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Economic Evaluation of a Standardized Care Pathway for Non-Traumatic Abdominal Pain in the Emergency Department

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Introduction

- Non-traumatic abdominal pain (NTAP) is a common and diagnostically challenging complaint in Emergency Departments (EDs).[1]
- Emergency care for abdominal pain in Germany is poorly standardized, leading to unspecific diagnoses and impacting patient outcomes.[2]
- The Abdominal Pain Unit (APU) project introduced a standardized care pathway for adult patients with NTAP.[3,4]
- This study assesses the cost-effectiveness (CE) of the APU pathway compared to usual care from the ED perspective (provider's perspective). The payer's perspective was also analyzed separately.

Methods

- A prospective cluster-randomized stepped-wedge trial was conducted from September 2021 to August 2023 in ten German EDs.
- Resource use was assessed based on the number of APU-defined procedures in the ED. Costs were assigned based on a standardized pricing catalogue.[5]
- The primary outcome measures were patient-reported pain and satisfaction (ZUF-8) at ED discharge as well as ED length of stay.
- Group differences were analyzed using mixed-effects models.
- Incremental cost-effectiveness ratios (ICERs) were calculated; for sensitivity analyses a non-parametric bootstrap approach was used.

Results

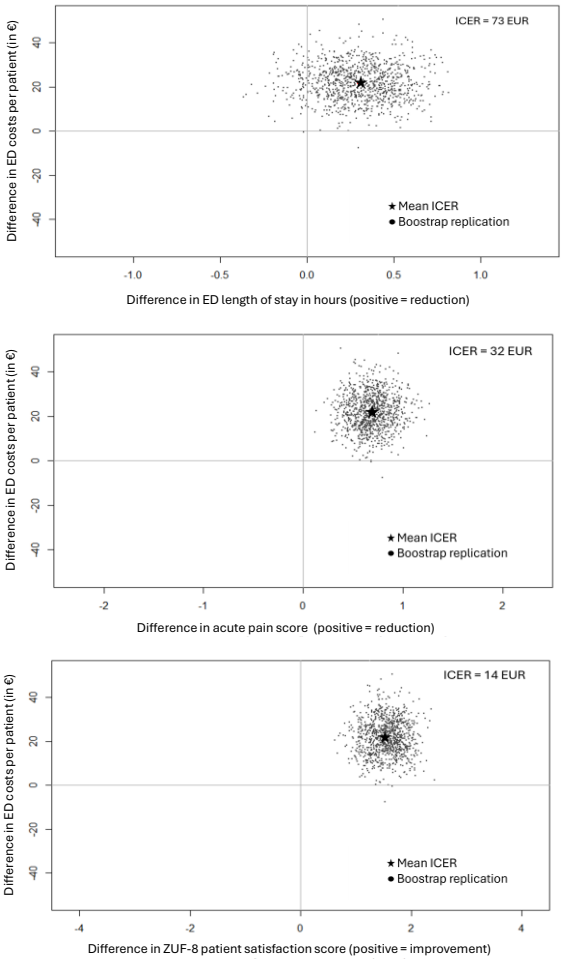
A total of 2,119 patients were enrolled (control: 1,017; intervention: 1,102). Patients in the intervention group were younger (45 vs. 49 years) and slightly more often female (Table 1). These differences were adjusted for in the mixed-effects models.

Mean adjusted ED costs were higher in the intervention group (€113 vs. €91; difference = €21; 95% CI 3.5–37) due to more diagnostic procedures per patient (3.0 vs. 2.3). This increase was mainly driven by more electrocardiograms, urine tests, ultrasounds, and medical councils.

Pain reduction and improved patient satisfaction were observed in the intervention group, along with a slight, non-significant decrease in ED length of stay. These outcomes correspond to ICERs of €73 per hour reduction in ED stay, €32 per unit reduction in pain, and €14 per unit increase in satisfaction. Sensitivity analyses (Fig. 1–3) confirmed most replications in the upper-right quadrant.

Table 1: Comparison of selected patient characteristics between intervention and control group.

Characteristic		Total (n=2,119)	Intervention group (n=1,102)	Control group (n=1,017)
Sex, n (%)	Female	1,197 (56.5)	637 (57.8)	560 (55.1)
Age in years, median (IQR)		47 (32.0; 61.0)	45 (31.0; 60.0)	49 (33.0;62.0)
Pain Score at admission, n (%)	0-4	844 (39.8)	445 (40.4)	399 (39.2)
	5-10	1,008 (47.6)	533 (48.4)	475 (46.7)



Figures 1–3: Cost-effectiveness planes for ED length of stay, pain score, and patient satisfaction (from top to bottom).

Conclusion

The APU pathway increased both diagnostic and therapeutic activity, resulting in a modest increase in ED costs while improving patient outcomes (reduced acute pain and greater patient satisfaction). This was achieved without prolonging ED length of stay, indicating enhanced efficiency. Targeted investment in ED resources may therefore support the effective implementation of standardized NTAP care.

References

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