

# Introducing a local HHS protocol at the beginning of the COVID-19 pandemic: a review of HHS management against national standards before and after



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## 1 Background

The outbreak of COVID-19 raised concerns that there would be an increased number of patients presenting to GG&C hospitals with HHS. A delay in presentation could result in increased morbidity & mortality. Early data also suggested that COVID-19 infection itself was linked with poorer outcomes & increased risk of severe illness in people with diabetes<sup>1</sup>.

This fast-tracked the introduction of a local HHS protocol based on national standards. The protocol is based on the Joint British Diabetes Societies Guideline (2012), and it was introduced in Apr-20.

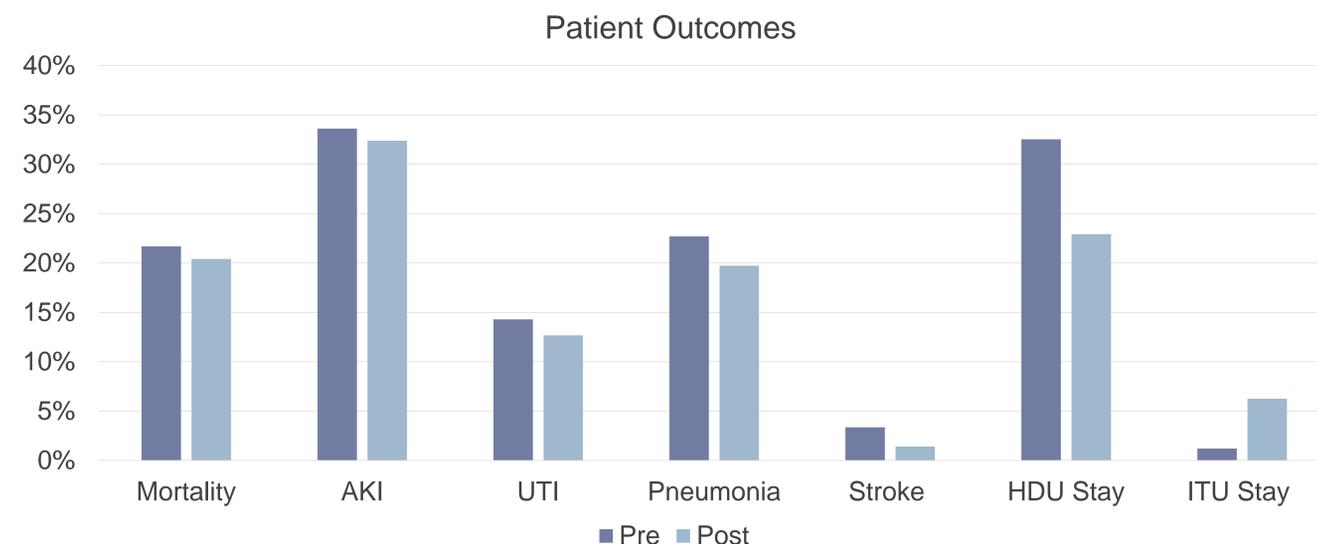
## 2 Aims

To review the management of HHS against national standards before and after the introduction of a local HHS protocol. To compare patient outcomes including morbidity and mortality. To review adherence to protocol. To review outcomes in patients with COVID-19 infection & HHS.

## 3 Methods

Patients were identified by biochemistry data and diagnosis coding at the time of discharge. Data was extracted from clinical systems between Jan-19 and Jan-21. Patients were excluded if they died within 24 hours of admission, notes were unavailable, or if they were incorrectly labelled as HHS. Data collected was extensive, which included patient demographics, COVID-19 status, morbidity & mortality, length of stay and adherence to protocol.

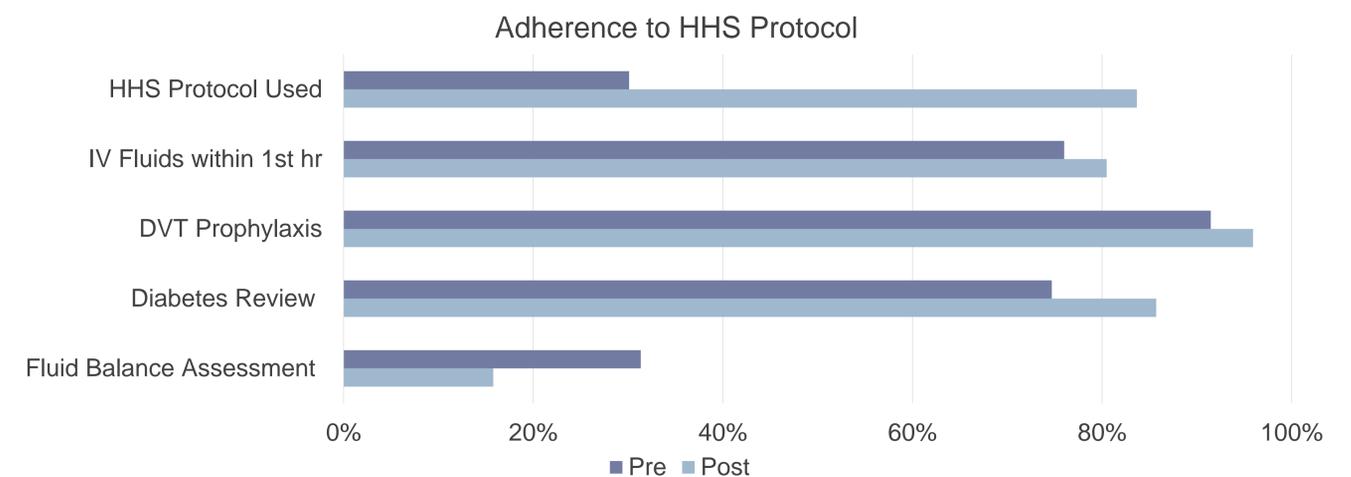
## 4 Results



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The study included 132 patients with HHS (83 pre protocol and 49 post). 85% of patients had a pre-existing diagnosis of diabetes. 3 patients had confirmed COVID-19 infection.

Mortality rate (during and within 28 days of admission) and overall rate of complications (AKI, UTI, pneumonia, stroke) fell post protocol introduction. Rate of HDU admissions fell, with more patients being treated at ward level. Rate of ITU admissions increased, although overall numbers were low. Average length of stay fell from 25 to 19 days post protocol.



The percentage of patients treated based on an HHS protocol increased from 30% to 84%. The percentage of patients receiving appropriate DVT prophylaxis, IVF within 1 hour of diagnosis and a diabetes review increased post protocol. Fluid balance assessment was poorer.

## 5 Discussion

Only 3 patients had confirmed COVID-19 infection, limiting our ability to review outcomes in patients with COVID-19 & HHS. Reassuringly, morbidity and mortality remained stable despite the COVID-19 pandemic. Length of stay fell by 24% in this patient cohort. Rate of HDU admissions (recommended place of care) may have fallen secondary to reduced HDU capacity or increased emphasis on advanced care planning. Assessing adherence to the protocol was challenging. Data was often missing as it relied on accurate documentation and supporting documents to be uploaded onto clinical systems. Fluid balance assessment in particular was poorly documented. The protocol is often tailored to individual patient need, various combinations of VRII/DKA/HHS protocol use was observed. Further study could include reviewing adherence to the protocol and patient outcomes out with the COVID-19 pandemic.

1. Hartmann-Boyce, J. et al. 2020. Diabetes and COVID-19: Risks, Management, and Learnings From Other National Disasters. *Diabetes Care*, [online] 43(8), pp.1695-1703. Available at: <<https://care.diabetesjournals.org/content/43/8/1695>> [Accessed 21 September 2021].