Income-Related Inequalities in Utilization of Health Services among Private Health Insurance Beneficiaries in Brazil

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1. Background

Social Health Insurance (formal workers) → Health Reform (1988) → National Health Services (Universal Coverage)
1. Background

Privileged access

Public coverage

Formal Workers

Health Reform

1988

Private coverage (PHI)

Formal Workers
1. Background

Two-tier system:

- Dual coverage (SUS & PHI)
- SUS dependent
1. Background

1. Background

PHI coverage variation by income quintiles, 1998-2008

- Poorest: 41.2%
- Poor: 17.4%
- Middle income: -0.9%
- Rich: -5.8%
- Richest: -4.8%
- General Population: -1.7%
2. Building on the literature

The literature focuses on differences between privately insured and uninsured (SUS only) and reports higher levels of utilization among insured individuals.
Accountability issue: Does private insurance improve access regardless of individuals’ income?

Investigate inequalities in healthcare utilization among PHI beneficiaries across income.
4. Methods – measuring inequality

1. Need-standardized variations across income-quintiles

2. Concentration curves

3. Concentration Index / Horizontal inequality index

4. Decomposition analysis
4. Methods – data source

- **1998 & 2008** *Pesquisa Nacional por Amostra de Domicílios – PNAD*

- Administrative data on hospital beds and physician per capita at state level (RIPSA 2012).
4. Methods – analytical model

Dependent variables

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician services</td>
<td>Any physician visit (contact)</td>
</tr>
<tr>
<td></td>
<td>Number of physician visits (volume)</td>
</tr>
<tr>
<td>Hospital services (SUS financed &amp; PHI financed)</td>
<td>Any hospitalization (contact)</td>
</tr>
<tr>
<td></td>
<td>Number of inpatient days (volume)</td>
</tr>
<tr>
<td>Hospital services (admissions)</td>
<td>Number of hospital admissions (volume)</td>
</tr>
</tbody>
</table>
4. Methods – analytical model

Health services System variables

Resources & Distribution
- Hospital beds/1000
- Physician beds/1000

Organization (access)
- Family health program
- Geographical coverage
- Cost-sharing

Organization (structure)
- Premium amount
- PHI quality
- Employer-based coverage

Individual determinants

Predisposing & Enabling
- Age/Sex (confounding)
- Income (living standard)
- Family type
- Education
- Economic activity
- Race/ethnicity
- Geographic region
- Area of residence (urban/rural)

Need (confounding)
- Self-assessed health
- Impairment
- Physical limitations
5. Results – physician services
5. Results – physician services

### Any physician visit

<table>
<thead>
<tr>
<th>Year</th>
<th>Probability of service use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td><img src="chart1998.png" alt="Chart data" /></td>
</tr>
<tr>
<td>2008</td>
<td><img src="chart2008.png" alt="Chart data" /></td>
</tr>
</tbody>
</table>

### Number of physician visits

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean number of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td><img src="chart1998.png" alt="Chart data" /></td>
</tr>
<tr>
<td>2008</td>
<td><img src="chart2008.png" alt="Chart data" /></td>
</tr>
</tbody>
</table>

Note: Refers to actual distribution

- ▼ Poorest 20%
- ● 2nd poorest 20%
- ⋆ Middle
- □ 2nd richest 20%
- ▲ Richest 20%
- × Mean
5. Results – physician services

- Decomposition of Inequality in Healthcare Utilization - 1998
  - Any Physician Visit
  - Number of Physician Visits
  - Any PHI Hospitalization
  - Number of PHI Hospital Days
  - Number of Hospital Admission

- Decomposition of Inequality in Healthcare Utilization - 2008
  - Any Physician Visit
  - Number of Physician Visits
  - Any PHI Hospitalization
  - Number of PHI Hospital Days
  - Number of Hospital Admission

Legend:
- Self-Assessed Health
- Impairment
- Physical Limitations
- Age-Sex
- Log of Family Income
- Bed per thousand
- Physician per thousand
- Family type
- Insurance premium
- Employer based coverage
- Insurance quality
- Insurance coverage area
- Insurance copay
- Family health program
- Family Head's Education
- Family Head's Economic Activity
- Race
- Geographic Region
- Rural Residence
5. Results – physician services

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Any Physician Visit</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>0.7163</td>
<td>0.5185</td>
<td>0.8139</td>
</tr>
<tr>
<td>2nd poorest 20%</td>
<td>0.7312</td>
<td>0.5598</td>
<td>0.8249</td>
</tr>
<tr>
<td>Middle</td>
<td>0.7447</td>
<td>0.5685</td>
<td>0.8393</td>
</tr>
<tr>
<td>2nd richest 20%</td>
<td>0.7673</td>
<td>0.6006</td>
<td>0.8427</td>
</tr>
<tr>
<td>Richest 20%</td>
<td>0.7919</td>
<td>0.6763</td>
<td>0.8578</td>
</tr>
<tr>
<td>Mean</td>
<td>0.7503</td>
<td>0.5848</td>
<td>0.8357</td>
</tr>
<tr>
<td>Horizontal Inequity Index (HI)</td>
<td>0.0206</td>
<td>0.0724</td>
<td>0.0099</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Number of Physician Visits</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>3.0498</td>
<td>2.0079</td>
<td>3.4873</td>
</tr>
<tr>
<td>2nd poorest 20%</td>
<td>3.3531</td>
<td>2.2932</td>
<td>3.8301</td>
</tr>
<tr>
<td>Middle</td>
<td>3.2350</td>
<td>2.3360</td>
<td>3.9669</td>
</tr>
<tr>
<td>2nd richest 20%</td>
<td>3.6090</td>
<td>2.4912</td>
<td>4.2303</td>
</tr>
<tr>
<td>Richest 20%</td>
<td>3.9514</td>
<td>2.8358</td>
<td>4.4480</td>
</tr>
<tr>
<td>Mean</td>
<td>3.4395</td>
<td>2.3928</td>
<td>3.9917</td>
</tr>
<tr>
<td>Horizontal Inequity Index (HI)</td>
<td>0.0512</td>
<td>0.1200</td>
<td>0.0483</td>
</tr>
</tbody>
</table>

Need-standardized with controls (OLS)
Source: Almeida et al (2013)
5. Results – hospital services (SUS)
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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>0.0747</td>
<td>0.1014</td>
<td><strong>0.0550</strong></td>
<td>0.0891</td>
</tr>
<tr>
<td>2nd poorest 20%</td>
<td>0.0783</td>
<td>0.0929</td>
<td>0.0704</td>
<td>0.0816</td>
</tr>
<tr>
<td>Middle</td>
<td>0.0782</td>
<td>0.0794</td>
<td>0.0737</td>
<td>0.0776</td>
</tr>
<tr>
<td>2nd richest 20%</td>
<td>0.0804</td>
<td>0.0730</td>
<td>0.0875</td>
<td>0.0731</td>
</tr>
<tr>
<td>Richest 20%</td>
<td>0.0879</td>
<td>0.0728</td>
<td>0.0925</td>
<td>0.0757</td>
</tr>
<tr>
<td>Mean</td>
<td>0.0799</td>
<td>0.0839</td>
<td>0.0758</td>
<td>0.0794</td>
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<tr>
<td>Health Inequity Index (HI)</td>
<td>0.0367</td>
<td>-0.0104</td>
<td><strong>0.1002</strong></td>
<td>0.0189</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>0.2917</td>
<td>0.6241</td>
<td><strong>0.1891</strong></td>
<td>0.5967</td>
</tr>
<tr>
<td>2nd poorest 20%</td>
<td>0.3356</td>
<td>0.6460</td>
<td><strong>0.2755</strong></td>
<td>0.5882</td>
</tr>
<tr>
<td>Middle</td>
<td>0.2789</td>
<td>0.5644</td>
<td>0.3057</td>
<td>0.5818</td>
</tr>
<tr>
<td>2nd richest 20%</td>
<td>0.3428</td>
<td>0.4551</td>
<td>0.4029</td>
<td>0.5093</td>
</tr>
<tr>
<td>Richest 20%</td>
<td>0.3689</td>
<td>0.4150</td>
<td>0.4191</td>
<td>0.5027</td>
</tr>
<tr>
<td>Mean</td>
<td>0.3236</td>
<td>0.5409</td>
<td>0.3182</td>
<td>0.5557</td>
</tr>
<tr>
<td>Health Inequity Index (HI)</td>
<td>0.0472</td>
<td>0.0239</td>
<td><strong>0.1491</strong></td>
<td>0.0430</td>
</tr>
</tbody>
</table>

Need-standardized with controls (OLS)
Source: Almeida et al (2013)
6. Conclusion

**Physician Services**
- Poor PHI beneficiaries utilize physician services at comparable levels as the rich. Compared to national levels, they have an advantage.

**Hospital Services**
- Poor PHI beneficiaries utilize private hospital at lower levels than the rich. Compared at a national level, they are at a disadvantage. In 1998, this was not the case, suggesting that PHI may be developing mechanisms to deter utilization.
6. Policy implications

These findings suggest that PHI carriers are finding ways to game the system at the expense of their poorest beneficiaries.

The Brazilian government (ANS) needs to do a better job at monitoring utilization across income/premium and developing policies to increase the transparency and accountability of PHI products.
Thank you!

Questions?

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Extras slides
6. Discussion

Why might poor PHI beneficiaries be using SUS hospitals?

**PHI “push factors”**
- Insufficient supply (beds)
- Cost-sharing

**SUS “pull factors”**
- Family health program
- Cultural element (educational level)
4. Methods – indirect standardization

1. Actual (crude) utilization:

\[ y_i = \alpha + \beta \ln inc_i + \sum_j \beta_j x_{ji} + \sum_k \gamma_k z_{ki} + \varepsilon_i \]

2. Expected utilization:

\[ \hat{y}^X_i = \hat{\alpha} + \hat{\beta} \ln inc_i + \sum_j \hat{\beta}_j x_{ji} + \sum_k \hat{\gamma}_k \bar{z}_p \]

3. Standardized utilization is:

\[ y^{IS}_i = y_i - \hat{y}^X_i + \bar{y} \]
4. Methods – concentration curve

The share of the health variable accounted for by cumulative proportions of individuals in the population ordered by the socioeconomic variable.
4. Methods – concentration index

Convenient covariance formula:

\[ C = \frac{2}{\mu} \text{cov}(h, r) \]

- The formula reflects the relationship between the health variable and rank in the income distribution.
- It is the covariance between these two variables scaled by 2 divided by the mean of the health variable.
7. Significance and Contribution of Research

• Brings innovation as no study to date has focused on inequality among PHI beneficiaries in Brazil.

• Builds on theory with the operationalization of contextual variables using Andersen’s framework.

• Develops empirical evidence on the problem of utilization through private coverage.
8. Limitations

• Cross sectional survey not primarily designed to test equity in healthcare

• Recall period of 12 months

• Methods can only provide information on differences in quantities of healthcare and not on quality or appropriateness of healthcare