedding ring (WR)
 - Wearing a ring with a stone (RWS)

 - Ask to wear rings continuously for at least 15 days before the beginning of the study
 - Cultures were obtained from hands wearing rings at the end of the duty and just after hand disinfection
 - Hands of the same side from nurses without rings were sampled
-

Rings in Healthcare settings

- ❑ The colony counts of total, Gram-positive and Gram-negative bacteria were compared
 - ❑ Most prominent Gram-positive bacteria in transient flora were *S. aureus* and *Enterococcus* spp.
 - ❑ Isolated Gram-negative bacteria included *Acinetobacter* species, *Enterobacter* species, *Pseudomonas* species, *Klebsiella* species, *Stenotrophomonas maltophilia*, *E. coli*, *Serratia*, *Proteus mirabilis*
-

Rings in Healthcare settings

- Ring wearer had more Gram-positive (top), Gram-negative (middle) and total (bottom) bacterial colonization than those without rings despite using an alcohol-based rub ($p = 0.001$)
- Colony counts of Gram-positive, Gram-negative and total bacteria did not differ among WR and RWS groups ($p > 0.05$)

Groups	N	Cfu/ml	p	
Nurses with plain wedding ring	28	26.6±14.7	0.7	0.001
Nurses with ring with stone	28	27.2±12.0		
Nurses without ring	28	5.8±7.1		0.001

Groups	N	Cfu/ml	p	
Nurses with plain wedding ring	28	12.0±13.1	0.4	0.001
Nurses with ring with stone	28	13.3±14.7		
Nurses without ring	28	0.4±0.2		0.001

Groups	N	Cfu/ml	p	
Nurses with plain wedding ring	28	38.5±17.3	0.05	0.001
Nurses with ring with stone	28	40.5±20.0		
Nurses without ring	28	6.2±7.1		0.001

Rings in Healthcare settings

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY MARCH 2007, VOL. 28, NO. 3

ORIGINAL ARTICLE

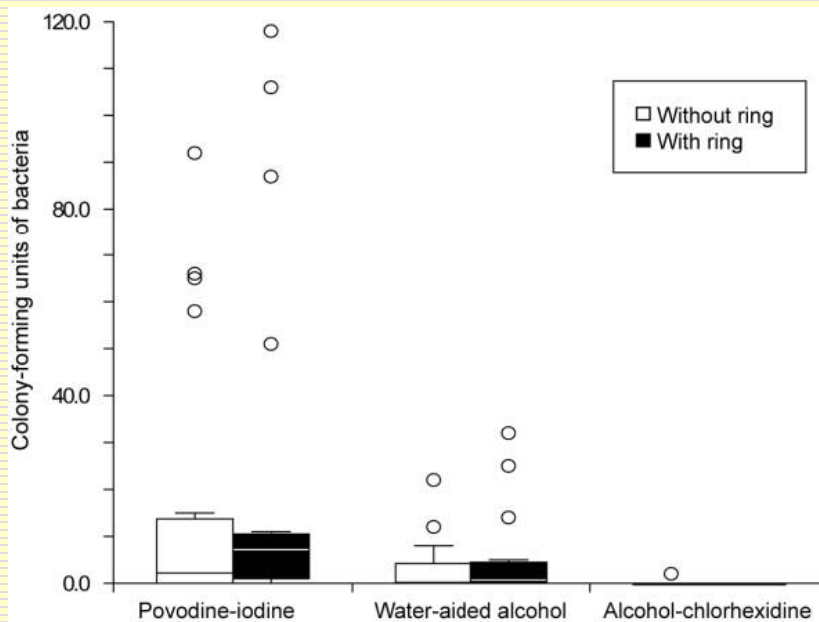
Influence of Rings on the Efficacy of Hand Sanitization and Residual Bacterial Contamination

Montri D. Wongworawat, MD; Sidney G. Jones, MD

Rings in Healthcare settings

- ❑ 60 volunteer subjects wore a ring on 1 finger of either hand were chosen from peri-operative staff and medical students
 - ❑ Randomly assigned to use hand sanitizers
 - Povidone-iodine scrub,
 - Water-aided alcohol wash (Triseptin; Healthpoint),
 - Waterless alcohol-chlorhexidine lotion (Avagard; 3M HealthCare)
 - ❑ Samples of hand flora were obtained using a modified “glove juice” technique
 - ❑ Samples from the ringed and non-ringed hands of each subject were obtained for culture,
 - ❑ Comparing the no. of CFUs from the ringed hand with the number from the non-ringed hand of each subject
-

Rings in Healthcare settings



- No significant difference in no. of bacteria between hands with and hands without rings for the groups that used alcohol wash or alcohol-chlorhexidine lotion
- For the povidone-iodine group, the number of bacteria on hands with rings > the number on hands without rings ($P < .05$)



Wedding rings are not a significant source of bacterial contamination following surgical scrubbing

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ABSTRACT

INTRODUCTION Despite some evidence that the wearing of rings may increase the microbial load, there is currently nothing to suggest that viable bacteria remain following a standard surgical scrub. The aim of the study was to examine the distribution and type of microbial flora seen on the hands of doctors following a standard surgical scrub.

MATERIALS AND METHODS Ten surgeons and 10 anaesthetists, all of whom wore wedding rings on the fourth finger of their left hand, participated in the study. Each individual was asked to 'scrub-up' as for their normal first scrub of the day. Following completion of washing, the wedding ring was removed, its internal circumference swabbed and the swab placed in a culture medium. Volunteers placed each hand palm-down on separate agar plates. The plates were incubated and the number of colonies counted and classified.

RESULTS The culture plates of one of the anaesthetists were damaged in transit leaving a total of 19 subjects for analysis. In all the palm imprint plates, coagulase-negative staphylococci were grown. One surgeon grew coagulase-negative staphylococci from the ring swab. A *Candida* spp. from the right hand of one surgeon was grown. There was no statistically significant difference between the number of colony-forming units (CFUs) cultured from the right and left (ring-wearing) hands of the surgeons ($P = 0.260$) and anaesthetists ($P = 0.345$). There was no statistical difference in CFUs when surgeons were compared with anaesthetists ($P = 0.383$ for right hand and $P = 0.234$ for left).

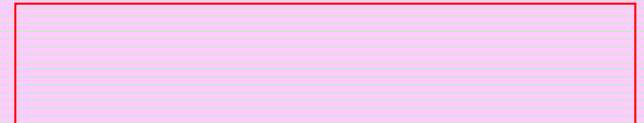
CONCLUSIONS This preliminary study would suggest that a traditional band wedding ring is not a source of a bacterial load following a standard surgical scrub procedure and, as such, there is no requirement for their removal pre-operatively.

Summary-rings

- ❑ Ring wearing may increase the bacterial colonization of hands, even after hand disinfection
- ❑ The type of ring may not affect the level of hand colonization
- ❑ Wearing any kind of ring should be avoided during patient care, especially in high risk areas eg. ICU
- ❑ Consider alternatives eg. remove rings at work, wear them around the neck on a chain

Stethoscopes in Healthcare settings

- A medical device, often carried by HCWs as personal belongings
- Come into patient contact almost as frequently as hands



Stethoscopes in Healthcare settings

Stethoscopes: A Potential Vector of Infection?

ANNALS OF EMERGENCY MEDICINE 28:3 SEPTEMBER 1995

- A prospective, cross-sectional analysis in the ED of a 700-bed teaching hospital and Level I trauma center
 - 150 HCWs
 - Emergency medicine house staff and attending physicians (n=50),
 - ED nurses (n=50),
 - Pre-hospital personnel (n=50)
-

Stethoscopes in Healthcare settings

Table.

Study results by group.

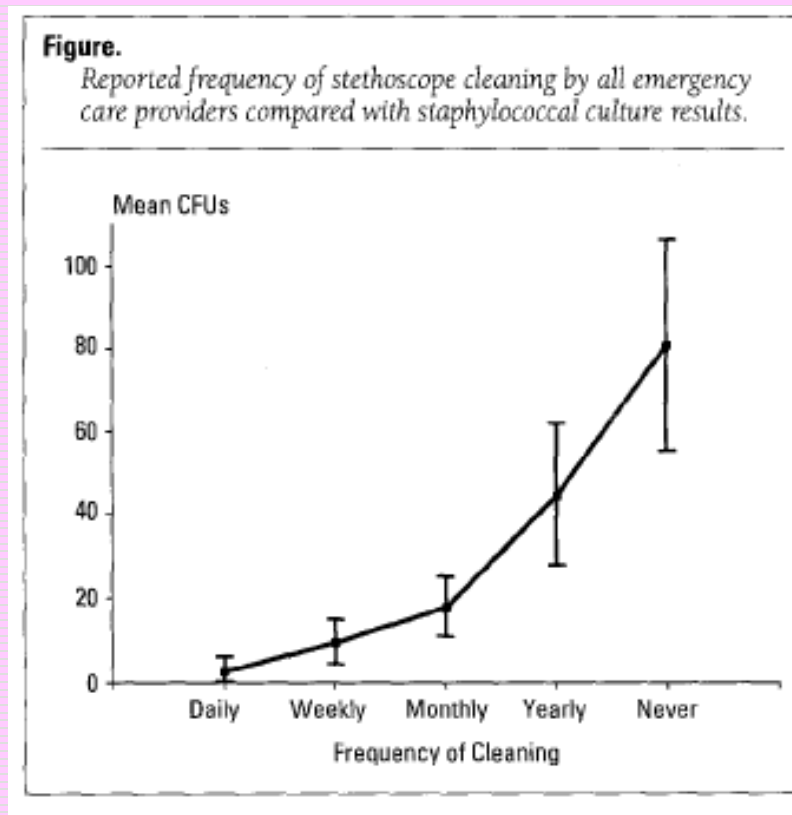
Parameters	No. of Physicians (%) [n=50]	No. of Nurses (%) [n=50]	No. of EMS Personnel (%) [n=50]
Cleaning schedule			
Never	3 (6)	2 (4)	5 (10)
Yearly	4 (8)	3 (6)	4 (8)
Monthly	15 (30)	21 (42)	20 (40)
Weekly	14 (28)	10 (20)	11 (22)
Daily	14 (28)	14 (28)	10 (20)
CFUs			
Staphylococcal colonies*	52.3±78	13.0±21	45.7±92
Range	6-300	0-120	0-500
<i>S aureus</i> colonies*	2.0±4.1	4±2.8	3.1±3.9
% <i>S aureus</i>	3.8	3.1	6.8

*Data expressed as mean±SD.

- How often were they cleaned?
- Daily or weekly, 48% (74 of 150)
- 37% monthly
- 7% yearly
- 7% never
- None cleaned the stethoscope after every patient

Stethoscopes in Healthcare settings

- Culture each stethoscope by pressing the diaphragm on mannitol salt agar
- 89% of 133 stethoscopes grew staphylococci
- Most were CoNS
- 25 stethoscopes (19%) yielded *S aureus*
- The mean number of staphylococcal CFUs markedly increased as the stethoscopes went for longer periods of time between cleanings



Stethoscopes in Healthcare settings

The screenshot shows a Windows Internet Explorer browser window. The address bar contains the URL: <http://www.ncbi.nlm.nih.gov/pubmed?term=How%20clean%20are%20our%20stethoscopes%20and%20do%20we%20need%20to%20clean%20them%20?>. The search bar contains the text "pubmed". The browser's toolbar includes various icons for search engines (Google, Yahoo!, Ask), social media (Facebook), and other services (Amazon, YouTube). The main content area displays the search results for the article "How clean are our stethoscopes and do we need to clean them?". The article is from the journal *J Infect*, 2008 Oct;57(4):355-6. The authors listed are Bandi S, Uddin L, Milward K, Alivu S, and Makwana N. The article is available as a full-text article from Elsevier. The browser's taskbar at the bottom shows several open applications, including Yahoo! Home, How clean..., accessories, Microsoft P..., Adobe Rea..., CH, and the system clock showing 15:36.

How clean are our stethoscopes and do we need to cl... [J Infect. 2008] - PubMed - NCBI - Windows Internet Explorer

http://www.ncbi.nlm.nih.gov/pubmed?term=How%20clean%20are%20our%20stethoscopes%20and%20do%20we%20need%20to%20clean%20them%20? Yahoo! 搜尋

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J Infect. 2008 Oct;57(4):355-6. Epub 2008 Sep 11.

How clean are our stethoscopes and do we need to clean them?

Bandi S, Uddin L, Milward K, Alivu S, Makwana N.
Sandwell General Hospital, West Bromwich B71 4HJ, UK. seenu_dr@hotmail.com

PMID: 18789536 [PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Substances

LinkOut - more resources

Related citations

A strategy to reduce MRSA colonization of stethoscopes. [J Hosp Infect. 2006]

Why, when and how to clean stethoscopes. [J Hosp Infect. 1998]

Staphylococcus aureus and stethoscopes. [Med J Aust. 2003]

Review Towards evidence based emergency medicin [Emerg Med J. 2008]

Review Minimising cross-infection risks associated with beds [Nurs Times. 2005]

See reviews... See all...

Related information

Related Citations

Substance (MeSH Keyword)

開始 Yahoo! Ho... How clean ... accessories Microsoft P... Adobe Rea... CH 100% 15:36

Stethoscopes in Healthcare settings

- A paediatric hospital based studies

 - 40 stethoscopes were sampled for cultures
 - 20 personal stethoscopes from paediatricians (consultants, registrars and other junior doctors)
 - 20 ward based stethoscopes (12 from the NNU, 4 from PN ward, 3 from labour ward, 1 from the labour ward theatre)
-

Stethoscopes in Healthcare settings

- How often were they cleaned?
- Interval of cleaning varies from once daily to have never been cleaned

Table 1 Colony-forming unit of stethoscopes according to the frequency of cleaning

No.	Interval of cleaning	No. of samples	Total colony count	Median (IQR) CFU
1	1–3 Days	19	458	13 (4.5–24)
2	1–3 Weeks	6	95	11.5 (6.5–20.25)
3	Can't remember when last cleaned	8	86	9 (4.5–14.25)
4	Never cleaned	7	818	100 (17.5–129)

Stethoscopes in Healthcare settings

- In another study,
 - 3/ 50 clinicians (6%) unaware of the need to regularly clean their stethoscopes
 - 9 (19%) of the rest 47 clinicians did not clean their stethoscope regularly
 - The median answer was 'weekly'

 - Journal of Hospital Infection 76 (2010) 278-279
-

Stethoscopes in Healthcare settings

- ❑ What bugs was found?
 - ❑ Only 1/50 stethoscopes swabbed was free from bacteria
 - ❑ 6/50 (12%) harboured potential pathogens including MSSA, Pseudomonas spp. and coliforms
 - ❑ C. difficile and MRSA were not isolated
-

Stethoscopes in Healthcare settings

- ❑ 54 doctors' and 7 ward stethoscopes on the medical wards were screened on two separate days at the Leicester Royal Infirmary
 - ❑ The bell and diaphragm of each stethoscope was swabbed with a pre-moistened cotton swab
 - ❑ Inoculated onto *C. difficile* selective agar plate
 - ❑ 3/61 (4.9%) detected *C. difficile*
 - ❑ All of the isolates obtained were from doctors' stethoscopes
 - ❑ [J Hosp Infect.](#) 2009 Oct; 73(2):187-9. Epub 2009 Aug 28.
 - ❑ Stethoscopes: potential vectors of *Clostridium difficile*.
-

Stethoscopes in Healthcare settings



Anaesthesia

Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia, 2009, 64, pages 620-624

doi:10.1111/j.1365-2044.2009.05892.x

Bacterial contamination of stethoscopes on the intensive care unit

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1 ICU Resident, 2 Senior Microbiologist, 3 Consultant Microbiologist, 4 Consultant in Intensive Care Medicine, Hammersmith Hospital, London, UK

Summary

We assessed how often bedside stethoscopes in our intensive care unit were cleaned and whether they became colonised with potentially pathogenic bacteria. On two separate days the 12 nurses attending the bedspaces were questioned about frequency of stethoscope cleaning on the unit and the bedside stethoscopes were swabbed before and after cleaning to identify colonising organisms. Twenty-two health care providers entering the unit were asked the same questions and had their personal stethoscopes swabbed. All 32 non-medical staff cleaned their stethoscopes at least every

Stethoscopes in Healthcare settings

- 12 nurses attending the ICU bedspaces were questioned about frequency of stethoscope cleaning on the unit
- The diaphragm and bell of the stethoscopes were swabbed before and after cleaning, and inoculated onto blood and MacConkey agar plates
- 22 HCWs (10 doctors, 9 PTs, 2 MS and 1 nurse) entering the unit were asked the same questions and had their personal stethoscopes swabbed

Stethoscopes in Healthcare settings

- ICU nurse: at least once during their current shift
 - 20/22 (91%) cleaned it every time it was used
 - 2/22 (9%) cleaned it at the start of their shift
- Medical staff (10 doctors and 2 medical students) cleaned their personal stethoscopes infrequently
 - 3 (25%) daily or after every use
 - 3 (25%) every one to 6 months
 - 2 (17%) never

Frequency of cleaning	After every use	At least every day	At least every week	At least every month	Every 1–6 monthly	Never
ICU bedside stethoscopes						
ICU nurses (<i>n</i> = 22)	20	2	0	0	0	0
Personal stethoscope of visitors to the ICU						
Doctors (<i>n</i> = 10)	3	0	1	3	1	2
Medical students (<i>n</i> = 2)	0	0	0	2	0	0
Physiotherapists (<i>n</i> = 9)	9	0	0	0	0	0
Nurses (<i>n</i> = 1)	1	0	0	0	0	0

Stethoscopes in Healthcare settings

- 29/46 use isopropyl alcohol swabs
 - 8/46 applied alcohol gel
 - 1/46 used soap and water
 - 7/46, who were all ICU nurses, use detergent wipes designed for cleaning hospital equipment
-

Stethoscopes in Healthcare settings

- 5/46 (11%) diaphragms were colonized with potentially pathogenic bacteria, which fell to 2% after cleaning
 - 10/46 (22%) earpieces were colonised with potentially pathogenic bacteria, which fell to 7% after cleaning
-

Table 2 Culture results from stethoscopes pre- and postcleaning. Antibiotic sensitivities in brackets.

	Diaphragm precleaning	Diaphragm postcleaning	Ear pieces precleaning	Ear pieces postcleaning
ICU bedside stethoscopes (n = 24)				
No growth	8	10	6	8
Skin flora only	14	13	13	15
Pathogenic bacteria	2	0	5	1
Organisms cultured and significant antibiotic sensitivities	BS 8 – <i>A. iwoffi</i> (fully sensitive) BS 24 – <i>A. baumannii</i> (panresistant – S to colistin only)		BS 3 – MRSA (R methicillin, penicillin) BS 8 – <i>A. radioresistans</i> (R ceftazidime) BS 11 – <i>A. iwoffi</i> (fully sensitive) BS 13 – <i>A. iwoffi</i> (fully sensitive) BS 14 – <i>A. iwoffi</i> (fully sensitive)	BS 3 – MRSA (R methicillin, penicillin)
Personal stethoscopes (n = 22)				
No growth	1	5	0	2
Skin flora only	18	14	17	18
Pathogenic bacteria	3	2	5	2
Organisms cultured and significant antibiotic sensitivities	PS 7 – MRSA (R – all Beta-lactams, gentamicin, S – teicoplanin, vancomycin) PS 7 – <i>Enterobacter cloacae</i> (R – Cephalosporin) PS 12 – <i>A. baumannii</i> (S – carbapenems, colistin) PS 22 – <i>S. aureus</i> (S – methicillin, R- penicillin, fusic acid) PS 22 – <i>Stenotrophomonas maltophilia</i> (S – piperacillin and tazobactam only)	PS 7 – MRSA (R – all Beta-lactams, gentamicin, S – teicoplanin, vancomycin) PS 22 – <i>Stenotrophomonas maltophilia</i> (S – piperacillin and tazobactam only)	PS 2 – <i>S. aureus</i> (S methicillin R penicillin, fusidic acid) PS 11 – <i>Pseudomonas leuteola</i> (S – piperacillin and tazobactam) PS 12 – <i>A. baumannii</i> (S – carbapenems, colistin) PS 20 – <i>A. iwoffi</i> (S – carbapenems, colistin) PS 21 – <i>A. iwoffi</i> (S – carbapenems, colistin)	PS 11 <i>Pseudomonas leuteola</i> (S – piperacillin and tazobactam) PS 12 – <i>A. baumannii</i> (S – carbapenems, colistin)

BS, bedside stethoscope; PS, personal stethoscope (number designates a specific stethoscope); S, sensitive; R, resistant.

Summary-stethoscopes

- May harbour pathogenic bacteria including MRA, MRSA and Clostridium difficile
 - Still HCWs that do not aware of the need to regularly clean their stethoscopes
 - Interval of cleaning is highly variable, and some have never been cleaned
-

Summary-stethoscopes

- ❑ Stethoscopes should be disinfected before and after each use
 - ❑ The design of stethoscopes may have to be revisited to limit areas inaccessible to cleaning
 - ❑ ?Need to stop using their own stethoscopes in high risk areas or certain situations
-

Use of Mobile communication devices in Healthcare settings

- MCDs eg. mobile/cellular phones, personal digital assistants (PDAs) and communication pagers
 - Restrictions due to EMI have now been relaxed
-

Use of Mobile communication devices in Healthcare settings

□ Advantages

- Increases the speed of communication and contact
 - Increased 'connectivity'
 - Various applications:
 - Fast access to investigation results, feedback of results to the patients and ongoing monitoring of chronic diseases, instant access to information and resources
-

Use of Mobile communication devices in Healthcare settings

SURFING THE WEB

INVITED ARTICLE

Victor L. Yu, Section Editor

Infectious Diseases Resources for the iPhone

Richard L. Oehler,¹ Kevin Smith,² and John F. Toney¹

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Modern technology has revolutionized the clinician's ability to have vast information resources available literally at one's fingertips. The advent of the smartphone—an integration of the mobile phone with an ultraportable computer, web browser, multimedia player, and camera, has given clinicians the capability to merge their information and communication resources into one compact handheld instrument. Apple's iPhone, and its sister device, the iPod touch, with a combined customer base of more than 50 million users and more than 100,000 downloadable applications, are now the leading handheld platforms for medical personnel to access personal information, medical reference, clinical data, and medically oriented "apps" on the go. The purpose of this article is to provide an overview of some of the diverse infectious diseases-oriented resources available to the iPhone/iPod touch user.

Use of Mobile communication devices in Healthcare settings

- Concerns:
 - Patient confidentiality, noise and distractions in the clinical environment, data security and bacterial contamination of MCDs
 - ?role of MCDs in transmission of nosocomial pathogens?
-

Use of Mobile communication devices in Healthcare settings

Journal of Hospital Infection (2009) 71, 295–300



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REVIEW

Review of mobile communication devices as potential reservoirs of nosocomial pathogens

R.R.W. Brady^{a,*}, J. Verran^b, N.N. Damani^c, A.P. Gibb^d

Use of Mobile communication devices in Healthcare settings

- Search for 'bacteria', 'colonisation' or/and 'contamination' in combination with 'mobile phone', 'cellular phone', 'pager' and 'PDA'
 - Articles published in English or with at least an abstract in English
-

Use of Mobile communication devices in Healthcare settings

- ❑ High levels of both carriage and usage of MCDs among HCWs within the clinical environment
 - ❑ 50 and 65% of respondents admitted to using MCDs during patient care
 - ❑ ?chance that HCWs may touch MCDs during patient care without performing hand hygiene
-

Use of Mobile communication devices in Healthcare settings

- ❑ Issue on cleaning and decontamination
 - ❑ Cleaning the MCD with 70% isopropyl alcohol => a significant reduction of bacterial contamination
 - ❑ The need for effective decontamination must be balanced with the need to prevent damage to the device
 - ❑ Many MCDs are sensitive to liquid contact and high temperatures that they cannot be disinfected frequently
-

Use of Mobile communication devices in Healthcare settings

- ❑ Issue on cleaning and decontamination
 - ❑ Some manufacturers advise against the use of any cleaning fluids
 - ❑ Lack of guidelines for the care and cleaning for MCDs
 - ❑ High numbers of staff never clean their MCDs
-

Use of Mobile communication devices in Healthcare settings

- 9-25% of MCDs are contaminated with pathogenic bacteria
 - eg. Pseudomonas spp., Staphylococcus aureus, coliforms
 - Resistant organisms: MRSA, VRE, multi-resistant Acinetobacter
-

Use of Mobile communication devices in Healthcare settings

Table I Recent studies of contamination of mobile communication devices (MCDs)

Study	Year	Country	Setting	Sample	Findings
Beer <i>et al.</i> ³³	2006	Canada	HCWs, children's hospital	100 pagers	12% pathogenic bacteria
Borer <i>et al.</i> ²⁴	2005	Israel	HCWs, tertiary care hospital	124 mobile phones	12% <i>Acinetobacter</i> spp. (2% MDR)
Braddy <i>et al.</i> ²⁷	2005	USA	HCWs, teaching hospital	82 PDAs	2.5% MSSA (0% MRSA)
Brady <i>et al.</i> ⁷	2006	UK	HCWs, district general ward	105 mobile phones	7.6% MSSA (1.9% MRSA)
Brady <i>et al.</i> ²⁵	2007	UK	HCWs, operating theatre environment	46 mobile phones, 27 pagers, 5 PDAs	3.8% MSSA, 3% <i>Pseudomonas</i> spp.
Goldblatt <i>et al.</i> ²⁶	2007	USA/Israel	HCWs, non-clinical controls	400 mobile phones	26% pathogenic bacteria
Hassoun <i>et al.</i> ³²	2004	USA	Metropolitan teaching hospital	75 PDAs	11% MSSA (8% MRSA), 1% VRE
Jayalakshmi <i>et al.</i> ³¹	2008	India	Hospital and research institute	144 mobile phones	2.7% MRSA; 4.8% <i>Acinetobacter</i> spp.
Jeske <i>et al.</i> ²⁸	2007	Austria	Anaesthetists' hands after using MCDs	40 hands following 1 min call on mobile phone	10% pathogenic bacteria
Karabay <i>et al.</i> ²⁹	2007	Turkey	HCWs, teaching hospital	122 mobile phones	9.0% pathogenic bacteria, 8.1% MSSA
Khivsara <i>et al.</i> ³⁶	2006	India	Doctors, teaching hospital	30 mobile phones	40% MSSA (6.7% MRSA)
Namias <i>et al.</i> ³⁰	2000	USA	Urban teaching hospital	36 pagers	23.3% MSSA, 6.6% <i>Acinetobacter</i> spp.
Ramesh <i>et al.</i> ⁵	2008	Barbados	HCWs, general hospital	101 mobile phones	15% Gram-negative pathogens
Singh <i>et al.</i> ³⁴	2002	USA	Medical centre	100 pagers	21% MSSA (14% MRSA)
Tambekar <i>et al.</i> ³⁵	2008	India	Doctors, teaching hospital	75 mobile phones	20% MSSA

HCWs, healthcare workers; MDR, multidrug resistant; PDA, personal digital assistant; MSSA/MSRA, methicillin-sensitive/resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci.

Use of Mobile communication devices in Healthcare settings

ORIGINAL ARTICLE

INFECTIOUS DISEASES

Mobile phone technology and hospitalized patients: a cross-sectional surveillance study of bacterial colonization, and patient opinions and behaviours

R. R. Brady¹, A. C. Hunt², A. Visvanathan¹, M. A. Rodrigues¹, C. Graham³, C. Rae², P. Kalima², H. M. Paterson¹ and A. P. Gibb²

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Clin Microbiol Infect 2011; 17: 830–835

Use of Mobile communication devices in Healthcare settings

- 102 inpatients completed a questionnaire detailing their opinions and utilization of mobile phones, and provided their mobile phones for bacteriological analysis
 - 86/ 102 (84.3%) patients' mobile phone swabs were positive for microbial contamination
 - 12 (11.8%) mobile phones demonstrated growth of pathogenic bacterial species
-

Use of Mobile communication devices in Healthcare settings

- ❑ 50.9% stated that they had never cleaned their phone outside hospital
 - ❑ 6.9% cleaned yearly, 11.8% monthly, 17.6% weekly and 12.7% daily
 - ❑ 11 (10.8%) patients cleaned their phones since their admission
 - ❑ Alcohol/antibacterial wipes (21 patients), damp cloths (17 patients), or wiping with dry cloth (12 patients)
-

Use of Mobile communication devices in Healthcare settings

- No patient had received advice or information regarding mobile phone utilization during their hospital admission
 - No patient shared their phone with another patient
 - 50 (49.0%) stated that they would be happy to share their phone with another patient
-

Use of Mobile communication devices in Healthcare settings

Do mobile phones of patients, companions and visitors carry multidrug-resistant hospital pathogens?

Mehmet Sait Tekereköglü, MD, Yucel Duman, MD, Ayfer Serindağ, PhD, Serpil Semiha Cuglan, MD, Halim Kaysadu, MD, Emine Tunc, MD, and Yusuf Yakupogullari, MD
Malatya, Turkey

A cross-sectional study was conducted to determine bacterial colonization on the mobile phones (MPs) used by patients, patients' companions, visitors, and health care workers (HCWs). Significantly higher rates of pathogens (39.6% vs 20.6%, respectively; $P = .02$) were found in MPs of patients' ($n = 48$) versus the HCWs' ($n = 12$). There were also more multidrug pathogens in the patients' MPs including methicillin-resistant *Staphylococcus aureus*, extended-spectrum β -lactamase-producing *Escherichia coli*, and *Klebsiella* spp, high-level aminoglycoside-resistant *Enterococcus* spp, and carbapenem-resistant *Acinetobacter baumannii*. Our findings suggest that mobile phones of patients, patients' companions, and visitors represent higher risk for nosocomial pathogen colonization than those of HCWs. Specific infection control measures may be required for this threat.

Key Words: Mobile phone; colonization; patient visitor; nosocomial.

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Use of Mobile communication devices in Healthcare settings

- ❑ To determine whether MPs of patients, patients' companions, and visitors carry any pathogenic bacteria likely to cause infection in hospital wards
 - ❑ Swab samples were collected from the keypad, microphone part, and ear part of 200 MPs
 - ❑ 67 from HCWs; 133 from patients, patients' companions, and visitors
-

Use of Mobile communication devices in Healthcare settings

- Bacterial growth:
 - 58/67 (85.6%) of HCWs' gp and 121/133 (90.1%) of the patient's group
- Significantly higher rates (39.6% vs 20.6%) of pathogenic bacteria colonized on patients' groups than those of HCWs
- Higher number of resistant pathogens (7 vs 0, respectively) in patients' group

Table 1. The types and antimicrobial resistance profile of the bacteria isolated from mobile phones

Agent	HCW group, n = 67 (%)	Patient group, n = 133 (%)
Positive culture	58 (86.5)	121 (90.9)
CNS	52	101
MRCNS	21 (36.8)	42 (41.5)
Staphylococcus aureus	4	18
MRSA	–	1 (5.5)
Enterococcus spp	–	2
HLAR	–	1 (50)
Streptococcus spp	7	14
Escherichia coli	1	5
ESBL (+)	–	2 (40)
Klebsiella spp	–	4
ESBL (+)	–	2 (50)
Proteus spp	–	2
Pseudomonas aeruginosa	–	2
Acinetobacter baumannii	–	1
Carbapenem resistant	–	1 (100)
Bacillus spp	2	11

CNS, coagulase-negative staphylococci; ESBL, extended-spectrum β -lactamase; HLAR, high-level aminoglycoside resistant; MRCNS, methicillin-resistant, coagulase-negative staphylococci; MRSA, methicillin-resistant *Staphylococcus aureus*.

Summary- Mobile communication devices

- ❑ MCDs are commonly used in Healthcare settings
 - ❑ The frequency of cleaning and decontamination varies
 - ❑ May colonise pathogenic and resistant micro-organisms
 - ❑ Lack of staff and patient education
-

Summary- Mobile communication devices

- ❑ Hand hygiene measures
 - ❑ Avoid sharing of MCDs within Healthcare settings
 - ❑ Consider restricting use of MCDs in certain high risk areas
 - ❑ Use of slim fitting silicon cell phone covers
 - ❑ Guidelines on MCD cleaning and decontamination is required
-

Conclusion

- Accessories and MCDs may be colonised with pathogenic organisms
 - May play a role in the transmission of these organisms
-