Attachment 1

Detected microbial contaminations on touchscreens

Hospital	Community	Touchscreen device	Reference
g+ *Staphylococcus spp.* CNS 11.1% *S. aureus* 15.6%	g+ *Staphylococcus spp.* CNS 31% *S. aureus 20%* *Enterococcus faecalis* 5.2% g– *E. coli* 6.5%	Mobile phones	[58]
g+ *Staphylococcus spp.* CNS 76.5% *S. aureus* 6.9%		Mobile phones	[59]
g+ *Staphylococcus spp*. 65% *S. warneri* 40% *S. epidermis* 30% *S. capitis* 10% *S. sciuri* 10% *S. xylosus* 5% *S. aureus* 5% g– *enterobacteriaceae* 39%		Mobile phones	[41]
	g+ *Staphylococcus spp*. CNS 96% *S. aureus* 8% *Bacillus spp.* 36% *Micrococcus spp.* 54% g– diphtheroids 20%	Mobile phones	[9]
g+ MRSA 15%		Tablets	[60]
g+ *Staphylococcus spp.* *S. epidermis* 26.2% *S. hominis* 18.4% *S. capitis* 14.3% other CNS 5.3% *Micrococcus luteus* 22.2%		Tablets	[42]
g+ MRSA (Staphylococcus) and VRE (Enterococcus) 13%		Mobile phones	[43]
g+ *Staphylococcus spp.* CNS 96.9% *S. aureus* 73.2% MRSA 50.9% *Enterococcus spp*. 100% g– *P. aeruginosa* 6.7%		Tablets	[3]
g+ *Staphylococcus spp*. CNS 42.3% *S. aureus* 63.1% *Enterococcus faecalis* 14.4%		Mobile phones	[61]
	g+ *Staphylococcus spp*. 23% *Streptococcus spp*. 26.4%	Mobile phones	[62]
g+ *Staphylococcus spp*. CNS 47.4% *Micrococcus spp*. 5.4% *Streptococcus viridans* 5.4%		Mobile phones	[63]
	g+ *Staphylococcus spp*. 25% *S. capitis* 10% *S. epidermis* 10% *Micrococcus spp*. 20% *Micrococcus luteus* 35% g– *Moraxella spp.* 15%	Mobile phones	[44]

Hospital	Community	Touchscreen device	Reference
g+ *Staphylococcus spp.* CNS 60.6% *S. aureus* 25.8% *Bacillus spp.* 13.6%	g+ *Staphylococcus spp.* CNS 31.8% *S. aureus* 24.2%	Mobile phones	[45]
	g+ *Staphylococcus spp*. 96.5% *S. aureus* 81.5% MRSA 6.5%	Mobile phones	[64]
g+ *Staphylococcus spp*. CNS 86.7% *S. aureus* 50% *Bacillus spp*. 13.3% *Micrococcus spp*. 7.8% *Enterococcus spp*. 15.6% *Streptococcus spp*. 12.2% g– *Acinetobacter bauman.* 5.6% diphtheroids 10% f yeasts 6.7% f molds 20%	g+ *Staphylococcus spp*. CNS 76.1% *S. aureus* 56% *Bacillus spp*. 11.9% *Micrococcus spp*. 15.% *Enterococcus spp*. 17.4% *Streptococcus spp*. 23.9% g– *E. coli* 7.3% *enterobacteriaceae* 8.3% *diphtheroids* 9.6% f yeasts 8.7% f molds 19.3%	Mobile phones	[65]
g+ *Staphylococcus spp.* *S. epidermis* 31.1% *S. aureus* 14.1% *B. subtilis* 13.3% *Micrococcus spp*. 14.1% g– diphtheroids 6.7%		Mobile phones	[66]
g+ *Staphylococcus spp.* CNS 25% *S. aureus* 27% *Bacillus spp*. 10% *gram-positive bacilli* (*none* spore forming) 7% *gram-positive cocci* 13% g– gram-negative bacilli 18%		Mobile phones	[67]
g+ *Staphylococcus spp*. CNS 76.7% *S. aureus* 11.9% *Bacillus spp*. 33.2% *Streptococcus spp*. 15.8% g– *Pseudomonas spp*. 6.9% *Acinetobacter spp*. 7.4 % *Pantoae spp*. 6.9%		Mostly tablets	[68]
g+ *Staphylococcus spp*. CNS 50% MRSA 52.5% MSSA 17.5 % *Bacillus spp*. 42.5 % *Micrococcus spp*. 10% *Streptococcus viridans* 12.5% g– *E. coli* 12.5% *Klebsiella pneumoniae* 7.5% diphtheroids 30%		Mobile phones	[46]
v rotavirus v respiratory syncytial virus		Mobile phones	[69]
g+ *Staphylococcus spp.* *S. epidermis* 46% MSSA 22%		Mobile phones	[70]

Hospital	Community	Touchscreen device	Reference
g+ *Staphylococcus spp*. CNS 81% *Corynebacterium tuberculostearicum* 10% g– enterobacteriaceae 7% *gram*-negative oxidase *negative bacilli* 25% *gram*-negative oxidase *positive bacilli* 31% *sporulating bacilli* 24% f fungi 6%		Mobile phones	[47]
g+ *Staphylococcus spp.* *Micrococcus spp.* *Enterococcus spp.* *Kytococcus sedentarius* g– *Clostridioides difficile*	g+ *Enterococcus aerogenes* g– *E. coli* Klebsiella *spp*.	Touchscreens	[48]
v respiratory syncytial virus 6% v adenovirus 6%		Mobile phones	[71]
g+ *Staphylococcus spp.* *S.* epidermis 26.7% *Bacillus spp.* 13.3% *Micrococcus spp*. 10% *Enterococcus* spp. 6.7% *non*-hem. *streptococcus* 6.7% f non-albicans candida 16.7%		Mobile phones	[72]
g+ *Staphylococcus spp*. CNS 73.5% *Bacillus spp*. 16% *Bacillus cereus* 7.5% *Micrococcus luteus* 53% *Corynebacterium spp*. 16% Kocuria *spp*. 18.5% *Paenibacillus lactis* 7.5% g– *Acinetobacter lwoffu* 32.5%		Mobile phones	[49]
g+ *Staphylococcus spp*. CNS 32.3% *S. aureus* 18.1% *Bacillus spp*. 13.4% *Streptococcus viridans* 15.7% *Corynebacterium spp*. 11.8% g– *gram-negative bacilli* 6.3%		Mobile phones	[73]
g+ *Staphylococcus spp*. CNS: 26.6% *Bacillus spp*. 23.4%		Mobile phones	[74]
	g+: *Staphylococcus spp*. CNS *S.* aureus g– *Enterobacter cloacae* *Serratia spp*.	Different vending machines	[75]
g+ *Staphylococcus spp*. CNS 11% MRSA 19% *Bacillus spp*. 5% *Streptococcus viridans* 10% g– *Pseudomonas aeruginosa* 9% *E. coli* 17% *Klebsiella pneumoniae* 9% *Proteus spp*. 7%		Mobile phones	[76]

Hospital	Community	Touchscreen device	Reference
g+ *Staphylococcus spp*. CNS 87.5% *S. aureus* 5% *Bacillus spp*. 60% g– *Pseudomonas spp*. 50% *Klebsiella spp*. 22.5% *Acinetobacter spp*. 15% *Proteus spp*. 12.5%		Mobile phones	[10]
g+ *Staphylococcus spp*. CNS 64% *S. aureus* 20% *Bacillus spp*. 16% *Micrococcus spp*. 8% *Streptococcus spp*. 20% g– diphtheroids 52% f *Penicillium spp*. 8%		Mobile phones	[77]
	g– *coliforms* 30.9% enterobacteriaceae 28.6% f yeast and molds 53%	Mobile phones	[78
	g+ *Staphylococcus spp*. 75.3% *Corynebacterium spp*. 6.2% f yeast 16.4%	Mobile phones	[50]
g+ *S. aureus* 53.3% *Bacillus spp*. 18.3% g– *Proteus spp.* *P. vulgaris* 36% *P. mirabilis* 16% *Salmonella paratyphi* A 12% *Citrobacter freundii* 8% gram-negative rods 23.3%		Mobile phones	[79]
g+ *Staphylococcus spp*. CNS 22.9% MSSA 17.0% MRSA 8.1% g– *Pseudomonas aerugin.* 7.6% *E. coli* 22.9% *Klebsiella aerogenes* 16.6%	g+ *Staphylococcus spp*. CNS 28.2% MSSA 18.7% g– *Pseudomonas aerugin*.8.1% *E. coli* 24.9% *Klebsiella aerogenes* 16.3%	Mobile phones	[80]
g+ *Staphylococcus spp.* *S. aureus* 32.2% *Bacillus spp*. 43.5% *Streptococcus spp*. 8% g– *Pseudomonas spp*. 11.2% f *Candida spp*. 6.4% *Aspergillus niger* 11%		Mobile phones	[81]
	g+ *S. aureus* 56%	Mobile phones	[82]
g+ *Staphylococcus spp* *S. epidermis* 42.2% *S. saprophyticus* 11.1% *Bacillus spp*. 57.8% *Corynebacterium spp*. 6.7%	g+ *Staphylococcus spp.* *S. epidermis* 66.7% *S.* saprophyticus 11.1% *Bacillus spp*. 40% *Micrococcus spp*. 6.7% *Corynebacterium spp*.22.2%	Mobile phones	[83]
g+ *Staphylococcus spp*. CNS 76% S. aureus 20% *Bacillus spp*. 36% *Micrococcus spp*. 36% g– enteric bacteria 12%		Mobile phones	[13]

Hospital	Community	Touchscreen device	Reference
g+ *Bacillus spp.* *Enterococcus faecalis* g– *Pseudomonas spp*. coliforms		Public touchscreens	[84]
g+ *S. aureus* 16.7% *S.* epidermis 6.7%		Mobile phones	[85]
	g+ *Staphylococcus spp.* *S. aureus* 44.8% *S. epidermis* 27.6% g– *E. coli* 20.7%	Mobile phones	[86]
g+ *Staphylococcus spp*. CNS 22.6% MSSA 6.7% *Bacillus spp*. 11.5% *Micrococcus spp*. 14.4% g– *Pseudomonas spp*. 7.1% *E. coli* 39.3% *Klebsiella spp*. 17.9%		Mobile phones	[87]
g+ *Staphylococcus spp*. CNS (*S. epidermis*) 28% *S. aureus* 12% *Bacillus spp*. 5% g– *Pseudomonas aerugin.* 13% *E. coli* 22% *Klebsiella pneumoniae* 16%		Mobile phones	[88]
g+ *S. aureus* 45%	g+ *S. aureus* 25%	Mobile phones	[89]
	g+ *Staphylococcus spp.* *S. epidermis* 100% *S. aureus* 100% *Bacillus spp*. 40% g– *Pseudomonas spp*. 100% *E. coli* 60% f fungi	Cash dispenser	[90]
g+ *Staphylococcus spp.* *S. aureus* 6% g– *Pantoea spp*. 8.2%		Mobile phones and tablets	[17]
	g+ *Staphylococcus spp*. CNS 47.9% *S. aureus* 20.9% *Bacillus spp*. 74.8% g– *Pseudomonas aerugin.* 5% *E. coli* 8% *Klebsiella spp.* *K. pneumoniae* 17.2% *K. aerogenes* 16%	Mobile phones	[91]
	g+ *Staphylococcus spp*. 84.6% *Bacillus spp*. 7.7% *Enterococcus spp*. 7.7%	Mobile phones	[92]
g+ *Staphylococcus spp.* *S. aureus* 34.6% *S. epidermis* 23.1% *S. saprophyticus* 15.4% g– *Pseudomonas spp*. 20.5%		Mobile phones	[93]
g+ *Staphylococcus spp*. 85.2% *S. epidermis* 72.2% *S. capitis* 13.9% *S. saprophyticus* 5.6% *S. warneri* 5.6% *S. xylosus* 5.6% *Enterococcus spp*. 37%		Mobile phones	[51]

Hospital	Community	Touchscreen device	Reference
g+ *Staphylococcus spp*. CNS 62% *Bacillus spp*. 26% *Micrococcus spp*. 41% *Corynebacterium spp*. 5% g– *Pseudomonas spp*. 10% f fungi 6%		Mobile phones	[94]
g+ *Staphylococcus spp*. CNS 62% *S. aureus* 10% *Bacillus cereus* 7% *Enterococcus faecalis* 7% g– *Acinetobacter spp*. 7%		Mobile phones	[18]
	g– *coliforms* 13.3%	Public touchscreens	[95]
	v SARS-CoV-2-RNA (25%)	Public touchscreen	[96]
	g+ *Staphylococcus spp*. CNS 9% *S. aureus* 21%, *Bacillus spp*. 23% g– *Pseudomonas aerugin.* 9% *E. coli* 14% *Klebsiella pneumoniae* 11% *Proteus spp*. 8%	Cash dispenser	[52]
g+ *Staphylococcus spp*. CNS 74.7% f *Aspergillus niger* 13.7% *Microsporum audounii* 5.6%		Mobile phones	[6]
g+ *Staphylococcus spp*. CNS 19% *Bacillus spp*. 39.5% g– *Pseudomonas spp*. 5.5% *E. coli* 15.5% *Klebsiella spp*. 10.5%		Mobile phones	[97]
g+ *Staphylococcus spp*. CNS 50% *S. aureus* 24.5% *Bacillus spp*. 14.3%		Mobile phones	[98]
g+ *Staphylococcus spp*. CNS 25% *Bacillus spp*. 15.5%		Mobile phones	[99]
	v SARS-CoV-2-RNA 19.1%	Cash dispenser	[100]
v SARS-CoV-2-RNA (25%)		Mostly tablets	[101]
	g+ *Staphylococcus aureus* *Micrococcus spp*. g– *Pseudomonas spp.* *E. coli* *Salmonella spp.* *Serratia spp*.	Cash dispenser	[102]

Abbreviations:

g+: gram-positive bacteria

g–: gram-negative bacteria

f: fungi

v: virus

CNS: coagulase-negative Staphylococcus

MRSA: methicillin resistant *Staphylococcus aureus*

MSSA: methicillin-sensitive *Staphylococcus aureus*

VRE: Vancomycin-resistant Enterococcus

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