Public Health England

HSE

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Personal protective equipment and heat: risk of heat stress

Summary

Wearing personal protective equipment (PPE) in warm/hot environments increases the risk of heat stress. This occurs when the body is unable to cool itself enough to maintain a healthy temperature. Heat stress can cause heat exhaustion and lead to heat stroke if the person is unable to cool down.

Measures to control the temperature of clinical environments and enable staff to make behavioural adaptations to stay cool and well hydrated should be made. Staff may require more frequent breaks and the frequency of PPE changes may increase, with a resulting increase in demand.

Action

Plan now for the summer:

- Assess the risk of overheating in your workplace and consider appropriate control measures to implement.
- Consider collective control measures first (eg remove or reduce the sources of heat and improve ventilation, where possible).
- Consult the Heatwave Plan for England.
- Sign up to receive PHE/Met Office heat-health alerts so that you know when high temperatures are forecast

Ensure that staff are aware of the risk of heat stress when wearing PPE and know how to reduce their risk:

- Satisfy yourself that there is a cascade in place to ensure that frontline staff receive the alerts.

Staff working in warm/hot conditions should follow the advice:

- Take regular breaks, find somewhere cool if you can.
- Make sure you are hydrated (checking your urine is an easy way of keeping an eye on your hydration levels – dark or strong-smelling urine is a sign that you should drink more fluids).
- Be aware of the signs and symptoms of heat stress and dehydration (thirst, dry mouth, dark or strong-smelling urine, urinating infrequently or in small amounts, inability to concentrate, muscle cramps, fainting). Don't wait until you start to feel unwell before you take a break.
- Use a buddy system with your team to look out for the signs of heat stress (eg confusion, looking pale or clammy, fast breathing) in each other.
- Between shifts, try to stay cool as this will give your body a chance to recover.

Ensure that PPE supplies are sufficient to cover a likely increase in demand for certain PPE items during warmer months due to staff changing equipment more frequently.

Consider whether more staff may be needed per shift to maintain service levels while accommodating increased staff breaks.

Any actions taken must be aligned with local infection prevention and control policies.

Problem/background

Hospitals and other healthcare settings in England are at risk of overheating in warm weather. During 2018 nearly 50% of NHS hospital trusts reported at least one incident of overheating, and 8% of trusts reported over 50 incidents.[i]

Occupational heat strain is associated with productivity loss and has an impact on the health of those affected.[ii]

Employers have a responsibility to ensure a reasonable working temperature in workrooms and local heating or cooling where a comfortable temperature cannot be maintained.[iii] Adequate ventilation reduces the risk of coronavirus (COVID-19) aerosol transmission and can also positively impact the risk of heat stress for those working in warm/hot conditions. Understanding of the role played by ventilation for controlling transmission is increasing and the HSE's ventilation guidance [iv] is under frequent review. Ventilation should inform your assessment of the risk and selection of measures to control the potential for heat stress.

To reduce the risk of transmission of COVID-19, healthcare staff are now required to wear PPE, specified for different settings and activities in line with national guidance. This can effectively require them to wear PPE for the entirety of their clinical work.[v]

Wearing PPE in warm/hot environments increases the risk of heat stress because:[iii]

- PPE reduces the body's ability to evaporate sweat and prevents heat loss through convection and radiation;[vi]
- scope for staff to adapt to their environment by removing clothing may be compromised through the necessary wearing of PPE;
- the impact of PPE on a person's risk of heat stress in a health or social care setting will depend on work rate, workplace climate, PPE and the individual.

Heat stress can present as heat exhaustion and lead to heat stroke if the person is unable to cool down. Heat exhaustion is when someone becomes very hot and starts to lose water or salt from their body. Heat stroke is where the body is no longer able to cool itself and a person's body temperature becomes dangerously high.

The signs of heat exhaustion include: a headache; dizziness and confusion; loss of appetite and feeling sick; excessive sweating and becoming pale, clammy skin; cramps in the arms, legs and stomach; fast breathing or pulse; temperature of 38°C or above; being very thirsty.

If someone is showing signs of heat exhaustion, they need to be cooled down. Further information is available on heat exhaustion, heat stroke and actions to take to cool down.

Demand on PPE equipment may increase as PPE may need to be changed more often due to increased regularity of breaks (during which PPE must be discarded). PPE also needs to be changed and discarded when it becomes uncomfortable or damp, for example with sweat.

Health and social care workers will need to take more frequent breaks to cool down which may impact on productivity.

For queries relating to PPE and workplace risk assessments, that cannot be answered from information available on the HSE website at www.hse.gov.uk, or by the local health and safety risk management team, please contact HSE using our online working safely enquiries form at https://hsegov.microsoftcrmportals.com/workingsafelyenquiries/

For queries relating to the Heatwave plan and heat-health alerts, please contact ExtremeEvents@phe.gov.uk

References

[i] NHS Digital. Estates Return Information Collection 2018-19 https://digital.nhs.uk/data-and-information/publications/statistical/estates-returns-information-collection/england-2018-19 [Accessed 19th May 2020]

[ii] Flouris AD *et al.* Workers' health and productivity under occupational heat strain: a systematic review and meta-analysis https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30237-7/fulltext

[iii] Health and Safety Executive. Managing workplace temperature. Available at: https://www.hse.gov.uk/temperature/thermal/managers.htm [Accessed 20th May 2020]

iv HSE (2021) Ventilation and air conditioning during the coronavirus (COVID-19) pandemic. https://www.hse.gov.uk/coronavirus/equipment-and-machinery/air-conditioning-and-ventilation/index.htm?utm_source=hse.gov.uk&utm_medium=refferal&utm_campaign=coronavirus&utm_term=air-con&utm_content=home-page-popular [Accessed 28th May 2021]

[v] Public Health England. Coronavirus (COVID-19): personal protective equipment (PPE) hub. Available at: https://www.gov.uk/government/collections/coronavirus-covid-19-personal-protective-equipment-ppe [Accessed 12th June 2020].

[vi] Potter AW et al. Ebola Response: Modelling the Risk of Heat Stress from Personal Protective Clothing. PLoS One. 2015; 10(11): e0143461