

Doctors underestimate 2 m social distancing more than other health care workers

Social distancing has emerged as a key measure to reduce the spread of COVID-19.¹ Limitation of virus transmission is particularly important in healthcare settings where staff are at increased risk of contracting COVID-19 compared with the general public.² A systematic review³ suggested a halving in the risk of transmission for every additional metre over 1 m between an infected individual and a susceptible host. Currently, in the UK, 2 m social distancing is recommended wherever possible.¹

Given that most interactions in the hospital workplace require individuals to determine 2 m without the help of visual cues, we aimed to investigate the ability of hospital staff to estimate a 2 m social distance; to determine whether the ability to judge a 2 m distance was related to age, gender, height or staff group; to explore the possibility that those likely to be familiar with the metric system (ie, younger participants or those who provided height in metres) might estimate a 2 m distance more accurately; and to establish whether provision of visual aids improved accuracy.

Recruitment was by convenience sampling in different workplace settings at Dumfries and Galloway Royal Infirmary, a district general hospital in south west Scotland. Participants were asked to estimate and stand at a distance of 2 m from one of four researchers, outwith the field of view of any other participants. The exact distance was then measured using a Bosch DLE40 Professional Laser Rangefinder. The accuracy of the rangefinder was checked using 30 measurements against a tape measure with distances ranging from 1 to 4 m. All measurements were within 0.5 cm. For each participant, we recorded age, gender, height in either imperial or metric units, the staff group to which they belonged and whether visual aids (figure 1) were in place in their department. Heights given in imperial units were converted to metric for analysis.



Figure 1 Visual aid to promote hospital workers' 2 m social distancing.

Table 1 Summary statistics of estimated distance for the sample

Category	N	Median (IQR)	n (%) within 0.25 cm of 2 m	n (%) under 2 m
Administration	28	2.44 (2.2–2.8)	5 (18)	3 (11)
Nursing	47	2.41 (2.0–2.8)	13(28)	10 (21)
Allied health professions	40	2.42 (2.1–2.8)	13(33)	8 (20)
Doctor	54	2.20 (1.9–2.5)	24(45)	18 (33)
Domestic services staff	23	2.88 (2.1–3.4)	7 (30)	3 (13)
Healthcare support worker	21	2.39 (2.1–2.8)	5 (24)	3 (14)
Management	11	2.39 (2.0–3.0)	1 (9)	3 (27)
Pharmacy	22	2.56 (2.1–3.0)	4 (18)	5 (23)
Biomedical scientist	34	2.38 (2.2–2.6)	7 (21)	3 (9)
Other	20	2.51 (2.1–3.1)	6 (30)	4 (20)
Total	300	2.39 (2.1–2.8)	85 (28)	60 (20)

We analysed estimated distance using summary statistics and, given the non-normal distributions, by non-parametric Mann-Whitney U, Kruskal-Wallis, Spearman's rank correlation and χ^2 tests. All analyses were performed on IBM SPSS V.26.0. A 5% level of significance was set.

Three hundred subjects belonging to 10 different staff groups were recruited (table 1). Median estimates of a 2 m distance were greater than 2 m in all 10 staff groups but varied considerably between groups (table 1). Medians were highest for domestic services staff (2.88 m) and closest to 2 m for doctors (2.20 m). Less than a third of estimates (28.3%) were within 25 cm of the 2 m distance with doctors (44.5%) most likely and managers (9.1%) least likely to achieve this degree of accuracy.

No significant relationship was found between estimated distance and participant age ($r=-0.087$, $p=0.13$), gender ($p=0.12$) or the presence of a 2 m visual aid ($p=0.11$). There was no overall relation between estimated distance and participant height ($r=-0.095$, $p=0.10$), although we did find a significant difference in estimated distance between those ($n=265$) who reported their height in imperial units (median 2.4) and those ($n=35$) who gave their height in metric units (median 2.3) ($p=0.03$).

One in five of the participants in this study underestimated 2 m. Doctors were significantly more likely to underestimate 2 m than other study participants (33.3% v 17.1%, $p=0.005$). The OR of doctors underestimating versus all other study participants was 2.43. More doctors (44.4%) reported their height in metric units than did other staff groups (all <11%, $p<0.001$), and more participants who gave their height in metric units underestimated 2 m compared with those who used imperial units (37.1% v 17.7%, $p<0.001$). It is possible therefore that these two observations were related.

To our knowledge, this is the first study of healthcare workers' perceptions of 2 m distance. Blinding participants to the standing distance and accuracy of their colleagues ensured they participated without bias. We nevertheless recognise a number of limitations. These include a relatively small sample size and use of convenience sampling. Moreover, we did not take repeated measures on the same individual to determine the reproducibility of the test.

We conclude that visual estimation alone does not result in accurate judgement of 2 m across different healthcare professions and that a significant number of staff members underestimate this distance. Doctors were more likely to underestimate distance than other healthcare workers. A 2 m long visual cue did not appear to improve estimation of a 2 m distance. How a person judges distance is complex and multifactorial.⁴ The use of other measures, such as floor markings,⁵ could be an alternative way of improving social distancing, with the ultimate aim of reducing transmission of COVID-19.

Iona Lennie,¹ Smyrna Muralidharan,¹ Mary Rimbi,¹ Angus McFadyen,² Mark Crowther,³ Chris Isles¹

¹Medicine, Dumfries and Galloway Royal Infirmary, Dumfries, UK

²akm-stats, Glasgow, UK

³Haematology, Dumfries and Galloway Royal Infirmary, Dumfries, UK

Correspondence to Dr Iona Lennie; iona.lennie@nhs.scot

Contributors MC had the idea for the study; IL, SM and MR undertook all the measurements; AMcF was responsible for the statistical analyses; IL and CI wrote the first draft; all authors contributed to the final draft.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval We did not seek ethical approval for this study as there were no person identifiable data, in keeping with our health board's policy.

Provenance and peer review Not commissioned; externally peer reviewed.

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To cite Lennie I, Muralidharan S, Rimbi M, *et al.* *Postgrad Med J* Epub ahead of print: [please include Day Month Year]. doi:10.1136/postgradmedj-2021-139814

Accepted 6 March 2021

Postgrad Med J 2021;**0**:1–2.
doi:10.1136/postgradmedj-2021-139814

ORCID iD

Chris Isles <http://orcid.org/0000-0001-7830-7561>

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