



Datos, evidencia, decisiones:
generando valor para la gestión
y las políticas sanitarias

Sevilla, 17 al 19 de junio de 2026



Universitat
de les Illes Balears



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Variation in hospital length of stay among patients with sepsis: A relative comparative assessment of the German and Spanish health care systems between 2005 and 2015

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1. Motivation

- What is sepsis?


- Why sepsis?


- Global Burden (2017) →

- 49 MM episodes
- 11 MM related deaths
- 20% of global deaths
- 42% ICU mortality rate

- Correlated with other morbidities and ageing

- Challenge for healthcare systems worldwide

- 4.01/1,000 inhab.¹
 - 23.5% mortality rate¹
 - 41.7% ICU mortality rate¹
 - 8.2–8.3 beds/1,000 inhab.²
- 

- 4.45/ 1,000 inhab.³
 - 17,9% mortality rate³
 - 37% ICU mortality rate³
 - 3.3– 3 beds/1,000 inhab²
- 

¹ Fleischmann-Struzek, C., Micolajetz, A., Schwarzkopf, D. et al.(2018)

² OECD/European Union, Health at a Glance (2010, 2015)

³ Álvaro-Meca A, Jiménez-Sousa MA, Micheloud D, et al.(2018)



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1. Why comparing Germany and Spain?



Health care system



- Income-related contributions and federal subsidies finance multi-payer model of statutory health insurance (96 health funds) → almost universal coverage
 - Outpatient and inpatient: mix of public and private providers
 - High inpatient capacity
 - Governance is decentralized: 16 federal states manage hospital planning and supervise regional health funds and outpatient service providers
- Tax funded national health system
 - Universal coverage
 - Strong outpatient and primary-care orientation
 - Lower inpatient capacity
 - Highly decentralized management of health care provision (17 Autonomous Communities)



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2. This study

- Research question: *Are organisational and contextual factors associated to variation in hospital length of stay (LOS) for sepsis episodes?*
- Contribution: First comprehensive comparative analysis of organisational factors associated with LOS variation for sepsis episodes in Spain and Germany



3. Materials

- Clinical-administrative data:
 - Krankenhausstatistik (Hospital statistics)
 - Conjunto Mínimo Básico de Datos al alta hospitalaria (CMBD)
- Study population:
 - Sepsis surviving population (ICD-9 Spain, IC-10 Germany) → sepsis identification algorithm from Rudd et al.(2020)
 - 1,925 acute care German hospitals across 16 federal states
 - 289 acute care Spanish hospitals across 17 ACs

Covariates:

- Outcome: LOS (days) from admission to discharge (home or care facility)
- Clinical: Age, sex
- Organisational: Hospital size, region (Federal state/ AC), ownership (Germany)
- Temporal: Month, year



3. Methods: Survival analysis

- Parametric models under Accelerated Failure Time parametisation

- 1) Exponential
- 2) Weibull
- 3) Log-Normal

$$h(t) = \frac{1}{t\sigma\sqrt{2\pi}} \exp\left[\frac{1}{2} \left(\frac{\log t - \mu}{\sigma}\right)^2\right]$$
$$1 - \Phi\left[\frac{\log t - \mu}{\sigma}\right]$$

- Interpretation of the TR

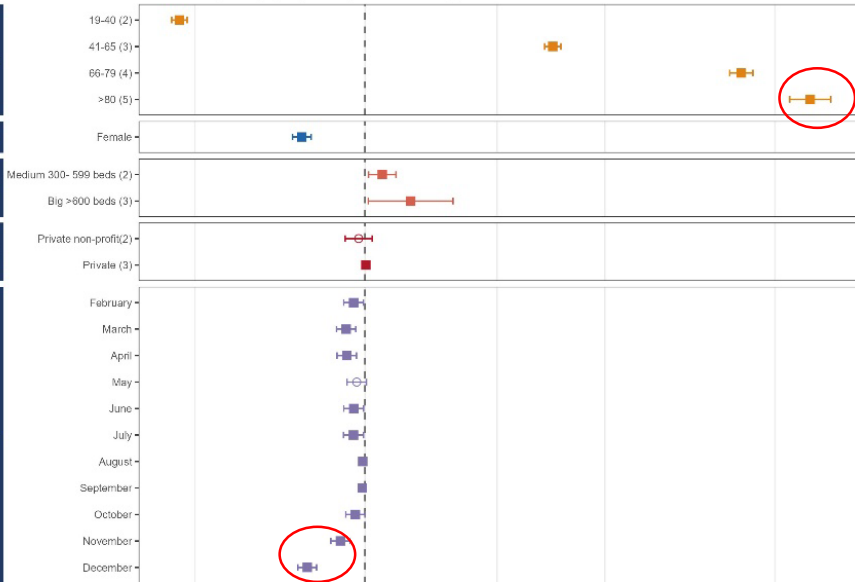
TR > 1 → longer LOS
TR < 1 → shorter LOS

4. Results & Implications



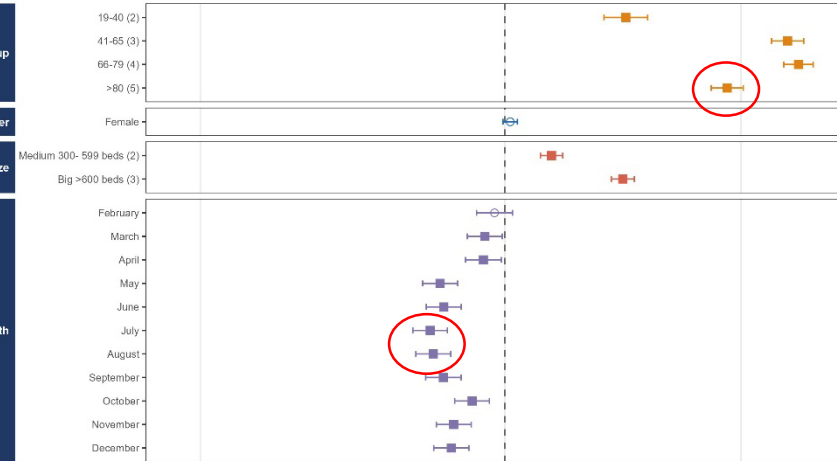
Log-Normal AFT

Time Ratios (95% CI) | Log scale | Dashed line = (1)



Log-Normal AFT

Time Ratios (95% CI) | Log scale | Dashed line = (1)





5. Conclusions

- Organisational factors are associated with meaningful variation in LOS, alongside patient and hospital characteristics, and contextual factors.
- Examining organisational factors may inform the development of more effective clinical and organisational management tools, both at the meso and micro level.
- Further research is needed to identify best practices and better understand the patterns linking organisational factors to LOS variation



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Questions?

Thank you

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