Sheraton Vancouver Wall Centre, Vancouver, BC | March 30 mars – April 2 avril

State of the Art Clinical Debate: Baring It All – or Not

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nova scotia health authority

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To restate (the obvious).....

Physical contact with patients

- Common points of contact
  - Hands & wrists
    - wristwatch
  - Sleeves
  - Front of clothing
  - Necktie
  - Stethoscope

Contamination of white coats

Year	Methodology	Findings
1991[1]	Cross-sectional survey Bacterial contamination of WCs	25% of WCs had MSSA (cuffs, pockets) Degree associated with increased use & not related to perceived cleanliness
2000[2]	Random sample (n=100) Cultured medical students WCs	All coats contaminated to varying degrees Sleeve more likely to be heavily colonized than the back ($p < 0.001$)
2001[3]	Cross-sectional sample (n=57) Bacterial contamination belt-hem	MRSA, VRE, *C.difficile* recovered Shift start 39% of uniforms with ≥ 1 microorganism Shift end 54% of uniforms with ≥ 1 microorganism
2009[4]	Cross-sectional study (n=149) Sampled WCs for growth	*S. aureus* grown from 23% WCs (18% MRSA) No VRE
2011[5]	Cross-sectional sample (n=135) Sampled WCs/uniforms	63% contaminated with potential pathogens

1. BMJ 1991; 303:1602-4 2. JHI 2000; 45:65-8 3. JHI 2001; 48:238-41
4. Am J Infect Control 2009; 37:101-5 5. Am J Infect Control 2011: 39:555-9

Persistence of bacteria on fabrics

Microbe	# tested	Survival (# days)		
		Cotton	Blend	Polyester
MSSE	3	8,16,21	6,6,7	7,10,16
MRSE	3	14,18,20	20,22,28	16,20,22
MSSA	3	4,5,19	1,9,21	10,12,56
MRSA	3	4,5,21	1,3,3	11,16,40
VRE	4	18,22,62, >90	18,22,52, >90	73, >80 (2), >90

J Clin Microbiol 2000; 38:724-6

Laudering – an anonymous survey

Uniform	Provider		
	Faculty	Housestaff	Student
Whitecoat	12.8±2	12.6±1.6	11.4±2.4
Scrub	1.3±0.2	1.9±	1.8±.4
WC vs scrub	<.001	<.001	<.001

4 people laundered at intervals > 90 days!

AJIC 2013: 41:565

Transfer of pathogens from fabric

Table I
Growth of organisms at serial dilutions (beginning at 0.5 McFarland)

Organism	Time (min)	Dilution of organisms				
		1	1:100	1:1000	1:10 000	1:100 000
MRSA	1	+	+	−	−	−
	5	+	+	−	−	−
	30	+	+	−	−	−
VRE	1	+	+	−	−	−
	5	+	+	−	−	−
	30	+	+	−	−	−
PRA	1	+	+	−	−	−
	5	+	+	−	−	−
	30	+	+	+	−	−

+, growth of organism; −, no growth of organism; MRSA, meticillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant *Enterococcus faecium*; PRA, pan-resistant *Acinetobacter baumannii*.

JHI 2010;75:137-8

Transfer of pathogens to a mannequin

Table I

Total colony counts of micrococcus cultured from the mannequins after examination according to the four combinations of dress

Total colony counts	With tie	Without tie
Long sleeve shirt	24	1
Short sleeve shirt	2	0

Table II

Number of contaminated mannequins after examination according to the four combinations of dress

No. of colonized mannequins	With tie	Without tie
Long sleeve shirt	4 of 5	1 of 5
Short sleeve shirt	2 of 5	0 of 5

JHI 2012;80:252-4

Contaminated personal devices

- Cell phones from 288 health care providers
  - 43% positive for a microorganism
  - 53% of physician's cell phone
  - *S. aureus* (33%), CoNS (22.9%), *E. coli* (12.8), *Acinetobacter* (9.1%), enterococcus (9.1%)

AJIC 2010; 38: 404-5

- Mobile phones of 200 HCWs
  - 94.5% had bacterial growth
  - *S. aureus* (52%), GN (31.3%)

Ann Clin Microbiol Antimicrob 2009; 8:7

Contaminated bedside computer keyboards (& faucets)

- Contamination rates in occupied rooms
  - Computer keyboards: 26%
  - Faucet handles: 15%
- Contamination rates in non-occupied rooms
  - Computer keyboards: 17%
  - Faucet handles:0
- 49% of isolates were MRSA and 33% GNR

AJIC 2000; 28: 465-70

Contaminated iPads

- Devices used in the inpatient & outpatient clinical setting by pharmacists (n=30)
- All culture positive
- Inpatient isolates
  - CoNS 100%
  - *S. aureus* 71.4%
  - GNR 100%

PloS One 2014; 9:e111250

Summary of evidence

Component	Evidence
Pathogens contaminate patient's skin & environment	Conclusive
HCW clothing & devices contaminated	Conclusive
Clothing & devices can transmit pathogens	In vitro evidence
BBE and leaving devices out of patient care space decreases infection	No evidence

The arguments against

- There is no evidence
- Potential harms
- Attitudes towards garb
- Achievability

Is there a Holy Grail of evidence?

Parachute evidence

Parachutes reduce the risk of injury after gravitational challenge, but their effectiveness has not been proved with randomised controlled trials

What is already known about this topic

Parachutes are widely used to prevent death and major injury after gravitational challenge

Parachute use is associated with adverse effects due to failure of the intervention and iatrogenic injury

Studies of free fall do not show 100% mortality

What this study adds

No randomised controlled trials of parachute use have been undertaken

The basis for parachute use is purely observational, and its apparent efficacy could potentially be explained by a "healthy cohort" effect

Individuals who insist that all interventions need to be validated by a randomised controlled trial need to come down to earth with a bump

BMJ 2003; 327:1459-61

Experience and intuition

- There is no evidence that transporting a patient with acute GI bleed to hospital by ambulance compared to taxi reduces pre-hospital mortality
- There is no evidence that looking both ways before crossing the street compared to not looking reduces pedestrian fatalities

JAMA 2013; 310:2149-50

INFECTIOUS DISEASE PREVENTION AND CONTROL

ROUTINE PRACTICES AND ADDITIONAL PRECAUTIONS FOR PREVENTING THE TRANSMISSION OF INFECTION IN HEALTHCARE SETTINGS

PROTECTING CANADIANS FROM ILLNESS

Public Health Agency of Canada | Agence de la santé publique du Canada

Canada

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5. Personal protective equipment

a. Personal protective equipment for contact precautions should be provided outside the patient room (or when available, in the anteroom), cubicle or patient's designated bedspace in shared rooms. CII

b. In addition to the use of personal protective equipment as per routine practices[22;219]:

i. Gloves AII

- Gloves should be worn to enter the patient room, cubicle or patient's designated bedspace in shared rooms.
- Gloves should be removed and discarded into a no touch waste receptacle and hand hygiene should be performed on exit from the room or patient bedspace[337;339;407].

ii. Long-sleeved gowns BII

- A long-sleeved gown should be worn if it is anticipated that clothing or forearms will be in direct contact with the patient or with environmental surfaces or objects in the patient care environment.
- If a gown is to be worn it should be put on prior to entry into the room, cubicle or patient's designed bedspace in shared rooms[48;70;95;473].
- The gown should be removed and discarded into a no touch receptacle immediately after the indication for use and hand hygiene should be performed before leaving the patient's environment[129;130].

c. The same personal protective equipment should not be worn for more than one patient. Personal protective equipment should be changed and hand hygiene performed between contacts with all patients in the same room[337;339;405;407;474]. BII

Contact precautions based on the premise that clothing can become contaminated

If we can subject patients to contact precautions, can we not expect HCWs to bare their lower arms and leave their devices elsewhere?

What about harm?

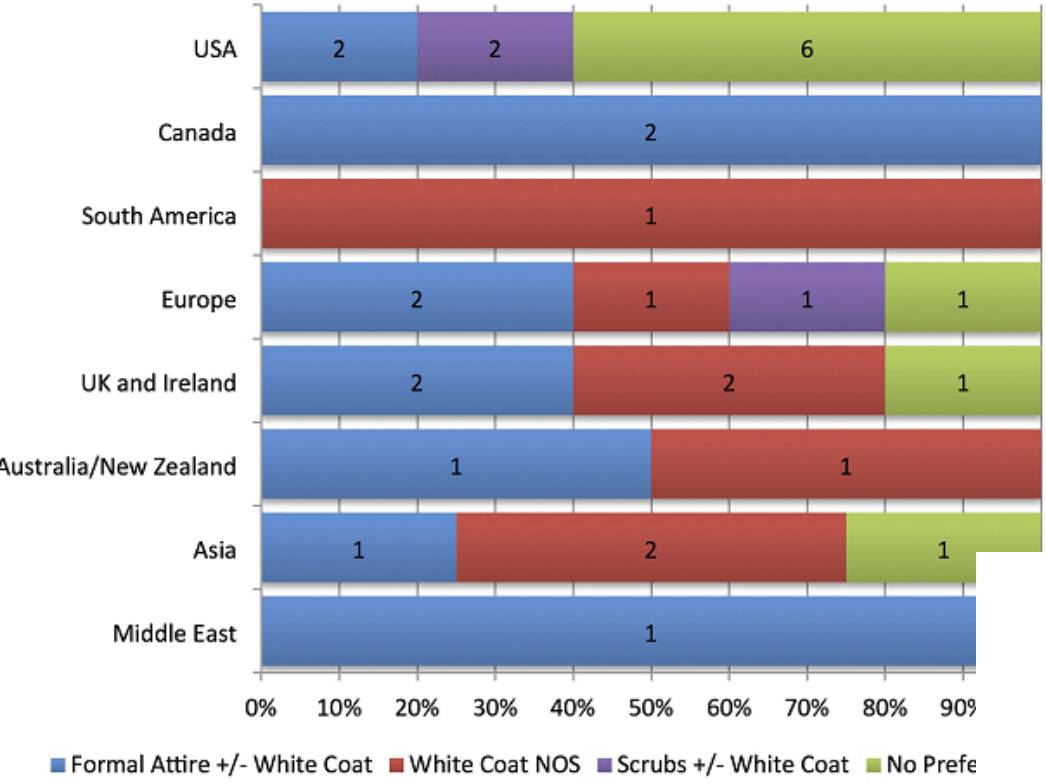
Skin disorders?

- there is always the capacity to accommodate

Cultural sensitivities?

- long (or ¾ length), tight fitting sleeves rolled up prior to clinical contact & HH

What do patients think?



BMJ Open 2015; 5:e0006578

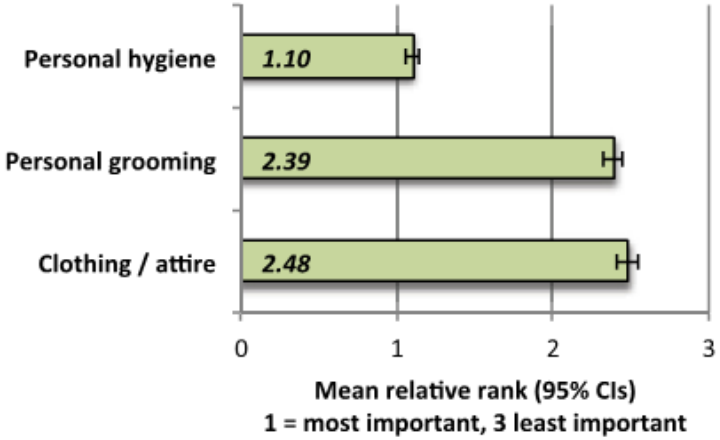


Fig. 3 – Mean rank scores (and associated 95% confidence intervals) for three attributes of a doctor's appearance as determined by the survey respondents ($n = 374$).

Surgeon 2014; 12:40-6

What do patients think?

Attire	Before	After education
Smart	52%	22%
Scrubs	24%	62%
No preference	24%	8%
Unsure	0	8%

JHI 2008; 69:408-9

Is it possible?

Current attire/practice	Health care worker		
	Attending	Resident	Med student
Wear a lab coat at least every other day	38%	43%	45%
BBE 4-7 days/week	55%	57%	57%

ICHE 2014; 35:740-2

Implementation of daily chlorhexidine baths for inpatients and BBE in lieu of CPs:

HH adherence >85%

BBE adherence (>11,000 patient care episodes) 69%

ICHE 2015; 36:978-80

Be it resolved that healthcare workers **should be encouraged** to remain bare below the elbows and **avoid the use of personal items** in the patient care setting, which may act as fomites and promote the spread of potential pathogens.