A Comparative Analysis of Proxy Measures for Coordination of Care within a South African Insured Population

Authors: Jessica A. Nurick\textsuperscript{1}, Simon P. Dreyer\textsuperscript{1}

Introduction
The persistence of high healthcare costs, and high cost inflation, is driving governments, insurers and managed care organisations to seek new ways of addressing this problem while simultaneously improving the quality and cost effectiveness of healthcare provision. Fragmentation of care delivery has been identified as a critical area of waste within the healthcare system, encouraging research into the assessment of levels of coordination of care and their relationship with costs and outcomes.

Coordination has been defined in numerous ways and from various perspectives. These definitions are at best proxy measures for coordination. This paper will apply a selection of these proxy measures to a subset of claims data within the South African medical scheme (private insurance) environment and present a comparative analysis of results.

Methods
Our initial work, based on a population of 3.1 million lives, examined the relationship between the number of General Practitioners (GPs; primary care physicians) visited by a patient over 12 months and the patient's incurred costs, utilisation and hospital admission rates over the same period. Using regression analysis to derive risk-adjusted expected costs and grouping on GPs-visited count, we were able to establish a direct, positive relationship between costs and utilisation, and number of GPs visited. Preliminary results of the analysis are presented in Table 1.

While this work confirmed an important trend, we recognised that the number of GPs visited is a crude proxy for the level of coordination of care and further areas for analysis were identified. In particular, this paper will consider other measures from the literature of the relationship between patient and healthcare provider, including the Johns Hopkins ACG coordination markers and the Herfindahl-Hirschman Index (HHI), a measure commonly used to assess market concentration. An approach using HHI on a US insured population has previously been explored by Frandsen \textit{et al} (2015)\textsuperscript{1}. We also consider the Bice-Boxerman Continuity of Care Index (Bice TW, Boxerman SB. 1977)\textsuperscript{2}.

Much of the exploratory work on coordination of care to date has been done on the relationships between patients and healthcare providers, as discussed in the previous paragraph. We will however also be exploring the relationships and referral patterns between GPs and specialists in more detail. Pollack \textit{et al}, in two papers (Pollack CE \textit{et al.} 2015; Pollack CE \textit{et al.} 2013)\textsuperscript{3, 4}, define care density as a proxy measure for how frequently a patient's doctors collaborate. We apply this methodology to our South African dataset to further understand coordination in our insured population.

In performing the patient-doctor and doctor-doctor analyses we consider a number of confounding factors and their impact on the ability for coordination to explain differences in cost and outcomes. For example, in addition to age, gender, morbidity (as defined using the ACGs) and insured benefits, we consider factors recognised as worthy of consideration in Pollack \textit{et al}’s work such as race/ethnicity, urban/rural, proximity to healthcare providers and managed care interventions designed to promote coordination of care. These interventions include GP nomination and specialist referral benefit rules.

Owing to the richness of claims (including diagnosis) and demographic data available for this study, we are able to examine several scenarios of coordination and relate them to cost (both in total and by type, such as pathology) and outcomes. These scenarios vary in perspective and control for multiple factors, as
A Comparative Analysis of Proxy Measures for Coordination of Care within a South African Insured Population

References:


Results
Preliminary results, more to follow.

Conclusions
Preliminary conclusions, more to follow.

Table 1

<table>
<thead>
<tr>
<th>Number of Providers Seen</th>
<th>Total Beneficiary Months</th>
<th>Total Beneficiary Months</th>
<th>Number of Patients</th>
<th>Actual Total Cost pmp*</th>
<th>Expected Total Cost pmp*</th>
<th>Actual Relative to Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 GPs (0 Specialists)</td>
<td>5 031 921</td>
<td>597 741</td>
<td>R 16</td>
<td>R 204</td>
<td>-92%</td>
<td></td>
</tr>
<tr>
<td>1 GP</td>
<td>13 600 430</td>
<td>1 279 989</td>
<td>R 537</td>
<td>R 592</td>
<td>-9%</td>
<td></td>
</tr>
<tr>
<td>2 GPs</td>
<td>7 915 162</td>
<td>711 642</td>
<td>R 898</td>
<td>R 854</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>3 GPs</td>
<td>3 226 550</td>
<td>282 397</td>
<td>R 1 295</td>
<td>R 1 162</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>4 GPs</td>
<td>1 074 849</td>
<td>92 548</td>
<td>R 1 747</td>
<td>R 1 532</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>5+ GPs</td>
<td>434 078</td>
<td>37 004</td>
<td>R 2 695</td>
<td>R 2 217</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>0 GPs (Specialists only)</td>
<td>1 018 376</td>
<td>101 335</td>
<td>R 1 242</td>
<td>R 782</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32 301 366</td>
<td>3 102 656</td>
<td>R 712</td>
<td>R 712</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

*plpm = per life per month; R = South African Rands (€, 1.00 = R13.49 on 22 July 2015)

1. Health Intelligence Unit, Medscheme, Cape Town, South Africa.