



Digital Devices In Our Pockets â?? Creating More-Heat Or Preventing Heat-Loss: A Worth Investigating Phenomenon

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Digital Devices In Our Pockets â?? Creating More-Heat Or Preventing Heat-Loss: A Worth Investigating Phenomenon

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My opinion

Some of us always have funny feelings and inexplicable discomfort when our digital devices are held for too long and too near to our bodies [1-7]. Despite objectively measuring strengths of digital devices' electric and magnetic fields via personal or industrial meters [8], this may not be experienced and thus not understood by others who may not want to be distracted during their own digital device usage by trying to understand someone else's experiences with their own digital devices. Still, those who are experiencing inexplicable phenomena may find it worth sharing with global researcher population and leave it up to them whether they can get inspired to plan future research systematically investigating into these inexplicable experiences.

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Figure 1 [9] depicts temperature (T) and relative humidity (RH) changes with areas under curve (AUC-T and AUC-RH) over six-hours per Hygrochron iButton DS1923 (OnSolution Proprietary Limited, New South Wales, Australia [10]) with changed pocket site within non-scrub clothes and changed forms of digital device (iPhone 13 Pro Max [11] and SafeSleeve Antimicrobial protection case [12]) in the pocket

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RIGHT CHEST FRONT POCKET USED DURING TIME POINTS 1-360 SPANNING 90-MINUTE DURATION

Empty Pocket during time points 1-60 spanning 15-minute duration [AUC-T=1527; AUC-RH=2190]

Only Case In Pocket during time points 61-120 spanning 15-minute duration [AUC-T=1655; AUC-RH=2170]

iPhone Shut Off In Pocket during time points 121-180 spanning 15-minute duration [AUC-T=1631; AUC-RH=2158]

iPhone Powered On In Pocket during time points 181-240 spanning 15-minute duration [AUC-T=1695; AUC-RH=2416]

iPhone Shut Off Within Case In Pocket during time

points 241-300 spanning 15-minute duration [AUC-T=1689; AUC-RH=2172]

iPhone Powered On Within Case In Pocket during time points 301-360 spanning 15-minute duration [AUC-T=1795; AUC-RH=2280]

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LEFT CHEST FRONT POCKET USED DURING TIME POINTS 361-720 SPANNING 90-MINUTE DURATION

Empty Pocket during time points 361-420 spanning 15-minute duration [AUC-T=1709; AUC-RH=1967]

Only Case In Pocket during time points 421-480 spanning 15-minute duration [AUC-T=1642; AUC-RH=2114]

iPhone Shut Off In Pocket during time points 481-540 spanning 15-minute duration [AUC-T=1757; AUC-RH=2152]

iPhone Powered On In Pocket during time points 541-600 spanning 15-minute duration [AUC-T=1744; AUC-RH=2055]

iPhone Shut Off Within Case In Pocket during time points 601-660 spanning 15-minute duration [AUC-T=1796; AUC-RH=2139]

iPhone Powered On Within Case In Pocket during time points 661-720 spanning 15-minute duration [AUC-T=1810; AUC-RH=1860]

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LEFT THIGH FRONT POCKET USED DURING TIME POINTS 721-1080 SPANNING 90-MINUTE DURATION

Empty Pocket during time points 721-780 spanning 15-minute duration [AUC-T=1835; AUC-RH=2089]

Only Case In Pocket during time points 781-840 spanning 15-minute duration [AUC-T=1818; AUC-RH=2269]

iPhone Shut Off In Pocket during time points 841-900 spanning 15-minute duration [AUC-T=1740; AUC-RH=2208]

iPhone Powered On In Pocket during time points 901-960 spanning 15-minute duration [AUC-T=1841; AUC-RH=2561]

iPhone Shut Off Within Case In Pocket during time

points 961-1020 spanning 15-minute duration [AUC-T=1886; AUC-RH=2675]

iPhone Powered On Within Case In Pocket during time points 1021-1080 spanning 15-minute duration [AUC-T=1872; AUC-RH=2678]

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RIGHT LOWER ABDOMINAL QUADRANT FRONT POCKET USED DURING TIME POINTS 1081-1440 SPANNING 90-MINUTE DURATION

Empty Pocket during time points 1081-1140 spanning 15-minute duration [AUC-T=1855; AUC-RH=1945]

Only Case In Pocket during time points 1141-1200 spanning 15-minute duration [AUC-T=1973; AUC-RH=2018]

iPhone Shut Off In Pocket during time points 1201-1260 spanning 15-minute duration [AUC-T=1921; AUC-RH=2310]

iPhone Powered On In Pocket during time points 1261-1320 spanning 15-minute duration [AUC-T=1955; AUC-RH=2470]

iPhone Shut Off Within Case In Pocket during time points 1321-1380 spanning 15-minute duration [AUC-T=1987; AUC-RH=2910]

iPhone Powered On Within Case In Pocket during time points 1381-1440 spanning 15-minute duration [AUC-T=1901; AUC-RH=2731]

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Figure 2 [13] depicts temperature (T) and relative humidity (RH) changes with areas under curve (AUC-T and AUC-RH) over five-hours per Hygrochron iButton DS1923 (OnSolution Proprietary Limited, New South Wales, Australia) with changed pocket site within scrubs plus personal protective equipment and changed forms of digital device (iPhone 13 Pro Max with or without SafeSleeve Antimicrobial protection case and Amazon Kindle 10th Generation [14]) in the pocket

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RIGHT CHEST FRONT POCKET USED DURING TIME POINTS 1-120 SPANNING 60-MINUTE DURATION

iPhone Shut Off Within Case In Pocket during time points 1-60 spanning 30-minute duration [AUC-T=1872; AUC-RH=2763]

iPhone Powered On Within Case In Pocket during time points 61-120 spanning 30-minute duration [AUC-T=1972; AUC-RH=2339]

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LEFT CHEST FRONT POCKET USED DURING TIME

POINTS 121-240 SPANNING 60-MINUTE DURATION

iPhone Shut Off Within Case In Pocket during time points 121-180 spanning 30-minute duration [AUC-T=2016; AUC-RH=1955]

iPhone Powered On Within Case In Pocket during time points 181-240 spanning 30-minute duration [AUC-T=1997; AUC-RH=2025]

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LEFT THIGH FRONT POCKET USED DURING TIME POINTS 241-360 SPANNING 60-MINUTE DURATION

iPhone Shut Off Within Case In Pocket during time points 241-300 spanning 30-minute duration [AUC-T=2000; AUC-RH=2295]

iPhone Powered On Within Case In Pocket during time points 301-360 spanning 30-minute duration [AUC-T=1972; AUC-RH=2284]

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RIGHT LOWER ABDOMINAL QUADRANT FRONT POCKET USED DURING TIME POINTS 361-480 SPANNING 60-MINUTE DURATION

iPhone Shut Off Within Case In Pocket during time points 361-420 spanning 30-minute duration [AUC-T=2005; AUC-RH=2290]

iPhone Powered On Within Case In Pocket during time points 421-480 spanning 30-minute duration [AUC-T=2025; AUC-RH=2494]

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LEFT THIGH FRONT POCKET USED DURING TIME POINTS 481-600 SPANNING 60-MINUTE DURATION

Kindle Shut Off In Pocket during time points 481-540 spanning 30-minute duration [AUC-T=1787; AUC-RH=2915]

Kindle Powered On In Pocket during time points 541-600 spanning 30-minute duration [AUC-T=1889; AUC-RH=2679]

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Three things come to light based on Figure 1 [9] and Figure 2 [13] and calculations therein:

- As compared to with non-scrub clothes wherein temperatures fluctuated above and below 30 degrees Celsius, scrubs plus personal protective equipment kept temperatures across the board above 30 degrees Celsius.
- As compared to that for empty pocket, calculated area under curve for 15-minute-recorded temperature under non-scrub clothes consistently increased when iPhone 13 Pro Max (within SafeSleeve Antimicrobial protection case) was powered on across all four pocket sites (right chest, left chest, left thigh and right lower abdominal

quadrant) which was significantly different among the four pocket sites ($P=0.0108$ per Chi-Square Test: 2x4 contingency table [15]).

- As compared to that for empty pocket, calculated area under curve for 15-minute-recorded relative humidity under non-scrub clothes consistently increased when iPhone 13 Pro Max (without SafeSleeve Antimicrobial protection case) was powered on across all four pocket sites (right chest, left chest, left thigh and right lower abdominal quadrant) which was significantly different among the four pocket sites ($P < 0.0001$ per Chi-Square Test: 2x4 contingency table).

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Summarily, if the figures [9, 13] can inspire global researchers, it may be worthwhile to systematically investigate whether our always powered on digital devices within or without their cases are differentially creating more heat or preventing heat-loss [16-18] and thereafter changing temperature and relative humidity locally thus inducing funny feelings and inexplicable discomfort therein when kept within our pockets near our various anatomical sites.

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