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Doctor-Nurse Teams, Incentives and Behavior

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resumo | abstract / résumé

Nurses have been gaining expertise over time and it is common that they work together in a team with doctors to treat patients. Using a model based on contract theory, the aim of this article is to analyze the effects of an improvement in nurses’ productivity on the incentives paid and on the behavior of doctors and nurses, in particular when the budgets are limited. The results show that following an improvement in nurse productivity, nurses’ incentives are lower but the overall budget of incentives is higher. Under a restricted health care budget, results show that the treatment of patients is mainly carried out by nurses, and not doctors, reflecting free-riding by doctors. The contribution of this work is particularly relevant for human resources policy makers in primary health-care units.

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It is natural that doctors and nurses work in teams. The list of references to this type of team outside of Economics is long. These teams may be explicit (Firth-Cozens, 2001) or not (Anderson and Halley, 2008; Radcliffe, 2000), and may or may not be part of a hierarchy of authority.

The main feature of a doctor-nurse team is that it aims to improve a patient’s health condition, but it is not possible to clearly identify the contribution of each individual to that goal. This idea of a team coincides with the definition of teams proposed by Alchian and Demsetz (1972).1

Doctor-nurse team work was initially described by Stein (1967). In this team, the doctor is more relevant than the nurse, in the sense that the nurse has a lower level of education, status and payment. The nurse is seen as the doctor’s third arm with the nurse’s productivity comparably lower.

More than twenty years later, Stein and two of his colleagues revisited doctor-nurse team work and conclude that nurses now have a different role (Stein et al., 1990). Nurses have become more autonomous health professionals, with well defined areas of expertise, and nursing has increasingly become an associated science to medicine.

The improvement in the level of expertise and productivity of nurses has been documented by Brown (1988). He concludes that physicians’ offices would be more profitable if nurses substituted assistant physicians. Some research shows that nurses have increased their expertise so much that they can substitute doctors2. A review of this topic has been carried out by Richardson and Maynard (1995).

Our aims are: i) to model the doctor-nurse team game, where agents are heterogeneous in their productivities, ii) to analyze the effects of an improvement in nurse productivity on the incentives offered and how the choice of agents on their efforts impacts patients, in particular, under limited health budgets. It is not our purpose to study the relationship between doctors and nurses.

The proposed model is based on contract theory employing a comparative statics analysis for two different points in time. It considers a team of a doctor and a nurse, who exert effort to treat or improve the health status of patients. The improvement in the nurse’s expertise is captured in the team production function. The principal is the contractor who pays the incentives to the team but he cannot observe their efforts; he only observes the outcome of the efforts.

The results show that with nurses having improved their expertise, the budget needed to provide incentives to both agents is higher than before. This happens because the increase in the nurse’s productivity creates a free-riding possibility for the doctor. As a consequence, the doctor needs higher incentives to be diligent. If budgets are sticky and limited then it becomes impossible to provide high incentives for both agents. The contractor can adopt one of two possible attitudes: either the incentives are kept constant, or one agent is chosen to whom the necessary incentives will be provided to exert effort. In both situations, the effort to treat the patient is provided by the nurse, and not the doctor, because the nurse is highly productive and can substitute for the doctor’s effort.

The scenario described here is more likely in non-surgical areas of health care, such as primary care and family health care units as well as rehabilitation units. The model described in this work does not apply to a hospital ward, where a set of patients are to be found, but it applies to primary health care units where the medical attention is fully given to each patient at a time. There is no trade-off between agents’ effort and number of patients receiving attention. All patients looking for medical primary care, receive it. This care is provided either with high, or low, professional commitment to improve the patient condition.

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1 According to Achian and Demsetz’s definition, health care team work is such that it is not possible to separate it into two different production functions, respectively dependent on the labor of doctor and nurse.

2 For instance, in some countries and under some conditions, nurses prescribe drugs (Lewis-Evans and Jester, 2004; While and Biggs, 2004).