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Economic Incentives in General Practice: the Impact of Pay for Participation Programs on Diabetes Care.

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Primary care and the organisation of the health care sector

In a period of tight budget constraints, primary care is acquiring a central role in the organisation of health care sectors.
In designing the institutional system, public policies in this area pursue a wide range of objectives:

- improve health outcomes
- clinical governance of demand (appropriateness)
- cost containment

➡ identify the determinants of GPs decisions;

➡ evaluate the impact of public policies;

➡ test the role of incentives in influencing resource allocation.

General purpose of the research

The increasing adoption of financial incentives in primary care outlines the importance of improving our knowledge on their impact on the quality of care.

Evaluate the effects of economic incentives (special payments) on a series of health care outcomes.

Outcome measure

ACSCs (Ambulatory Care Sensitive Conditions):

conditions for which hospital admission is potentially avoidable if timely and effective outpatient care is provided [Billings et al., 1993]

The focus of the empirical study presented here is on

DIABETES CARE

Incentive schemes in primary care

Special payments are bonuses paid over and above physician's base income (capitation, salary and/or fee for service).

They are aimed at improving the quality of primary care and may take different forms:

- **Pay-for-Performance**
  - payments are contingent to the achievement of pre-defined targets.
- **Pay-for-Participation**
  - payments follow the assumption of responsibility for particular types of patients and/or for participation in care improvement activities.
- **Pay-for-Compliance**
  - payments are contingent to the acceptance of guidelines and clinical protocols.

Motivation of pay for participation programs

Advantages

- do not crowd out intrinsic motivations, a potentially important determinant of physician's effort;
- perceived by GPs as less intrusive than compensation schemes based on performance indicators;
- contain potential distortions related to multitasking.

Limitations

- the absence of ex-post supervision may result in too weak incentives;
- vulnerable to strategic behaviour (eg. increase of list size).

Focus on a specific ACSC DIABETES TYPE II.

- In the Italian region Emilia Romagna, contracts stipulated by Local Health Authorities (LHAs) with their GPs can include a monetary *bonus* for managing type 2 diabetes patients.
  - ✓ The bonus tops up (uniform) capitation and differs across LHAs.

- Outcome indicator : *incidence of emergency hospitalisations as a consequence of hyperglycaemic episodes*
  - ✓ Hospitalisation for acute hyperglycaemic episodes (ICD-9 codes 250.1 to 250.2) can be sign of poor adherence with diabetes medications and in many cases it can be avoided through early recognition [Booth and Fang, 2003].

Data base

The database collects information for year 2003, and covers patients and GPs of the whole region.

By linking several epidemiological and administrative databanks, we obtain detailed information on:

- **health consumption of the population**
- **the different components of GP remuneration,**
- **prevalence of morbidity for several diseases and chronic conditions in large groups of patients.**

The study population

- The population for our study is identified by integrating data from multiple sources.
  - Following WHO criteria, we classify as diabetes patient anyone >35 years who received at least one prescription for diabetes medications (oral agents or insulin) during the year 2002.
  - As some diabetes patients who are being managed through a diet and exercise alone can be missed with this strategy, we also include individuals who had at least one outpatient visit to a diabetic centre during the 2002 or an hospital admission with a diabetic diagnostic code in the previous two years.
- The citizens classified as diabetes patients are 168.843

Methodology

Multilevel models [Goldstein, 2003]

Suitable for analysing phenomena that can be represented through a hierarchical structure.

Variables may refer to the statistical units of the analysis or they can be grouped. Our statistical unit is the patients but information is potentially clustered at the GP and the district level.

Multilevel analysis is based on regression analysis and controls for the consequences of grouped regressors:

(i) estimate variability at the different hierarchical levels;
(ii) insert sets of explanatory variables for each level,
(iii) correct standard errors to account for the different correlation between regressors of different levels.

A three-level logit model with a random intercept

$$Logit\,(\pi_{ijk}) = log(\pi_{ijk}/1-\pi_{ijk}) = \underbrace{\beta_0 + \beta_1 x_{ijk}}_{\text{Deterministic component}} + \underbrace{v_{0k} + u_{0jk} + e_{ijk}}_{\text{Random component}}$$

v_{0k}, u_{0jk}, e_{ijk} are the residuals for the third (Local Health District), the second (GPs) and the first level of the hierarchy (individual patient), respectively.

Being at different levels, the random components of the models are assumed to be uncorrelated.

The Var/Cov Matrix is assumed to be block diagonal

The residuals follow a Normal distribution with mean zero and variance σ^2 (v_{0k}), σ^2 (u_{0jk}).

u_{0jk} measures the random variation of the intercept, β_0, amongst GPs.

v_{0k} measures the random variation of the same intercept amongst local areas.

Explanatory variables- *Year 2003*

PATIENTS (n. 168.843)

Gender (male=1)

Age

Insulin dependent

Visit to DOC

LOCAL HEALTH DISTRICTS

Average per-capita Income (quartiles)

Beds in endocrinology

GPs (n. 3.252)

Gender

Age

List per GP

Practice type **(association, network, group)**

Rural Practice location

Postgraduate qualifications

Economic incentives

- **Pay for participation**
- **Pay for compliance**

	Model 2			Model 3		
Explan. Variables.	ß	St. Dev	p >	ß	St. Dev.	p >
Constant	-6.492	(0.188)	***	-6.138	(0.601)	***
Patient level						
male Patient	-0.159	(0.095)	*	-0.169	(0.094)	*
P_Age 65-75	-0.324	(0.126)	**	-0.328	(0.125)	**
P_Age >75	0.325	(0.107)	***	0.332	(0.106)	***
Insulin dep.	1.913	(0.101)	***	1.877	(0.101)	***
Visit to DOC	0.103	(0.021)	***	0.124	(0.021)	***
Physician level						
male GP	0.196	(0.124)		0.213	(0.122)	*
List size 1100-1500	-0.262	(0.110)	**	-0.258	(0.108)	**
List size >1500	-0.419	(0.178)	**	-0.395	(0.176)	**
^ ^ ^						
Pay for Compliance	-0.062	(0.042)		-0.034	(0.051)	
Pay for Participation	-0.222	(0.085)	**	-0.210	(0.089)	**
District level						
Inc. 25%-75%				0.150	(0.201)	
Inc. ≥75%				0.771	(0.223)	***
Beds Endocr.				-0.233	(0.193)	
RANDOM EFF.						
Lev. 2 - σ^2 (u_{0jk})	0.309	0.165	*	0.064	(0.153)	
Lev. 3 - σ^2 (v_{0k})				0.069	(0.037)	**
Dev. [-2ln(L)]	-584333			-590556		

^ ^ ^ Additional controls at the GP level include: Rural location, Postgraduate specialisation, GP age classes Association/ Network/Group, none of which was significant.

Conclusions

Patients' characteristics emerge as the most important factors influencing the probability of the adverse outcome.

With the exception of list size, GPs' characteristics do not display any significant effect.

Economic incentives display the expected negative sign

Physicians receiving a relatively higher fraction of their income through Pay for Participation programs are associated with patients that display a significantly lower probability of experiencing avoidable hospitalisation.

Pay for Compliance programs are never significant.

Scope for further research

- **Potential endogeneity of financial programs**
  - We don't know much of the process that lead to the definition of local contracts.
  - The availability of longitudinal data could provide more robust indications
- **Lack of information about the socio-economic status of the patient**
  - how to proxy patient compliance?
- **Extend the analysis to additional (more general) indicators**
  - Do these ad hoc programs generate positive external effects and improve appropriateness of care also in other areas of primary care?