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Evaluation of an Urgent and Emergency Liaison Mental Health Service in an Acute Hospital Using an Interrupted Time Series Analysis

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BACKGROUND

- NHS England has made available transformation funding to improve liaison services in general hospitals with 24/7 Emergency Departments (1).
- This model of 24/7 urgent and emergency mental health care is referred to as the Core24 model which provides response to patients who present at EDs within 1 hour and to all urgent ward referrals within 24 hours (1).
- Evidence has shown that benefits of these models of care are anticipated at both the patient and provider level in terms of reduced inappropriate hospital admissions, improved discharge planning, reduced length of hospital stay, reduced re-attendances at EDs and better support due to clearer referral routes for patients and training and support for staff (2,3).
- Recent evaluations of similar liaison models have been retrospective in nature so a RCT was impractical and it was not possible to include a control. Authors of the recent evaluations have reported difficulty when trying to overcome this limitation in their statistical analysis (2,3).
- An interrupted time-series (ITSA) is increasingly being used as a more flexible design to be considered for the evaluation of health interventions (4).

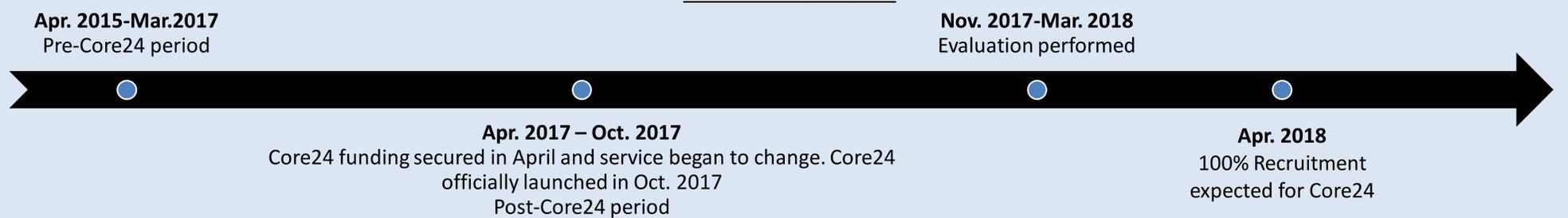
OBJECTIVE

- Apply an ITSA to evaluate the cost-effectiveness of a CORE24 mental health liaison team that is being launched in a hospital in North England, with a primary focus on ED attendances and length of stay (LOS).

DATA AND METHODS

- Individual level anonymised data pertaining to patients diagnosed with a mental health condition (ICD-10 code with an F prefix).
- Outcome variables: Number of ED attendances and subsequent costs and average length of stay (LOS) and costs.
- Costs were estimated using the Healthcare Resource Group (HRG) codes provided for each patient in the data to retrieve the relevant cost in the NHS reference costs
- Statistical analyses was conducted using Stata 15. The *itsa* command was used to run the interrupted time series analysis.
- Data were aggregated in weeks with 134 time intervals generated in total: 105 pre-Core24, 1 week during the intervention and 28 weeks post-Core24.

EVALUATION TIMELINE



RESULTS

Figure 1: Impact of Core24 on ED costs

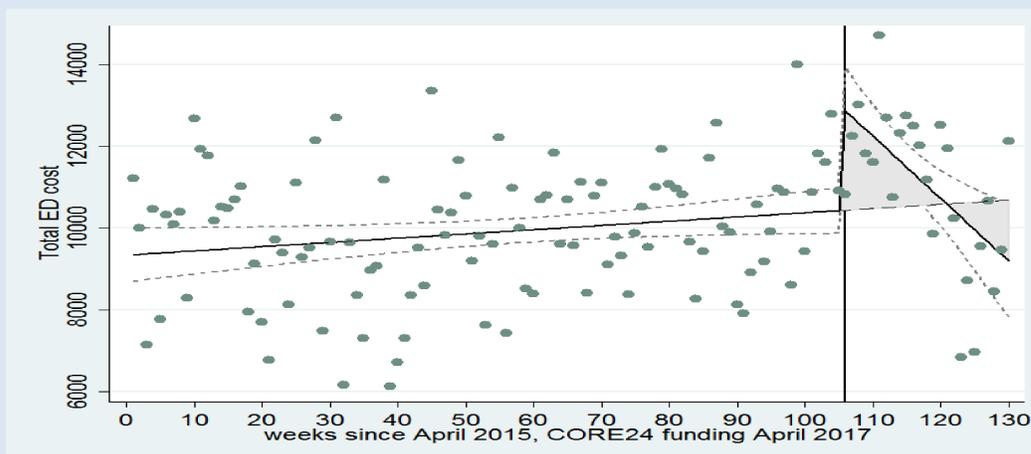
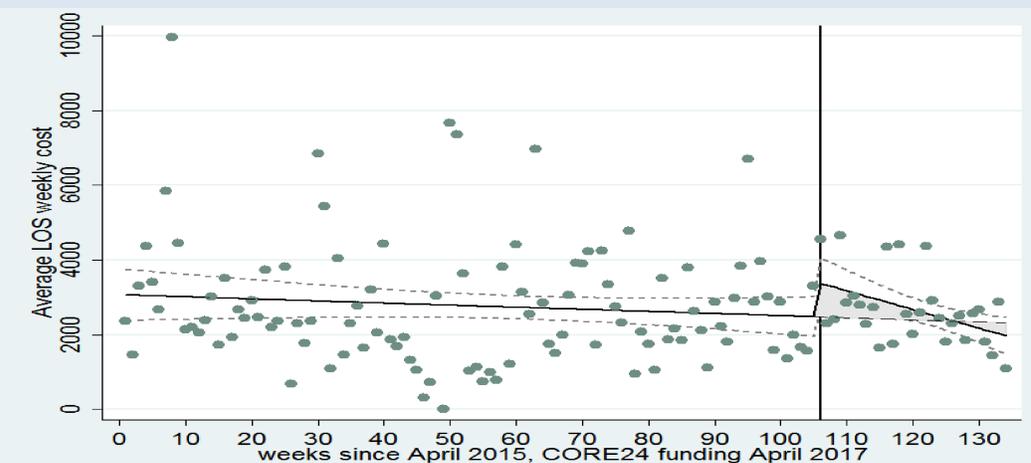


Figure 2: Impact of Core24 on LOS costs



Sample

- 8104 patients with a mental health condition attended the ED and 1803 patients with a mental health condition were admitted to the hospital during the study period.
- Average age of ED patients was 34 years and average age of inpatients was 65 years.

Impact of Core24 on ED costs

- In the first week of the intervention (Figure 1), there was a significant increase in ED costs (β_2 , $P < 0.01$, CI = £1229.86, £3620.17).
- Followed by a significant decrease in weekly costs, relative to the pre-intervention trend (β_3 , $P < 0.05$, CI = -£253.13, -£72.58).
- Results predict that Core24 began to reduce total ED costs at week 121; 15 weeks after Core24 was secured.

Impact of Core24 on LOS costs

- During the first week of Core24 (Figure 2), there was a significant increase in the average weekly LOS cost (β_2 , $P < 0.05$, CI = £28.03, £1775.25).
- Followed by a significant decrease in LOS costs, relative to the pre-intervention trend (β_3 , $P < 0.05$, CI = -£82.40, £-6.57).
- Results predict that Core24 began to reduce average LOS costs at week 127; 21 weeks after Core24 funding was secured.

CONCLUSION

- This evaluation provides evidence that since the launch of the Core24 mental health liaison team, the North England hospital has experienced a reduction in ED attendances, a decline in ED costs, a significant reduction in LOS and a significant decrease in LOS

LIMITATIONS

- Evaluation of an incomplete service
- Lack of post-intervention data
- Could not adjust for patient demographics in ITSA model

STRENGTHS

- Robust methodology
- Repeatability of analysis
- Captured largest proportion of patients targeted by Core24

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Table 1: ITSA Statistical Output

Outcome	Intercept (β_0)	Baseline trend (β_1)	Change in level after Core24 (β_2)	Change in trend after Core24 (β_3)	Postrend output
Number of ED attendances	60.31***	0.03	12.49**	-0.93**	-0.91***
ED total weekly costs	£9346.93***	£10.36**	£2425.01***	-£162.86**	-£152.50**
Average LOS	12.19***	-0.02	3.44**	-0.20**	-0.22**
LOS average weekly costs	£3062.13***	-£5.61	£901.64**	-£44.49**	-£50.10**