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## Hospital Digitalisation on Healthcare Quality: Real-World Evidence



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Hospital digitalisation has been touted as a key driver for improving healthcare services, enhancing efficiency, and reducing operational costs. In Germany, digitalisation efforts have been accelerated through initiatives such as the Hospital Future Act, which promotes investment in digital infrastructure. However, while many assume that digital transformation positively impacts the quality of care, the relationship between hospital digitalisation and actual improvements in process and outcome quality is complex and often unclear. An article from the Journal of Medical Systems explores this relationship by examining data from the German DigitalRadar (DR) project and specific hospital quality indicators, focusing on both process and outcome measures.

### The Role of Process Digitalisation in Healthcare

Hospital digitalisation often refers to integrating digital tools in various operational processes, such as patient admission, electronic health records (EHRs), and telehealth services. Digital processes are expected to streamline operations, reduce errors, and expedite patient care. One of the core hypotheses driving hospital digitalisation is that higher levels of process digitalisation will result in better process quality, leading to improved patient outcomes.

The DigitalRadar project in Germany developed a comprehensive digital maturity score, known as the DR-score, which ranges from 0 (not digitalised) to 100 (fully digitalised). This score provides a detailed overview of the degree to which hospitals have embraced digital processes across seven dimensions, including clinical processes, documentation, decision support, and access to information. The relationship between these digitalisation levels and key process indicators, such as preoperative waiting times for hip replacement or osteosynthesis, has been a subject of interest. However, evidence suggests that the association between digitalisation and process quality is not as straightforward as expected.

### Challenges in Linking Digitalisation with Outcome Quality

While many digital tools have been shown to improve practitioner performance and process efficiency, their impact on outcome quality, such as patient mortality or complication rates, remains inconclusive. The German study explored two outcome quality indicators: mortality from outpatient-acquired pneumonia and the rate of new decubitus cases (bedsores). Interestingly, while there was a weak association between higher digital maturity and lower mortality rates for pneumonia, digitalisation was also associated with an increased incidence of decubitus cases. This finding suggests that digitalisation may facilitate better documentation and diagnosis of decubitus, leading to higher reported rates rather than an actual increase in the occurrence of these cases.

The weak correlation between digitalisation and improved outcomes could be due to several factors. Outcome indicators, particularly in observational studies, may not capture the subtle variations in hospital quality that digitalisation can influence. Additionally, the indicators used to measure quality are often broad, encompassing a variety of patient groups and medical specialities, making it difficult to attribute changes in outcome quality directly to digital transformation efforts.

### Process Quality Indicators and Digital Maturity

Analysing process quality indicators provides further insight into the complex relationship between hospital digitalisation and healthcare performance. The study used two specific process indicators: preoperative waiting times for hip replacement surgery and osteosynthesis after femur fracture. In theory, increased digitalisation should lead to faster decision-making and reduced waiting times, improving overall process quality. However, the study found no significant association between digital maturity, measured by the DR-score, and improvements in these process quality indicators.

This lack of a significant relationship could be attributed to how process quality is measured. For example, preoperative waiting times are recorded as the percentage of cases that exceed a 24-hour threshold. While digital tools might reduce waiting times on a minute-to-minute basis, their impact may not be substantial enough to affect whether a surgery procedure is performed within a 24-hour window, thus limiting the sensitivity of the process quality indicator. The study highlights the importance of using more granular and appropriate measures to assess the

impact of digitalisation on process efficiency.

## **Conclusion**

The findings from the German study underscore the complexities of linking hospital digitalisation with tangible improvements in healthcare quality. While digital maturity, as measured by the DR-score, shows some association with better outcomes, particularly in reducing mortality from pneumonia, its overall impact on process and outcome quality remains inconclusive. This may be due to the limitations of quality indicators, which may not fully capture the benefits of digital transformation in hospitals.

Future research should focus on developing more sensitive quality indicators that can better reflect the nuances of digitalisation's impact on healthcare. Additionally, longitudinal studies that track the effects of digitalisation over time within hospitals could provide a clearer picture of how digital tools influence both process efficiency and patient outcomes. As hospitals continue to invest in digital infrastructure, it is crucial to ensure that these investments are aligned with measurable improvements in patient care quality.

By addressing these challenges, healthcare systems can better understand the actual value of digitalisation and optimise their strategies for achieving high-quality, efficient, and patient-centred care.

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