

# **Comparing the cost-effectiveness and clinical effectiveness of a new community in-reach rehabilitation service with the cost-effectiveness and clinical effectiveness of an established hospital-based rehabilitation service for older people: a pragmatic randomised controlled trial with microcost and qualitative analysis – the Community In-reach Rehabilitation And Care Transition (CIRACT) study**

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## Scientific summary

### **The CIRACT study**

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# Scientific summary

## Background

Older people represent a significant proportion of patients admitted to hospital as an acute medical emergency. Compared with the care of younger patients, their care is more challenging, their stay in hospital is much longer, the risk of hospital-acquired problems is much higher and the risk of being readmitted within 28 days is much greater.

## Aims and objectives

The main aim of this study was to compare the clinical effectiveness, microcosts and cost-effectiveness of a Community In-reach Rehabilitation And Care Transition (CIRACT) service (intervention) with those of the traditional hospital-based rehabilitation (THB-Rehab) service (standard care) in older people aged  $\geq 70$  years admitted to hospital as an acute medical emergency.

The primary objective was to assess differences in hospital length of stay between the two groups.

The secondary objectives were to evaluate the effects of the CIRACT service compared with the THB-Rehab service on:

1. readmission rates within 28 and 91 days post discharge
2. super spell bed-days (total time in NHS care) at day 91
3. functional ability at day 91
4. comorbidity at day 91
5. health-related quality of life at day 91
6. microcosts and cost-effectiveness.

A qualitative appraisal provided an explanatory understanding of the organisation, delivery and experience of the CIRACT service from the perspective of key stakeholders and patients.

## Methods

A pragmatic randomised controlled trial with an integral health economic study and parallel qualitative appraisal was undertaken in medical wards within a large teaching hospital in the UK, with community follow-up. Participants were individually randomised to either the intervention (the CIRACT service) or standard care (the THB-Rehab service). The distinguishing features of the CIRACT service compared with the THB-Rehab service were that the CIRACT team was employed by the community rather than the hospital, was able to provide more intensive hospital rehabilitation and was able to continue with rehabilitation following discharge and facilitate directly ongoing community care. The CIRACT team worked closely with the patient and his or her carers while in hospital, allowing a more seamless, integrated discharge home, working alongside community providers.

The qualitative appraisal involved an ethnographic study of the organisation, delivery and experience of the two services from the perspective of key stakeholders and patients. The economic evaluation compared the microcosts (through a three-phase time and motion study) and cost-effectiveness [with quality-adjusted life-years (QALYs)] of the CIRACT service and the THB-Rehab service.

## Results

In total, 250 participants were randomised, 125 to the CIRACT service and 125 to the THB-Rehab service. Of these, 212 participants were followed up and included in the primary analysis. There was no significant difference in length of stay between the CIRACT service and the THB-Rehab service [median 8 vs. 9 days; geometric mean 7.8 vs. 8.7 days; mean ratio 0.90, 95% confidence interval (CI) 0.74 to 1.10]. Median super spell bed-days were 17 and 15 for the CIRACT and THB-Rehab services respectively (geometric mean ratio 0.96, 95% CI 0.76 to 1.21). Of the participants who were discharged from hospital, 17% and 13% were readmitted within 28 days post discharge from the CIRACT and THB-Rehab services respectively (risk difference 3.8%, 95% CI -5.8% to 13.4%) and 42% and 37%, respectively, were readmitted within 91 days post discharge (risk difference 5.7%, 95% CI -7.5% to 18.8%). There were no other significant differences in any of the other secondary outcomes between the two groups.

The mean cost of delivering the CIRACT service and the THB-Rehab service alone, as determined from the microcost analysis, was £302 and £303 per patient respectively. The mean costs (including direct costs to the NHS and Personal Social Services costs) of the CIRACT and THB-Rehab services as determined by the Client Service Receipt Inventory were £3744 and £3603 respectively (mean cost difference £144, 95% CI -£1645 to £1934) and the mean QALYs for the CIRACT service were 0.846 and for the THB-Rehab service were 0.806. The incremental cost-effectiveness ratio (ICER) from a NHS and Personal Social Services perspective was £2022 per QALY, considered within the National Institute for Health and Care Excellence (NICE) cost-effectiveness threshold, with the probability of the intervention being cost-effective estimated at 0.909 for the £30,000 threshold.

The qualitative appraisal showed that, although the CIRACT service was highly regarded by those most involved with it, the emergent configuration of the service working across organisational and occupational boundaries was not readily accommodated by the services currently established in the community.

## Conclusion

The CIRACT service as a complex intervention does not reduce hospital length of stay or short-term readmission rates compared with the standard hospital therapist-employed service, although it was highly regarded by those most involved with it. The estimated ICER appears cost-effective although it is subject to much uncertainty, with points spanning all four quadrants of the cost-effectiveness plane, such that caution should be used in interpreting this result. Microcosting work-sampling observational methodology provided a useful method to estimate the cost of service provision. Limitations in sample size, which may have excluded a smaller reduction in length of stay, and lack of blinding, which may have introduced some cross-contamination between the two groups, must be recognised.

Reducing hospital length of stay and hospital readmissions remains a priority for the NHS. Further studies are necessary, which should be powered with larger sample sizes and use cluster randomisation (to reduce bias) but, more importantly, should include a more integrated community medical model as part of the CIRACT team.

## Trial registration

This trial is registered as ISRCTN94393315.

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