



## The continuous collection of user experience for timely addressing critical factors of the hospital journey

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### Abstract

**Purpose of the paper:** This work explores differences in the hospital process of care pointing out the benefits of a continuous measurement of patient reported experience. To this end, we compared results among different units and across different time-periods.

**Methodology:** We analyzed five-month data (N=2536) collected through the continuous measurement of patient reported experience (c-PREMs) within 11 private hospitals that provide care for the Tuscan Health System (Italy). The e-questionnaire administered to users daily monitors their journey through the hospital process of care. Specifically, we compared c-PREMs data along each journey phase, among macro-specialties and across different time-periods.

**Main Findings:** Results showed significant differences in the overall patient experience by both the journey phases and the macro-specialties: e.g. users of medical macro-specialties reported a lower experience in the hospital care phase and in the overall experience compared to users of the surgical and the rehabilitation macro-specialties. Additionally, differences were observed across different time-periods.

**Practical implications:** The collection of c-PREMs data, rather than cross sectional survey data, provides healthcare managers with actionable insights to manage critical factors within the patient journey and to operationalize the requested improvements.

**Originality/value:** To the best of our knowledge, this is the first research providing evidence of the value produced by the collection of c-PREMs.

**Type of paper:** Quantitative study

**Keywords:** c-PREMs, healthcare, patient journey

## 1. Introduction

Since 80s, scholars started introducing and investigating the concept of experience in consumption: “Consumption has begun to be seen as involving a steady flow of fantasies, feelings, and fun encompassed by what we call the “experiential view””. (Holbrook et al., 1982).

In the service marketing context, an increasing attention has been given to customer experience (CX) in services rather than in products, and the concept of value evolved from the value-in-exchange to the value-in-use (Lusch et al., 2014).

CX can be defined as a flow of perceptions that shape emotions, thoughts, and attitudes (Nenonen et al., 2004), and, differently from the concept of customer satisfaction that is outcome-oriented, the concept of experience is process-oriented, comprehending all the moments of interactions and emotions during the experience (Schmitt, 1999).

Service marketing researchers have always looked at CX in connection with service quality. For example, several studies showed how service quality is an antecedent or a driver for customer experience (Cronin et al., 2000; McDougall et al., 2000), while other scholars pointed out how service quality and CX are almost the same concept (Berry et al., 2006).

Moreover, by definition services are co-created through the relational interactions between the user and the service provider (Lush et al., 2014). Accordingly, in order to reach the desired CX, service providers should completely understand the customer perspective on services (Berry et al., 2002), and the value that the repeated interactions between the service provider and the customer produce (Meroni et al., 2011).

Therefore, CX is of utmost importance particularly for those sectors characterized by high-intensity customer-provider relationships, such as the healthcare sector, where customer participation plays a key role in the process design and delivery and in the outcomes achievement (Hausman, 2004). Indeed, encouraging the patient to share useful information and to evaluate the service is fundamental for the co-creation of a valuable CX (Gallan et al., 2012).

A research conducted by Gallagan et al. (2012) found out how higher degree of involvement enhances patient perceptions of the quality of the service provided and satisfaction with the co-produced service experience. Hence, healthcare managers should concentrate on providing services based on participation and engagement, thus improving service quality perceptions. By doing so, customers participate actively in the coproduction of value (Lush et al., 2014; Grönroos 2006; Wieland et al., 2015). The conceptual framework developed by Osbourne et al. (2016) highlighted the importance of involving the customer in the voluntary co-design and co-innovation of the public service and a study by Bate and Robert (2006) remarked the same need specifically for the healthcare sector. Nonetheless, they highlighted how since then patient experience was not actually used to co-design services.

More specifically, among scholars there is wide acceptance on the importance of patient perspective in order to enhance service quality and managerial processes in the healthcare sector (Anhang Price et al., 2014; Farley et al., 2014; Doyle et al., 2013; Manary et al., 2013).

Since 2000, patient survey data used for measuring service quality have been usually collected among a sample of patients by means of a structured questionnaire and during a limited time period (cross sectional surveys).

However, collecting patient experience data *per se* is not able to improve quality. Whereas, information from CX surveys have to be analysed and used to activate continuative interventions to provide sustained care enhancements in a continuous improvement quality perspective (Ahmed et al., 2014).

Starting from the acknowledgement that *collecting data is not enough* for activating quality improvement mechanisms (Coulter et al., 2014), a large debate was borne on the poor use of the collected data made by the stakeholders (policymakers, managers, professionals and the patients themselves). Moreover, in order to activate effectively *ad hoc* actions, professionals need data at the micro-organisational level.

In this panorama, several researchers have started to work to introduce innovation in the measurement process of CX data. In particular, thanks to the spread of new technologies, cross-sectional surveys evolved towards a continuous measurement system able to provide healthcare managers with an integrated performance evaluation system and to integrate patient perspective with administrative data.

This research is a first explorative analysis based on a pilot study applied to private hospitals in Tuscany and coordinated by the Healthcare and Management Laboratory (MeS Lab) of Scuola Superiore Sant'Anna (Pisa, Italy),

A group of Tuscan private hospitals, together with the MeS Lab, developed a continuous patient experience measurement (c-PREMs) – not for a limited period of time – among all users – rather than samples of users – with the final aim of returning data to each ward/specialty. In fact, the more patient survey data refer to smaller units, rather than to the whole organization, the more healthcare professionals can effectively use them (Reeves et al., 2008).

Following the stream of research on customer experience as driver for continuous quality improvement, this study analyses c-PREMs data relative to a group of Tuscan private hospitals and provides evidence on how the availability of continuous data enables the comparison across short time periods (potentially even day-by-day), along different phases of the patient journey, and among different macro-specialties.

### *1.1 The context: the private hospitality in the Tuscan regional health system*

The Tuscan private hospitals included in this study are all part of the Italian Association for private hospitals (AIOP) that is a national federation. In addition, they provide

healthcare services for the regional health system. Private hospitals represent an alternative to the public health service in case the offer is lower than the demand for healthcare services.

The offer and the consequent utilization of private health services vary across the 20 Italian regions. For what concerns Tuscany, the total number of private hospitals that are part of AIOP is 19 (40 are the total public hospitals), which is rather small, compared with the private offer in other regions similar to Tuscany in terms of number of residents.

The services provided by the private hospitals are mainly related to specialized visits and diagnostic services, and the prevalent specialties involved are the surgical, rehabilitation and long-term ones, even though in Tuscany the public offer for rehabilitation services exceeds 50% of the total offer (Osservatorio sulla sanità privata in Italia e in Lombardia – Ricerca del CERGAS Bocconi (2011)).

The percentage of patients discharged from Tuscan private accredited hospitals (ordinary and day-hospital admissions) is about 6.6% for acute care, 37.4% for rehabilitative care, and 100% for long-term care.

In 2011 11 private hospitals in Tuscany adhered to the Performance Evaluation System (PES), designed and promoted by the MeS Lab, that comprehends the patient experience measurement initiative.

Initially, it was a two-year cross-sectional survey that reported the experience of a sample of patients within a given time period. In 2018, as mentioned in the *Introduction*, the MeS Lab developed an innovative methodology that allows the continuative measurement of patient experience, which entails the added-value of collecting the voice of each patient - after consent collection - on a daily basis, for an unlimited period of time.

## 2. Research design

### 2.1 Hypotheses

As discussed in the *Introduction*, considering the customer journey in addition to customer experience is deemed fundamental, since CX builds and evolves through each interaction between the customer and the service provider (Baron et al., 2010; Berry et al., 2006). Therefore, given that customer experience is influenced by every interaction between the service provider and the user, the service provider should consider the experience in every journey phase in order to improve the overall CX (Meyer et al., 2007).

Given this premise, in this study we first investigate potential differences in the perceived patient experience along the whole patient journey, from the admission to the hospital to the discharge. In particular, we divided the overall patient journey into three main phases, i.e. admission, hospital care and discharge. Hence, the first hypothesis tested is the following:

H1: Are there any statistically significant differences in the patient experience along different phases of the patient journey?

Secondly, healthcare managers may be also interested in knowing potential differences in patient experience according to the specialty in which the patient was hospitalized. In particular, in this paper the three macro-specialties that are prevalently present in the Tuscan private hospitals were considered, i.e. medical, surgical, and rehabilitative ones. Therefore, the second hypothesis is the following:

H2: Are there any statistically significant differences in the experience among the medical, surgical and rehabilitative macro-specialities and along the patient journey?

Finally, one of the main innovation introduced through c-PREMs is the possibility to analyse results related to subsequent and short periods of time. Indeed, promptly detecting potential criticalities in the service provisioning represents one of the main drivers for service excellence. Hence, we tested the third hypothesis:

H3: Are there any statistically significant differences in the patient experience across short and subsequent periods of time and along the patient journey?

## *2.2 Sample and data collection*

C-PREMs collection began in November 2018 and will be ongoing as long as they desire to participate.

Patient experience data are collected on a daily basis through an integrated system that directly interacts with the informative system of the MeS Lab. When a patient is discharged and after her/his consent to the use of personal data, within 24 hours she/he receives an email and/or a sms containing a link to a web-based questionnaire. The responses are returned and stored into the MeS informative system in an anonymous and aggregated form. Moreover, two reminds are sent to the patient in case she/he did not complete the questionnaire.

For the analysis purpose we considered a time span that starts in November 2018 and ends in April 2019. During these 5 months, 7187 patients received the invitation email and/or sms with the link to the questionnaire and 2536 of them completed the online survey, with a response rate equal to 35.30%, that is coherent with the response rate usually obtained with web surveys (Cook et al., 2000).

The complete description of the questions of the survey used for the analyses is reported in Table 1 of the Appendix.

## *2.3 Variables*

In the analyses, we included a set of variables able to represent the whole patient journey, that we divided into three phases: admission, hospital care and discharge. The variables were based on the answers to the questionnaire c-PREMs. In particular, the

admission phase was summarized by a question about the courtesy provided by the ward personnel. The hospital care phase was the most substantial in terms of number of questions. In fact, a group of questions was related to the management of fears and anxiety and to the pain alleviation. Another set of questions concerned the communication between professionals and patient, with the distinction between the three main professional roles, i.e. physicians, nurses and physiotherapists. The last group of questions investigated the capacity of collaboration among hospital personnel as perceived by the patient. Finally, the discharge phase analysed the level of clarity and completeness of the information provided by the professionals. In addition, the overall patient experience with the hospital and the willingness to recommend were also measured.

All the patient experience variables were measured through a Likert scale, either on a 3 or a 5-point scale, where 1 represented the lowest level of experience and 3 or 5 the highest one. A complete description of the patient experience measures for each patient journey phase included in the analyses is provided in Table 1.

*Table 1 - Patient journey phases and measures of experience*

<b>Patient journey phases</b>	<b>Measures</b>	<b>Levels</b>	<b>Scale</b>
<b>Admission</b>	Courtesy		1-3
<b>Hospital care</b>	Fears and anxieties	Physicians, nurses, physiotherapists	1-5
	Pain		1-5
	Respect	Physicians, nurses, other hospital staff, physiotherapists	1-5
	Dignity	Physicians, nurses, other hospital staff, physiotherapists	1-5
	Involvement		1-5
	Clear answers	Physicians, nurses, physiotherapists	1-5
	Relatives		1-5
	Collaboration between doctors and nurses		1-5
<b>Discharge</b>	What to keep under control		1-3
	Drugs		1-3
	Clear information		1-3
<b>Overall experience</b>	Assistance		1-5
	Willingness to recommend		1-3

As control variables, we also considered a set of socio-demographic information, such as gender, level of education, and age, and a set of other patient characteristics, like the self-reported health status and whether or not the general practitioner (GP) was informed about the hospital care. Moreover, we accounted for the specialties in which the patient was

hospitalized, by gathering together wards related to three different macro-specialties, i.e. medical, surgical, rehabilitative ones. Finally, the period in which the patient was hospitalized was also included in the analyses, i.e. we divided each month of observation into 3 periods, each covering 10 days of the month.

For the analyses purposes, we excluded the responses “I do not know/I prefer not to answer/Not applicable”.

The following table provides a complete description of the control variables.

*Table 2 - Description of control variables*

<b>Variables</b>	<b>Type of variable</b>	<b>Scale</b>
<b>Age</b>	Continuous	3-100
<b>Gender</b>	Dichotomous	Male, female
<b>Education</b>	Ordinal	Primary, secondary, high, degree, post degree
<b>Self-reported health status</b>	Ordinal	Very poor, poor, fair, good, excellent
<b>Macro-specialty</b>	Categorical	Medical, surgical, rehabilitation
<b>GP informed</b>	Dichotomous	No, yes
<b>Chronic condition</b>	Ordinal	No, One chronic condition, two chronic conditions, three or more chronic conditions
<b>Hospital care for chronic condition</b>	Dichotomous	No, Yes
<b>Period</b>	Categorical	1-10, 11-20, 21-31 days of the month

### 3. Results

#### 3.1 Descriptive analysis

All the statistical analyses presented in this paper have been performed with Stata 15. As reported in Table 3, respondents were on average 54 years old, almost perfectly balanced among men and women, with a high school diploma, a fair self-reported health status, and not affected by any chronic condition. Moreover, the majority of those who were affected by one or more chronic conditions, stated that the chronic condition was not the cause of their hospital care.

Patients were predominantly discharged by surgical specialties (92%) and the majority of them reported that their general practitioner was informed about the hospital care (95%).

The overall patient experience with Tuscan private hospitals was generally positive, since the average reported score was 4,75 (out of 5) for the overall assistance received and 2,95 (out of

3) for the willingness to recommend a specific ward to relatives and acquaintances with similar health needs.

Table 4 shows the average score and the standard errors for each patient experience measure.

*Table 3 - Patient characteristics*

<b>Patient characteristics</b>				
<b>Age, mean (SD, range)</b>		54,00	(16.54)	(3-100)
<b>Gender (%)</b>	Male	50.47		
	Female	49.53		
<b>Educational level (%)</b>	Primary	9.36		
	Secondary	31.97		
	High	40.35		
	Degree	15.56		
	Post degree	2.77		
<b>Self-reported health status (%)</b>	Very poor	1.05		
	Poor	15.77		
	Fair	37.73		
	Good	33.02		
	Excellent	12.42		
<b>Macro-specialty (%)</b>	Medical	4.40		
	Surgical	92.13		
	Rehabilitative	3.47		
<b>GP informed (%)</b>	No	5.51		
	Yes	94.49		
<b>Chronic condition (%)</b>	No	76.47		
	One chronic condition	15.72		
	Two chronic conditions	5.35		
	Three or more chronic conditions	2.47		
<b>Hospital care due to chronic condition (%)</b>	No	64,86		
	Yes	35,14		

*Table 4 - Patient experience measures*

<b>Patient journey phases</b>	<b>Measures</b>	<b>Mean (SD)</b>
<b>Admission</b>	Courtesy	2.95 (0.25)
	Fears and anxieties	4,48 (0.97) (physicians) 4,52 (0.92) (nurses) 4,39 (1.12) (physiotherapists)
<b>Hospital care</b>	Pain	4,75 (0.62)

	Respect	4.73 (0.72) (physicians) 4.69 (0.74) (nurses) 4.70 (0.72) (other hospital staff)
	Dignity	4.76 (0.69) (physiotherapists) 4.91 (0.40) (physicians) 4.87 (0.48) (nurses) 4.84 (0.56) (other hospital staff)
	Involvement	4.73 (0.83) (physiotherapists)
	Clear answers	4.55 (0.89)
	Caregivers	4.81 (0.56) (physicians) 4.76 (0.64) (nurses), 4.73 (0.78) (physiotherapists)
	Collaboration between doctors and nurses	4.76 (0.64)
<b>Discharge</b>	What to keep under control	4.68 (0.57)
	Drugs	2.78 (0.45)
	Clear information	2.86 (0.38)
<b>Overall experience</b>	Assistance	2.94 (0.26)
	Willingness to recommend	4.75 (0.55) 2.95 (0.26)

### 3.2 Construct validity and statistical analyses

First, through the Cronbach's alpha we tested for the reliability of the constructs used to measure the phases of patient journey (described in details in Table 1). In particular, we checked for the validity of the hospital care and discharge phases, since the admission phase was measured by a single variable. As shown in Table 5, both for the hospital care and the discharge phases, the Cronbach's alpha was around 0.80, showing a more than acceptable internal consistency (Peterson (1994)).

Table 5 - Cronbach's alpha

Cronbach's alpha	Average inter-item covariance	Alpha
<b>Hospital care</b>	0.33	0.81
<b>Discharge</b>	0.17	0.83

Once tested for the internal consistency of the dimensions measured through the questionnaire, we carried out a series of statistical analyses aimed at understanding the role played by (H1) the phase of the patient journey, (H2) the macro-specialty, and (H3) the period in which the patient was hospitalized on the overall patient experience.

In particular, we carried out a multivariate analysis to check for possible differences in the mean experience perceived in each of the three patient journey phases (H1). Then, we performed an analysis of variance (ANOVA) to investigate whether the macro-specialties were significantly and differently associated both with the overall patient experience and the experience along the patient journey (H2). Finally, by the use of ANOVA we analysed the possible effect played by the time-period both on the overall patient experience and on the patient experience through the journey (H3).

The first step of the analysis aimed at investigating possible differences among the three phases of the patient journey, identified in *Section 2*. In fact, health professionals and managers may be interested in discovering possible criticalities related to a specific moment of the service provided, so that they could analyse the problem and implement appropriate actions addressed to that specific phase. This, in turn, would also improve the overall service quality and consequently the overall patient experience.

In order to perform the analyses, we created two variables representing the experience with each phase built as the mean sum of the scores obtained by the set of variables related to the same phase (as described in Table 1). Then, we transformed the mean sum in an ordinal variable taking on value from 1 to 3, where 1 corresponded to the lowest level of experience and 3 to the highest one.

The first hypothesis was tested through a multivariate analysis on the means of the experience perceived along the three phases.

As reported in Table 6, the null hypothesis of equal means can be rejected, hence there is a statistically significant difference in the experience perceived along the three phases. In particular, if we look at the means (Table 7), we notice that the discharge reports a lower level of experience compared to the admission and the hospital care. Therefore, H1 can be accepted, since results from this preliminary analysis suggest that on average patients are likely to perceive a lower level of experience during the discharge, compared to the admission and the hospital care.

*Table 6 – Mv-test on the mean experience along the journey phases*

<b>H0: mean (diff)=0</b>	
<b>Hotelling T2</b>	476.34
<b>Hotelling F(2, 3022)</b>	238.09
<b>Prob&gt;F</b>	0.0000

*Table 7 – Average experience along the journey phases*

<b>Journey phases</b>	<b>Mean (SD)</b>
<b>Admission</b>	2.95 (0.25)
<b>Hospital care</b>	2.97 (0.19)
<b>Discharge</b>	2.81 (0.41)

For the following analyses, we used the experience with assistance as overall measure for patient experience.

Going through the second step, the analysis shows a statistically significant difference in the overall experience among the three macro-specialties. In particular, the medical macro-specialty seems to be associated with a significantly lower level of overall experience, compared to the surgical and the rehabilitative macro-specialties. Moreover, when we look at the experience along the patient journey and among the macro-specialties the result persists for the hospital care phase, since during this phase patients seem to perceive a lower experience in the medical macro-specialty, compared to the other two, while no significant difference has emerged among the macro-specialties for the admission and the discharge phases (Table 8). Results suggest that the lower overall experience observed for the medical macro-specialties is especially due to the lower experience perceived during the hospital care phase.

Therefore, H2 can also be accepted.

Table 8 - ANOVA for differences in patient experience (overall and along the journey) among macro-specialties

<b>H0: mean (diff)=0</b>	<b>Medical</b> mean (SD)	<b>Surgical</b> mean (SD)	<b>Rehabilitation</b> mean (SD)
<b>Overall experience</b>	4.58*** (0.85)	4.75*** (0.53)	4.77*** (0.45)
<b>Admission</b>	2.93 (0.25)	2.95 (0.25)	2.97 (0.17)
<b>Hospital care</b>	2.94** (0.33)	2.98** (0.18)	2.96** (0.21)
<b>Discharge</b>	2.82 (0.39)	2.81 (0.41)	2.81 (0.40)

\*\*\*  $p$ -value < 0.01 ; \*\*  $p$ -value < 0.05 ; \*  $p$ -value < 0.10

The last step of the analysis, which is also the most innovative since it is strictly related to the added-value introduced with c-PREMs consists in an ANOVA estimation of the potential differences in patient experience along subsequent short time periods. In order to do that, we divided each month into three periods of time, one going from the 1<sup>th</sup> to the 10<sup>th</sup> of the month, the second from the 10<sup>th</sup> to the 20<sup>th</sup>, and the last one from the 21<sup>th</sup> to the end of the month. Then, for each month of observation, we performed the ANOVA on the differences in the mean experience reported for the three time periods. From results, it is possible to observe a statistically significant difference in the overall experience along the three periods of December 2018 (Table 9). Specifically, the third period seems to be the critical one, since it shows a relevant lower overall patient experience, compared to the first two periods of the month. Whereas for the month of March 2019, we can notice a significant lower level of overall patient experience for the second period, with respect to the first and the third one (Table 10). For December, the decrease in patient experience may be explained by the fact that the third period coincides with Christmas time, so for instance some organizational changes related to workforce reduction may have been occurred. The possibility to analyse c-

PREMs periodically enables health professionals to detect potential criticalities, understand the problem and adopt prompt remedial action.

Given these results, we also investigated which phases of the patient journey was specifically associated with a reduction in patient experience for the two months.

For December, the hospital care seemed to represent the critical phase (Table 9). For March, we discovered a critical phase related to hospital care for period 2 and another one related to the discharge for period 3. Hence, we also accepted H3, even if it holds only for two months of observation.

*Table 9 - ANOVA for differences in patient experience (overall and along the journey) across December time periods*

<b>December 2018</b> <b>H0: mean (diff)=0</b>	<b>Period 1</b> <b>mean (SD)</b>	<b>Period 2</b> <b>mean (SD)</b>	<b>Period 3</b> <b>mean (SD)</b>
<b>Overall experience</b>	4.73*** (0.54)	4.81*** (0.40)	4,00*** (0.00)
<b>Admission</b>	2.95 (0.22)	2.96 (0.20)	3,00 (0.00)
<b>Hospital care</b>	2.98** (0.15)	2.97** (0.20)	2.67** (0.58)
<b>Discharge</b>	2.79 (0.41)	2.71 (0.49)	2.67 (0.58)

\*\*\*  $p$ -value<0.01 ; \*\*  $p$ -value<0.05 ; \* $p$ -value<0.10

*Table 10 - ANOVA for differences in patient experience (overall and along the journey) across March time periods*

<b>March 2019</b> <b>H0: mean (diff)=0</b>	<b>Period 1</b> <b>(mean, SD)</b>	<b>Period 2</b> <b>(mean, SD)</b>	<b>Period 3</b> <b>(mean, SD)</b>
<b>Overall experience</b>	4.84** (0.45)	4.69** (0.60)	4.74** (0.47)
<b>Admission</b>	2.95 (0.28)	2.96 (0.21)	2.97 (0.18)
<b>Hospital care</b>	2.98** (0.13)	2.94** (0.30)	3,00** (0.00)
<b>Discharge</b>	2.87** (0.37)	2.81** (0.41)	2.73** (0.47)

\*\*\*  $p$ -value<0.01 ; \*\*  $p$ -value<0.05 ; \* $p$ -value<0.10

#### 4. Discussion

The statistical analyses conducted show insights on the continuous collection of patient experience, that may be of interest for the health management. In particular, first of all evidence suggests that when we look at the whole patient journey that is constituted by different phases, the patient perceives a different experience along these different moments. For example, during the discharge, patients seem to have a worse experience compared to the

admission and the hospital care phases. Hence, considering the whole patient journey as made up of different moments that may produce different patient experience is of utmost importance for healthcare managers and policy makers.

Secondly, patient experience may vary across different macro-specialties. For instance, medical macro-specialties show a significantly lower level of patient experience compared to surgical and rehabilitative ones, and this occurs especially during the hospital care phase. Therefore, what we can infer by looking at these two evidences is that even if hospital care phase seems not to represent the most critical phase in terms of patient experience, this does not hold for medical macro-specialties, that show a potential criticality exactly in that phase.

Finally, through the c-PREMs collection it is possible to monitor patient experience on a continuative basis, even day-by-day once patient participation is large enough to allow it. For the moment, we analysed c-PREMs data on a ten-day basis, and we discovered significant differences in patient experience along different periods, especially during December and March.

Once healthcare managers get used to look and analyse c-PREMs data on a continuous basis, these will represent a precious source of information useful to manage and improve the service offered, by detecting criticalities or even best practices. In fact, c-PREMs may also be used in order to test the effectiveness of some service innovation. Indeed, c-PREMs represent an innovation able to foster service excellence.

## 5. Conclusions and limitations

This study is a first explorative analysis on the c-PREMs data collected among 11 private hospitals in Tuscany. C-PREMs represent an innovation for what concerns patient experience measurement since they overcome the limits of cross-sectional survey (cost and sample of patients in a given time period), providing the healthcare management with a strategic tool able to monitor continuously patient experience with the service offered. Then, through the continuous measurement, healthcare managers can analyse patient experience, identify potential criticalities and develop corrective actions. Moreover, thanks to c-PREMs they could also implement new practices designed to improve the service and understand whether these have produced some effects in patient experience.

From this first analyses, evidence seems to suggest that (1) the different phases that compose the patient journey, (2) the macro-specialties where the patient has been hospitalized, and (3) the period when the patient has been hospitalized are all fundamental aspects that need to be taken into account by the healthcare management in a service improvement perspective.

These results also suggest that, in order to improve the service provided, healthcare managers should develop differentiated strategies according to the patient journey phase, to the macro-specialty, and to the period of hospital care.

This research refers to the private context only, so it would be interesting to compare the results from the private context with those from the public one. This will be possible in the short term since also the Tuscany public health system has recently adopted c-PREMs. Moreover, this study focuses on patient experience with hospital cares only, whereas, as mentioned in *Section 1.1*, the private activities are related also to diagnostic visits, so future research may consider also this kind of activities in order to build a more complete view on patient experience with private hospitals.

In addition, as soon as more c-PREMs data will be available, it would be interesting to replicate the analyses including a day-by-day perspective and the ward level, rather than the macro-specialties. In other words, as the c-PREMs data increase in magnitude, it will be possible to perform the analyses with a higher granularity level. Finally, through regression analyses it will be possible to investigate causality effects, such as the relationship between overall patient experience, patient experience along the journey, patient experience among the macro-specialties (or with the ward), and daily patient experience.

## Appendix

*Table 1 - Questions measuring patient experience*

<b>Patient journey phases</b>	<b>Questions</b>
<b>Access</b>	Did the ward personnel welcome you with kindness and courtesy?
<b>Hospital care</b>	During the hospital care, did the personnel help you to manage the fears and anxiety about your health status? Do you think that the ward personnel did their best to help you dealing with the pain during the hospital care? During the hospital care, did the personnel talk to each other as if you were not present?

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<b>Discharge</b>	<p>During the hospital care, did you feel treated with respect and dignity?</p> <p>During the hospital care, do you think you have been involved enough in the choices related to your care path?</p> <p>During the hospital care, did the personnel answer clearly to your questions?</p> <p>During the hospital care, did your relatives find it easy to have information about your health conditions?</p> <p>Do you think that physicians and nurses were able to work together?</p> <p>At the discharge, did you receive clear information on what to keep under control once back home (ex. physical activity, diet, smoking)?</p> <p>At the discharge, did you receive clear information on the drugs to take once back home?</p>
<b>Overall experience</b>	<p>Were the information written in the discharge letter clear?</p> <p>How do you evaluate the overall health assistance received in the hospital?</p> <p>Would you recommend the ward where you have been hospitalized to relatives and acquaintances with similar health needs?</p>

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