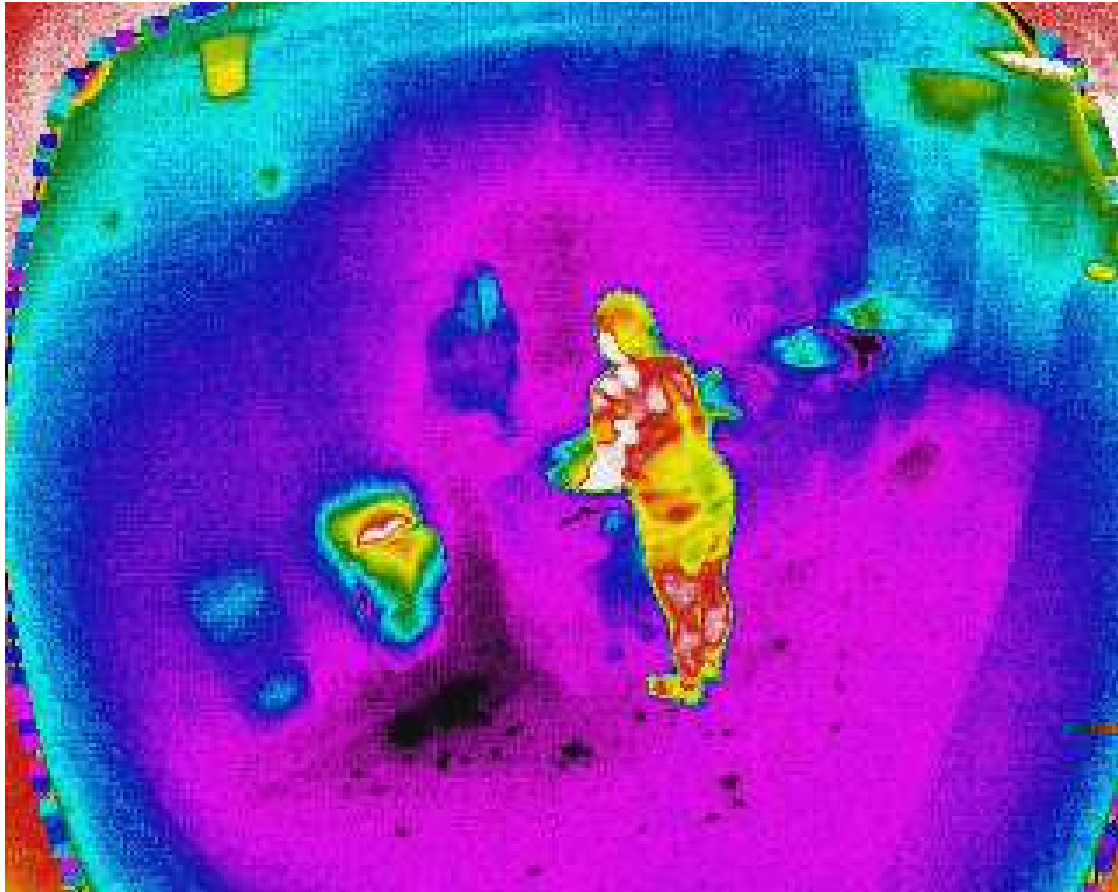


Written Evidence Submitted by
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(C190006)



Interim Report on hand hygiene practices in Northern Ireland during the novel coronavirus (COVID-19) Pandemic

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Executive Summary

- The ongoing novel coronavirus (COVID-19) pandemic is one of the most significant public health challenges in a generation.
- Adequate hand hygiene practice and compliance is known as being one of the most effective self-protective behaviours in preventing transmission of COVID-19.
- However, thermal observation of UK members of the general population ($n = 498$) between 10-20th March 2020 indicated that despite the nationwide impact of the pandemic, the overall hand hygiene compliance of the general population was wholly inadequate.
- The interim findings indicated that 82.93% of the general population are practicing inadequate hand hygiene compliance as per this ongoing study.
- This is despite the numerous public health communication campaigns encouraging people to spend longer washing their hands and to wash hands thoroughly in order to prevent the spread of COVID-19.
- These interim findings suggest that current public health communication campaigns focusing on hand hygiene behaviour and compliance have not had the desired impact and may need revised or re-enforced in order to improve the overall hand hygiene behaviour and compliance of the general population.
- A major focus should be on improving the length of time members of the general population spend washing and drying hands, and to use children as possible promotional role models for adequate hand hygiene compliance (44.44% compliance rate) for adults (14.35% compliance rate).
- If adherence to adequate hand hygiene compliance by the general population in the UK improves, then this could not only help slow the spread of the pandemic but also lessen the burden on our National Health Service (NHS).

Introduction

1. My name is Dr Aaron Lawson, Lecturer in Environmental Health at Ulster University, Belfast, Northern Ireland and I am submitting this interim report on behalf of the organisations I work for. Over the past five years my research has primarily focused on looking at the general population's hand hygiene behaviour and compliance in the context of communicable disease transmission and how it can be improved through various informed intervention strategies.
2. Ulster University in collaboration with **safefood** Ireland are currently conducting research into hand hygiene practices across the island of Ireland (Northern Ireland and the Republic of Ireland). This is an interim report of initial findings from observations of the general population's handwashing behaviour and compliance when using public restrooms in Northern Ireland and the significance for the novel coronavirus (COVID-19) pandemic.
3. While these recent observations are of handwashing behaviour and compliance in public restrooms, the interim findings can be indicative of wider hand hygiene practices in community settings.
4. This interim report is not a detailed analysis of the overall findings but a preliminary report to highlight key observations and the potential significance of these findings to the current public health campaign and actions in relation to the COVID-19 pandemic.

Background Information

5. In order to evaluate the general population's handwashing behaviour and compliance in this study, thermal-imaging cameras were installed in one set of male and one set of female public restrooms located in Belfast city centre, Northern Ireland. Thermal-camera observation of the sink and hand dryer areas in each restroom was conducted over a 10-day period between 10 - 20 March 2020. Only those clearly identifiable as children were classified as such in the study.
6. Public restrooms located in Belfast city centre were selected because of their availability during the ongoing novel coronavirus (COVID-19) pandemic, and also because it was theorised that urban public restrooms may provide ample opportunity for the spread of the virus during close contact between members of the general population after using the toilet.
7. Each public restroom had only liquid soap available for washing hands, and Dyson hand dryers for drying hands. There were 3 cubicles, 5 urinals, 3 sinks and 2 hand dryers in the male restroom. In the female restroom there were 4 cubicles, 4 sinks and 2 hand dryers.
8. An example of the images captured during the thermal-camera observation in both the male and female public restrooms is shown in Figures 1 and 2 below.

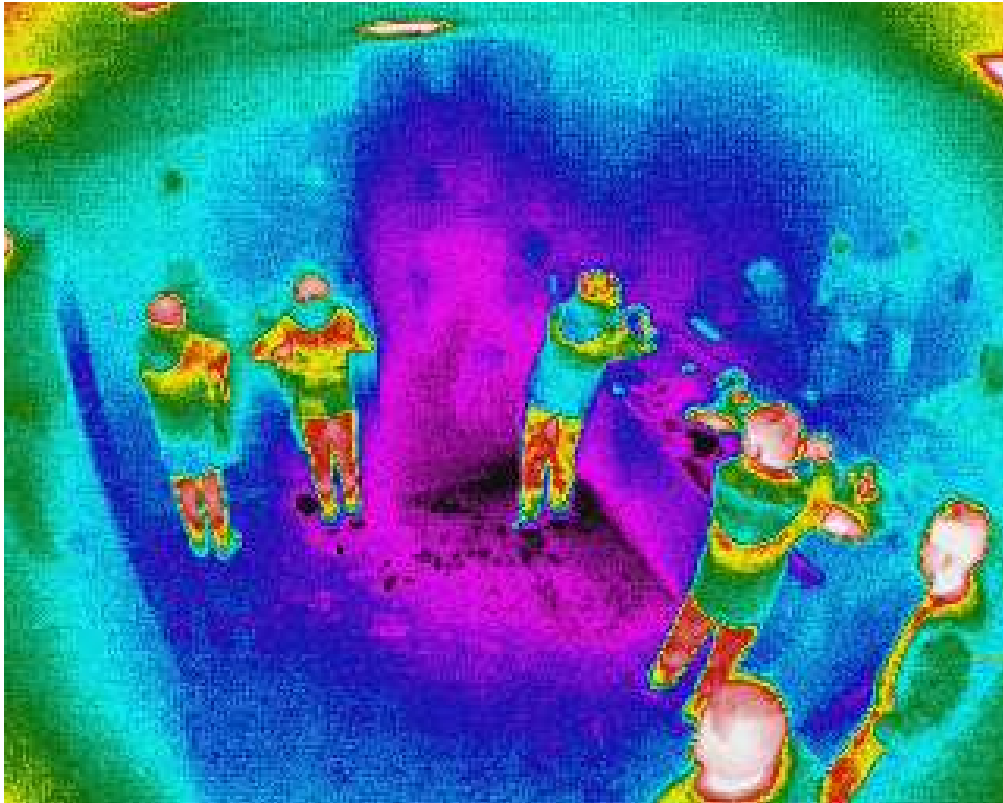


Figure 1. Thermal image of male public restroom under observation in the study.

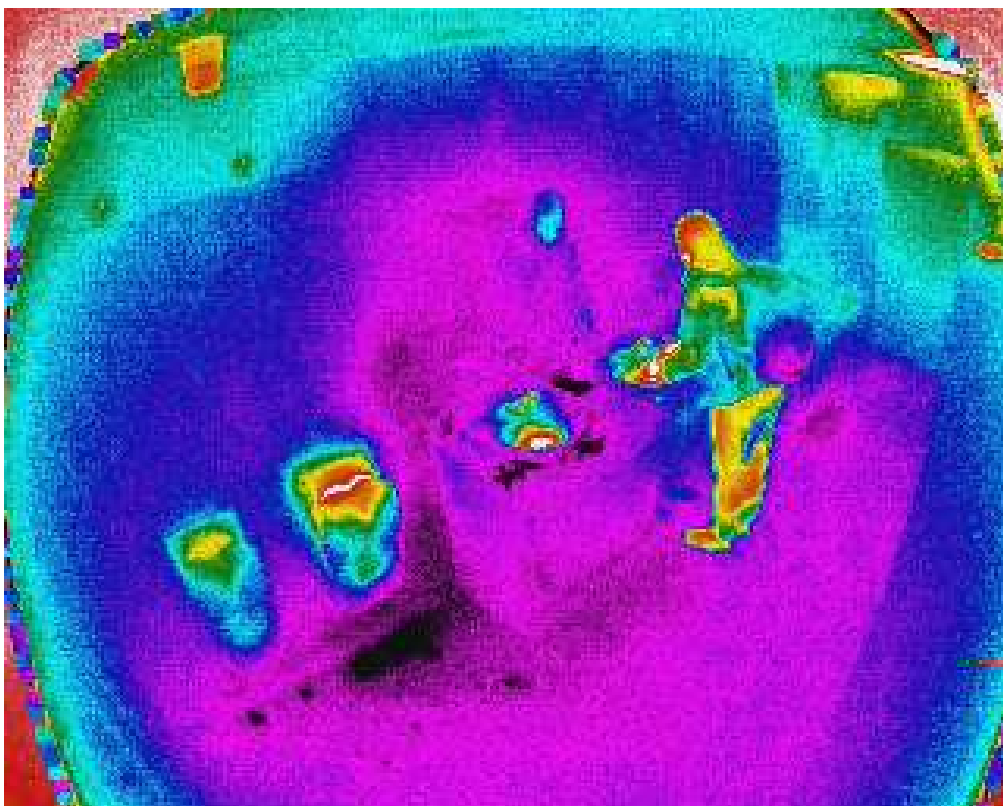


Figure 2. Thermal image of female public restroom under observation in the study.

Findings:

9. **Key Finding: Hand hygiene compliance amongst the general population remains highly inadequate even considering current media campaigns around the novel coronavirus (COVID-19) pandemic.**
10. This ongoing research study involved the use of thermal-imaging cameras to observe the general population's hand hygiene behaviour and compliance when using public restrooms. To date, a total of 498 thermal observations of members of the general population has taken place. This includes 254 males and 244 females. Of this general population, 453 were observed as being adults and 45 were observed as being children.
11. For the purpose of this research, the hand hygiene compliance of the general population was defined into four distinct categories based upon relevant literature. The four categories and their definitions are described in the table below.
12. ***The term *Inadequacy* refers to the combination of non-hand hygiene, poor hand hygiene and basic hand hygiene.**

HH Category	Description
Adequate HH	Washing hands for 20s using soap, water and drying for 15s using a Dyson hand dryer
Basic HH	Washing hands using soap, water and drying using a hand dryer but not for the adequate length of time.
Poor HH	Any other combination not fitting the above two.
Non HH	Did not wash or dry hands at all

13. The hand hygiene compliance of the general population in this study is summarised in the tables below.

14. Table 1 shows the overall and gender hand hygiene compliance categorisation for the sample population. **Only 17.07% of the general population wash their hands adequately as defined within this study. A significant proportion show intent to wash their hands (62.65%) which is statistically significant ($p = 0.02$), but this is still in an inadequate fashion. Significantly, 7.23% of the overall general population do not wash or dry their hands at all, and this is more predominant amongst males and this is statistically significant ($p = 0.02$).**

HH Compliance	Male		Female		Overall		p -value
	n	(%)	n	(%)	n	(%)	
Adequate HH	50	19.69	35	14.34	85	17.07	0.11
Basic HH	146	57.48	166	68.03	312	62.65	0.02
Poor HH	33	12.99	32	13.11	65	13.05	0.97
Non HH	25	9.84	11	4.51	36	7.23	0.02
Total	254	100.00	244	100.00	498	100.00	

Table 1. Overall and gender hand hygiene compliance categorisation for the sample population.

15. Table 2 shows the overall adult versus child hand hygiene compliance categorisation for the sample population. Significantly this table demonstrates the difference between adult and child hand hygiene. **From the data gathered, children were significantly more likely to wash their hands adequately (44.44%) compared to adults (14.35%) and this is statistically significant ($p = < 0.01$).**

HH Compliance	Adult		Child		Overall		p -value
	n	(%)	n	(%)	n	(%)	
Adequate HH	65	14.35	20	44.44	85	17.07	< 0.01
Basic HH	290	64.02	22	48.89	312	62.65	0.05
Poor HH	62	13.69	3	6.67	65	13.05	0.18
Non HH	36	7.95	0	0.00	36	7.23	0.05
Total	453	100.00	45	100.00	498	100.00	

Table 2. Overall adult versus child hand hygiene compliance categorisation for the sample population.

16. Table 3 shows the overall adult versus child comparison of hand hygiene adequacy versus inadequacy of the sample population. It highlights the difference in hand hygiene adequacy versus inadequacy* between adults and children.

HH Compliance	Adult		Child		Overall	
	n	(%)	n	(%)	n	(%)
Adequate HH	65	14.35	20	44.44	85	17.07
Inadequate HH	388	85.65	25	55.56	413	82.93
Total	453	100.00	45	100.00	498	100.00

Table 3. Overall adult versus child comparison of hand hygiene adequacy versus inadequacy of the sample population.

17. Table 4 shows the overall and gender comparison of hand hygiene adequacy versus inadequacy of the sample population. It highlights the difference in hand hygiene adequacy versus inadequacy* between males and females. **Overall, 80.31% of the general sample population do not wash their hands adequately despite the continued coverage in the media highlighting the importance of adequate hand hygiene in minimising the transmission of novel coronavirus (COVID-19).**

HH Compliance	Male		Female		Overall	
	n	(%)	n	(%)	n	(%)
Adequate HH	50	19.69	35	14.34	85	17.07
Inadequate HH	204	80.31	209	85.66	413	82.93
Total	254	100.00	244	100.00	498	100.00

Table 4. Overall and gender comparison of hand hygiene adequacy versus inadequacy of the sample population.

18. A breakdown of the general population's hand hygiene behaviour is provided in the tables below.

19. Table 5 shows the drying method used by male and female members of the general population who were observed, and Table 6 provides a breakdown of the drying method by adult and child.

Drying Method	Male		Female		Total	
	n	(%)	n	(%)	n	(%)
Hand dryer	198	77.95	202	82.79	400	80.32
Toilet Paper	16	6.30	15	6.15	31	6.22
Clothes	6	2.36	5	2.05	11	2.21
Not at all	34	13.39	22	9.02	56	11.24
Other	0	0.00	0	0.00	0	0.00
Total	254	100.00	244	100.00	498	100.00

Table 5. Overall frequency of drying method used by male and female members of the general population.

Drying Method	Adult		Child		Total	
	n	(%)	n	(%)	n	(%)
Hand dryer	358	79.03	42	93.33	400	80.32
Toilet Paper	30	6.62	1	2.22	31	6.22
Clothes	9	1.99	2	4.44	11	2.21
Not at all	56	12.36	0	0.00	56	11.24
Other	0	0.00	0	0.00	0	0.00
Total	453	100.00	45	100.00	498	100.00

Table 6. Overall frequency of drying method used by adult and child members of the general population.

20. Figures 3 and 4 below shows how long members of the general population spent washing and drying hands. The mean length of time spent washing hands for all research subjects was 18.66 seconds (Std. dev: 13.91), and the mean length of time spent drying hands for all research subjects was 13.46 seconds (Std. dev: 9.49).

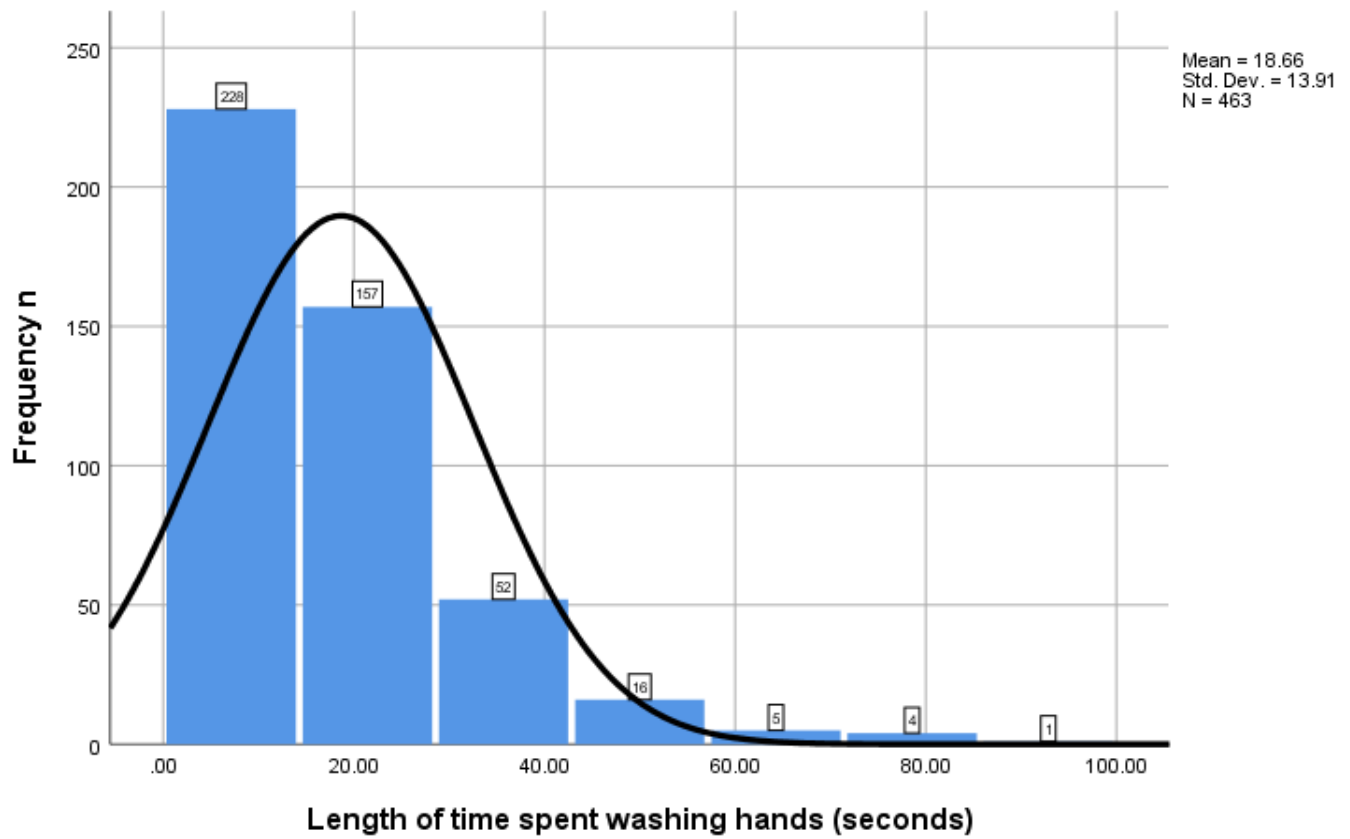


Figure 3. Mean length of time spent washing hands for research subjects.

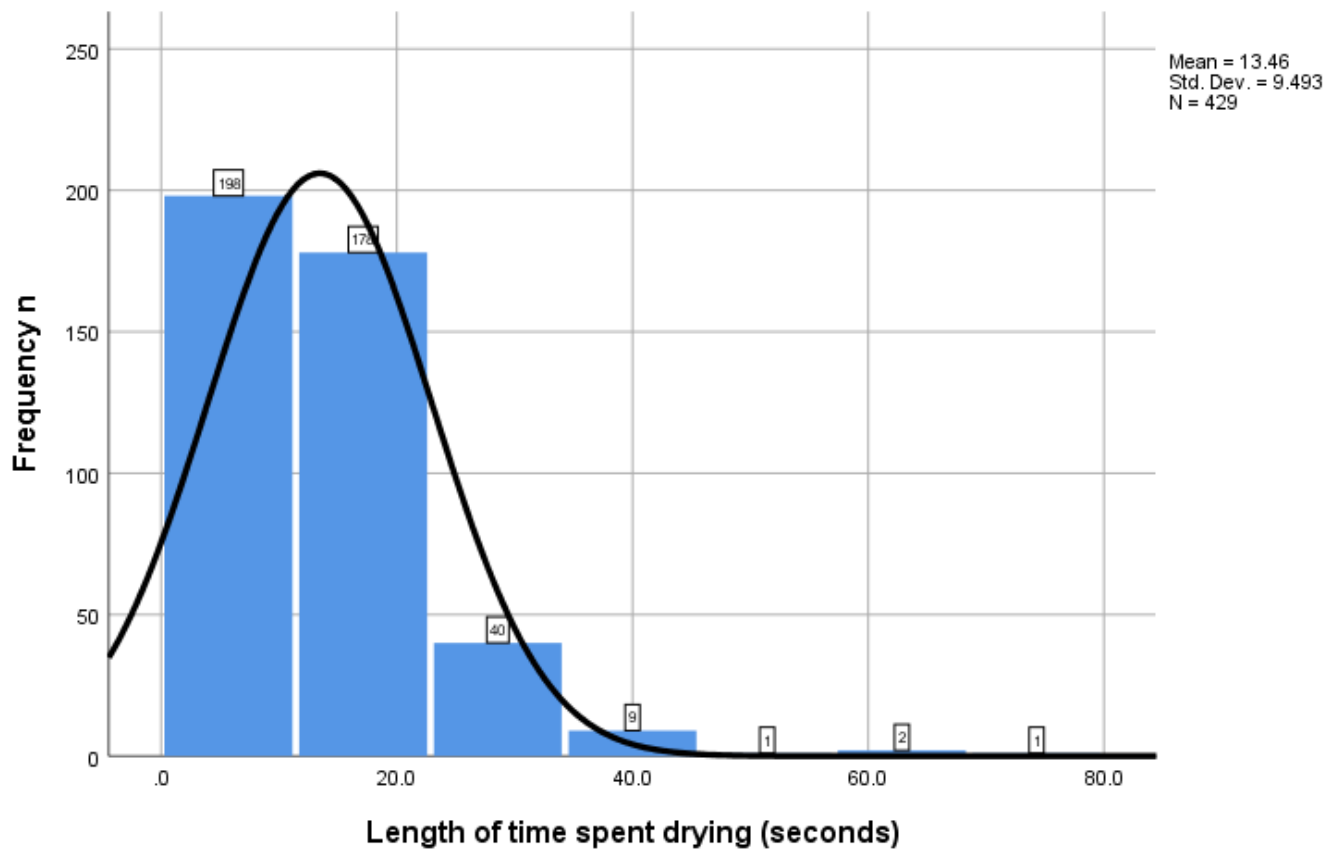
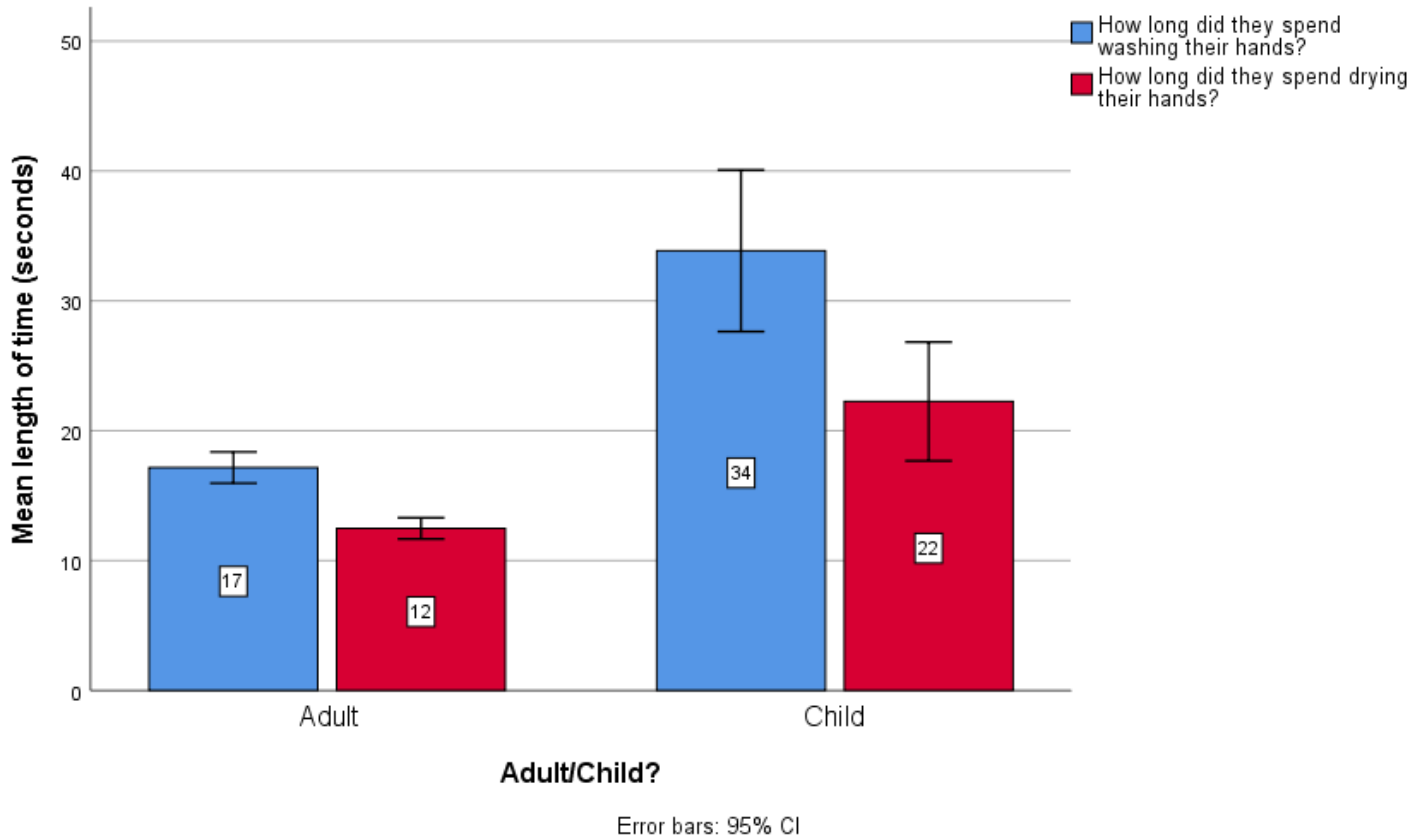


Figure 4. Mean length of time spent drying hands for research subjects.

21. For adults versus children, the mean length of time spent washing hands for adults was 17.17 seconds (SD: 12.08), and for children it was 32.51 seconds (SD: 20.75). For hand drying, the mean length of time spent by adults doing so was 12.48 seconds



(SD: 8.16) and for children it was 22.26 seconds (SD: 14.85). Figure 5 below summarises this information.

Figure 5. Mean length of time spent washing and drying hands for adults and children in this study.

Key Observations

22. Notwithstanding the overall aim of the study, these findings appear highly significant considering the unforeseen novel coronavirus (COVID-19) pandemic. One of the overriding messages to the general population has been on the importance of washing hands to prevent the spread of the new disease. This is emphasised in almost every news and public health announcement.
23. The interim findings in this report indicate that despite these repeated communications and public health messages, **the general population is still not practicing adequate hand hygiene compliance with 82.93% overall practicing inadequate hand hygiene compliance as per this ongoing study.**
24. Another key finding in this ongoing study would be that **children have a significantly higher level of hand hygiene compliance (44.44%) compared to adults (14.35%). This may indicate that children may be valuable role models in any public health campaign on hand hygiene** (It must be noted however that within the sample population there were only 45 children observed in total).
25. **Males are significantly more likely to not wash or dry their hands at all (9.84%) compared to females (4.51%)** although both levels of non-hand hygiene compliance appear to be high considering current public health campaigns around minimising the transmission of novel coronavirus (COVID-19).

Recommendations

26. This study aimed to evaluate the hand hygiene behaviour and compliance of the general population during the novel coronavirus (COVID-19) pandemic in an urban setting in the UK. This may be the only research of its kind currently being undertaken anywhere across the globe. Given the importance of this unique public health research and in light of the novel coronavirus (COVID-19) pandemic, we feel that the interim findings of this ongoing study could be highly significant in informing public health campaigns in the coming weeks and months, and potentially could be of international significance.
27. If the indicative level of inadequate hand hygiene behaviour and compliance amongst the general population is not addressed quickly and effectively, then this will not only increase the risk of further spread, but also increase the burden of the disease on the national healthcare service and its capacity to cope.
28. Current public health campaigns around novel coronavirus (COVID-19) do not appear, based on this study, to have the desired impact and may need to be reviewed or re-enforced in order to achieve the levels of compliance required to slow the spread of the pandemic.
29. A major focus should be placed on improving the length of time spent washing and drying hands to at least 20 seconds or more as timing is the key factor in the adequate method of hand hygiene practice and compliance as has previously been established.
30. Focus should also be placed on improving the behaviour of the large number in the basic hand hygiene category, displaying an intent to practice good hand hygiene, but not meeting the required 20 seconds. Improvement in behaviour among this group would make a significant difference in the levels of overall hand hygiene compliance and should be viewed as a key target group.
31. While other initiatives to improve timing need to be investigated, a simple visual or audible timer placed in public restrooms may be a novel approach to ensure that people do spend the correct length of time washing hands in these facilities.

32. Similarly for hand drying, most hand dryers are constricted to a pre-determined timing setting, and therefore most people who do not dry their hands adequately are potentially doing so because they trust the time limit set by the hand dryer for its operating duration, rather than using a visual or audible timer or counting themselves to make sure hands are dried adequately.
33. Children appear to practice adequate hand hygiene compliance significantly better than adults, and they may be useful as key role models for promoting adequate hand hygiene behaviour in current and future public health campaigns around preventing the spread of COVID-19 for both children and adults. Particularly for those adults who frequently practice inadequate hand hygiene compliance.

(April 2020)