

29th ECCMID

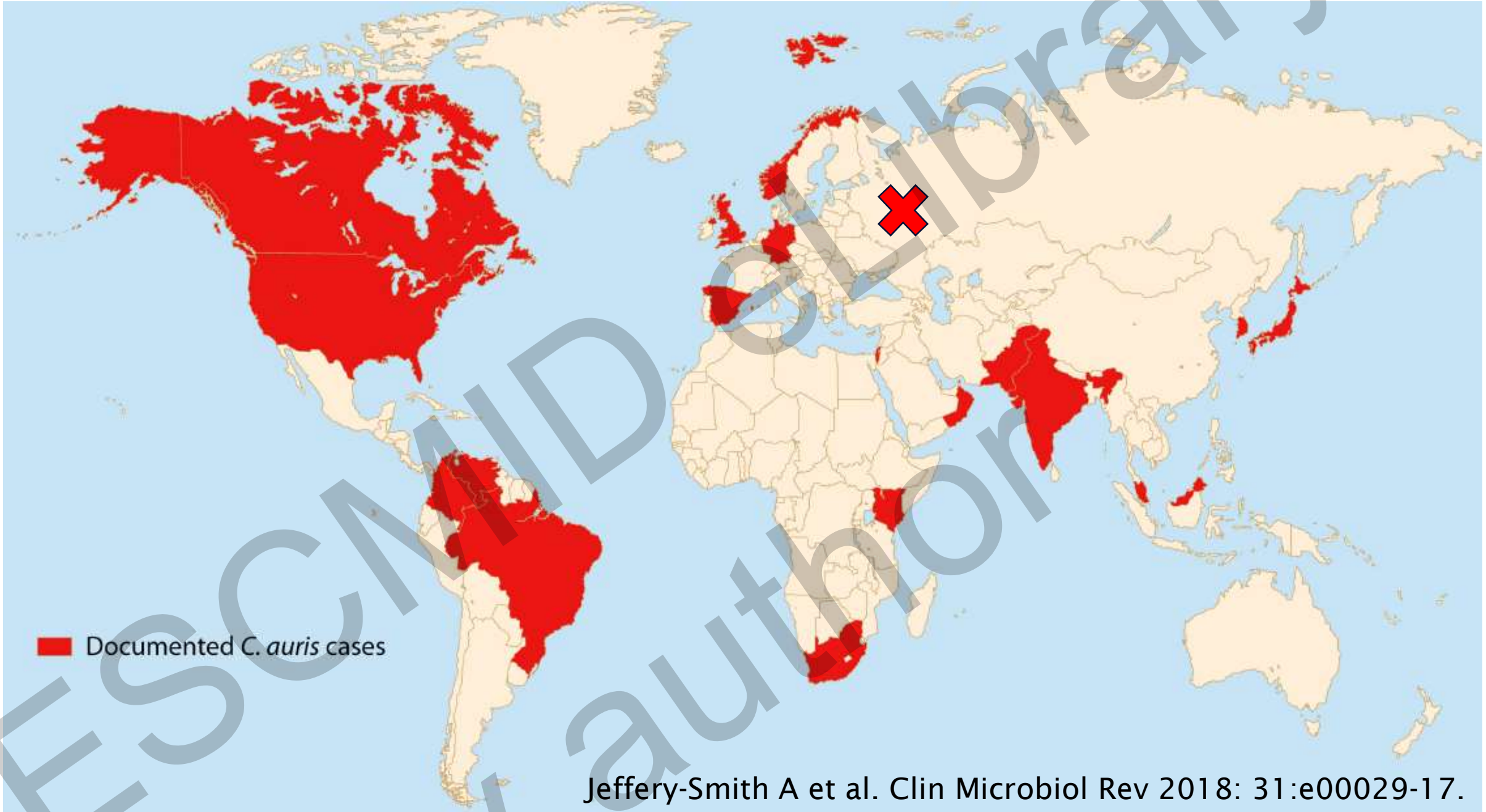
Are special infection control measures needed for *Candida auris*?

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Disclaimer

- No conflict of interest to be declared



Jeffery-Smith A et al. Clin Microbiol Rev 2018; 31:e00029-17.

Candida auris – A summary

- Outbreaks described in numerous countries all over the world, lately also in Russia -Resistance to fluconazole, but also to other azoles, echinocandins and AmB described
- *Candida auris* = unusual Candida species – specialized mycology laboratory needed
- Patient population at risk of *C.auris* infection = at risk of „conventional“ Candida infection - First description in Japan
 - *C. auris* is found in 50% of the cases in blood cultures, Risk factor: CVC
 - *C. auris* is transmitted to other patients at risk from colonized roommates, healthcare personel and environment

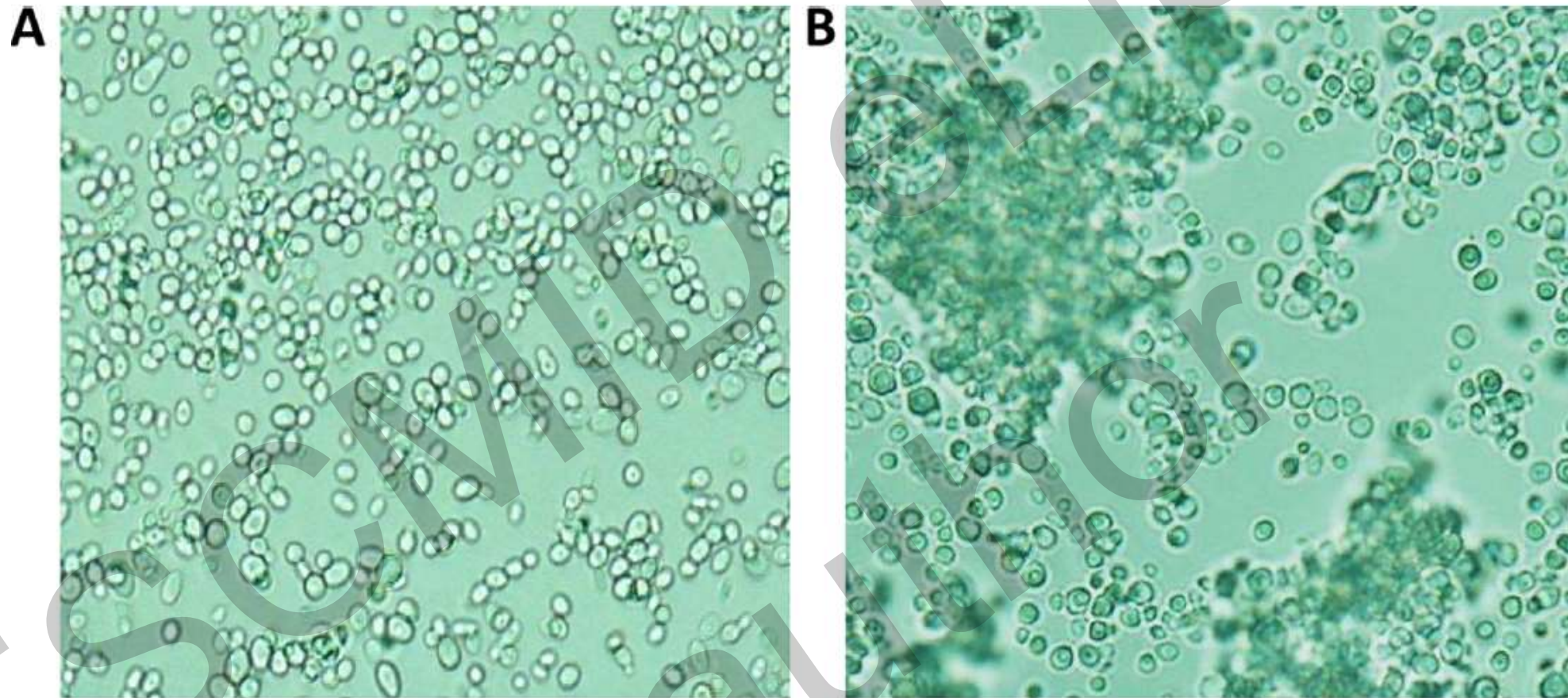
Infection Control 1st - Find *C. auris*!

- Rapidly find patients infected or colonized with *C.auris* !
 - Identify all invasive Candida isolates to the species level
 - Identify „superficial“ Candida isolates when *C. auris* was detected on the ward, when clinically indicated and/or the patient has been in a country with *C.auris* outbreaks reported (colonization up to 1 year!)
 - Micro Laboratory must be capable to identify *C.auris* or to refer suspect Candida isolate to a reference lab



<https://www.cdc.gov/fungal/candida-auris/recommendations.html>

Candida auris – non-aggregative vs. aggregative forms



Borman AL et al., mSphere 2016:1(4):e00189-16

Identification of *C. auris*

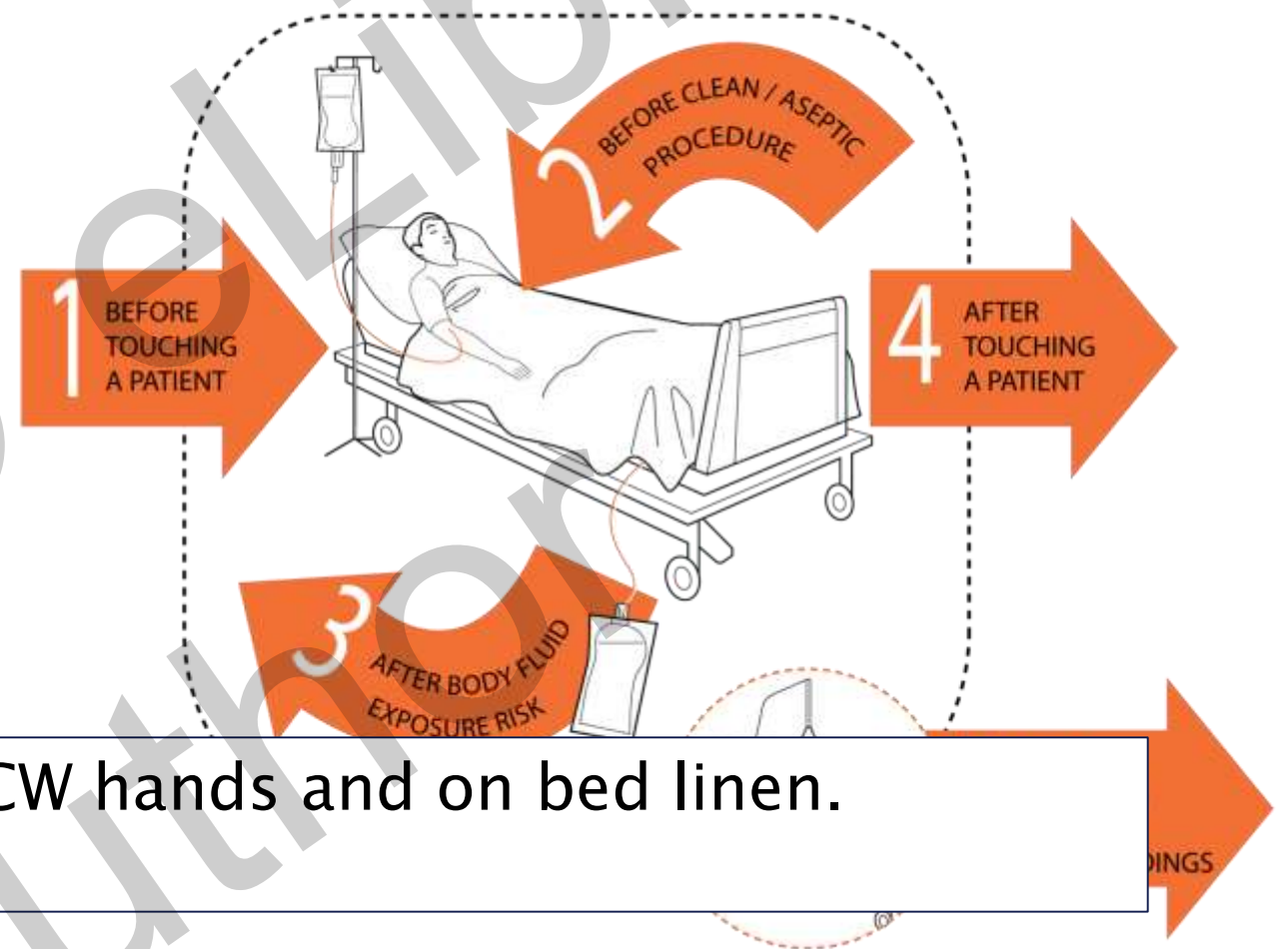
- *C. auris* is a budding yeast very rarely with pseudohyphae and always without germ tubes. There are aggregative strains and not aggregative strains. *C. auris* grows well at 40–42° C on CHROMagar. *C. auris* colonies appear white, pink, red, or purple.
- *C. auris* can be (mis)identified when using traditional biochemical methods like VITEK 2 YST, API 20C, BD Phoenix yeast identification system or MicroScan as
 - *C. haemulonii*, *C. duboushaemulonii*, *C. sake*, *Rhodotorula glutinis*, *C. famata*, *C. guillermondii*, *C. lusitaniae*, *C. parapsilosis*
- Identification using matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF)
 - Bruker Biotyper brand MALDI-TOF using the updated Bruker FDA-approved MALDI Biotyper CA System library (Version Claim 4) or their “research use only” libraries (Versions 2014 [5627] and more recent) and VITEK (MALDI-TOF) MS RUO (with Saramis Ver 4.14 database and Saccharomycetaceae update)
 - <https://www.cdc.gov/fungal/diseases/candidiasis/pdf/Testing-algorithm-by-Method-temp.pdf>

Contact precautions and hand hygiene



1st Rule of Infection Control

- Hand hygiene !
 - Gloves alone do not substitute hand disinfection
 - Hand hygiene before putting on gloves and after removal
 - Do not touch other surfaces with gloves while caring for *C. auris* patients

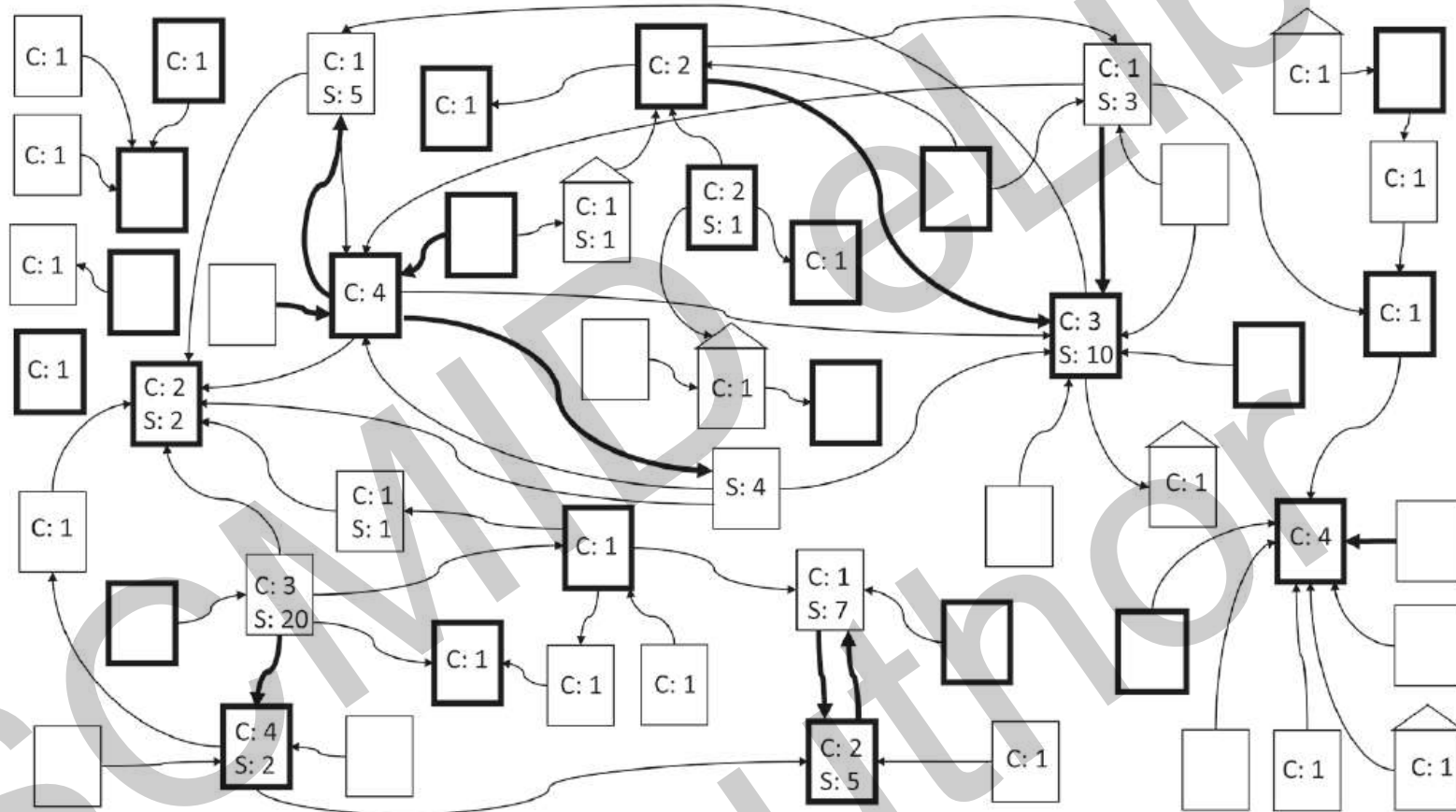


C. auris was detected on HCW hands and on bed linen.
Biswal et al., JHI 2017

Infection Control Recommendations – Single room

- Place *C.auris* patients in a single room PLUS adherence to contact precautions
 - If not enough single rooms
 - Single room for patients requiring higher level of care
 - Cohort patients with *C. auris*
 - Do NOT cohort with patients with any other multiresistant enterobacteria, *C. diff.*, VRE or MRSA
 - Use dedicated fomites (equipment/medical products)
 - Regular cleaning and disinfection by trained personnel - accountability

Single room – why?



Transfer of patients between HC facilities / Environmental samples, Adams et al., EID 2018

Single room – why?

Table 2. Environmental contamination with *Candida auris* in healthcare facilities, New York, USA, 2013–2017*

Category, object or surface	No. samples	Positive by culture, no. (%)	Positive by PCR and negative by culture, no. (%)	Negative by culture and PCR, no. (%)
Near-patient surfaces and objects in rooms				
Bedside/over bed table	44	2 (5)	2 (5)	40 (91)
Bed rail	49	7 (14)	5 (10)	37 (76)
TV remote/call button	36	2 (6)	2 (6)	32 (89)
IV poles	21	5 (24)	1 (5)	15 (71)
Bed	17	4 (24)	0	13 (77)
Privacy curtain	6	2 (33)	0	4 (67)
Miscellaneous other†	5	0	1 (20)	4 (80)
Total	178	22 (12)	11 (6)	145 (82)
Other surfaces and objects in rooms				
Door knob/handle	36	1 (3)	1 (3)	34 (94)
Sink	27	1 (4)	2 (7)	24 (89)
Window	22	3 (14)	1 (5)	18 (82)
Floor	17	4 (24)	0	13 (77)
Furniture	27	3 (11)	0	24 (89)
Window curtain	11	3 (27)	0	8 (73)
Light switch	9	0	0	9 (100)
Closet	6	0	0	6 (100)
Wall	4	1 (25)	0	3 (75)
Bathroom	4	1 (25)	0	3 (75)
Countertop	4	1 (25)	0	3 (75)
Toilet	4	0	0	4 (100)
Miscellaneous other‡	16	2 (13)	0	14 (88)
Total	187	20 (21)	4 (2)	163 (87)
Equipment in room				
Ventilator/respiratory equipment	12	1 (8)	0	11 (92)
Pump	4	0	0	4 (100)
Miscellaneous other§	19	4 (21)	0	15 (79)
Total	35	5 (14)	0	30 (86)
Equipment outside of room				
Clean supply cart	51	1 (2)	0	50 (98)
Ventilator/respiratory equipment	45	1 (2)	0	44 (98)
Vital sign machine	21	3 (14)	1 (5)	17 (81)
Normothermia system (e.g., Bair hugger)	20	1 (5)	0	19 (95)
Computer workstation	20	0	0	20 (100)
Thermometer	14	1 (7)	1 (7)	12 (86)
PPE/isolation cart/box	12	1 (8)	1 (8)	10 (83)
Lift/scale	11	2 (18)	0	9 (82)
Glucometer	11	0	0	11 (100)
Housekeeping cart	9	0	1 (11)	8 (89)
Dialysis equipment	7	1 (14)	0	6 (86)
Suction canister	6	1 (17)	0	5 (83)
Ultrasonography equipment	4	0	0	4 (100)
Miscellaneous other¶	29	1 (3)	0	28 (97)
Total	260	13 (5)	4 (2)	243 (94)

Environmental samples,
Adams et al., EID 2018

What can go wrong with infection control procedures?

- Hand hygiene insufficient
 - Hand-rub dispensers either not at point of care or absent
- Compliance to contact precautions poor despite of single room
 - No clear signalling or signalling ignored
- Personal protection equipment not used
 - Poor knowledge how to use/don it
 - Not available
- No adequate disinfection
 - Wrong use of disinfectant or only cleaning solution used
 - Gap in knowledge how to dose disinfectant
 - Lack of knowledge of contact times of disinfectant
- Contamination of medical devices and equipment
 - blood pressure cuff, temperature probe, ECG, etc.), linen, HCW hand washing
- Only one bucket for cleaning and wrong use of disinfectant
 - Biswal et al., J Hosp Infect 2017
- Contamination of skin-temperature probes, pulse oximeter, patient hoist
- Wrong use of disinfectant (quat. ammonium solution)
 - Eyre D et al., NEJM 2018

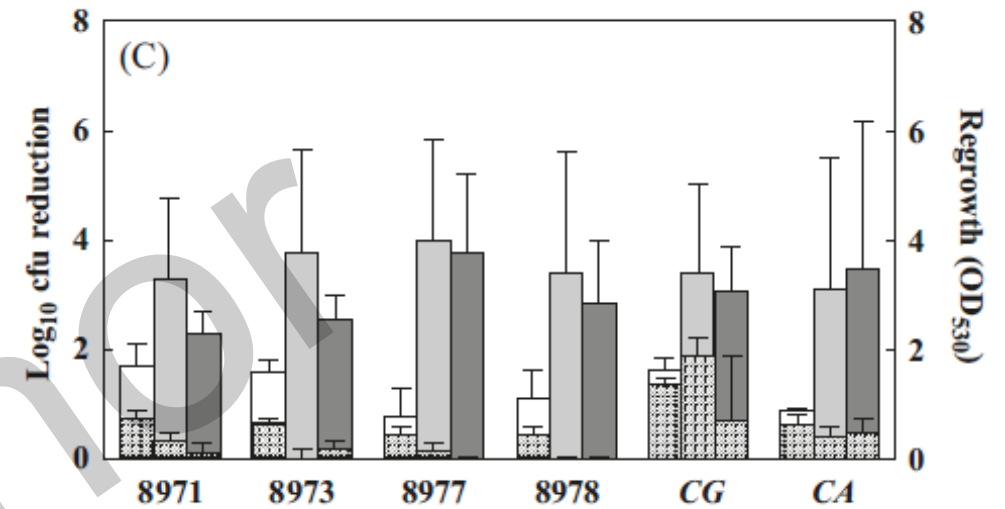
Adams et al., EID 2018

Disinfection and cleaning of environment, equipment and devices

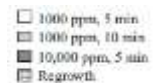


C. auris survives in the environment

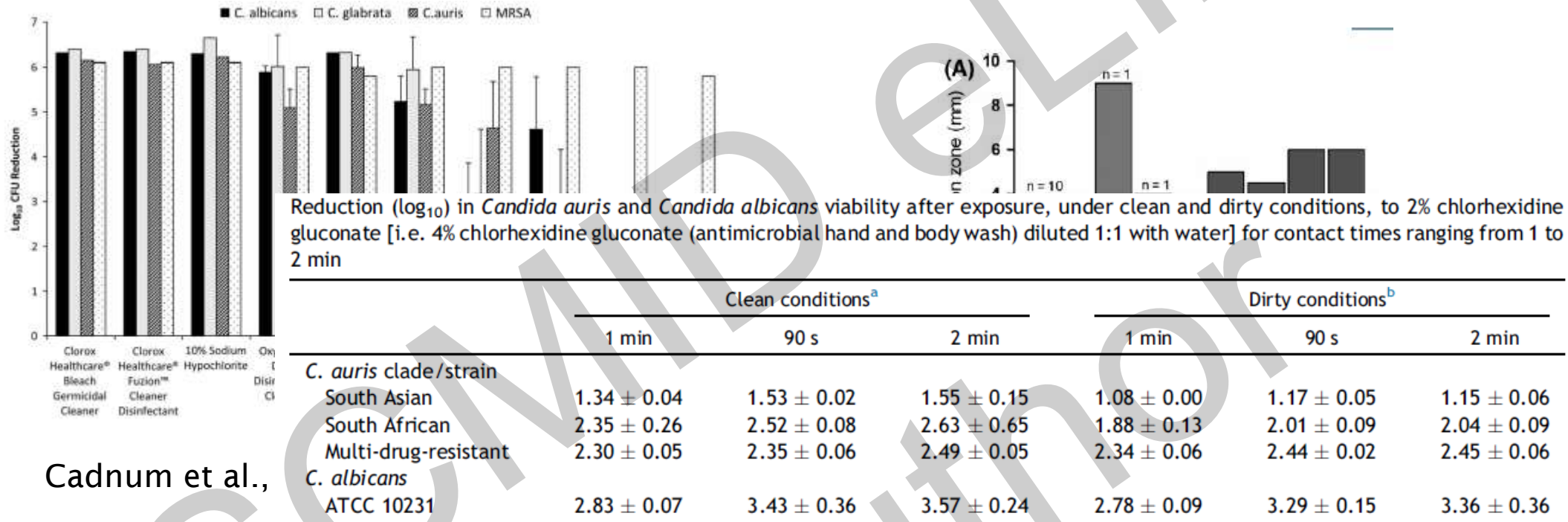
- Reports that *C. auris* is found in the environment months to 1 year after discharge of case patient (Ben-Ami et al., EID 2017)
- *C. auris* is persistent on surfaces – and can regrow even after disinfection e.g. with Na hypochlorite (Kean et al., J Hosp. Infect 2018)



Sodium hypochlorite,
polymer surface



Reduced efficacy of disinfectants against *C.auris*



Cadnum et al.,

Moore et al., JHI 2017; EN 13624:2013

Efficacy of disinfectants against *C.auris*

	Surface disinfectant		Antiseptic skin cleanser		Skin disinfectant	
	1000 ppm chlorine (5 min)		10% povidone-iodine (2 min)		2% chlorhexidine gluconate in 70% IPA (2 min)	
	Clean conditions ^a	Dirty conditions ^b	Clean conditions ^a	Dirty conditions ^b	Clean conditions ^a	Dirty conditions ^b
<i>C. auris</i> clade/strain	>4.66	>4.88	>4.66	>4.88	>5.18	>5.18
South Asian						
South African						
Japanese/Korean						
Multi-drug-resistan						
<i>C. albicans</i>						
ATCC 10231						
Clinical isolate						
	Viable cells log cfu/ml					
			NCPF8971	NCPF8977	NCPF8984	DSM21092
						C. albicans ATCC10231
Control			6	6	7	6
25 g Ethanol (94 %ig),35 g Propan-1-ol/100ml/1MIn			0	0	0	0
0,525 g Didecyldimethylammoniumchlorid, 0,120 g Polyhexanide/100ml/1Min			0	0	0	0
8.0 g Glutaraldehyd,5.0 g Benzalkoniumchlorid, 3.0 g Didecyldimethylammoniumchlorid/100mml 0,5%/ 15 Min			0	0	0	0

Moore et al., J

Zatorska, unpublished; EN 13624:2013

Infection Control Recommendations

- Performing thorough environmental disinfection
 - Cleaning and disinfection of patient environment (DAILY! and terminal C/D)
 - Cleaning/disinfection with EPA listed disinfectant effective against Clost. diff. spores
 - Chlorine containing solutions including bleach
 - Peroxide containing solutions
 - Peracetic acid containing solutions

Cleaning and disinfection

- Functional rooms to allow easy cleaning and disinfection
- Implementation of functional cleaning process
 - E.g. 2-bucket-method, clean wipes
- Train personal to clean and disinfect patient environment
 - Collaborative effort between environmental services, patient support staff, and healthcare workers
- Take care of correct dosing of detergents and disinfection solution
 - E.g. with quaternary ammonium solutions
- Keep appropriate contact time of disinfectants
- Keep alcoholic solutions closed (beware of evaporation)

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See also Tsay et al, CID 2018

Medical devices and equipment

- Check and discard devices and equipment which cannot be cleaned and disinfected
 - Check with cleaning/reprocessing instructions
 - Is personel trained for special reprocessing procedures available?
 - What is the general work load of the ward/institution?
- Examples:
 - Outbreak ceased only after removal of temperature probes
 - “Decluttering” of patient environment to facilitate cleaning, reduced bedside equipment, and removed fans and forced-air convection blankets.

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Eyre D et al., NEJM 2018
See also Tsay et al, CID 2018

Screening to identify cases and „sources“



Screening

- Screening of close contacts of *C. auris* cases in hospitals and nursing homes, and until waiting for the result and then if positive for *C. auris* management according the *C.auris* infection control measures
- Nursing homes:
 - Standard precautions for „functional“ residents able to perform hand hygiene. They may leave the room after performing hand hygiene
 - Contact precautions (gowns and gloves) for caring with close contact, dressing wounds, for patients with indwelling devices etc.
 - Physical therapy:
 - Work with the *C. auris* patient only equipped with gowns and gloves of anticipating contamination with *C. auris*

Repeat screening

- Screening: Periodic reassessment for presence of *C. auris*
 - Z-swab: arm pits – groins, sites previously positive for *C. auris* (after having stopped local antiseptic for 2 days)
 - If negative – repeat after at least 1 week before discontinuing *C. auris* specific-infection control precautions

Conclusion – Do we need special IC measures ?

- *C.auris* is a distinctive Candida species persistent on patients' skin and environment - A PERFECT MARKER for lack of hygiene and infection control practice
- ✓ The transmission is by contact – thus IMPLEMENT AND MONITOR contact precautions (single rooms – „dedicated“ fomites)
 - TAKE CARE that all infection control measures that are implemented are CORRECTLY DONE
 - Check cleaning/disinfection frequencies - train and monitor for correct procedures!
- ✓ *CHECK disinfection compound in use AND monitor the correct use*
 - *C. auris* may also be resistant to disinfectants depending on the concentration, type of solution, application, contact time and surfaces involved

Existing infection control recommendations/guidance



Candida auris:
Learn how you can stop it from spreading.

<https://www.cdc.gov/fungal/candida-auris/index.html>

This drug-resistant fungus causes serious infections and spreads in healthcare facilities.

www.cdc.gov/fungal



RAPID RISK ASSESSMENT

Candida auris in healthcare settings – Europe

First update, 23 April 2018

<https://ecdc.europa.eu/en/publications-data/rapid-risk-assessment-candida-auris-healthcare-settings-europe>