

Volume 15, 20 October 2015

Publisher: Open Journals

URL: <http://www.ijic.org>

Cite this as: Int J Integr Care 2015; ETC Conf Suppl; [URN:NBN:NL:UI:10-1-117163](https://nbn-resolving.org/urn:nbn:nl:ui:10-1-117163)

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Conference Abstract

## **Relationship between the implementation of health information systems and the activity per surgeon and operating room usage in France: results from the E-SI (PREPS-SIPS) study**

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This study was supported by the Ministry of Health (DGOS).

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### **Abstract**

**Purpose:** The aim of this study was to assess the impact of implementing health information systems (HIS) on the activity per surgeon and use of operating rooms in acute care hospitals across France.

**Context:** HIS are increasingly being adopted in healthcare settings. However, they require significant upfront and ongoing investments [1]. In France, the Ministry of Health (DGOS) launched the national “Hopital numérique 2012-2017” program, a strategic plan for the modernization of HIS, with the goal of making hospitals more efficient [2].

**Methods:** Four national databases were used in this retrospective study: oSIS (observatoire des systèmes d'information de santé-2012), IPAQSS (indicateurs pour l'amélioration de la qualité et la sécurité des soins-2011), Hospi-Diag (French hospital performance indicators - 2012), and the national accreditation database. National data and methodological support were provided by the DGOS and French National Authority for Health (HAS). We used two multivariate linear models to estimate the activity per surgeon (model 1) and operating room usage (model 2), which were dependent variables [3-5]. For both models, the independent variables were the proportion of electronic health records (EHRs) used (full, partial, or no EHRs); number of computers per capita connected to the HIS; shared planning tools or electronic programming tools; type of hospital (teaching, private non-profit, for-profit, or other public hospital); accuracy of the care, with versus without home care hospitalization; number of surgical beds; level of severity of the medical issue; number of stays related to oncology; and geographic region of the hospital. For consistency, only hospitals with the highest rates of surgical inpatients were used for the analyses.

**Results and discussion:** In model 1 ( $n = 149$  hospitals, pseudo  $R^2 = 0.32$ ), we found that the higher the number of full EHRs used, the higher the activity per surgeon ( $p < 0.001$ ). The activity per surgeon also increased with the number of computers per capita connected to the HIS ( $p = 0.003$ ), in for-profit hospitals ( $p = 0.011$ ), and for care that does not involve home care hospitalization ( $p = 0.001$ ). The activity per surgeon decreased when the patient's medical issue rose above severity level 3 and 4 ( $p < 0.003$ ). In model 2 ( $n = 149$  hospitals, pseudo  $R^2 = 0.44$ ), the use of operating rooms increased when shared planning tools or electronic programming tools were adopted ( $p = 0.004$ ) and in for-profit hospitals ( $p < 0.001$ ). The analysis also revealed that the higher the number of surgical beds, the higher the operating room usage ( $p < 0.001$ ). The operating room usage decreased when the patient's medical issue rose above severity level 3 and 4 ( $p < 0.029$ ). Neither full nor partial EHRs were associated with a higher use of operating rooms. In both models, at least one variable related to the HIS (EHR, number of computers or shared planning tools) had a significant positive impact on the activity per surgeon and use of operating rooms within French hospitals. Our findings are useful for guiding broad development of HIS in healthcare settings [6].

## Keywords

**econometrics; efficiency; health information system; hospital; surgical activity**

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