What is The Evidence for Virtual Wards or Hospital-At-Home Care Pathways for Exacerbations of Chronic Obstructive Pulmonary Disease? A Systematic Review and Meta-Analysis

Bushra Alenazi1,2,3, Christopher Hatton2,3, Elizabeth Sapey2,3
1.Imam Abdulrahman bin Faisal University,Dammam, Saudi Arabia, 2. NIHR Midlands Patient Safety Research Collaboration University of Birmingham, 3. Department of Inflammation & Ageing, University of Birmingham, Edgbaston, Birmingham

NIHR SafetyNet Symposium 2025
psrc-network.nihr.ac.uk

Background

Acute exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) are a leading cause of unplanned, emergency hospitalization, with significant healthcare costs and poor outcomes (1). There is increased interest in avoiding hospitalisation through novel care models that are delivered at home but coordinated and led by hospital-based staff. Two such models are the **hospital-at-home (HaH)** and **virtual ward (VW)** (2–4). However, the evidence supporting their safety, efficacy, and operational processes is unclear. This systematic review evaluates the evidence on using **HaH** and **VW** models for **AECOPD**, focusing on patient selection, safety, and effectiveness compared to hospital care.

Methodology

Database searches included **MEDLINE** and **EMBASE** (via Ovid), and the **Cochrane Central Register of Controlled Trials (CENTRAL)**. Risk of bias was assessed using the Cochrane **Risk of Bias Tool version 2 (RoB2)** for **RCTs**, while the **observational cohort study** was evaluated using the **Newcastle-Ottawa Scale (NOS)**. A meta-analysis was conducted for the primary outcomes, which were mortality rate and readmission rate.

PICOS	Description
Population	Adults aged 18 years or older with an ECOPD presenting to the hospital or who require hospital-led care.
Intervention	VW or HaH care pathways, including ESD and AA, which provide hospital-led care to patients in their own homes. Other home or community care systems not used for the treatment of ECOPD were excluded.
Comparator	Patients who are admitted to the hospital for an ECOPD and who receive usual care as an in-patient.
Outcomes	Primary Outcomes: 1. Safety (mortality rate of all causes, in-patient, 7 days, and 30 days) 2. Readmission rate in 7 and 30 days. Secondary Outcomes: 1. Length of stay in the hospital and length of stay on the VW or HaH care pathway. 2. Exacerbation rates up to 12 months after the index exacerbation. 3. Patient selection criteria for VW 4. Treatments included as part of the care model 5. Changes in physiology, including oxygen saturations and respiratory function
Study Design	All randomized and non-randomized controlled trials and observational studies with both an intervention and comparator arm were included. All types of narrative reviews were excluded. Case studies and case series of less than ten participants were excluded. There were no restrictions on study dates or languages.

Table 1: Inclusion and exclusion criteria for title, abstract and Full-Text selection (PICOS)

Results

Twelve studies met the inclusion criteria: eleven randomized controlled trials (RCTs) and one observational cohort study**.** **Meta-analysis** conducted for our co-primary endpoints at 30 days indicated no significant changes in survival or readmission rates attributable to the interventions. Furthermore, pooled analysis across all time points demonstrated no mortality benefit associated with the intervention, with low event rates observed in both groups. However, when all time periods were grouped, there was a signal for a reduced readmission rate in the intervention group. See **Figures 1 and 2.**

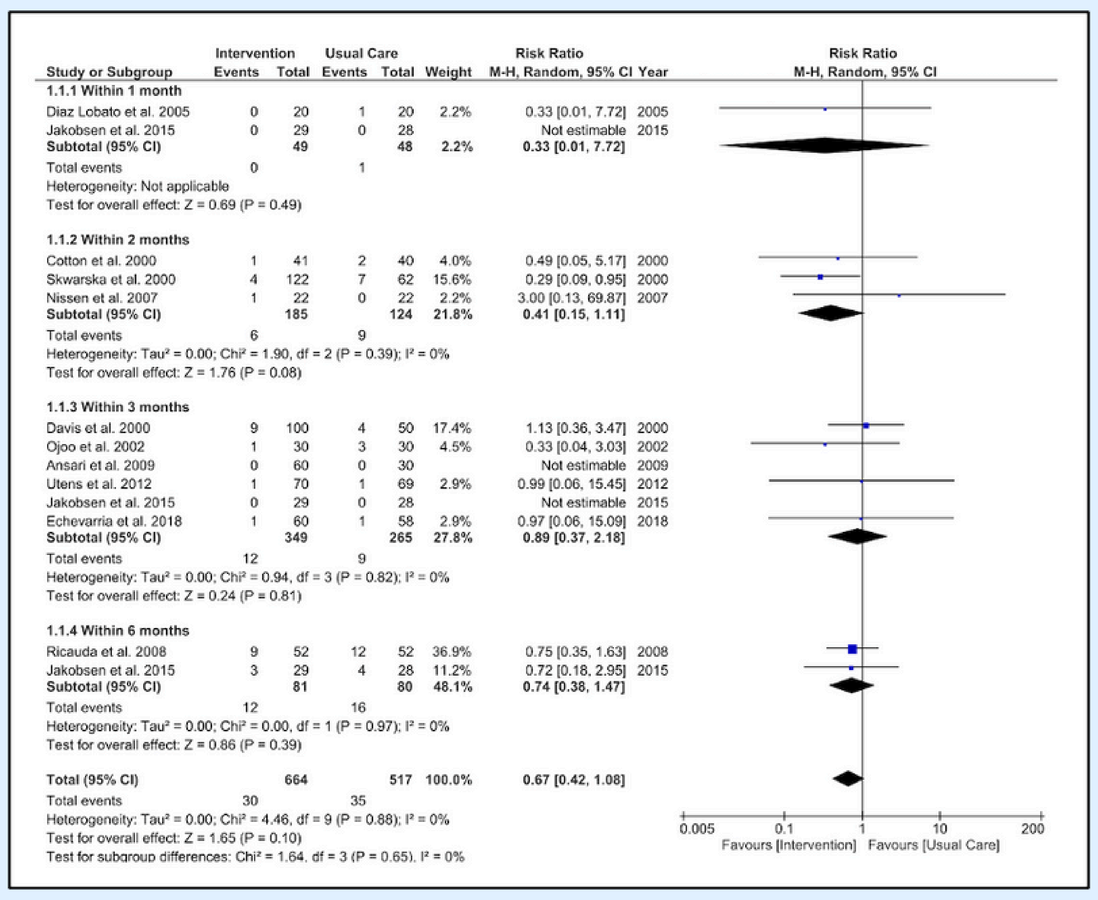

Figure 1: Comparison of the mortality rates between intervention vs. usual care

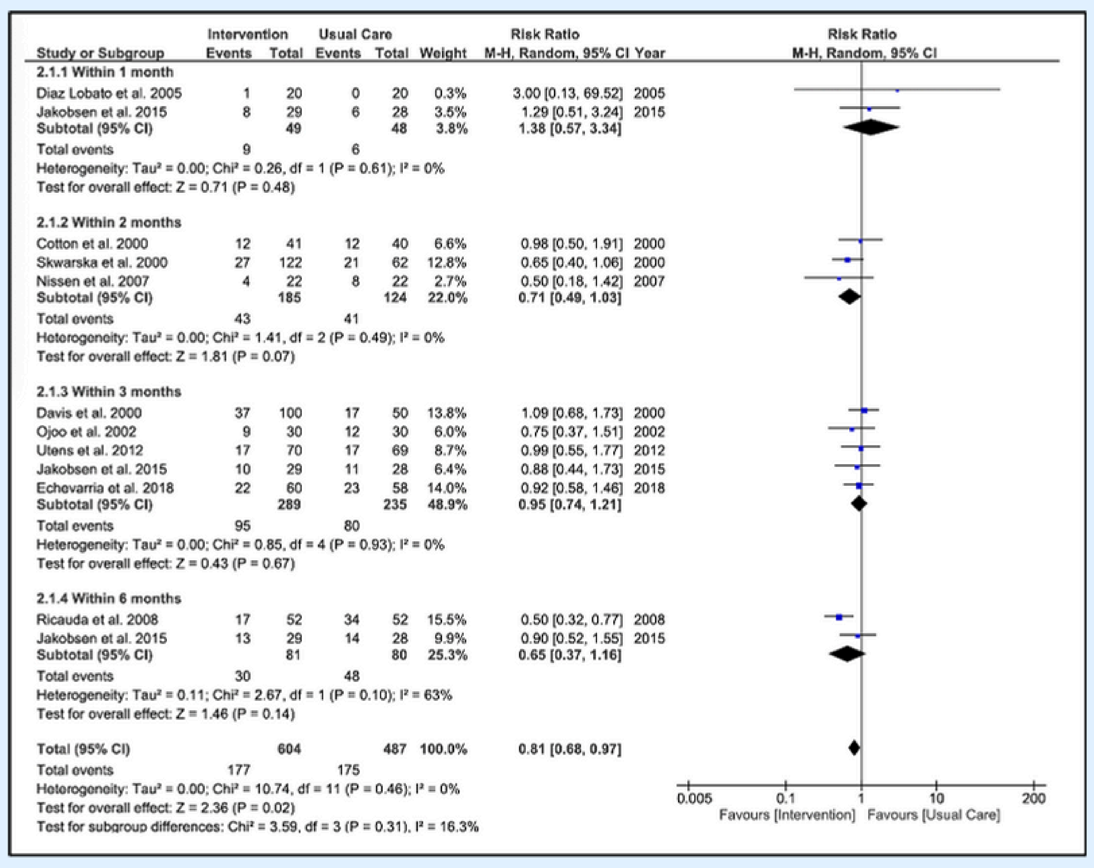

Figure 2: Comparison of the readmission rates between intervention vs. usual care

Conclusion

VW and **HaH** services may be a promising strategy for reducing readmissions in **AECOPD**, which would traditionally require hospital admission. However, studies reported to date have been small, often single-centred, and have chosen different endpoints to assess outcomes of interest. The findings suggest more evidence is needed to identify the key elements of these services for patients with **AECOPD** and optimise patient selection.

References

NIHR | Midlands Patient Safety Research Collaboration

UNIVERSITY OF BIRMINGHAM

جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Contact details:
Bushra AlEnazi
baa260@student.bham.ac.uk

This study is funded by the National Institute for Health and Care Research (NIHR) Midlands Patient Safety Research Collaboration. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.