# A tertiary care ambulatory heart failure pathway managing one-third of all admissions including older patients with similar quality to inpatient management

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**Table 1. Patient characteristics and mortality for heart failure index admissions**

| Characteristics (n=1,919) | Inpatient (n=1,321) | Ambulatory (n=598) | Data missing | p[a] |
|---|---|---|---|---|
| Age, years, median (IQR) | 82 (74–88) | 81 (73–88) | 0 | 0.218 |
| **Prior comorbidities** | | | | |
| Ischaemic heart disease, n (%) | 441 (33) | 199 (33) | 0 | 0.964 |
| Pulmonary disease, n (%) | 284 (22) | 117 (20) | 3 | 0.627 |
| Cerebrovascular disease, n (%) | 205 (16) | 63 (11) | 8 | 0.014 |
| Diabetes, n (%) | 383 (29) | 181 (30) | 3 | 0.847 |
| Hypertension, n (%) | 691 (52) | 337 (56) | 3 | 0.255 |
| Valvular heart disease , n (%) | 225 (17) | 96 (16) | 4 | 0.835 |
| Smoker, n (%) | 108 (8) | 52 (9) | 395 | 0.093 |
| **Characteristics at admission** | | | | |
| Hypotension (bp <100 mmHg systolic), n (%) | 128 (10) | 30 (5) | 0 | 0.001 |
| NHYA breathlessness scale (1–4), median (IQR) | 3 (3–4) | 3 (3–3) | 31 | 0.024 |
| Heart rate on admission, beats per minute, median (IQR) | 86 (71–102) | 82 (69–97) | 0 | 0.012 |
| NtProBNP, pg/mL, median (IQR) | 6,015 (2,398–14,340) | 3,516 (1,773–8,717) | 934[b] | <0.001 |
| Creatinine, µmol/L, median (IQR) | 104 (70–149) | 102 (78–140) | 62 | 0.367 |
| Haemoglobin, g/L, median (IQR) | 119 (101–136) | 124 (108–138) | 1 | 0.002 |
| Living alone, n (%) | 523 (40) | 196 (33) | 103 | 0.016 |
| **Outcomes** | | | | |
| 30-day mortality, n (%)[c] | 570 (34) | 28 (11) | 0 | <0.001 |
| 30-day mortality[d] (comorbidity corrected) | | | | <0.001 |

[a]p values calculated using ranksum tests for continuous variables and chi-squared test for categorical variables. [b]NTProBNP reading collected by heart failure nurses, awaiting confirmation from direct lab testing results. [c]30 day mortality - death in hospital or death within 30 days of discharge. [d]From multivariable regression models based on backwards elimination p<0.05, from mortality plus Table 1 factors. bp = blood pressure; IQR = interquartile range; NTProBNP = N-terminal-pro-brain natriuretic peptide.

## Introduction

Heart failure (HF) is the commonest cause of adult hospital admissions in the over 65s, accounting for over 67,000 admissions in England and Wales per year 1.[1] The average hospital stay lasts 13 days and costs around £3,800.[2] The increased use of same day emergency care (SDEC) services provide opportunity for novel HF management pathways while still achieving quality and best practice tariff targets[3] in this setting.

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## Methods

An ambulatory HF pathway was established in a 'medical' SDEC unit supported by a specialist HF team and a Hospital At Home service providing intravenous diuretic therapy, clinical assessment and point-of-care diagnostics. Data were collected on every index HF admission as part of the National Heart Failure Audit, and as a service evaluation.

## Results

From August 2019 to January 2021, 598/1,919 (31%) HF admissions were managed on an ambulatory pathway. Factors associated with inpatient management were hypotension, higher New York Heart Association Classification (NYHA) class, faster heart rate, higher N-terminal-pro-brain natriuretic peptide (BNP), lower haemoglobin, and living alone. Age was not associated with inpatient management. Patients managed via the ambulatory pathway were more likely to be referred to heart failure nurses and cardiology follow-up on discharge. There was no difference in the proportion seen by the specialist team within 24 hours, or having an echocardiography. Independent and comorbidity-corrected 30-day mortality was lower for ambulatory patients. Savings of approximately 5,000 bed-days are estimated.

## Discussion

A third of heart failure management can be achieved via an ambulatory pathway irrespective of age without a clear difference in outcomes when compared with inpatient care. A large saving in inpatient bed usage can be achieved, despite cost of outreach teams. Mortality differences demonstrated are confounded by patient selection. Further evaluation of ambulatory pathways is needed to understand which patients benefit from ambulatory management, and better develop these services. ■

## References

1 National Institute for Health and Care Excellence. *Acute heart failure: diagnosis and management: Clinical guideline [CG187]*. NICE, 2021. www.nice.org.uk/guidance/cg187 [Accessed 10 February 2022].
2 British Heart Foundation. *An integrated approach to managing heart failure in the community*. BHF, 2015.
3 NHS England. *2021/22 national tariff payment system*. NHSE, 2021. www.england.nhs.uk/wp-content/uploads/2020/11/21-22-National-tariff-payment-system.pdf [Accessed 10 February 2022].