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A comparative performance analysis of a renowned public private partnership for health care provision in Spain between 2003 and 2015☆

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ABSTRACT

Background: Recently, the once archetype of the public private partnership (PPP) in the Spanish National Health System (SNHS), namely the Alzira's Model, has come to an end. Advocates defended the superiority of PPPs over public-tenured provision, in terms of quality and technical efficiency. This paper profiles and compares Alzira's life-cycle performance with similar public-tenured providers.
Methods: Observational study on secondary data from virtually all hospital care episodes produced in 51 integrated providers (i.e., administrative healthcare areas) and 67 hospitals, in 2003 and 2015. Alzira's 2015 performance (and its variation since 2003) was compared with all public-tenured peers in the SNHS, using 26 indicators analysing the differences in age-sex standardized rates of events or risk-adjusted mortality, severity-adjusted hospital expenditure and hospital technical efficiency.
Results: In comparison with the corresponding public-tenured peers, Alzira's 2015 performance was statistically worse than the benchmark in the majority of indicators (15 out of 26); yet, its performance was one of the best in the SNHS in adjusted-mortality after Percutaneous Coronary Intervention (PCI). Over time, Alzira showed a statistically greater 2003–2015 improvement than its peers' average in eleven of the indicators, and a lower improvement in nine.
Conclusions: In this comprehensive comparative study on Alzira's performance, this PPP has not generally outperformed public-tenured providers, although in some areas of care its developments have been outstanding.

1. Background

In the statutory Spanish National Health System (SNHS), where responsibilities on health care planning, services purchase and provision were fully decentralized to the Autonomous Communities (ACs) in the early 2000's, the role of the public system is prominent, both in hospital care (the 70% of hospitalizations are provided by public institutions, although with remarkable variation across ACs –between 53% and 91%) and primary care (with only a few exceptions) are delivered by public institutions [1].

In general terms, since the inception of the SNHS, regional Departments of Health (i.e., health authorities at AC level) have been purchasing hospital care services from private not-for-profit or for-profit providers, generally acting as subsidiary agents (typically, to reduce waiting lists, both for diagnostic testing and surgical procedures, or as part of early discharge programs). Nonetheless, some regional Health Authorities have been strongly supportive to substitute public provision mechanisms for private provision schemes. So, in the late 1990s two new provision mechanisms were incepted: 1) primary care 'limited partnership' (namely, EBAs) that provide care to a registered population according to a contract with the Health Department (i.e. resembling to a certain extent Clinical Commissioning Groups in the UK); and, 2) the public-private partnership (PPP), specifically, administrative concessions, that provide

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hospital and primary care to a registered population, namely the population who lives in a health care area. While EBAs have been confined to Catalonia and no more have been set up since the late 1990s, PPPs have experienced some expansion over the last two decades, particularly between 2007 and 2011, under the assumption that PPPs were able to provide care services more efficiently than providers run under public administration rules.

The AC of Valencia has championed the use of this kind of PPP, with five health care areas serving the whole resident population of La Ribera (Alzira), Manises, Denia, Elche-Vinalopó, and Torrevieja, currently representing the 18.7% of the population in the AC – approximately 900 thousand lives. However, in April 2018 (when the administrative concession came to an end), the Valencia's Health Authority reversed the PPP and reset direct public provision in the Department of la Ribera, the health care area where Alzira's Model was set up.

Advocates had defended PPPs superiority with respect to public-tenured providers arguing on a better productivity [2,3] although international evidence is inconclusive [4–6], particularly, when it comes to their achievements in quality of care [2,7,8]. On the other hand, the few Spanish studies where PPPs were challenged, particularly those assessing Alzira's performance, provided partial evidence (i.e. the number of providers for comparison is limited and they have a narrow focus in performance dimensions) or did not exactly compare with similar public-tenured providers [9–11].

This paper seeks to shed light on whether Alzira's performance has shown to be superior to its public-tenured peers in the SNHS. For that purpose, the paper profiles and compares Alzira's performance with virtually all similar public providers, for a comprehensive number of performance indicators.

2. Method

2.1. Design and population

Observational study on secondary data from virtually all hospital care episodes produced in our sample of providers, in the years 2003 (when the administrative concession to Alzira expanded to primary care services, becoming an integrated provider comparable with the rest of health care areas is the SNHS) and 2015 (when the decision of reversion was announced). The sample was composed of virtually all public providers similar to Alzira in terms of population size and assisted severity (i.e., APR-DRG complexity weights); so, 51 health care areas (i.e., integrated providers) and 67 hospitals were selected for comparison (*n.b.* Health care areas in the statutory SNHS are the managerial structure for the delivery of hospital and primary care services, which *de facto* entails the administrative distribution and registration of the whole population residing in the area).

2.2. Main endpoints

Performance was measured throughout 26 performance indicators including: potentially avoidable hospitalizations (PAH) in chronic patients with angina, asthma, dehydration, diabetes, COPD, congestive heart failure, as well as a composite of all those conditions; low-value surgical procedures as adenoidectomy, tonsillectomy, grommets, c-section in low risk deliveries, episiotomy, hysterectomy in benign conditions, uterine curettage, cardiac ablation, trigger finger and carpal tunnel surgery; utilization of orthopaedic procedures as back surgery and, hip and knee replacements; and, in-hospital mortality after myocardial infarction, ischemic stroke, Percutaneous Coronary Intervention (PCI) or Coronary Artery Bypass Graft (CABG)) (Operational definitions of these indicators have been detailed in Appendix 1 in Supplementary data). In addition, severity-adjusted expenditure on hospital care and technical efficiency were estimated as detailed in the analysis section. All these indicators were developed and validated in the context of the Atlas VPM project [see www.atlasvpm.org].

2.3. Sources

All indicators were constructed reusing data collected by the health system and collated, curated and maintained by the Atlas VPM project. The master database contains virtually all the publicly financed discharges produced in the SNHS since 2002 (approximately, 65 million admissions) containing administrative, demographic and clinical information for each episode, as well as complementary datasets allowing: a) geographic allocation of each episode to the health care area where the patient is registered; b) standardized measures according to demographic information; and, c) the stratification of providers according to supply features. An analysis of the dataset quality in terms of coverage, accuracy and reliability is available at http://www.echo-health.eu [12].

2.4. Analyses

2.4.1. Performance profiling

Following the methodology developed in the Atlas VPM Project, for those indicators representing health care areas performance (i.e., potentially avoidable hospitalizations, low-value surgical procedures, and orthopaedic surgery) age-sex standardized rates were calculated [13]. In the specific case of severity-adjusted per capita hospital expenditure, as there are no full costing accounting systems in all the hospitals in the sample, the overall expenditure in a year was allocated to each episode according to its relative complexity measured by APR-DRGs, and then allocated to the place of residence of the individual [14,15]. For those hospital specific indicators different strategies developed by the Atlas VPM project, and described in depth elsewhere, were followed; basically: a) for the hospital quality indicators, an adjusted-risk of death was estimated using logistic multivariate multilevel regression models [16]; and, b) in the case of technical efficiency, a stochastic frontier analysis was carried out using the Cobb-Douglas function specification [17].

2.4.2. Benchmarking

Alzira was benchmarked according to: a) its performance in 2015; and, b) the difference in performance between 2015 and 2003. So, for each of the indicators, Alzira's 2015 age-sex standardized rates or adjusted-mortality were compared with the providers in the percentile 10^{th} of the distribution, technical efficiency was compared with the providers in the percentile 90^{th} of the distribution and expenditure was compared with the providers' average. Consistently, for each of the indicators, the absolute 2015 to 2003 change was compared with its peers, in this case, using as a benchmark those providers with an average behaviour.

2.5. Ethics statement

This study, observational in design, used retrospective pseudonymised data, and was conducted in accordance with the amended Helsinki Declaration, the International Guidelines for Ethical Review of Epidemiological Studies, and Spanish laws on data protection and patients' rights. This study implies the use of pseudonymised individual data, using double dissociation (i.e., in the original data source and once data are stored in the final master file) which impedes patients re identification.

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Table 1A
Alzira's performance profiling.

	Indicator	2003 Observed cases	2003 Population at risk	2015 Observed cases	2015 Population at risk	[a]2003 Std. Rate	[a]2015 Std. Rate	[b]2015 minus 2003 Std. Rate variation
Potentially Avoidable Hospitalisations	Angina	346	114,282	140	137,755	30.1	9.9	−20.2
	Asthma	19	114,282	15	137,755	1.7	1.1	−0.6
	Dehydration	9	42,015	38	47,048	2.2	7.4	5.1
	Diabetes	16	114,282	12	137,755	1.4	0.8	−0.6
	COPD	355	114,282	284	137,755	30.9	20.1	−10.8
	Congestive heart failure	264	114,282	326	137,755	23.4	22.8	−0.6
	All together	1012	114,282	816	137,755	88.5	57.5	−31.0
Low value surgical procedures	Adenoidectomy	109	48,920	28	51,157	22.9	4.9	−18.0
	Tonsillectomy	93	48,920	84	51,157	19.7	15.0	−4.6
	Grommets (tympanostomy or ventilation tubes)	64	48,920	26	51,157	13.4	4.6	−8.8
	C-section in low-risk deliveries	116	741	54	387	15.9	13.9	−2.0
	Episiotomy	635	1,429	241	1,439	44.7	16.8	−27.9
	Hysterectomy in benign conditions	1	104,764	3	110,479	0.1	0.2	0.1
	Uterine curettage	68	104,764	14	110,479	6.4	1.4	−5.0
	Cardiac ablation	1	206,814	10	218,289	0.1	0.4	0.4
	Trigger finger surgery	8	206,814	15	218,289	0.4	0.6	0.2
	Carpal tunnel surgery	270	206,814	228	218,289	13.1	9.5	−3.6
	Back surgery	97	192,496	192	206,278	5.0	8.8	3.8
Orthopaedics	Hip replacement	149	133,866	161	159,638	11.0	10.3	−0.7
	Knee replacement	253	96,221	407	116,679	26.1	38.6	12.6
Inpatient Quality indicators	Acute Myocardial Infarction (AMI)	36	306	22	225	116.6	112.1	−4.4
	Percutaneous Coronary Intervention (PCI)	5	207	5	354	26.6	9.3	−17.4
	Coronary Artery Bypass Graft (CABG)	8	151	13	163	54.0	90.9	37.0
	Ischaemic Stroke (IS)	49	363	47	318	132.1	154.8	22.7

[a] In potentially avoidable hospitalizations, low-vale surgical procedures, and orthopaedics Std. stands for age-sex standardized rates; in the case of in-hospital quality indicators, Std. stands for risk-adjusted mortality including as confounding factors age, sex, STEMI vs. NSTEMI events and concomitant cardiac surgery in CABG and Elixhauser comorbidities.
[b] The value stands for per 10,000 points difference in Potentially Avoidable Hospitalisations, Low Value Care and Orthopaedics and for 1000 points difference in Inpatient Quality Indicators.

Table 1B
Alzira's performance profiling.

	Indicator	2003 Severity adjusted Discharges	2003 Outpatient visits & ER	2015 Severity adjusted Discharges	2015 Outpatient visits & ER	[a]2003 Efficiency	[a]2015 Efficiency	[b]2015 minus 2003 Efficiency
Efficiency	Technical Efficiency	15,845	565,562	19,114	677,345	0.62	0.54	−0.1
		2003 severity adjusted expenditure	2003 Population under coverage	2015 severity adjusted expenditure	2015 Population under coverage	2003 Deflated per-capita expenditure	2015 Deflated per-capita expenditure	2015 minus 2003 Expenditure
	Public hospital expenditure (in euros)	90,647,642	241,416	158,139,716	257,435	375.5	487.1	111.7

[a] Technical Efficiency ranges from 0 to 1, being 1 the potential frontier of efficiency.
[b] The value stands for the 2015 and 2003 difference.

3. Results

Tables 1A and 1B provides, for each performance indicator, Alzira's number of cases and exposed population or patients, as well as its performance in terms of 2015 crude and adjusted figures, and 2015 to 2003 change.

In comparison with the corresponding peer health care areas [Fig. 1 and Appendix 2 in Supplementary data] Alzira's 2015 performance was (red dots), in the majority of indicators, statistically worse than the benchmark providers (red lines). So, Alzira's effectiveness in preventing PAH was rather poor in chronic patients with angina, dehydration, diabetes, congestive heart failure and COPD. Overall, 85 admissions (10.4% of the total potentially avoidable admissions) could have been avoided if Alzira was behaving as the benchmark. In terms of quality, risk-adjusted mortality for Myocardial Infarction, CABG and Ischaemic Stroke was far from the best performers; so, behaving as the benchmarks, Alzira would have avoided a 50% of in-hospital fatalities for Acute Myocardial Infarction (11 annual cases), an 82,6% of deaths for CABG (11 annual cases) and a 46.4% of deceases for Ischaemic Stroke (22 annual cases). In

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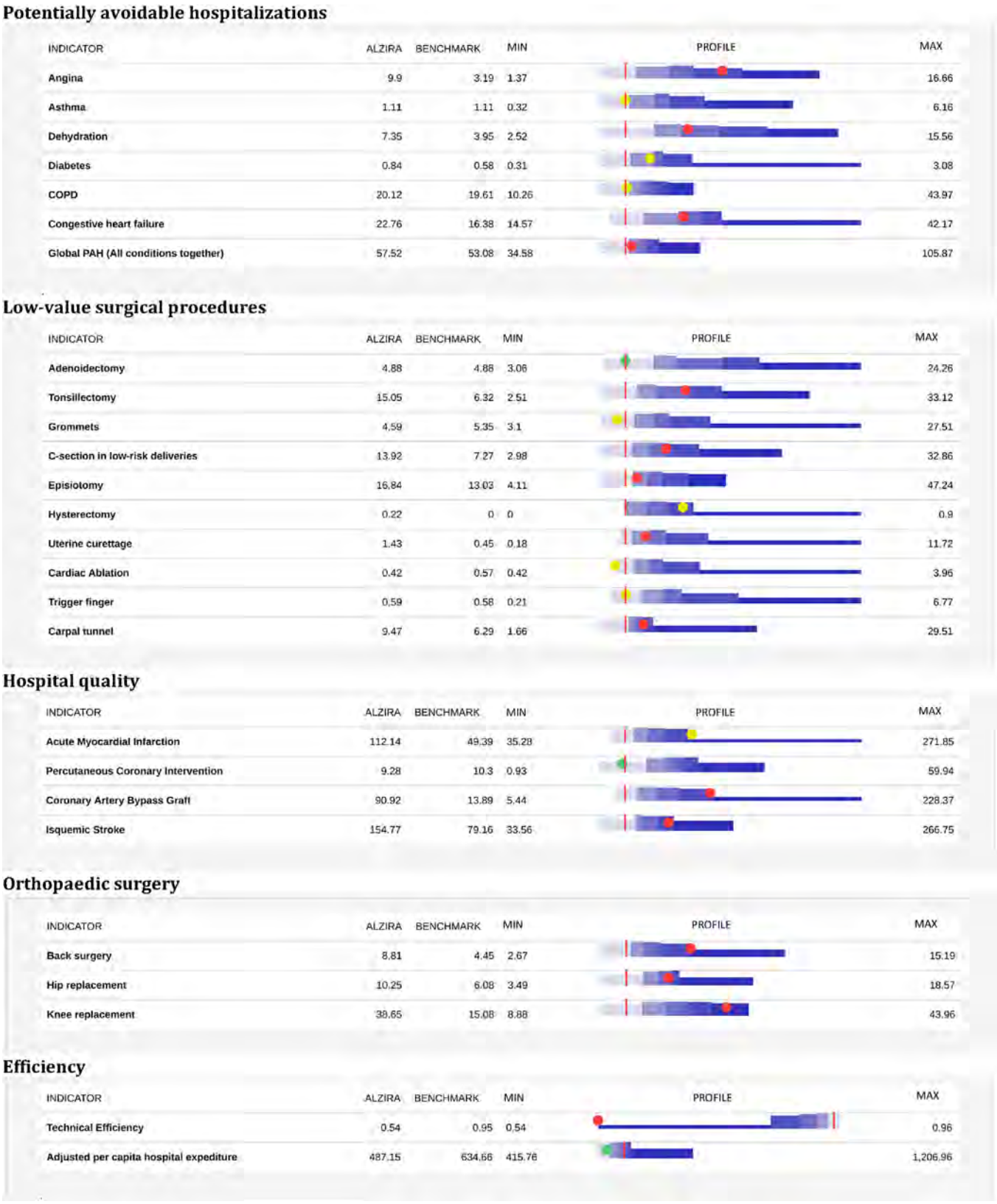

Fig. 1. The Alzira's model performance in 2015 (comparison with similar public-tenured providers). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)
Note: For each one of the performance indicators, the following information is shown: ALZIRA: Alzira's performance estimate for the indicator; BENCHMARK: performance estimate for those providers in the percentile 10th of the distribution; Min: Lowest performance estimate; PROFILE: blue columns represent the distribution of performance estimates in the sample divided in quintiles; the red vertical line, represents the benchmark; Coloured dots represent Alzira's performance relative position as: a green dot means a statistically significant better performance, a red dot means a statistically significant worse performance and the yellow one means no significant difference from benchmark. Max: Highest performance estimate.

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the case, of low value procedures, the excess cases ranged from 52 tonsillectomies to 3 uterine curettage cases. Finally, technical efficiency was observed as low as 0.54 (best scenario o frontier equals 1), 0.41 points away from the benchmark.

Nonetheless, there are some indicators where Alzira behaves as a benchmark area (green dots); for example, in the case of population rates of avoidable admission in adult asthma, adenoidectomy, grommets, cardiac ablation, and in-hospital mortality after PCI, as well as in the low adjusted per capita expenditure in specialized care.

When it comes to the absolute difference between 2015 and 2003 [Fig. 2 and Appendix 2 in Supplementary data], Alzira showed a statistically greater improvement than the average in 11 indicators; thus, in avoidable hospitalisation rates for angina, in some low-value procedures (paediatric surgery on adenoidectomy, tonsillectomy and grommets, c-section in low-risk deliveries, cardiac ablation, trigger finger and carpal tunnel surgeries), in hip replacement, in risk-adjusted mortality after PCI, and in the case of severity-adjusted hospital expenditure. In turn, in 9 indicators the improvement was statistically lower than its peers' average; so, in avoidable hospitalisation rates for asthma and dehydration, in hysterectomy in benign conditions, back surgery and knee replacements, in risk-adjusted mortality after myocardial infarction, CABG and ischemic stroke and, in technical efficiency. Only in risk-adjusted mortality after PCI, Alzira behaved as one of the best providers in the country, in both the static (2015) and the over time analyses (2015–2003).

4. Discussion

To our best knowledge this is the first empirical exercise that compares both Alzira's PPP with virtually all the potentially similar public providers in the SNHS, using a comprehensive set of performance indicators and considering its variation over time, overcoming some limitations of the few studies conducted in the Spanish context.

In general terms, Alzira has been performing better than its peers in a good deal of indicators over the period; however, Alzira's achievements were statistically worse than those in benchmark public-tenured providers in most of potentially avoidable hospitalizations; in risk-adjusted mortality for Myocardial Infarction, CABG and Ischaemic Stroke; in most of low value procedures; and, contrary to international evidence, in technical efficiency as well. Moreover, in some indicators performance worsened since 2003; in particular, in PAH for dehydration, in the rate of hysterectomies in benign conditions, in the rates of back surgery or knee replacement, and in adjusted case-fatalities after CABG or ischemic stroke.

Yet, between a 25% and a 50% of public tenured peers performed worse than Alzira; moreover, Alzira behaved as a benchmark in a number of indicators, -mortality after PCI, and deflated, severity-adjusted per capita expenditure in specialized care.

To some extent these inconclusive results are coherent with the evidence published about administrative concessions in Spain. So, a study using 2009 and 2010 data, analysed the differences in costs and efficiency between five PPPs (those mentioned in the background section) and the remaining 19 hospitals in the AC of Valencia; authors found that PPPs were performing better than average, although not occupying any benchmark position in the ranking [9]. The second one, focusing on three out of these PPPs, sought to compare those with the universe of hospitals in Catalonia (where a greater diversity of governance models coexist) using data from 2012 to 2015; authors found no significant differences in terms of clinical or economical indicators [18]. The third one, compared all the integrated providers in Valencia showing that the differences observed in the number of primary care visits and hospital A&E departments contacts in chronic complex patients were irrespective of the model of governance [11].

4.1. Limitations

Nevertheless, our work holds the limitation that the performance measures refer only to hospital care; the lack of reliable primary care data in 2003 has impeded proper comparisons. Nonetheless, the availability of some 2015 data on diabetes care, mainly provided at primary care level, confirmed that Alzira's performance in terms of diabetes control (glycoside haemoglobin) and risk factors control (blood pressure, cholesterol and microalbuminuria) was worse that its peers [19].

On the other hand, some measures have been adopted to reduce the risk of bias (i.e., flagging Alzira as performing worse when in fact was doing better, *or viceversa*). Thus, the use of standardized or risk-adjusted measures, along with the comparison with comparable providers (in terms of size and assisted complexity), has limited the potential for confounding. Besides, the decision of using more (or less) restrictive thresholds is not expected to affect differentially to Alzira, as its data are part of the sample (i.e., contributing as any other provider to shape the distribution of rates and risks). Finally, in terms of misclassification of cases in the numerator and/or exposure in the denominator, the type of indicators selected have been shown accurate and reliable, with no signal of remarkable flaws in successive data quality analyses [12]; therefore we should not expect any specific impact on Alzira's indicators.

4.2. Implications for policy decision-making

Although the constant allusion to higher efficiency, quality or sustainability has been used to underpin the superiority of either public-tenured or PPP governance models, depending on the stakeholders' position, evidence did not play a central role in the decision of contract termination (made in 2015 and implemented in 2018); on the contrary, the increasing concerns on Alzira's governance had major influence in the decision [5].

However, if they had taken our results as the basis for the decision, a question would have then come up straightforwardly. Are these results conclusive? In accordance to the findings, Alzira performed worse than its peers in most of the indicators, but at the same time outperformed a substantial number of public-tenured providers (between a 25% and a 50%), acting as a benchmark in some dimension. So, although most of the intellectual debate has been focused on defending the superiority of either governance models, this comprehensive overall performance assessment exercise has not been able to definitively solve the conundrum.

Nonetheless, the findings have sharply raised a question on the irrelevance of the governance model in place when it comes to the delivery of 'high-quality highly efficient care' in the SNHS. Our results invite to not feeding more Manichean debates and, contrarily, putting the accent on the need of understanding the underlying causes of good performance. We can then hypothesize that the observed differences in performance reside in how microsystems (e.g., clinical departments, primary care teams) within each organization perform.

So, the policy analysis for Alzira, and those public-tenured providers, should not be placed on deciding which governing model performs better and, accordingly, which model should be implemented and expanded; conversely, the analyses and decisions should be based on what medical practice styles, what organizational and financial incentives, and what level of professional capacity would assure the best possible performance at a micro level.

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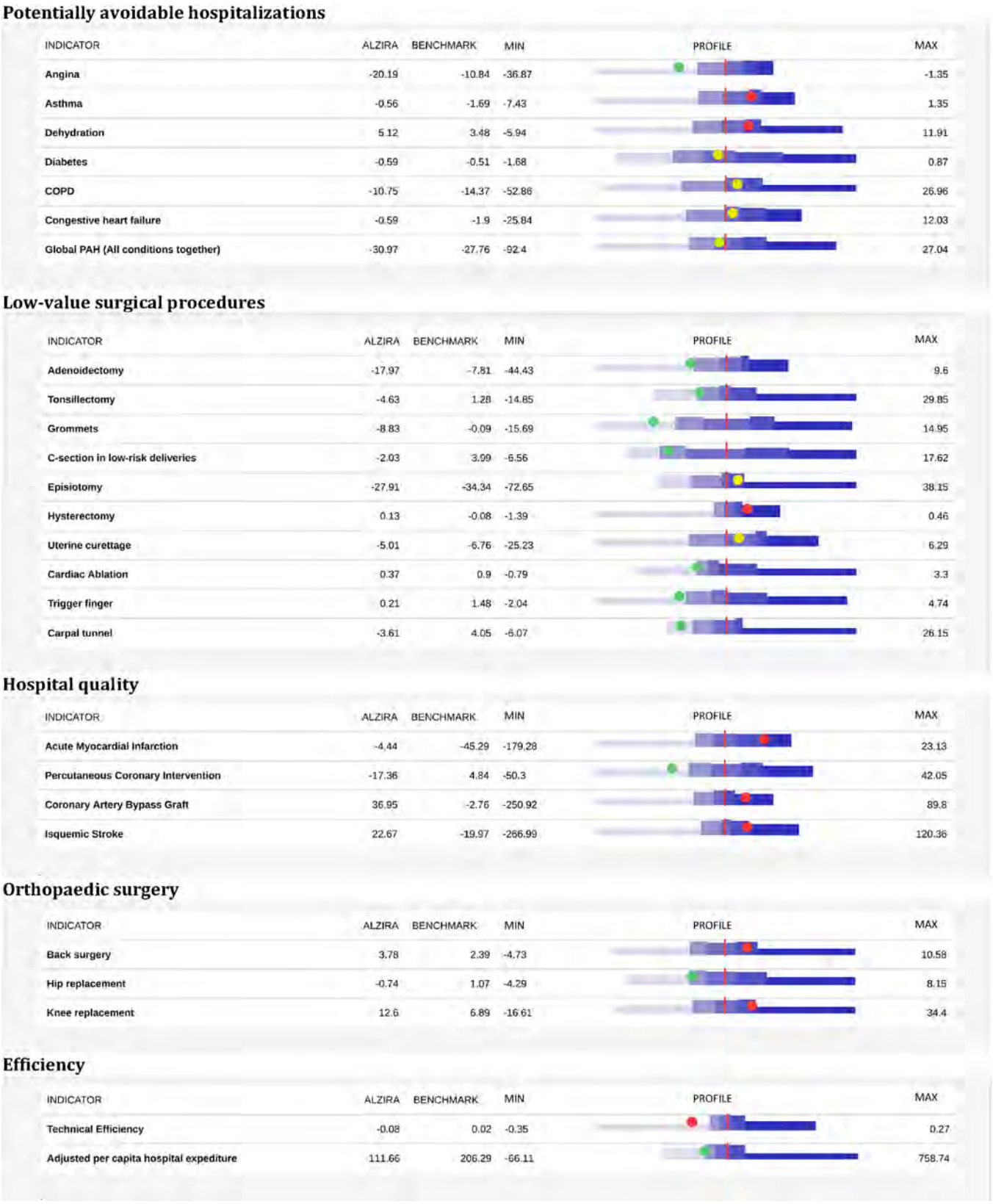

Potentially avoidable hospitalizations

INDICATOR	ALZIRA	BENCHMARK	MIN	PROFILE	MAX
Angina	-20.19	-10.84	-36.87		-1.35
Asthma	-0.56	-1.69	-7.43		1.35
Dehydration	5.12	3.48	-5.94		11.91
Diabetes	-0.59	-0.51	-1.68		0.87
COPD	-10.75	-14.37	-52.86		26.96
Congestive heart failure	-0.59	-1.9	-25.84		12.03
Global PAH (All conditions together)	-30.97	-27.76	-92.4		27.04

Low-value surgical procedures

INDICATOR	ALZIRA	BENCHMARK	MIN	PROFILE	MAX
Adenoidectomy	-17.97	-7.81	-44.43		9.6
Tonsillectomy	-4.63	1.28	-14.85		29.85
Grommets	-8.83	-0.09	-15.69		14.95
C-section in low-risk deliveries	-2.03	3.99	-6.56		17.62
Episiotomy	-27.91	-34.34	-72.65		38.15
Hysterectomy	0.13	-0.08	-1.39		0.46
Uterine curettage	-5.01	-6.76	-25.23		6.29
Cardiac Ablation	0.37	0.9	-0.79		3.3
Trigger finger	0.21	1.48	-2.04		4.74
Carpal tunnel	-3.61	4.05	-6.07		26.15

Hospital quality

INDICATOR	ALZIRA	BENCHMARK	MIN	PROFILE	MAX
Acute Myocardial Infarction	-4.44	-45.29	-179.28		23.13
Percutaneous Coronary Intervention	-17.36	4.84	-50.3		42.05
Coronary Artery Bypass Graft	36.95	-2.76	-250.92		89.8
Isquemic Stroke	22.67	-19.97	-266.99		120.36

Orthopaedic surgery

INDICATOR	ALZIRA	BENCHMARK	MIN	PROFILE	MAX
Back surgery	3.78	2.39	-4.73		10.58
Hip replacement	-0.74	1.07	-4.29		8.15
Knee replacement	12.6	6.89	-16.61		34.4

Efficiency

INDICATOR	ALZIRA	BENCHMARK	MIN	PROFILE	MAX
Technical Efficiency	-0.08	0.02	-0.35		0.27
Adjusted per capita hospital expediture	111.66	206.29	-66.11		758.74

Fig. 2. Variation of the Alzira's performance between 2003 and 2015 (comparison with similar public-tenured providers). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)
Note: For each one of the performance indicators, the following information is shown: ALZIRA: Alzira's performance improvement for the indicator; BENCHMARK: performance improvement for those providers in the average of the distribution; Min: Lowest performance improvement; PROFILE: blue columns represent the distribution of performance improvement in the sample divided in quintiles; the red vertical line represents the benchmark; Coloured dots represent Alzira's performance relative position as: a green dot means a statistically significant higher improvement than the average, a red dot means a statistically significant lower improvement than the average; and the yellow one means no significant difference from benchmark. Max: Highest performance improvement.

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5. Conclusion

In this comprehensive comparative study on Alzira's performance, this archetypical PPP has not generally outperformed public-tenured providers, although in some areas of care its developments have been outstanding. These findings have sharply raised a question on the irrelevance of the governance model in the delivery of 'high-quality highly efficient care' in the SNHS, turning the focus on how microsystems get their results.

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Conflicts of interest

Authors are indebted to the Regional Health Authorities who allow this type of research giving access to the hospital administrative data.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.healthpol.2018.11.009.

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