CAN INTEGRATED PRIMARY AND HOSPITAL CARE IMPROVE QUALITY AND EFFICIENCY ? EVIDENCE FROM A SPANISH PPP

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PAPER OVERVIEW (I)

- Growing number of health system reforms globally:
 - US: ACOs and "patient-centered medical home" (PCMH) initiative
 - UK: Quality and Outcomes Framework (QOF)
 - Basque Country (Spain): chronic care strategy
- Many of them intensify the provider's responsibility for a continuum of care and increase accountability for health costs and health quality
- GOAL of the paper: to understand the effect that primary care integration with specialist and hospital care has on quality and efficiency outcomes
- Data: unique proprietary data from Ribera Salud and comparisons with other hospitals in the Autonomous Region of Valencia, Spain.

Outcome Measures:

- EFFICIENCY Measures: efficient utilization of the emergency room by redirecting non-emergency care into primary care centers; Length of Stay
- QUALITY: the ratio of avoidable hospitalizations due to ambulatory casesensitive conditions (ACSC); death after AMI.

WHY RIBERA SALUD

• La Ribera has four key characteristics that make it particularly suitable for the purpose of the research:

1. La *Ribera Salud* was the first public-private partnership established in the region of Valencia for the provision of healthcare. It is responsible for the provision to the public healthcare insurance system of healthcare services to a **catchment area** of about 250,000 people.

2. *La Ribera* receives a per capita payment for its services. Here, money follows the patient; if a patient from *La Ribera* catchment area decides to use hospital services other than those of the Alzira hospital, the private consortium has to pay 100% of the official prices for the services received. If *La Ribera* receives patients from outside their catchment area, they are also reimbursed accordingly but at a discount (80% of the official price).

3. *La Ribera* provides a **natural experiment** for analyzing the impact of integrating primary care with specialized and hospital care. :

In 1999, La Ribera was only responsible for providing hospital care. This created difficulties as the gatekeeping role of the primary care physician was in the hands of the public sector.

In 2003, *La Ribera* renegotiated the concession and fully integrated primary care. After that point, in exchange of a per capita payment, it was responsible for the health of the entire catchment population, making it one of the first fully integrated care structures in Europe and the first one in Spain.

4. Lengthy time series of data allows for a difference-in-difference analysis against a synthetic control.

METHODS (I)

- Synthetic control method : First suggested by Abadie et al. (2010) and Abadie and Gardeazabal (2003)
- A difference-in-difference framework, but here there is only one unit of treatment, so standard asymptotic tests are not possible.
- Instead, trend change in treated hospital is compared with a "synthetic" counterfactual composed of a weighted average of other hospitals in AC Valencia.
- Weights selected so that observable characteristics of the synthetic cohort are as similar to La Ribera as possible.
- Once constructed, the idea is to compare key outcome variables before and after integration in La Ribera with the synthetic control.
- The synthetic control represents what would have happened to La Ribera in absence of the integration change.
 - ADVANTAGES: no degree of ambiguity on how and why comparison units are chosen
 - Overcomes difficulty of finding a single unexposed unit with relevant characteristics similar to that of the treatment before the change took place

THE DIFFERENCE-IN-DIFFERENCE FRAMEWORK: AN ILLUSTRATIVE EXAMPLE



METHODS (II)

- The synthetic approach determines the optimal weights of hospitals for a population of comparator hospitals in order to best approximate a synthetic counterfactual for La Ribera over the pre-integration period
 - Accomplished with a minimum distance estimator to weight elements in the vector of relevant characteristics, X:

$$||X_1 - X_0w||_v = \sqrt{(X_1 - X_0w)'V(X_1 - X_0w)}$$

- Once weights are estimated, impact is the difference between the observed outcome in the treated unit, La Ribera, and the synthetic cohort:

$$Y_{1,t} - \sum_{j=2}^J w_j^* Y_{jt}$$

METHODS (III)

- Only 1 treated unit, so no aysmptotic hypothesis tests.
- Instead can use permutation tests to understand robustness of result:
 - Re-estimate integration impact for every possible permutation of treatment, i.e. each individual hospital in the data,
 - Calculate the MSPE of integration for (a) period after and (b) period before integration onset (2004) – the ratio should be highest for units that were most effected by integration (i.e. the post integration MSPE should be very high).
 - Order each of the 20 MSPE the position of the MSPE ratio for La Ribera gives an analog of the Fisher exact p-value
 - In this case lowest p-value = 1/20 (.05).

 Primary dataset: Official records from La Ribera hospital

-Provided on a confidential, limited-use basis

- -Panel data at patient level from 1999 to 2013
- Statistics on Health Establishments Providing In-Patient Care (ESCRI)

-Panel data set at the hospital catchment area level from 1999 to 2009

- Spanish Hospital Morbidity Survey (HMS)
 - -Panel data set from 1999 to 2012 where we compare La Ribera catchment area to every other province across Spain

SUMMARIZING DATASETS

	Primary Dataset	ESCRI	HMS	CMBD
Time span	1999-2013	1999-2009	1999-2012	2001-2012
Unit of analysis	Patient	Hospital	Patient	Province
Patient id	\checkmark			
Patient charcateristics	\checkmark		\checkmark	
ICD-9 MC	\checkmark		\checkmark	
Length of stay	\checkmark		\checkmark	\checkmark
Hospital id	\checkmark	\checkmark		
Hospital charcateristics		\checkmark		
Hospital outcomes		\checkmark		\checkmark



WORK IN PROGRESS.

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RISK- ADJUSTMENT

- Observable characteristics of population varies across catchment area (i.e. proportion of older population)
 - -Likely affects potential disease burden in the catchment area
- Goal: To construct outcome measures not potentially confounded by differences in local population.
- Solution \rightarrow Risk-adjustment of outcome measures.
- Methods:
 - -Direct Standardization when age-sex distribution is available
 - -Indirect method when age-sex distribution is unknown

RISK- ADJUSTMENT: DIRECT STANDARDIZATION (NOTE: NEED TO REVISE)

 Outcome as a function of age-sex population distribution

$$\sum_{j} \left[\frac{x_j}{p_{ijt}} \times \frac{P_j}{P} \right]$$

- *j* distinguishes between age-sex-disease groups
- *i* distinguishes between provinces or catchment areas
- *t* distinguishes between years
- x is the variable we want to risk adjust
- p the population variable
- P is also a population variable, the same as p but evaluated for Spain in 2011.

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RISK- ADJUSTMENT: INDIRECT APPROACH

$$\frac{\sum_{j} \left[X_{j} \times \frac{p_{ijt}}{P_{j}} \right]}{\sum_{j} \left[p_{ijt} \right]} - \frac{x_{it}}{p_{it}}$$

- Age-sex distribution is unknown in ESCRI data
- Difference between of what would have happened in Spain if it would have had a given population distribution and what really happened in the catchment area with the distribution we imputed.