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# Variability of the scoring strategies for the hospital survey on patient safety culture

Joris Giai

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UNIVERSITE JOSEPH FOURIER  
FACULTE DE MEDECINE DE GRENOBLE

Année : 2015

N°

**VARIABILITY OF THE SCORING STRATEGIES  
FOR THE HOSPITAL SURVEY ON PATIENT SAFETY CULTURE**

Thèse présentée pour l'obtention du DOCTORAT EN MÉDECINE  
DIPLOME D'ÉTAT

**Joris GIAI**

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*\*La Faculté de Médecine de Grenoble n'entend donner aucune approbation ni improbation aux opinions émises dans les thèses ; ces opinions sont considérées comme propres à leurs auteurs.*

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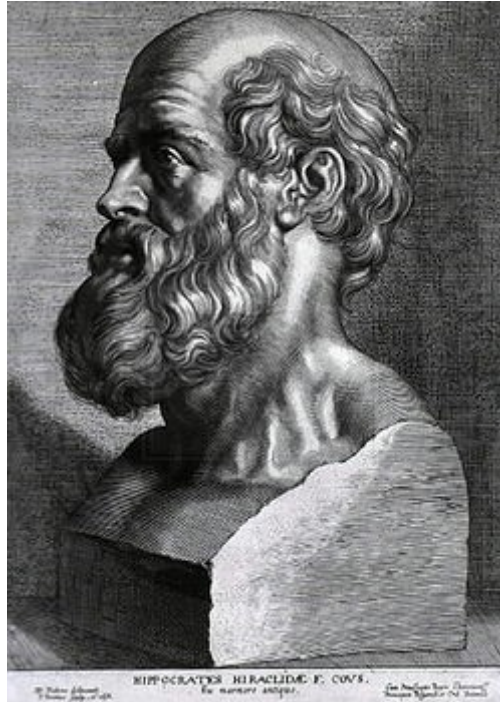
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*En présence des Maîtres de cette Faculté, de mes chers condisciples et devant l'effigie d'HIPPOCRATE,*

*Je promets et je jure d'être fidèle aux lois de l'honneur et de la probité dans l'exercice de la Médecine.*

*Je donnerai mes soins gratuitement à l'indigent et n'exigerai jamais un salaire au dessus de mon travail. Je ne participerai à aucun partage clandestin d'honoraires.*

*Admis dans l'intimité des maisons, mes yeux n'y verront pas ce qui s'y passe ; ma langue taira les secrets qui me seront confiés et mon état ne servira pas à corrompre les mœurs, ni à favoriser le crime.*

*Je ne permettrai pas que des considérations de religion, de nation, de race, de parti ou de classe sociale viennent s'interposer entre mon devoir et mon patient.*

*Je garderai le respect absolu de la vie humaine.*

*Même sous la menace, je n'admettrai pas de faire usage de mes connaissances médicales contre les lois de l'humanité.*

*Respectueux et reconnaissant envers mes Maîtres, je rendrai à leurs enfants l'instruction que j'ai reçue de leurs pères.*

*Que les hommes m'accordent leur estime si je suis fidèle à mes promesses.*

*Que je sois couvert d'opprobre et méprisé de mes confrères si j'y manque.*

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**À ma grand-mère**



## **Abréviations**

AHRQ	Agency for Healthcare Research and Quality
CNIL	Commission nationale de l'informatique et des libertés
HSOPSC	Hospital Survey On Patient Safety Culture
IC95, 95CI	Intervalle de confiance à 95%
IRB	Institutional Review Board
M1	Première méthode : pourcentage de réponses positives selon l'AHRQ
M2	Deuxième méthode : moyennes individuelles
M3	Troisième méthode : sommes individuelles
ORL	Oto-Rhino-Laryngology
PREPS	Programme de REcherche sur la Performance du Système de soins
sd	Standard deviation, écart type
US	United States

## **Abstract**

**Objective** - To assess the variability of safety culture dimensions scores and their associated rankings depending on three different scoring strategies using the Hospital Survey On Patient Safety Culture.

**Design** - Cross-sectional study using a self-administered questionnaire.

**Setting** - The study was conducted in a 1836-bed acute-care French university hospital with an annual volume of 90,000 stays, between April 2013 and November 2014.

**Participants** - All caregivers and technical-administrative staff with at least six months of employment and doing at least half of their working time in the hospital were asked to participate. Respondents were secondarily excluded according to the Agency for Healthcare Research and Quality (AHRQ) criteria.

**Methods** - Percentage of positive responses (M1), recommended by the AHRQ, averaged individual means (M2) and averaged individual sums (M3) were computed. Their 95% confidence intervals (95CI) were estimated using the bootstrap percentile method after rescaling.

**Results** - The response rate was 78.6% (n=3978), mainly women caregivers. M1 underestimated dimensional scores compared to M2 and M3 in the 6 less developed dimensions, and gave more widely spread scores in the 6 most developed ones. Rankings across age classes, specialties, occupation and gender greatly varied depending on the scoring methods. 95CI of M1 were almost twice as wide as their M2 and M3 counterparts and were overlapping.

**Conclusion** - Dimensional scores and rankings greatly depend on the used scoring method. Despite its recommended use, M1 had the worst results in terms of accuracy and rankings variability. The use of M2 should be preferred.

**Keywords:** patient safety culture, HSOPSC, variability, scoring, rankings

## Résumé

**Objectifs** - Évaluer la variabilité des scores des dimensions de culture de sécurité et leurs rangs de classement associés selon trois différentes méthodes de scoring de l'*Hospital Survey On Patient Safety Culture*.

**Type d'étude** - Étude transversale utilisant un questionnaire auto administré, conduite entre avril 2013 et novembre 2014 au centre hospitalo-universitaire de Grenoble.

**Participants** - Tout personnel hospitalier présent depuis au moins 6 mois et travaillant à au moins 50% dans l'hôpital pouvait participer. Les répondants étaient secondairement exclus selon les critères définis par l'*Agency for Healthcare Research and Quality* (AHRQ).

**Méthode** - Les pourcentages de réponses positives (M1) recommandés par l'AHRQ, les moyennes individuelles (M2) et les sommes individuelles (M3) ont été calculés. Leurs intervalles de confiance à 95% (IC95) respectifs ont été estimés par une méthode bootstrap percentile après remise à l'échelle.

**Résultats** - Le taux de réponses était de 78.6% (n=3978), en majorité des infirmières. En comparaison avec M2 et M3, la méthode de référence sous estimait les scores dans les dimensions peu développées et donnait des résultats moins précis dans les dimensions plus développées. Il en résultait des variations substantielles des rangs de classement associés en fonction des classes d'âge, sexes, spécialités ou types de métiers. Les IC95 se chevauchaient quelle que soit la méthode évaluée.

**Conclusion** - Les scores des dimensions de culture de sécurité et leurs rangs de classement dépendaient de la méthode utilisée pour les estimer. La méthode de référence donnait les moins bons résultats et l'utilisation de moyennes individuelles semblerait plus judicieuse.

**Mots-clés:** culture sécurité, HSOPSC, variabilité, scores, rangs de classement



## **Introduction**

The development of common beliefs shared among healthcare workers is the cornerstone of patient safety management (1). Since the enhancement of patient safety culture has become an important target for worldwide quality of care improvement policies, a reliable and validated tool was sought for its assessment.

Numerous tools have been designed to measure safety culture in various designs and settings (2). Among them, the most widely used in hospital wide designs is the Hospital Survey on Patient Safety Culture (HSOPSC), set up in 2004 by the US Agency for Healthcare Research and Quality (AHRQ) (3) and recommended by the European Network for Quality in Healthcare (2). The HSOPSC is a validated (4) self-administered questionnaire including 42 items used for the calculation of composite scores for 12 dimensions of safety culture. With its use, many studies reported culture safety variations among healthcare facilities, departments or occupational categories of healthcare workers in North-America (5-13), Europe (14-28), Asia (29-34) and Middle-East (35-41).

In those studies, three different aggregation methods were used for compound dimension-level scores computation, and substantial safety culture scores variations were found across surveys; in North-America for instance, most developed safety culture dimensions for a given health facility were not the same depending on the scoring method (5-13). Moreover, other studies have shown that method choice could influence subgroups rankings order (42-44), underlining the unfairness of ranking caregivers on such basis. If those discrepancies could be led by real differences in terms of structures or risk management, they could be also due to the scoring methods

heterogeneity and raise concerns about the relevance of the proposed safety culture enhancement policies.

The main goal of this study was to assess the variability of safety culture dimensions scores and their associated rankings depending on three different scoring strategies.

## **Methods**

### **Study design**

We performed a cross-sectional study using a self-administered questionnaire. The project has been submitted for advise purpose to an independent protection committee (IRB: IRB00006705), and received its approval from the French National Commission for Information Technology and Civil Liberties (CNIL).

### **Setting**

The study was conducted in a 1836-bed university hospital that serves a population base of 675,000 inhabitants with an annual volume of 90,000 stays.

### **Population**

This survey targeted the doctors, pharmacists, ambulance and hotel staff, administrative and technical employees from all medical and medico-technical departments with at least six months of employment and doing at least half of their working time in the hospital. Exclusion criteria were consistent with the recommendations from the AHRQ (3): less than 50% of the 42 items completed, no dimension fully completed, or identical and non-neutral answers for all of the 42 items.

### **Data collection**

The data collection was conducted anonymously on a volunteerism basis, department by department between April 2013 and September 2014. The questionnaires were distributed in all departments by an investigator, cooperatively with head nurses who

established the list of staff members to be included. After filling the form, participants had to return it in a ballot box at their disposal in each department.

Reminders were either performed orally by the investigator and the head nurse, or sent by email in order to reach an answer rate of 70% for each department, separately among physicians and paramedics.

### **Questionnaire and variables**

The French version of the HSOPSC (45, 46), whose cross-cultural adaptation process and psychometric properties have been reported elsewhere (18, 47), was used to assess the level of safety culture in our setting. Although no change was made to this version for use in our survey (one supplementary three-items dimension labeled “Training and organizational learning” ), the present analysis focused on the 42 items covering the 12 dimensions that were included in the original North American HSOPSC questionnaire. Eighteen items were negatively worded in order to encourage a careful reading.

Each item was answered on a five point Likert scale, either from “Strongly disagree” (1 point) to “Strongly agree” (5 points), or from “Never” to “Always” when relevant. These items assessed safety culture over three hospital-level process dimensions (teamwork across hospital units, hospital management support, hospital handoffs and transitions), seven unit-level process dimensions (supervisor expectations and actions, communication openness, non-punitive response to error, organizational learning, teamwork within hospital units, feedback and communication about errors, staffing) and two outcome dimensions (overall perception of safety, frequency of event reporting). Dimensions were formed from either 3 or 4 items each.

A global safety grade between “poor” and “excellent” and the numbers of reported incidents in the past 12 months were also assessed but were not used to compute any of the 12 dimensions scores.

The following professional and demographic characteristics were also included in the survey as categorical variables: occupation and sex; age and current unit seniority; percentage of working time in the hospital; participation in at least one risk management working committee. The “Nurse” and “Nursing assistant” occupation categories were left as is, while pharmacists were included in the “Physicians” category. Physiotherapists, occupational therapists, speech therapists, midwives and psychologists were categorized as “Other healthcare”. Hospital service employees, stretcher-bearers and paramedics were regrouped with “Technicians”. Administrative, reception and social staff were assigned to the “Administrative” category.

### **Scoring methods**

Before analysis, the coding of negatively worded items such as “Staff feel like their mistakes are held against them” were reversed so that high values answers would always be associated with a more developed safety culture.

The first dimension scores computation method (M1) was the percentage of positive answers defined as values of 4 (“Agree”) or 5 (“Strongly agree”). It was found in most of the studies (5, 6, 8-13, 15-20, 24, 26-31, 34-41) as it was the one promoted by the AHRQ (3). The first step was to obtain for each item the percentage of respondents who answered it positively among non-missing answers. In a second step, unweighted averages of those percentages were computed for each dimension. By definition this

method was a mean of percentages, hence resulting in dimension scores ranging from 0 to 100.

The second method (M2) found in several studies (7, 14, 16, 20-23, 25, 26, 28, 39-41) needed firstly the case wise computation of individual means across the 3 or 4 items in a dimension, followed by an averaging within dimensions. Because each individual item response ranged between 1 and 5, M2 dimension scores varied to the same extent.

The last method we found (M3) was only present in two studies (32, 33). Firstly, individual sums were assessed over dimensions with missing responses accounting for zero. Those were secondly averaged within dimensions. Thus, M3 3-items dimensions scores ranged from 1 to 15 whereas 4-items ones ranged from 1 to 20.

### **Statistical analysis**

Usual descriptive statistics were used to describe the sample characteristics. Qualitative variables were reported as numbers and percentages, while quantitative ones were reported as means with standard deviations or medians with range.

Dimension scores were assessed with M1, M2 and M3 within each of the 14 departments. Rankings were then obtained for each dimension and each scoring method by simply ordering departments according to their computed score. Absolute ranks differences were calculated for each department in each dimension as the absolute value of the difference between its rank using M1 and its rank using M2.

Dimension scores obtained with methods M2 and M3 were rescaled in order to vary from 0 to 100 as a matter of comparability. Since those modifications were performed using affine transformations only, they did not impair the ranking process.

M1 did not allow us to compute standard errors for the dimension scores. As we wanted a single way to calculate 95% confidence intervals for dimension scores of all three scoring strategies, we estimated them using the percentile bootstrap method from 5000 samples. This method was chosen not only because it was the most straightforward to implement, but also because the bias was expected to be null since the parameters of interest are estimated means on large enough samples (48). Bootstrap estimators of M2 and M3 95% confidence intervals were compared with the ones obtained from normal distribution approximation.

Analyses were performed using Stata software release 11 (StataCorp. 2009. College Station, TX: StataCorp LP).

## **Results**

### **Population**

Overall response rate was 78.6% (n=3978). It was 72.1% for physicians or pharmacists and 79.5% for paramedics. Among answerers, 2.3% (n=90) were secondarily excluded, most often because their form counted more than 50% of missing data. In total, we analyzed answers from 3888 hospital workers (Figure 1).

Women accounted for 80.6% of responses (Table 1). More than a third of respondents were aged 35 or less, and half of them were aged between 36 and 55. Almost 70% were directly involved in patient care, with nurses representing more than half of them. The two thirds of non-healthcare participants were technical staff. Twenty seven percent of answerers ever participated in an experience feedback or another risk management committee.

### **Scores**

More than a third of the participants (38.4%, n=1390) gave an “excellent” or “very good” global safety grade to their working unit, while a majority of 51.1% (n=1850) said it was “acceptable”. Ten percent (n=381) answered “poor” or “failing”. Over the past 12 months, a majority (57.6%, n=2041) had reported at least one event related to patient safety: 30.8% (n=1091) reported 1 or 2 events, 16% (n=567) reported between 3 and 5 events and 10.8% (n=383) reported at least 6 events.

M2 and M3 strategies globally attributed higher dimension scores than M1. According to M1, the two most developed dimensions were “teamwork within hospital units” (M1=62.7%; M2=63.4%; M3=65.2%) and “communication openness” (M1=59.4%;



M2=62.4%; M3=62.9%), while the two underdeveloped ones were “hospital handoffs and transitions” (M1=25.4%; M2=46.9%; M3=51.7%) and “hospital management support” (M1=20.2%; M2=41.7%; M3=46.1%). Median dimension was “overall perception of safety” (M1=42.0%; M2=55.3%; M3=58.3%).

### **Rankings and variability**

In all 12 dimensions, absolute score values varied across scoring methods for a given department. For instance in our most developed dimension “teamwork within hospital units”, the score of the worst department (F) increased by more than 10% from M1 to M3, going from 46.9% to 57.7% (Figure 2). Contrarily, for best ranked departments in the same dimension, scores tended to decrease from M1 to M3 on a smaller scale: department G for example decreased its score from 72.4% to 70.2%. This pattern of regression toward the mean was also found in dimensions “communication openness”, “supervisor expectations and actions”, “feedback and communication about errors”, “frequency of event reporting” and “organizational learning” (see additional figures in Annex 1, which show “caterpillar” type plots with M1, M2 and M3 departments scores point estimates and bootstrap 95% confidence intervals for all dimensions). Notably, these six dimensions were the most developed ones in our study according to M1 scores from the AHRQ, all above the median of 42%.

In the other six dimensions, M1 scores were always lower than their M2 and M3 counterparts. For example in the least developed dimension “hospital management support”, the last department according to M1 more than tripled its score, going from 14.6% with M1 to 47.5% with M3 (figure 3). This was also true for well ranked departments such as department M which went from 36.4% to 51.7%.

Rankings also varied across scoring methods for a given department. Like for absolute score values, variability patterns were different for the 6 more developed dimensions and the 6 less developed ones. In the 6 most developed dimensions cited above, sums of absolute ranks differences ranged from 2 in “teamwork within hospital units” to 20 in “frequency of event reporting”, with a median of 12 (mean=11). Although for the 6 less developed dimensions those sums were much higher and went from 12 in “staffing” to 48 in “hospital management support”, with a median of 14 (mean=24.7).

Bootstrap estimations of 95% confidence intervals with the percentiles method were consistent with normal approximation ones for M2 and M3. In all dimensions, M1 always had the widest confidence intervals while they were quite similar in width between M2 and M3. Moreover, the 95% confidence intervals of the scores were almost systematically overlapping within the three scoring methods. Thus, only few departments could be confidently placed in the top or bottom quartiles of the league table.

Finally, scores and ranking discrepancies were also found across age classes, specialties, occupation and gender (see additional tables in Annex 2, which show subgroups scores using M1, M2 and M3 with their associated ranks for all dimensions). Variability patterns were identical as the ones shown for departments: rank differences were greater for underdeveloped dimensions and were associated with a M1 underestimation of dimensional scores.

## Discussion

### Scores and rankings

In this study, we pointed the fact that absolute dimensional scores values as well as their associated rankings could vary significantly across scoring strategies. Likewise, we found 8 studies with various settings (4 in Europe, 3 in Middle-East, 1 in US) who also computed scores using both M1 and M2 (7, 16, 20, 26, 28, 39-41). Only 5 of those studies showed both scores but substantial discrepancies could be observed. Although, none of those studies formally compared the associated scores.

Unweighted means of M1, M2 and M3 dimensional scores along with other summary statistics at a continental level are presented in table 2. Interestingly and even if only 5 studies estimated dimensional scores with both M1 and M2, the same variability pattern as in our study appears. In all studies, a regression toward the mean can be noted in the six most developed dimensions according to M1, while in the six others M1 underestimated dimensional scores. This stays true for continental scores as well whereas study designs and settings are different. Overall, this supports the fact that M1 scores may not be reliable enough to be used at comparing subgroups of individuals.

The table 2 also underlines the variability of overall rankings in all studies. For instance, the dimension “Communication openness” is ranked seventh with M1 (mean score from 31 studies: 51.3%), but rises to the second place according to M2 (mean score from 10 studies: 66.9%) then drops back to the sixth place with M3 (mean score from 2 studies: 63.0%). Although, note that M3 scores may not be very reliable because of the only 2 studies involved, both from Japan.

Finally, the overlapping of most of the 95% confidence intervals of the dimensional scores has shown that it will be unlikely that the associated rankings will have a practical meaning whatsoever. Moreover, this result was expected since several studies already underlined the uncertainty associated with rankings at within hospital and across hospital levels (49, 50).

### **Strengths and limitations**

Unlike several studies (5-10, 12, 14-18, 20, 21, 25, 27-29, 34, 37), we decided to include every hospital worker to have a better understanding of safety culture dimensional scores and their variability. This allowed us to increase our sample size and minimize the selection bias, which was even more reduced by the high effective answer rate and the low secondary exclusion rate. We think that head nurses involvement in this project, as well as the paper-based data collection and the during-work survey completion as recommended by the AHRQ (3) greatly improved those rates.

To our knowledge, it is surprisingly the first time that 95% confidence intervals are estimated for any of the 3 scoring strategies. Even so, the percentile bootstrap method showed to be reliable and consistent with the normal approximation method for M2 and M3 scoring strategies (data not shown). These results hence advocate the use and displaying of 95% confidence intervals for dimensional scores.

Nevertheless, our study has also several limitations. First, inclusion of the participants was based on volunteerism and even with high answer rates this may have created a selection bias toward workers with a more developed safety culture. However, it is very unlikely that the extent of this bias could have been heterogeneous among worker

subcategories such as age classes or departments. Besides, this inclusion method has been used by every HSOPSC related study so far.

Second, this survey was monocentric like a minority (18.4%, n=7) of published studies (12, 15, 19, 29, 36, 37, 39). Although the results might apply less broadly, they are still valuable at least for similar settings. Moreover and because we estimated the dimensional scores for the 3 strategies on the same sample, this should not challenge the corresponding findings in a significant extent.

Last, we computed the 12 original dimensions scores as advocated by the AHRQ (3) despite the use of a French version of the HSOPSC with a slightly different validated dimensional framework (47). This choice was made to simplify external comparisons with other studies. Although, the French questionnaire only differs by the adjunction of three items to make a new dimension. Thus, we believe that the 12 calculated dimensions still correctly describe our sample.

## Tables and figures

**Table 1:** Characteristics of the participants (n=3888)

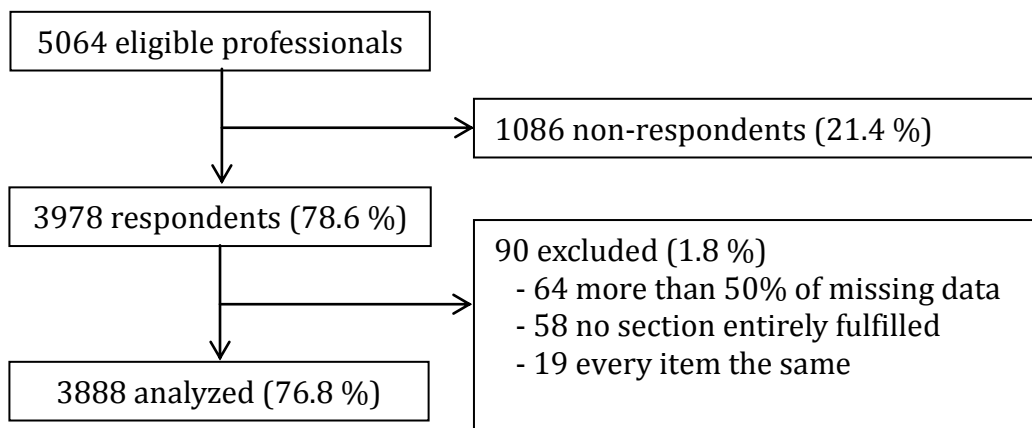
Characteristics	n (%)
Women	3016 (80.6)
Age classes (years)	
Up to 35	1406 (37.5)
36 - 45	966 (25.7)
46 - 55	967 (25.7)
56 or older	415 (11.1)
Seniority in current unit (years)	
Up to 1	460 (12.1)
1 - 2	652 (17.2)
3 - 5	982 (25.9)
6 or more	1698 (44.8)
Healthcare occupation	2665 (69.9)
Nurse	1323 (34.7)
Nursing assistant	706 (18.5)
Physician	457 (12.0)
Other healthcare	179 (4.7)
Non-healthcare occupation	1148 (30.1)
Technical	775 (20.3)
Administrative	347 (9.1)
Other non-healthcare	26 (0.7)
Department	
Couple-children	591 (15.2)
Locomotor system, ophthalmology, neurosurgery, ORL <sup>§</sup>	466 (12.0)
Multidisciplinary medicine	415 (10.7)
Anesthesia, reanimation	337 (8.7)
Thorax, vessels	310 (8.0)
Biology	303 (7.8)
Emergencies, acute medicine	302 (7.8)
Gastroenterology, uro-nephrology	300 (7.7)
Psychiatry, neurology	266 (6.9)
Oncology	158 (4.1)
Operating rooms	153 (3.9)
Imaging	150 (3.9)
Pharmacy	97 (2.5)
Management, home care	32 (0.8)

<sup>§</sup> ORL: Oto-Rhino-Laryngology

**Table 2:** Unweighted means of M1, M2 and M3 dimension scores (upper part) and summary statistics (lower part) at a continental level for 38 international studies on the Hospital Survey On Patient Safety Culture. Limited to relevant English written original publications found on Medline in March 2015 from the following search : ("HSOPSC" OR "hospital survey of patient safety culture" OR "hospital safety culture") AND ("validity" OR "psychometric" OR "dimensions" OR "composites" OR "scores" OR "aggregation" OR "scale" OR "subscale")

	US (n=10)	Europe (n=15)		Asia (n=6)		Middle East (n=7)		All studies (n=38)		
Dimension scores, mean ± sd	M1 (n=10)	M1 (n=10)	M2 (n=8)	M1 (n=4)	M3 (n=2)	M1 (n=7)	M2 (n=2)	M1 (n=31)	M2 (n=10)	M3 (n=2)
Overall perception of safety	56.0 ±12.7	58.4 ±7.0	61.7 ±4.5	57.3 ±6.8	64.0 ±0.0	53.8 ±13.7	65.0 ±6.0	56.4 ±10.5	62.4 ±4.6	64.0 ±0.0
Frequency of event reporting	47.9 ±12.1	42.7 ±21.5	56.5 ±12.3	47.5 ±13.4	74.7 ±2.8	51.3 ±13.4	68.9 ±4.4	46.9 ±16.0	59.0 ±12.2	74.7 ±2.8
Supervisor expectations and actions	69.4 ±9.8	58.3 ±13.1	66.4 ±3.5	72.3 ±9.4	69.0 ±0.7	59.9 ±8.9	64.0 ±3.5	63.7 ±11.8	65.9 ±3.4	69.0 ±0.7
Organizational learning	58.9 ±17.5	55.9 ±9.9	62.2 ±3.1	81.3 ±7.3	63.3 ±0.9	75.0 ±8.3	72.4 ±0.2	64.6 ±15.4	64.4 ±5.2	63.3 ±0.9
Teamwork within hospital units	64.2 ±19.6	71.7 ±8.6	69.8 ±5.0	88.0 ±4.5	93.3 ±0.9	74.0 ±8.8	73.1 ±2.7	71.9 ±14.5	70.5 ±4.7	93.3 ±0.9
Communication openness	48.5 ±16.7	55.9 ±9.5	68.6 ±3.3	48.3 ±15.9	63.0 ±0.5	50.2 ±10.2	60.1 ±5.5	51.3 ±12.9	66.9 ±5.0	63.0 ±0.5
Feedback & communication about errors	49.8 ±15.0	48.4 ±7.3	64.7 ±8.5	54.4 ±6.6	49.5 ±1.4	57.7 ±14.3	69.6 ±1.9	52.0 ±12.1	66.1 ±7.4	49.5 ±1.4
Non-punitive response to error	37.1 ±12.4	41.9 ±19.0	63.8 ±8.0	42.1 ±15.2	57.3 ±0.0	21.1 ±3.6	40.3 ±2.5	35.7 ±15.9	58.6 ±12.5	57.3 ±0.0
Staffing	48.6 ±15.8	42.1 ±12.2	61.1 ±8.9	37.3 ±6.7	55.0 ±0.7	34.5 ±8.1	46.6 ±0.9	41.6 ±12.8	58.2 ±9.9	55.0 ±0.7
Hospital management support	64.1 ±14.9	38.2 ±12.7	54.8 ±10.1	64.0 ±8.5	62.0 ±0.0	56.0 ±23.4	70.4 ±4.4	53.9 ±19.0	57.9 ±11.2	62.0 ±0.0
Teamwork across hospital units	52.5 ±10.0	40.9 ±11.2	52.8 ±8.2	64.3 ±6.3	60.3 ±0.4	50.8 ±15.9	59.3 ±0.4	50.1 ±13.6	54.2 ±7.6	60.3 ±0.4
Hospital handoffs and transitions	37.8 ±11.6	48.8 ±11.3	60.0 ±3.0	54.2 ±10.7	58.0 ±0.7	46.9 ±12.1	60.3 ±3.9	45.6 ±12.2	60.1 ±3.0	58.0 ±0.7
English language, n (%)	10 (100.0)	1 (6.7)		0 (0.0)		1 (14.3)		12 (31.6)		
Data collection, n (%)										
2005-2009	8 (80.0)	8 (53.3)		3 (50.0)		0 (0.0)		19 (50.0)		
2010-2014	2 (20.0)	7 (46.7)		3 (50.0)		7 (100.0)		19 (50.0)		
Number of dimensions, n (%)										
Less than 12	2 (20.0)	3 (20.0)		1 (16.7)		1 (14.3)		7 (18.4)		
Exactly 12	8 (80.0)	11 (73.3)		5 (83.3)		6 (85.7)		30 (79.0)		
More than 12	0 (0.0)	1 (6.7)		0 (0.0)		0 (0.0)		1 (2.6)		
Healthcare facilities, median [range]	33 [1 - 2717]	8 [1 - 100]		13.5 [1 - 42]		11 [1 - 68]		10.5 [1 - 2717]		
Analyzed questionnaires, median [range]	1773 [45 - 50513]	583 [148 - 3779]		974 [248 - 6963]		1316 [99 - 6807]		788 [45 - 50513]		
Population selection, n (%)										
Everyone	3 (30.0)	5 (33.3)		4 (66.7)		6 (100.0)		18 (48.7)		
Only healthcare occupations	5 (50.0)	8 (53.3)		0 (0.0)		0 (0.0)		13 (35.1)		
Only non-healthcare occupations	1 (10.0)	1 (6.7)		0 (0.0)		0 (0.0)		2 (5.4)		
Mixed	1 (10.0)	1 (6.7)		2 (33.3)		0 (0.0)		4 (10.8)		

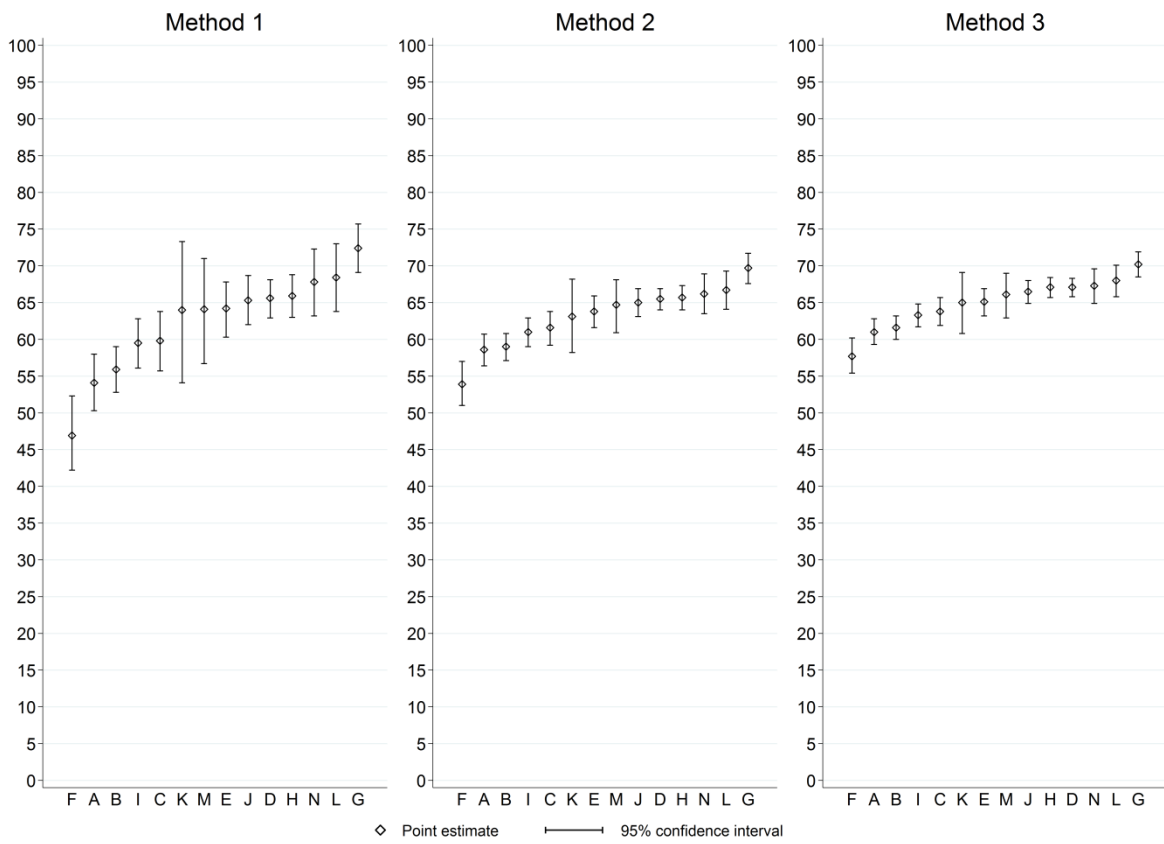
**Figure 1:** Flowchart of the study





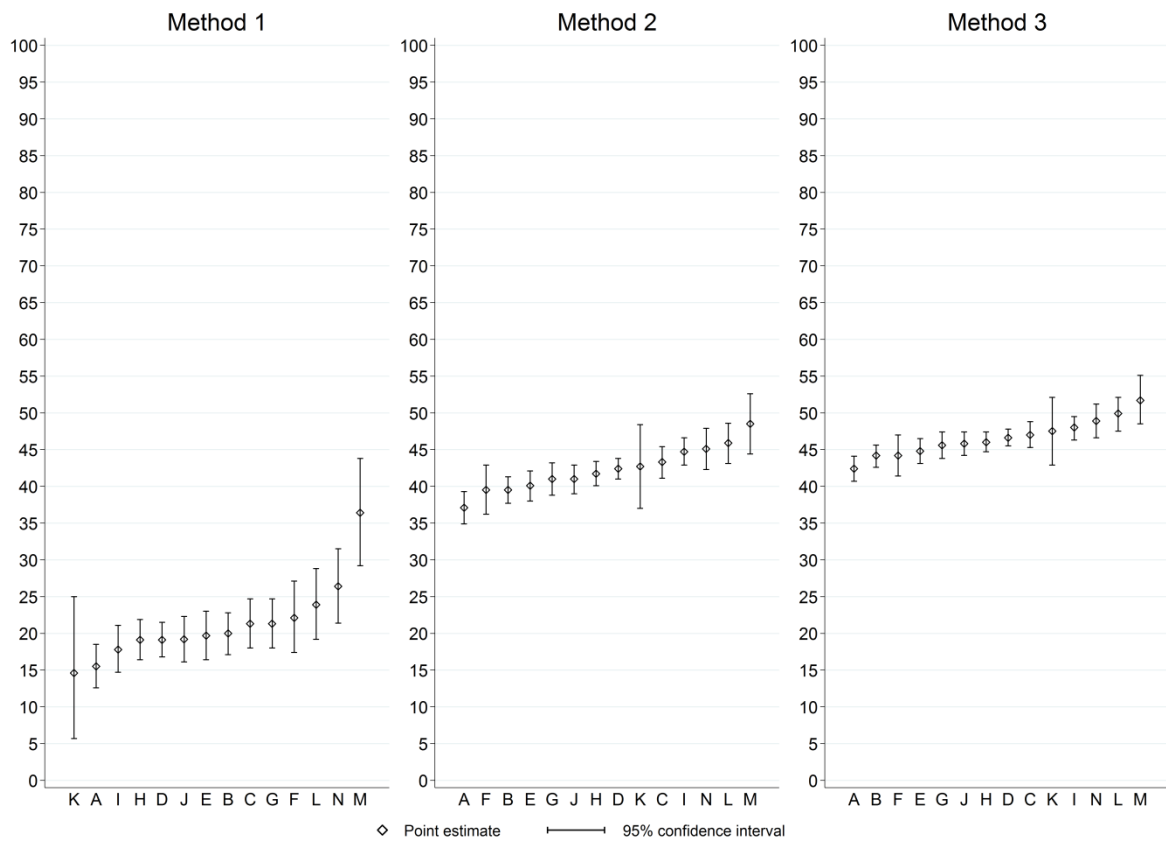
**Figure 2:** “Teamwork within hospital units” dimension scores.

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



**Figure 3:** “Hospital management support” dimension scores.

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



THESE SOUTENUE PAR : M. GIAI Joris

**TITRE: VARIABILITY OF THE SCORING STRATEGIES FOR THE HOSPITAL SURVEY ON PATIENT SAFETY CULTURE**

CONCLUSION

Depuis que le développement d'une culture de sécurité chez les professionnels de santé est considéré comme indispensable pour une amélioration de la sécurité des patients, plusieurs outils ont été mis au point pour l'évaluer. Parmi eux, le questionnaire *Hospital Survey On Patient Safety Culture* développé et validé par l'*Agency for Healthcare Research and Quality* en 2004 est le plus couramment utilisé, notamment en Europe où il est recommandé par l'*European Network for Quality in Healthcare*.

Une méthode de référence (pourcentage de réponses positives, M1) a été développée pour calculer les scores des 12 dimensions de ce questionnaire auto-administré comportant 42 items. Néanmoins, une revue de la littérature a montré que 18,4% des études (n=7) n'avait pas utilisé cette méthode et que 31,6% d'entre elles (n=12) utilisaient également l'une des deux méthodes alternatives non validées (moyennes individuelles, M2 ou sommes individuelles, M3). Il paraît ainsi difficile de comparer les scores de ces études, étant donné qu'aucune évaluation de la concordance entre M1, M2 et M3 n'a été réalisée.

À partir des données recueillies dans le cadre d'un projet PREPS sur un échantillon de 3888 professionnels de santé volontaires du CHU de Grenoble, nous avons montré qu'en comparaison avec M2 et M3, la méthode de référence sous estimait les scores dans les dimensions peu développées et donnait des résultats moins précis dans les dimensions plus développées. Il en résultait des variations substantielles des rangs de classement associés en fonction des classes d'âge, sexes, spécialités ou types de métiers. Cette étude démontre que les valeurs des scores et des rangs de classement dépendent de la méthode utilisée pour les estimer, et que malgré son utilisation recommandée, la méthode des pourcentages de réponses positives est la moins satisfaisante. Elle suggère également que l'utilisation de moyennes individuelles serait plus judicieuse.

VU ET PERMIS D'IMPRIMER

Grenoble, le 16/9/2015

LE DOYEN

J.P. ROMANET

LE PRESIDENT DE LA THESE

P. FRANÇOIS

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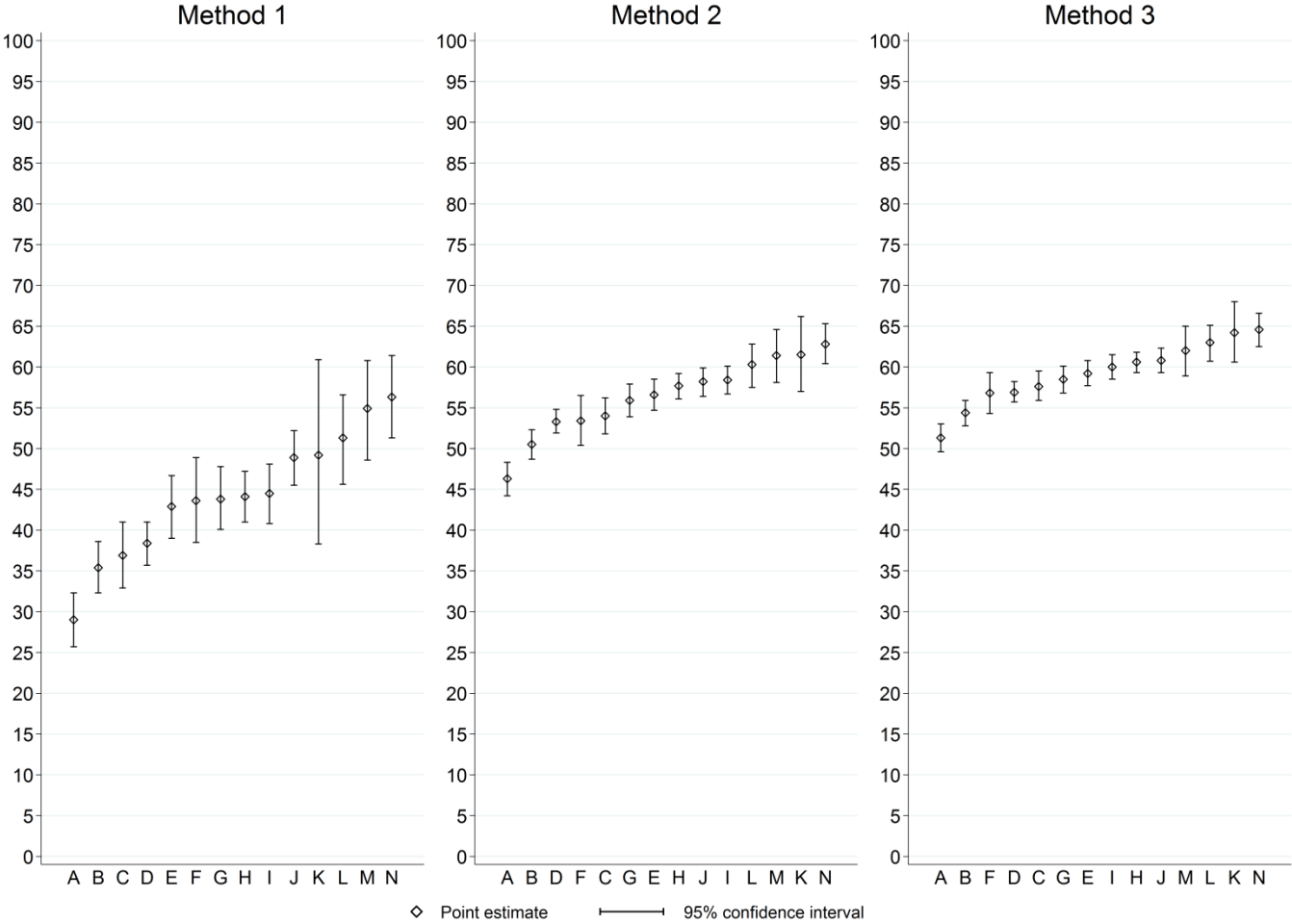
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**Annexes**

**Annex 1: Scores' plots with 95% confidence intervals and ranking variability for departments in the 3 compared methods, one figure per dimension**

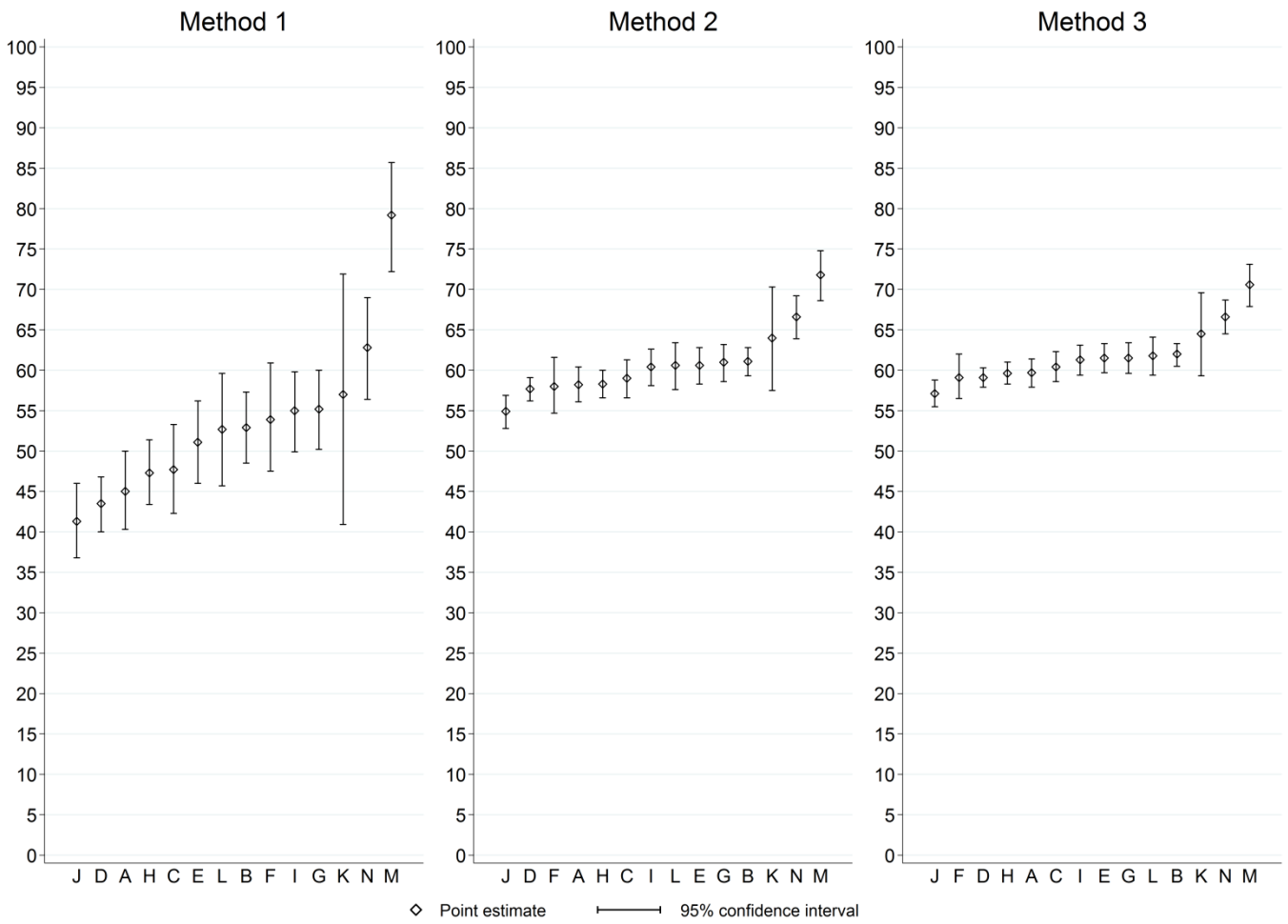
**Annex 1 - Figure 1: "Overall perception of safety" dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



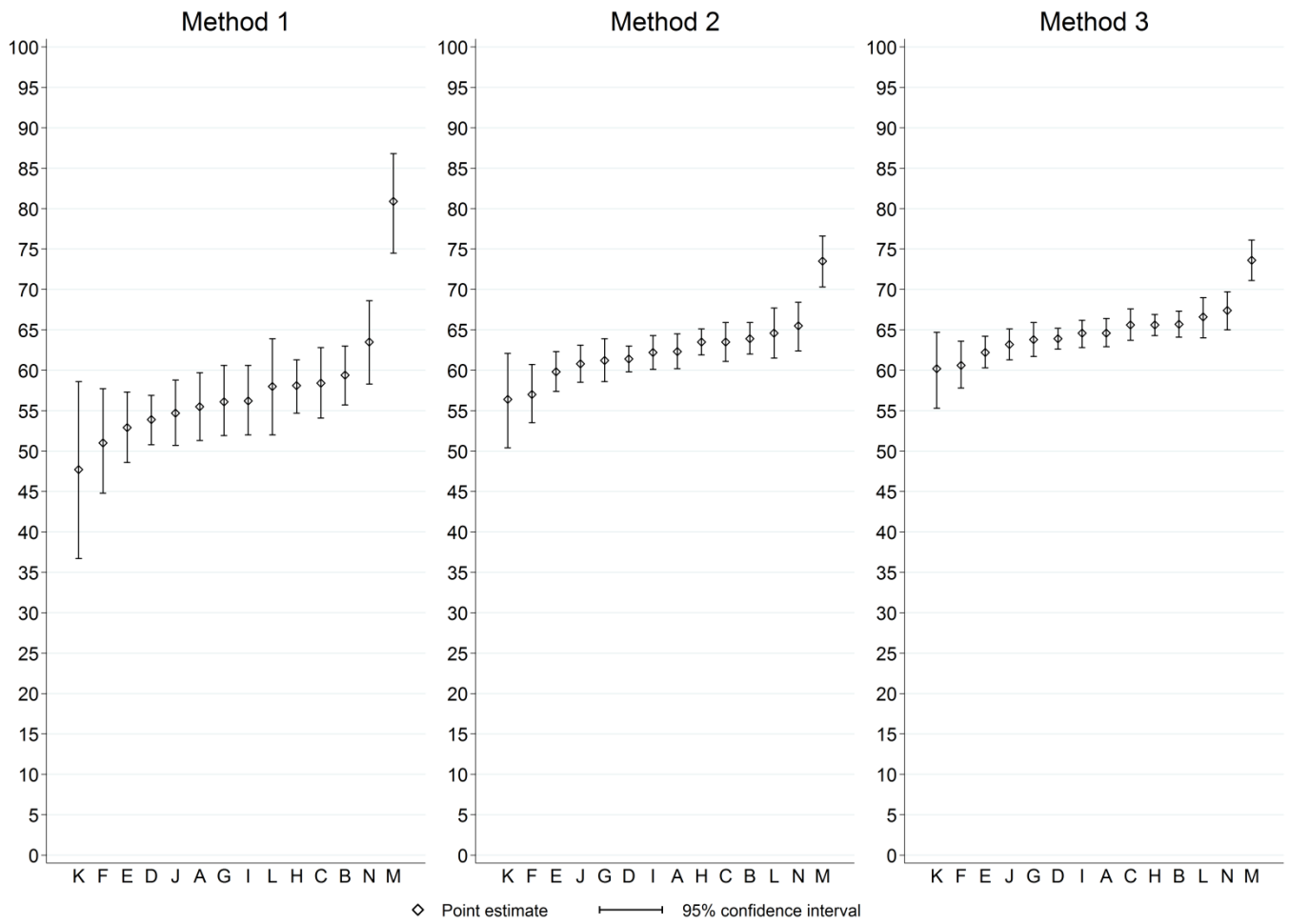
**Annex 1 - Figure 2: “Frequency of event reporting” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



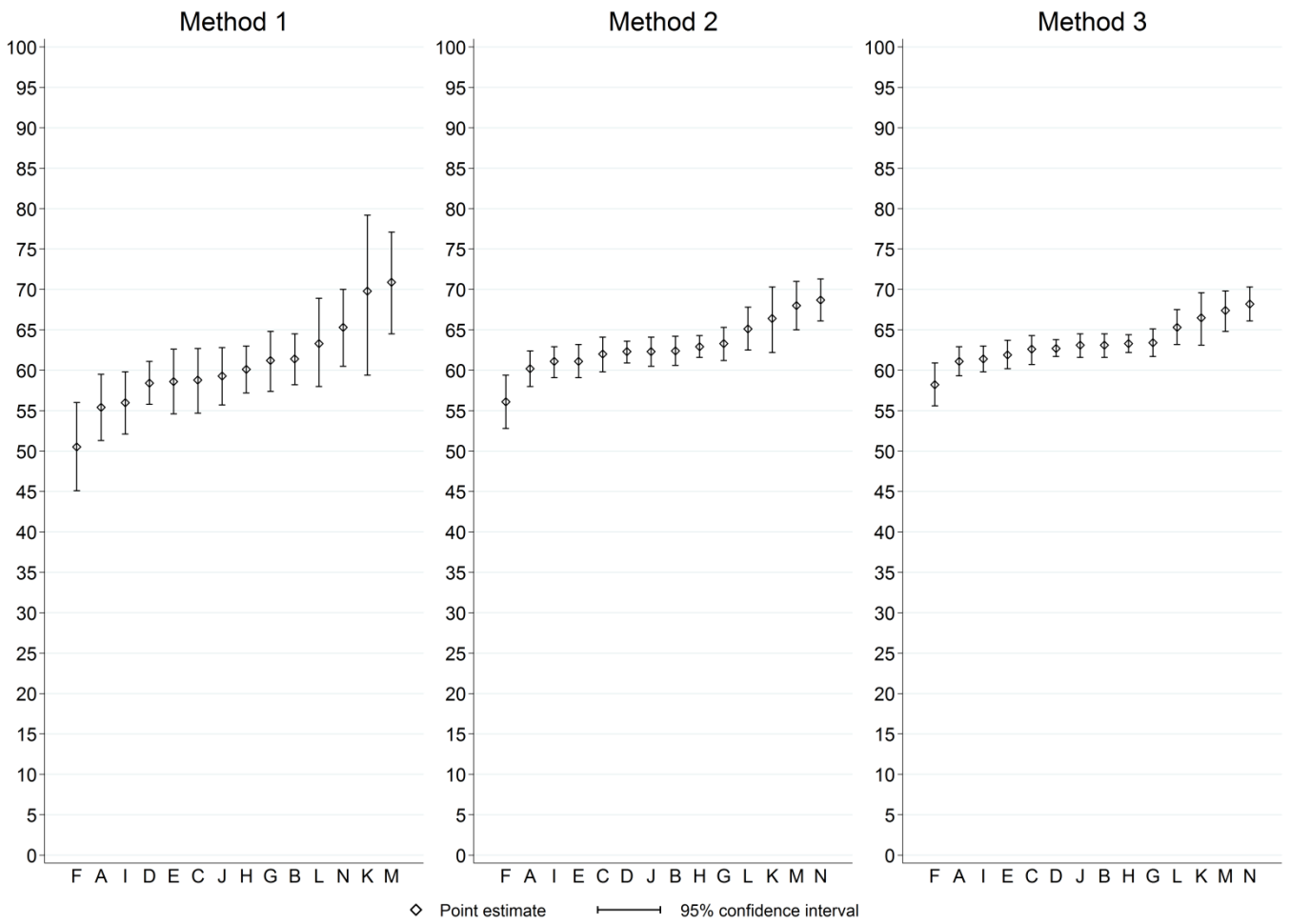
**Annex 1 - Figure 3: “Supervisor expectations and actions” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



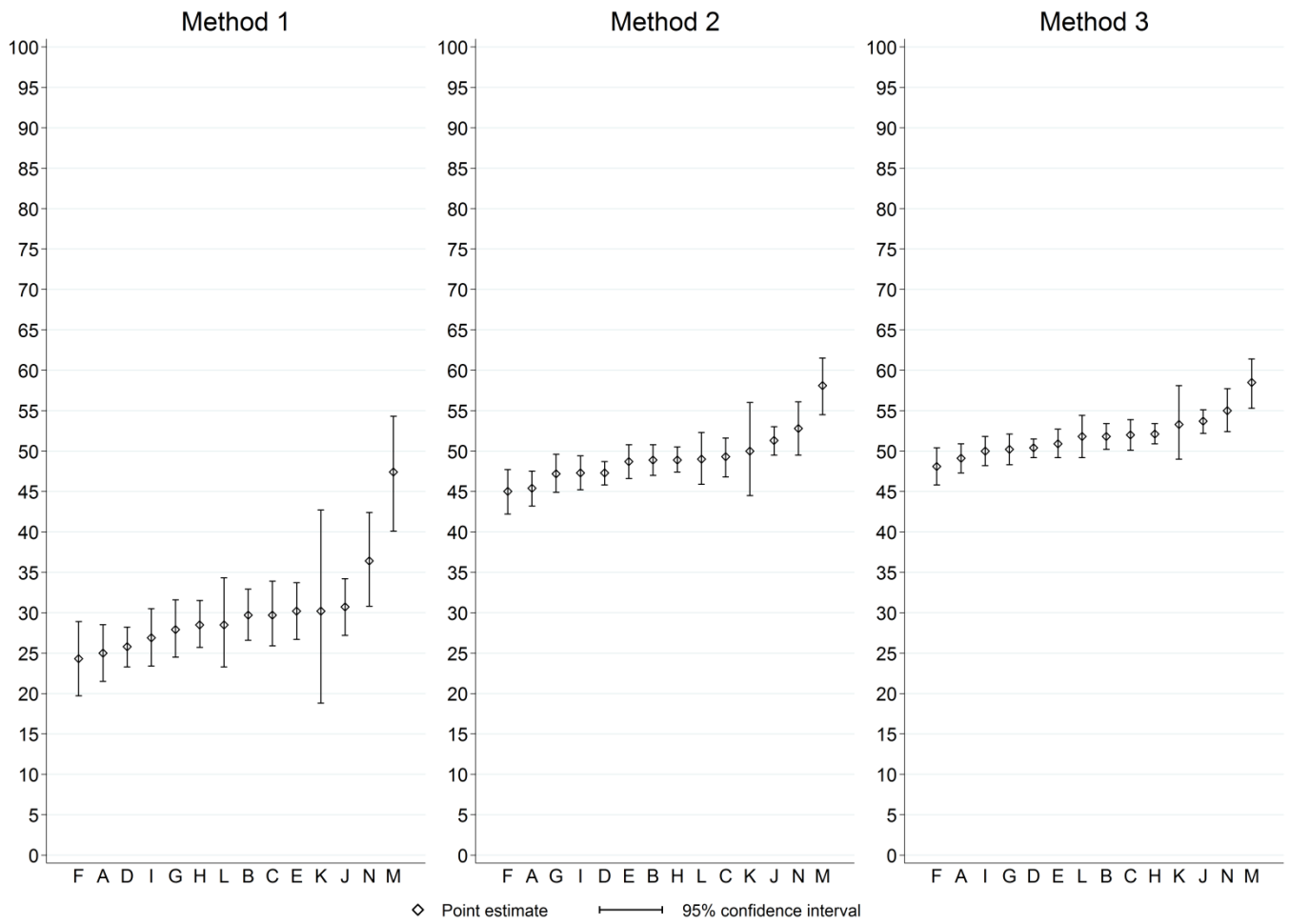
**Annex 1 - Figure 4: “Communication openness” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



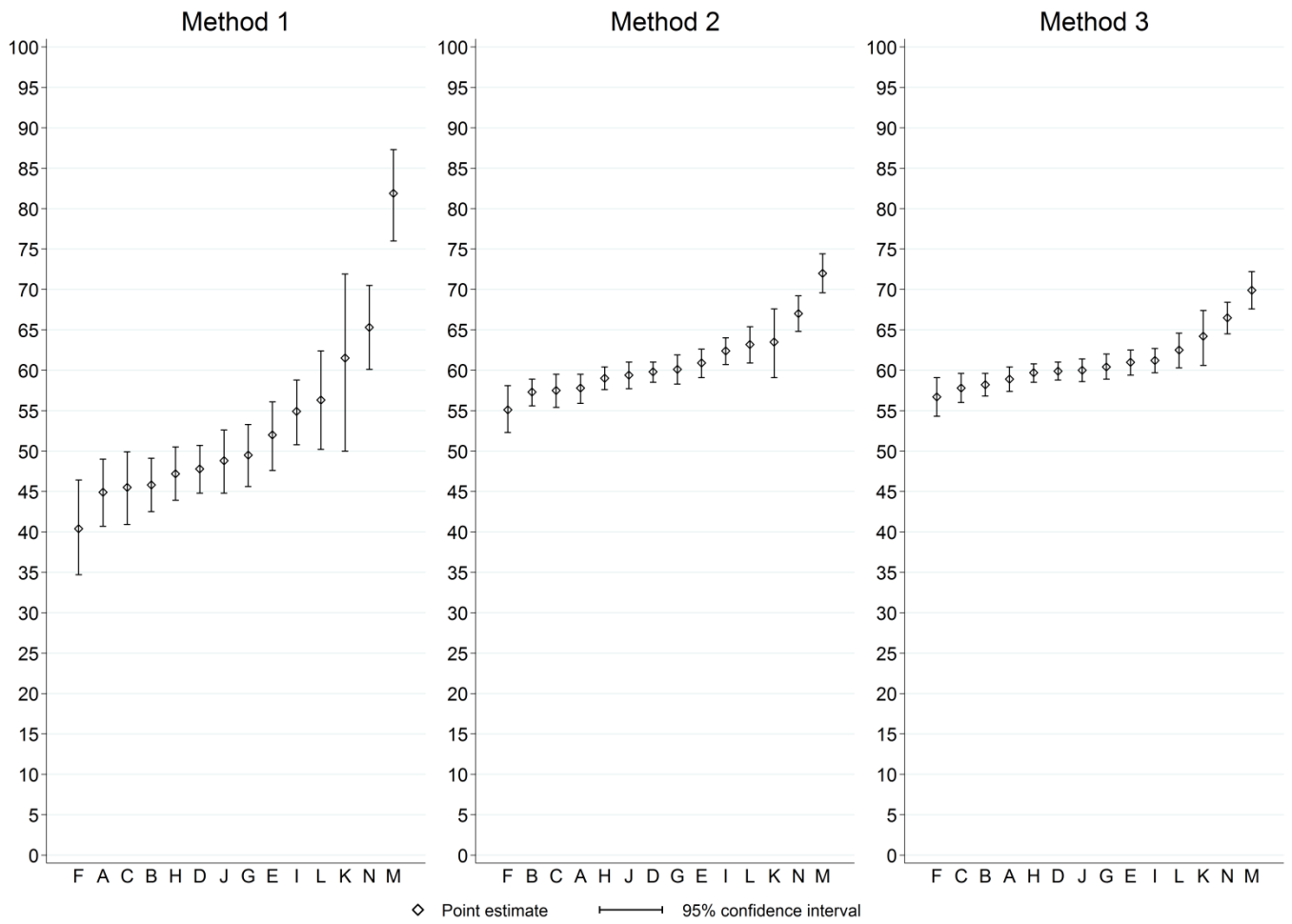
**Annex 1 - Figure 5: “Non-punitive response to error” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



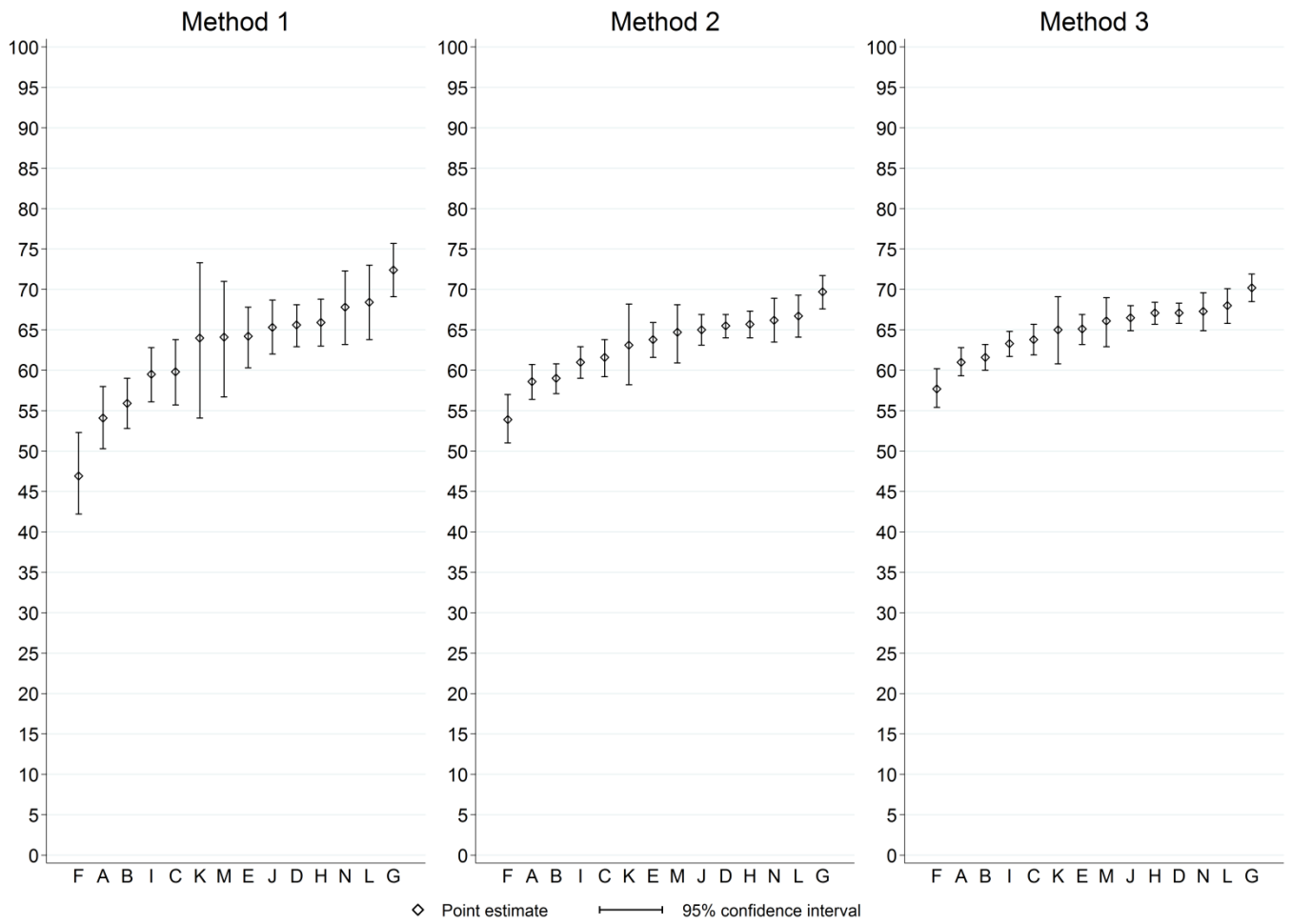
**Annex 1 - Figure 6: “Organizational learning” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



**Annex 1 - Figure 7: “Teamwork within hospital units” dimension scores.**

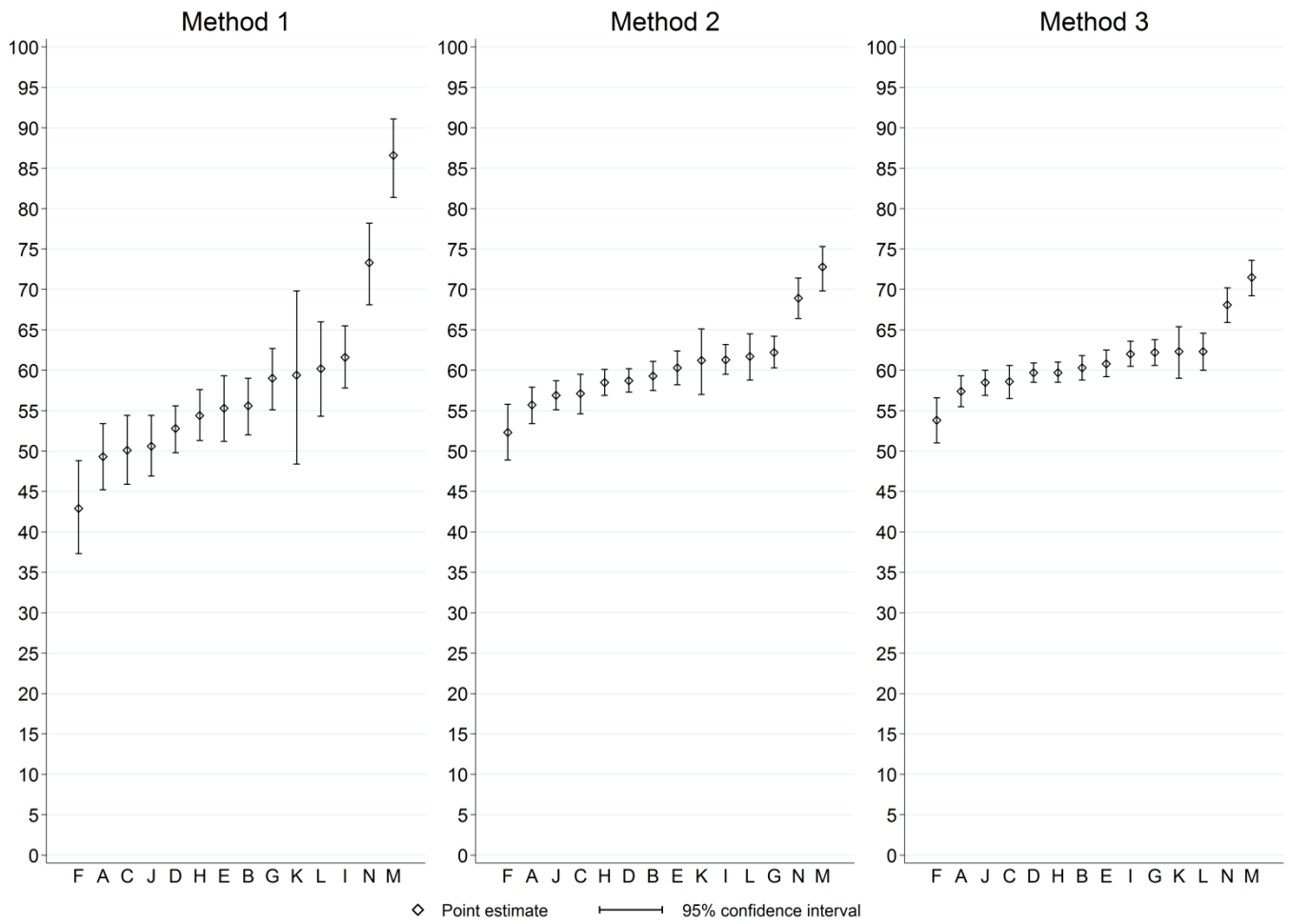
X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.





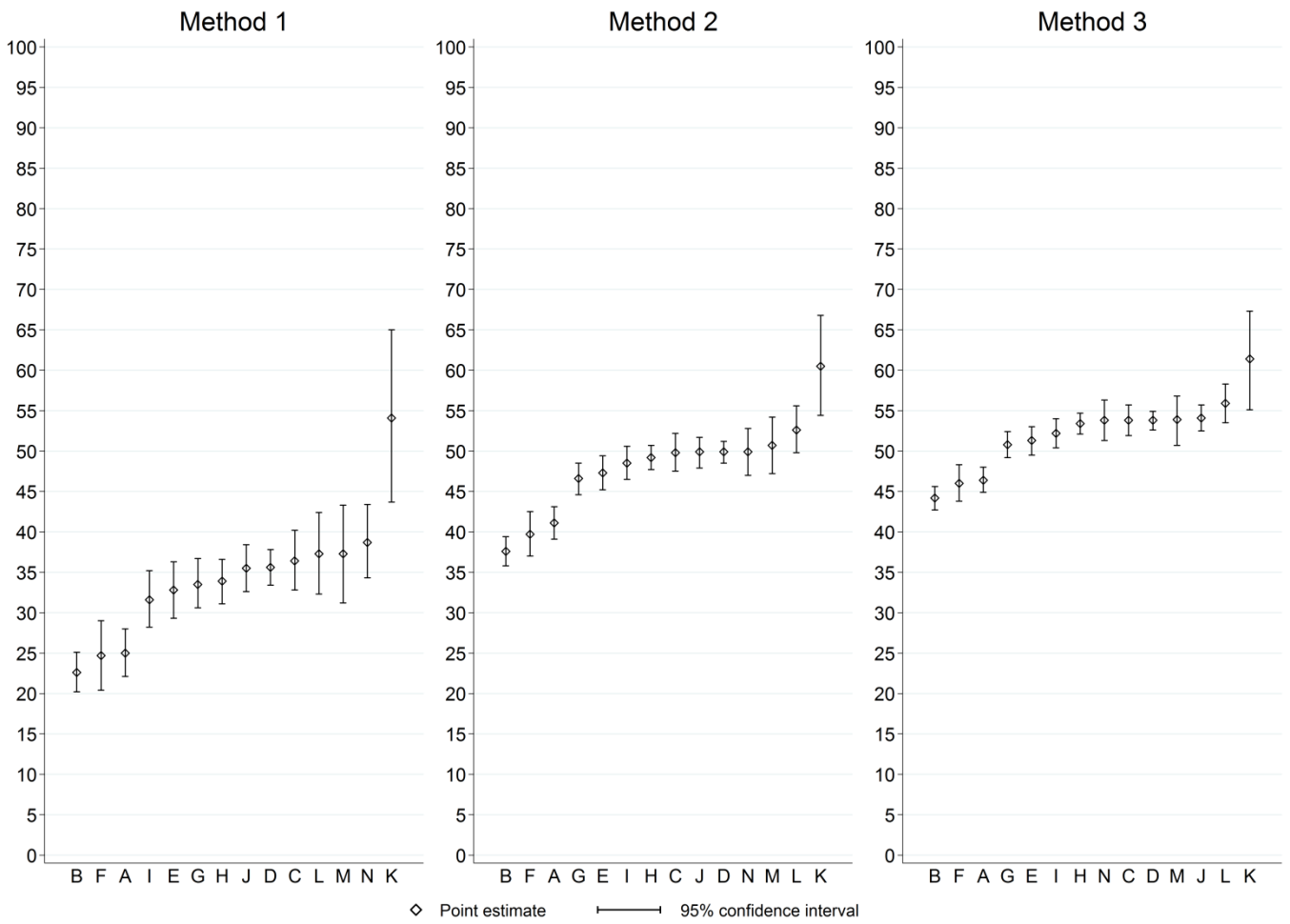
**Annex 1 - Figure 8:** “Feedback and communication about errors” dimension scores.

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



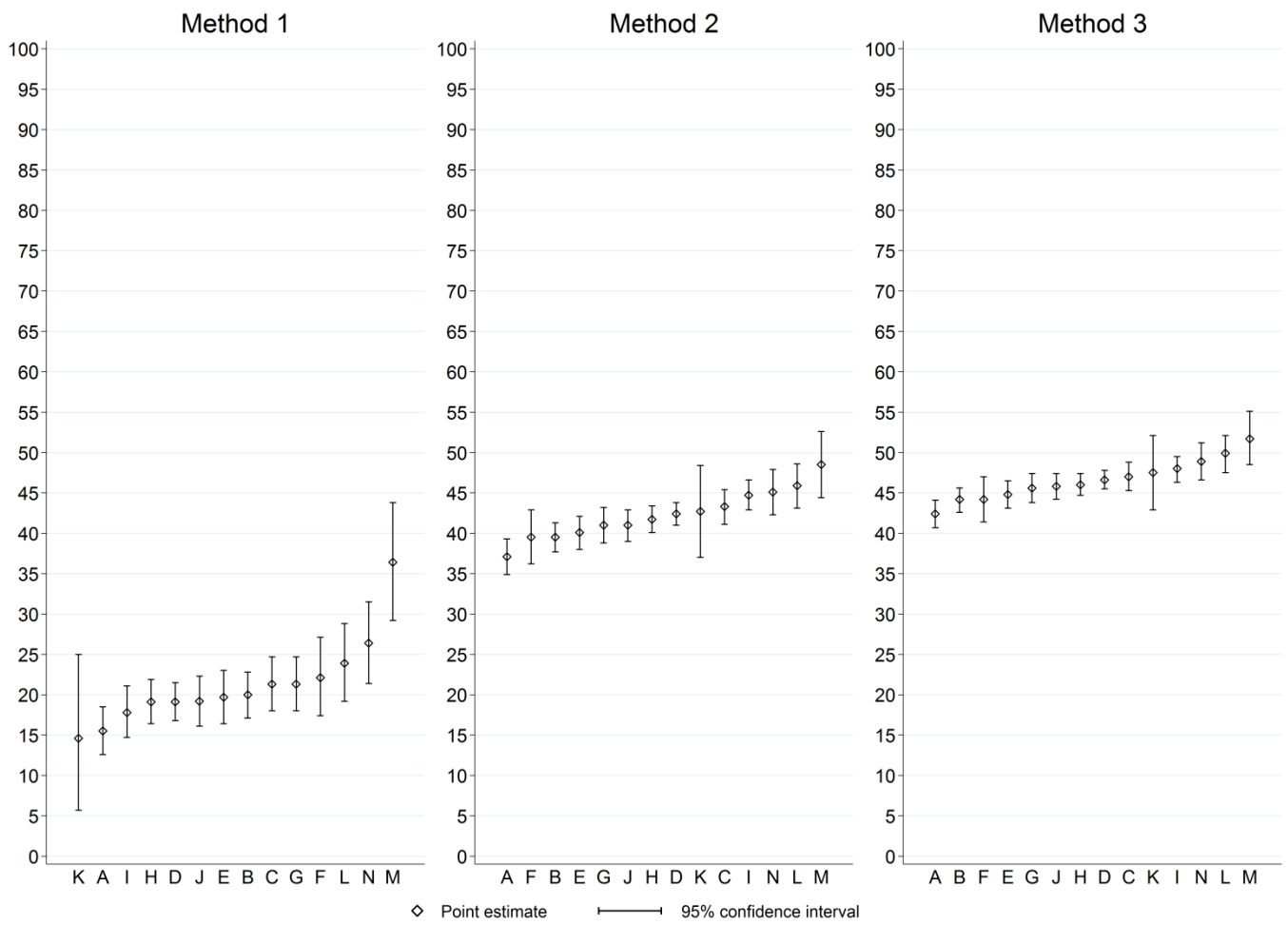
**Annex 1 - Figure 9: “Staffing” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



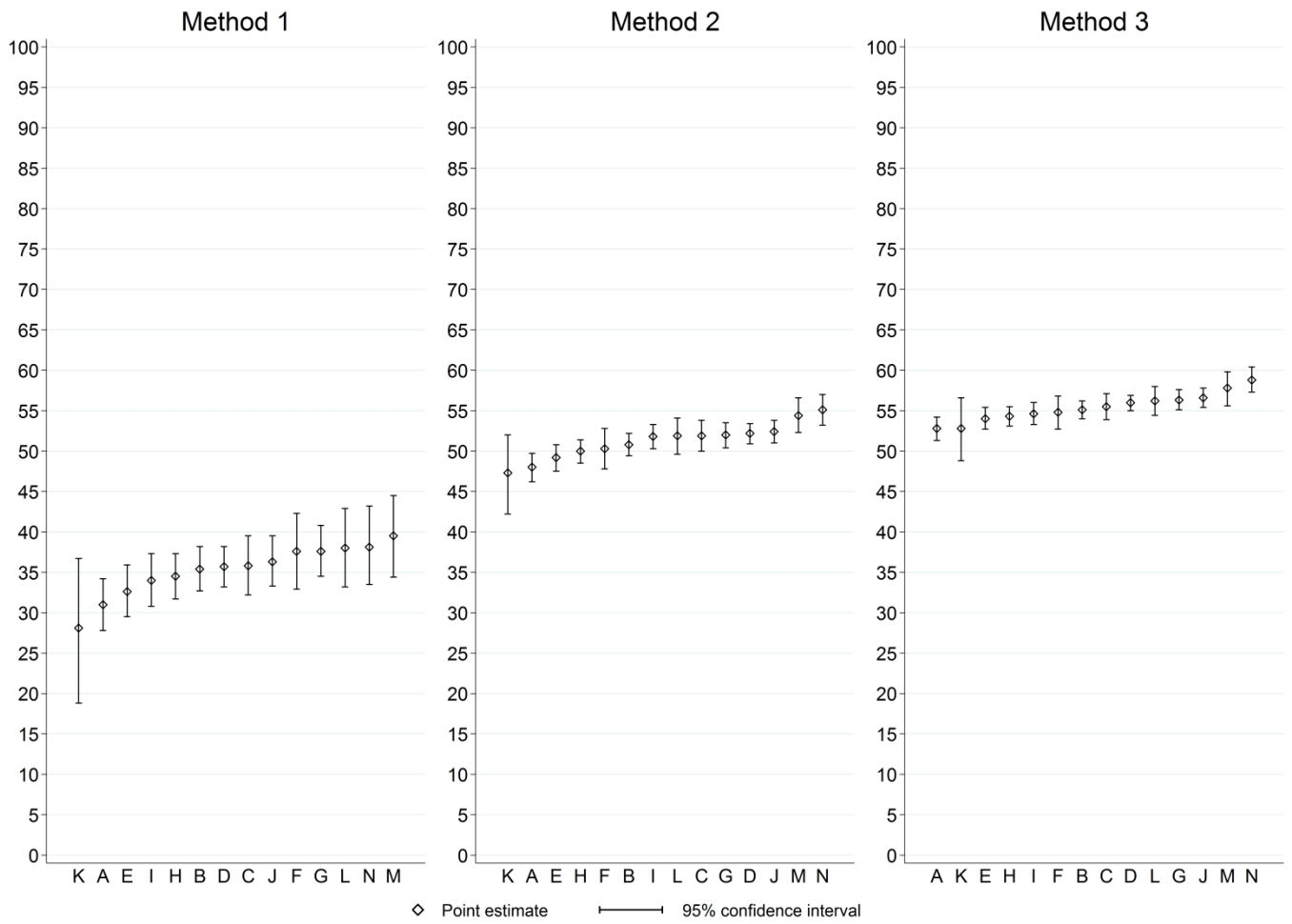
**Annex 1 - Figure 10:** “Hospital management support” dimension scores.

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



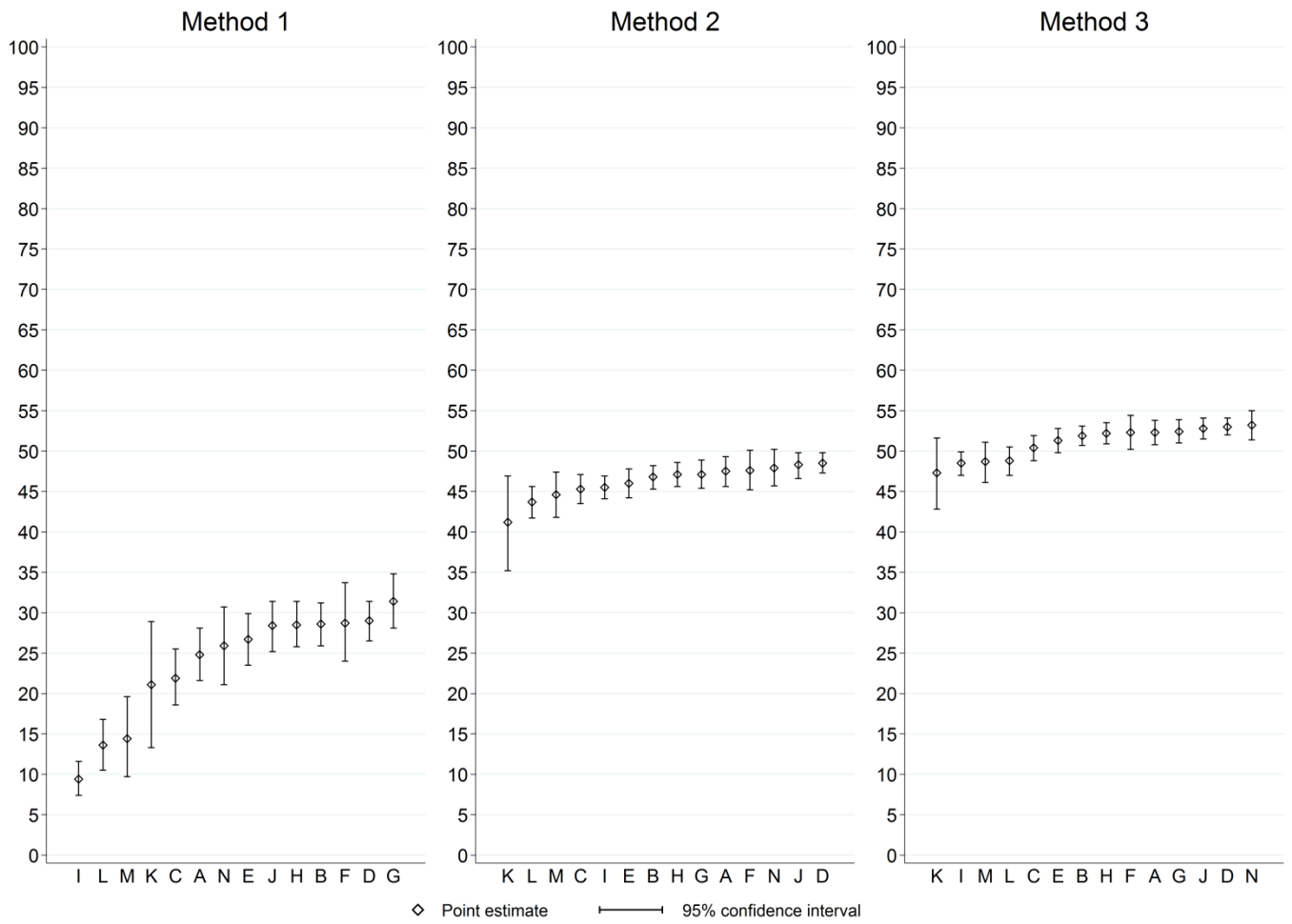
**Annex 1 - Figure 11: “Teamwork across hospital units” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



**Annex 1 - Figure 12: “Hospital handoffs and transitions” dimension scores.**

X-axis: ordered de-identified departments for each method. Y-axis: rescaled score.



**Annex 2: Tables illustrating scoring and ranking variability for age classes, occupation, gender, specialty and departments in the 3 compared methods, one figure per dimension**

**Annex 2 - Table 1:** “Overall perception of safety” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	47.2	58.2	60.1	1	1	1
45-54	967 (25.8)	43.3	55.7	58.3	2	2	2
<35	1406 (37.5)	40.9	54.7	58.2	3	3	3
35-44	966 (25.7)	40.1	54.5	58.0	4	4	4
<b>Occupation</b>							
Other non-healthcare	26 (0.7)	55.8	63.2	64.0	1	1	1
Physicist	457 (12.0)	49.9	58.6	61.0	2	2	2
Nursing assistant	706 (18.5)	43.4	53.9	57.2	3	7	7
Nurse	1323 (34.7)	42.9	54.1	57.8	4	6	5
Technical	775 (20.3)	41.6	56.7	59.1	5	3	3
Other healthcare	179 (4.7)	35.7	54.4	58.0	6	5	4
Administrative	347 (9.1)	28.8	54.8	57.5	7	4	6
<b>Department</b>							
N	158 (4.1)	56.3	62.8	64.6	1	1	1
M	97 (2.5)	54.9	61.4	62.0	2	3	4
L	150 (3.9)	51.3	60.3	63.0	3	4	3
K	32 (0.8)	49.2	61.5	64.2	4	2	2
J	337 (8.7)	48.9	58.2	60.8	5	6	5
I	303 (7.8)	44.5	58.4	60.0	6	5	7
H	466 (12.0)	44.1	57.7	60.6	7	7	6
G	310 (8.0)	43.8	55.9	58.5	8	9	9
F	153 (3.9)	43.6	53.4	56.8	9	11	12
E	300 (7.7)	42.9	56.6	59.2	10	8	8
D	591 (15.2)	38.4	53.3	56.9	11	12	11
C	266 (6.9)	36.9	54.0	57.6	12	10	10
B	415 (10.7)	35.4	50.5	54.4	13	13	13
A	302 (7.8)	29.0	46.3	51.3	14	14	14
<b>Gender</b>							
Men	725 (19.4)	44.3	55.6	59.0	1	1	1
Women	3016 (80.6)	41.5	55.2	58.2	2	2	2
<b>Specialty</b>							
Biology, imaging, pharmacy	586 (15.1)	48.1	59.5	61.2	1	1	1
Medicine, psychiatry	1163 (29.9)	42.9	56.3	59.2	2	2	2
Surgery, gynecology, obstetrics	990 (25.5)	41.0	55.0	58.3	3	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	39.1	52.5	56.3	4	4	4
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	38.4	51.7	55.5	5	5	5

**Annex 2 - Table 2: “Frequency of event reporting” subgroups scores. Ordered according to the AHRQ M1 score, n=3888**

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	55.3	62.3	62.6	1	1	1
45-54	967 (25.8)	52.0	60.5	61.4	2	2	2
35-44	966 (25.7)	48.8	59.0	60.3	3	3	3
<35	1406 (37.5)	47.7	58.2	59.8	4	4	4
<b>Occupation</b>							
Other non-healthcare	26 (0.7)	63.9	63.2	63.9	1	1	1
Nursing assistant	706 (18.5)	57.0	62.6	63.1	2	2	2
Nurse	1323 (34.7)	52.8	58.9	60.2	3	5	4
Physicist	457 (12.0)	51.7	59.0	60.1	4	4	5
Technical	775 (20.3)	51.5	61.1	61.9	5	3	3
Administrative	347 (9.1)	31.1	56.5	58.3	6	6	6
Other healthcare	179 (4.7)	29.1	52.8	55.2	7	7	7
<b>Department</b>							
M	97 (2.5)	79.2	71.8	70.6	1	1	1
N	158 (4.1)	62.8	66.6	66.6	2	2	2
K	32 (0.8)	57.0	64.0	64.5	3	3	3
G	310 (8.0)	55.2	61.0	61.5	4	5	6
I	303 (7.8)	55.0	60.4	61.3	5	8	8
F	153 (3.9)	53.9	58.0	59.1	6	12	13
B	415 (10.7)	52.9	61.1	62.0	7	4	4
L	150 (3.9)	52.7	60.6	61.8	8	7	5
E	300 (7.7)	51.1	60.6	61.5	9	6	7
C	266 (6.9)	47.7	59.0	60.4	10	9	9
H	466 (12.0)	47.3	58.3	59.6	11	10	11
A	302 (7.8)	45.0	58.2	59.7	12	11	10
D	591 (15.2)	43.6	57.7	59.2	13	13	12
J	337 (8.7)	41.3	54.9	57.1	14	14	14
<b>Gender</b>							
Men	725 (19.4)	50.5	59.2	60.4	1	2	2
Women	3016 (80.6)	49.6	59.5	60.7	2	1	1
<b>Specialty</b>							
Biology, imaging, pharmacy	586 (15.1)	57.3	62.0	62.7	1	1	1
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	55.4	61.4	62.0	2	3	3
Medicine, psychiatry	1163 (29.9)	52.6	61.5	62.4	3	2	2
Surgery, gynecology, obstetrics	990 (25.5)	45.7	57.5	58.8	4	4	4
Anesthesia, reanimation, emergencies	771 (19.8)	44.1	56.7	58.5	5	5	5

**Annex 2 - Table 3:** “Supervisor expectations and actions” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
45-54	967 (25.8)	58.1	63.2	65.2	1	1	1
>=55	415 (11.1)	56.5	62.9	65.1	2	2	2
35-44	966 (25.7)	56.5	62.3	64.7	3	3	3
<35	1406 (37.5)	56.4	61.9	64.3	4	4	4
<b>Occupation</b>							
Nursing assistant	706 (18.5)	61.2	63.3	65.2	1	3	3
Technical	775 (20.3)	59.3	64.8	66.5	2	2	2
Physicist	457 (12.0)	57.5	62.6	65.0	3	4	4
Nurse	1323 (34.7)	57.0	61.2	63.9	4	5	6
Other non-healthcare	26 (0.7)	57.0	66.3	68.0	5	1	1
Other healthcare	179 (4.7)	50.6	61.1	63.9	6	6	5
Administrative	347 (9.1)	44.4	60.0	62.5	7	7	7
<b>Department</b>							
M	97 (2.5)	80.9	73.5	73.6	1	1	1
N	158 (4.1)	63.5	65.5	67.4	2	2	2
B	415 (10.7)	59.4	63.9	65.7	3	4	4
C	266 (6.9)	58.4	63.5	65.6	4	5	6
H	466 (12.0)	58.1	63.5	65.6	5	6	5
L	150 (3.9)	58.0	64.6	66.6	6	3	3
I	303 (7.8)	56.2	62.2	64.6	7	8	8
G	310 (8.0)	56.1	61.2	63.8	8	10	10
A	302 (7.8)	55.5	62.3	64.6	9	7	7
J	337 (8.7)	54.7	60.8	63.2	10	11	11
D	591 (15.2)	53.9	61.4	63.9	11	9	9
E	300 (7.7)	52.9	59.8	62.2	12	12	12
F	153 (3.9)	51.0	57.0	60.6	13	13	13
K	32 (0.8)	47.7	56.4	60.2	14	14	14
<b>Gender</b>							
Men	725 (19.4)	60.1	64.1	66.2	1	1	1
Women	3016 (80.6)	56.2	62.1	64.4	2	2	2
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	60.6	64.7	66.5	1	1	1
Medicine, psychiatry	1163 (29.9)	60.6	64.5	66.3	2	2	2
Biology, imaging, pharmacy	586 (15.1)	60.1	64.4	66.3	3	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	53.1	60.1	62.9	4	4	4
Surgery, gynecology, obstetrics	990 (25.5)	51.7	59.5	62.4	5	5	5



**Annex 2 - Table 4:** “Communication openness” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	61.9	63.9	64.1	1	1	1
45-54	967 (25.8)	61.0	62.9	63.2	2	2	2
35-44	966 (25.7)	58.8	61.9	62.6	3	3	3
<35	1406 (37.5)	58.0	61.7	62.4	4	4	4
<b>Occupation</b>							
Other non-healthcare	26 (0.7)	78.2	74.4	72.8	1	1	1
Physicist	457 (12.0)	66.6	66.5	66.0	2	2	2
Nurse	1323 (34.7)	64.2	63.6	64.1	3	3	3
Nursing assistant	706 (18.5)	61.5	62.5	63.0	4	5	5
Other healthcare	179 (4.7)	58.4	63.2	63.6	5	4	4
Technical	775 (20.3)	53.0	59.7	60.5	6	6	6
Administrative	347 (9.1)	41.3	57.1	58.6	7	7	7
<b>Department</b>							
M	97 (2.5)	70.9	68.0	67.4	1	2	2
K	32 (0.8)	69.8	66.4	66.5	2	3	3
N	158 (4.1)	65.3	68.7	68.2	3	1	1
L	150 (3.9)	63.3	65.1	65.3	4	4	4
B	415 (10.7)	61.4	62.4	63.1	5	7	7
G	310 (8.0)	61.2	63.3	63.4	6	5	5
H	466 (12.0)	60.1	62.9	63.3	7	6	6
J	337 (8.7)	59.3	62.3	63.1	8	8	8
C	266 (6.9)	58.8	62.0	62.6	9	10	10
E	300 (7.7)	58.6	61.1	61.9	10	11	11
D	591 (15.2)	58.5	62.3	62.8	11	9	9
I	303 (7.8)	56.0	61.1	61.4	12	12	12
A	302 (7.8)	55.4	60.2	61.1	13	13	13
F	153 (3.9)	50.5	56.1	58.2	14	14	14
<b>Gender</b>							
Men	725 (19.4)	59.6	62.2	62.8	1	2	2
Women	3016 (80.6)	59.3	62.3	62.9	2	1	1
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	62.7	63.5	63.9	1	2	2
Medicine, psychiatry	1163 (29.9)	62.2	64.4	64.5	2	1	1
Biology, imaging, pharmacy	586 (15.1)	60.3	63.2	63.4	3	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	57.4	61.1	61.9	4	4	4
Surgery, gynecology, obstetrics	990 (25.5)	55.6	60.1	61.0	5	5	5

**Annex 2 - Table 5:** “Non-punitive response to error” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
<35	1406 (37.5)	30.3	50.0	52.9	1	1	1
>=55	415 (11.1)	29.4	48.3	51.0	2	2	2
45-54	967 (25.8)	27.7	47.7	50.2	3	3	4
35-44	966 (25.7)	27.4	47.7	50.9	4	4	3
<b>Occupation</b>							
Physicist	457 (12.0)	42.0	57.1	58.2	1	1	1
Other non-healthcare	26 (0.7)	38.5	52.6	55.4	2	2	2
Nurse	1323 (34.7)	33.3	50.3	53.0	3	4	4
Other healthcare	179 (4.7)	27.8	50.9	53.8	4	3	3
Nursing assistant	706 (18.5)	24.3	45.1	48.5	5	6	6
Technical	775 (20.3)	23.4	45.6	48.7	6	5	5
Administrative	347 (9.1)	15.1	43.5	47.5	7	7	7
<b>Department</b>							
M	97 (2.5)	47.4	58.1	58.5	1	1	1
N	158 (4.1)	36.4	52.8	55.0	2	2	2
J	337 (8.7)	30.7	51.3	53.7	3	3	3
K	32 (0.8)	30.2	50.0	53.3	4	4	4
E	300 (7.7)	30.2	48.7	50.9	5	9	9
C	266 (6.9)	29.7	49.3	52.0	6	5	6
B	415 (10.7)	29.7	48.9	51.8	7	8	7
L	150 (3.9)	28.5	49.0	51.8	8	6	8
H	466 (12.0)	28.5	48.9	52.1	9	7	5
G	310 (8.0)	27.9	47.2	50.2	10	12	11
I	303 (7.8)	26.9	47.3	50.0	11	11	12
D	591 (15.2)	25.7	47.3	50.4	12	10	10
A	302 (7.8)	25.0	45.4	49.1	13	13	13
F	153 (3.9)	24.3	45.0	48.1	14	14	14
<b>Gender</b>							
Men	725 (19.4)	30.6	49.5	52.5	1	1	1
Women	3016 (80.6)	28.4	48.4	51.2	2	2	2
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	31.4	49.8	52.6	1	3	1
Medicine, psychiatry	1163 (29.9)	31.2	50.0	52.4	2	1	2
Biology, imaging, pharmacy	586 (15.1)	30.9	49.8	52.2	3	2	3
Anesthesia, reanimation, emergencies	771 (19.8)	27.5	47.7	50.8	4	4	4
Surgery, gynecology, obstetrics	990 (25.5)	24.7	46.4	49.8	5	5	5

**Annex 2 - Table 6:** “Organizational learning” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	59.7	63.9	63.0	1	1	1
45-54	967 (25.8)	54.5	61.9	61.4	2	2	2
35-44	966 (25.7)	48.1	58.9	59.5	3	3	3
<35	1406 (37.5)	45.0	58.1	59.3	4	4	4
<b>Occupation</b>							
Physicist	457 (12.0)	65.1	65.5	65.3	1	1	1
Other non-healthcare	26 (0.7)	53.8	61.2	62.3	2	2	2
Nursing assistant	706 (18.5)	52.2	60.3	60.5	3	3	3
Nurse	1323 (34.7)	49.9	59.1	59.9	4	5	4
Technical	775 (20.3)	47.5	59.8	59.7	5	4	5
Other healthcare	179 (4.7)	38.1	55.6	57.3	6	7	7
Administrative	347 (9.1)	37.5	58.3	58.5	7	6	6
<b>Department</b>							
M	97 (2.5)	81.9	72.0	69.9	1	1	1
N	158 (4.1)	65.3	67.0	66.5	2	2	2
K	32 (0.8)	61.5	63.5	64.2	3	3	3
L	150 (3.9)	56.3	63.2	62.5	4	4	4
I	303 (7.8)	54.9	62.4	61.2	5	5	5
E	300 (7.7)	52.0	60.9	61.0	6	6	6
G	310 (8.0)	49.5	60.1	60.4	7	7	7
J	337 (8.7)	48.8	59.4	60.0	8	9	8
D	591 (15.2)	47.8	59.8	59.9	9	8	9
H	466 (12.0)	47.2	59.0	59.7	10	10	10
B	415 (10.7)	45.8	57.3	58.2	11	13	12
C	266 (6.9)	45.5	57.5	57.8	12	12	13
A	302 (7.8)	44.9	57.8	58.9	13	11	11
F	153 (3.9)	40.4	55.1	56.7	14	14	14
<b>Gender</b>							
Men	725 (19.4)	52.5	60.7	61.5	1	1	1
Women	3016 (80.6)	49.1	59.7	59.9	2	2	2
<b>Specialty</b>							
Biology, imaging, pharmacy	586 (15.1)	59.6	64.1	63.0	1	1	1
Medicine, psychiatry	1163 (29.9)	52.1	61.0	61.2	2	2	2
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	48.9	58.7	58.9	3	3	4
Anesthesia, reanimation, emergencies	771 (19.8)	47.3	58.4	59.3	4	4	3
Surgery, gynecology, obstetrics	990 (25.5)	44.1	58.0	58.8	5	5	5

**Annex 2 - Table 7:** “Teamwork within hospital units” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
<35	1406 (37.5)	66.1	65.6	67.2	1	1	1
>=55	415 (11.1)	62.7	64.0	65.6	2	2	2
45-54	967 (25.8)	61.3	62.5	64.2	3	3	3
35-44	966 (25.7)	59.2	61.2	63.3	4	4	4
<b>Occupation</b>							
Nurse	1323 (34.7)	68.2	66.8	68.0	1	1	1
Physicist	457 (12.0)	65.7	65.3	66.9	2	2	2
Other non-healthcare	26 (0.7)	64.1	65.2	66.3	3	3	4
Other healthcare	179 (4.7)	63.5	65.0	66.5	4	4	3
Nursing assistant	706 (18.5)	61.1	62.1	64.1	5	5	5
Administrative	347 (9.1)	57.4	61.1	62.9	6	6	6
Technical	775 (20.3)	56.6	59.3	61.7	7	7	7
<b>Department</b>							
G	310 (8.0)	72.4	69.7	70.2	1	1	1
L	150 (3.9)	68.4	66.7	68.0	2	2	2
N	158 (4.1)	67.8	66.2	67.3	3	3	3
H	466 (12.0)	65.9	65.7	67.1	4	4	5
D	591 (15.2)	65.6	65.5	67.1	5	5	4
J	337 (8.7)	65.3	65.0	66.5	6	6	6
E	300 (7.7)	64.2	63.8	65.1	7	8	8
M	97 (2.5)	64.1	64.7	66.1	8	7	7
K	32 (0.8)	64.0	63.1	65.0	9	9	9
C	266 (6.9)	59.8	61.6	63.8	10	10	10
I	303 (7.8)	59.5	61.0	63.3	11	11	11
B	415 (10.7)	55.9	59.0	61.6	12	12	12
A	302 (7.8)	54.1	58.6	61.0	13	13	13
F	153 (3.9)	46.9	53.9	57.7	14	14	14
<b>Gender</b>							
Women	3016 (80.6)	63.6	63.9	65.6	1	1	1
Men	725 (19.4)	59.5	61.6	63.8	2	2	2
<b>Specialty</b>							
Medicine, psychiatry	1163 (29.9)	65.7	65.6	67.0	1	1	1
Biology, imaging, pharmacy	586 (15.1)	62.5	63.1	65.0	2	2	2
Surgery, gynecology, obstetrics	990 (25.5)	62.4	62.9	64.8	3	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	61.3	62.7	64.6	4	4	4
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	57.2	60.1	62.1	5	5	5

**Annex 2 - Table 8:** “Feedback and communication about errors” subgroups scores.

Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	63.0	63.1	63.2	1	1	1
45-54	967 (25.8)	58.2	60.8	61.4	2	2	2
35-44	966 (25.7)	55.6	59.4	60.6	3	3	3
<35	1406 (37.5)	51.9	57.6	58.8	4	4	4
<b>Occupation</b>							
Physicist	457 (12.0)	63.1	62.4	62.6	1	1	2
Technical	775 (20.3)	58.8	61.2	61.9	2	3	3
Nursing assistant	706 (18.5)	58.5	61.0	61.6	3	4	4
Other non-healthcare	26 (0.7)	55.1	62.2	63.1	4	2	1
Nurse	1323 (34.7)	54.7	58.2	59.4	5	5	5
Administrative	347 (9.1)	44.0	56.3	57.6	6	6	6
Other healthcare	179 (4.7)	40.5	53.5	56.0	7	7	7
<b>Department</b>							
M	97 (2.5)	86.6	72.8	71.5	1	1	1
N	158 (4.1)	73.3	68.9	68.1	2	2	2
I	303 (7.8)	61.6	61.3	62.0	3	5	6
L	150 (3.9)	60.2	61.7	62.3	4	4	3
K	32 (0.8)	59.4	61.2	62.3	5	6	4
G	310 (8.0)	59.0	62.2	62.2	6	3	5
B	415 (10.7)	55.6	59.3	60.3	7	8	8
E	300 (7.7)	55.3	60.3	60.8	8	7	7
H	466 (12.0)	54.4	58.5	59.7	9	10	9
D	591 (15.2)	52.8	58.7	59.7	10	9	10
J	337 (8.7)	50.6	56.9	58.5	11	12	12
C	266 (6.9)	50.1	57.1	58.6	12	11	11
A	302 (7.8)	49.3	55.7	57.4	13	13	13
F	153 (3.9)	42.9	52.3	53.8	14	14	14
<b>Gender</b>							
Men	725 (19.4)	57.2	59.5	60.8	1	1	1
Women	3016 (80.6)	55.3	59.4	60.3	2	2	2
<b>Specialty</b>							
Biology, imaging, pharmacy	586 (15.1)	64.6	62.9	63.4	1	1	1
Medicine, psychiatry	1163 (29.9)	58.8	62.2	62.5	2	2	2
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	56.7	59.8	60.8	3	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	51.2	56.5	58.1	4	4	4
Surgery, gynecology, obstetrics	990 (25.5)	49.5	56.4	57.8	5	5	5

**Annex 2 - Table 9: “Staffing” subgroups scores. Ordered according to the AHRQ M1 score, n=3888**

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
<35	1406 (37.5)	34.1	48.2	52.9	1	1	1
>=55	415 (11.1)	33.0	47.4	51.3	2	2	2
35-44	966 (25.7)	31.9	46.6	51.1	3	3	3
45-54	967 (25.8)	30.2	45.5	50.0	4	4	4
<b>Occupation</b>							
Nurse	1323 (34.7)	38.6	49.5	53.5	1	3	3
Other healthcare	179 (4.7)	37.6	51.9	55.6	2	2	2
Other non-healthcare	26 (0.7)	36.4	53.4	55.8	3	1	1
Nursing assistant	706 (18.5)	34.2	45.8	50.5	4	5	4
Technical	775 (20.3)	28.3	46.1	50.4	5	4	5
Physicist	457 (12.0)	28.2	44.7	50.1	6	6	6
Administrative	347 (9.1)	17.0	41.8	47.2	7	7	7
<b>Department</b>							
K	32 (0.8)	54.1	60.5	61.4	1	1	1
N	158 (4.1)	38.7	49.9	53.8	2	4	6
M	97 (2.5)	37.3	50.7	53.9	3	3	4
L	150 (3.9)	37.3	52.6	55.9	4	2	2
C	266 (6.9)	36.4	49.8	53.8	5	7	5
D	591 (15.2)	35.6	49.9	53.8	6	5	7
J	337 (8.7)	35.5	49.9	54.1	7	6	3
H	466 (12.0)	33.9	49.2	53.4	8	8	8
G	310 (8.0)	33.5	46.6	50.8	9	11	11
E	300 (7.7)	32.8	47.3	51.3	10	10	10
I	303 (7.8)	31.6	48.5	52.2	11	9	9
A	302 (7.8)	25.0	41.1	46.4	12	12	12
F	153 (3.9)	24.7	39.7	46.0	13	13	13
B	415 (10.7)	22.6	37.6	44.2	14	14	14
<b>Gender</b>							
Women	3016 (80.6)	33.1	47.2	51.6	1	1	1
Men	725 (19.4)	30.0	46.5	51.5	2	2	2
<b>Specialty</b>							
Medicine, psychiatry	1163 (29.9)	34.1	47.7	51.9	1	2	2
Biology, imaging, pharmacy	586 (15.1)	33.3	49.6	53.2	2	1	1
Anesthesia, reanimation, emergencies	771 (19.8)	32.8	47.2	51.8	3	3	3
Surgery, gynecology, obstetrics	990 (25.5)	32.5	47.2	51.8	4	4	4
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	25.2	39.8	45.8	5	5	5

**Annex 2 - Table 10:** “Hospital management support” subgroups scores. Ordered according to the AHRQ M1 score, n=3888

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	28.0	46.3	49.6	1	1	1
45-54	967 (25.8)	24.3	44.3	48.1	2	2	2
35-44	966 (25.7)	19.6	41.3	45.6	3	3	3
<35	1406 (37.5)	15.9	39.3	44.5	4	4	4
<b>Occupation</b>							
Technical	775 (20.3)	25.1	46.4	49.3	1	2	3
Nursing assistant	706 (18.5)	22.9	40.8	45.4	2	5	6
Administrative	347 (9.1)	22.6	48.2	51.1	3	1	1
Other non-healthcare	26 (0.7)	21.8	46.2	49.3	4	3	2
Physicist	457 (12.0)	18.4	40.8	45.6	5	6	5
Nurse	1323 (34.7)	16.3	37.8	43.2	6	7	7
Other healthcare	179 (4.7)	15.8	43.5	47.7	7	4	4
<b>Department</b>							
M	97 (2.5)	36.4	48.5	51.7	1	1	1
N	158 (4.1)	26.4	45.1	48.9	2	3	3
L	150 (3.9)	23.9	45.9	49.9	3	2	2
F	153 (3.9)	22.1	39.5	44.2	4	13	12
G	310 (8.0)	21.3	41.0	45.6	5	10	10
C	266 (6.9)	21.3	43.3	47.0	6	5	6
B	415 (10.7)	20.0	39.5	44.2	7	12	13
E	300 (7.7)	19.7	40.1	44.8	8	11	11
J	337 (8.7)	19.2	41.0	45.8	9	9	9
H	466 (12.0)	19.1	41.7	46.0	10	8	8
D	591 (15.2)	19.1	42.4	46.6	11	7	7
I	303 (7.8)	17.8	44.7	48.0	12	4	4
A	302 (7.8)	15.5	37.1	42.4	13	14	14
K	32 (0.8)	14.6	42.7	47.5	14	6	5
<b>Gender</b>							
Men	725 (19.4)	22.9	42.4	46.7	1	1	1
Women	3016 (80.6)	19.7	41.7	46.1	2	2	2
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	22.9	41.6	46.0	1	2	2
Biology, imaging, pharmacy	586 (15.1)	22.7	45.5	49.0	2	1	1
Medicine, psychiatry	1163 (29.9)	20.2	41.5	45.8	3	3	3
Surgery, gynecology, obstetrics	990 (25.5)	19.6	41.1	45.6	4	4	4
Anesthesia, reanimation, emergencies	771 (19.8)	17.8	39.9	44.9	5	5	5

**Annex 2 - Table 11: “Teamwork across hospital units” subgroups scores. Ordered according to the AHRQ M1 score, n=3888**

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
>=55	415 (11.1)	37.1	53.0	55.9	1	1	1
45-54	967 (25.8)	37.1	51.9	55.9	2	2	2
<35	1406 (37.5)	34.4	50.6	55.1	3	4	4
35-44	966 (25.7)	34.3	50.8	55.1	4	3	3
<b>Occupation</b>							
Other non-healthcare	26 (0.7)	43.8	55.8	59.0	1	1	1
Physicist	457 (12.0)	42.9	53.5	57.1	2	3	3
Other healthcare	179 (4.7)	37.1	53.7	57.2	3	2	2
Nursing assistant	706 (18.5)	34.8	50.2	54.6	4	6	6
Nurse	1323 (34.7)	34.2	49.9	54.6	5	7	7
Technical	775 (20.3)	34.1	51.8	55.3	6	5	5
Administrative	347 (9.1)	33.3	52.9	56.6	7	4	4
<b>Department</b>							
M	97 (2.5)	39.5	54.4	57.8	1	2	2
N	158 (4.1)	38.1	55.1	58.8	2	1	1
L	150 (3.9)	38.0	51.9	56.2	3	7	5
G	310 (8.0)	37.6	52.0	56.3	4	5	4
F	153 (3.9)	37.6	50.3	54.8	5	10	9
J	337 (8.7)	36.3	52.4	56.6	6	3	3
C	266 (6.9)	35.8	51.9	55.5	7	6	7
D	591 (15.2)	35.7	52.2	55.9	8	4	6
B	415 (10.7)	35.4	50.8	55.1	9	9	8
H	466 (12.0)	34.5	50.0	54.3	10	11	11
I	303 (7.8)	34.0	51.8	54.6	11	8	10
E	300 (7.7)	32.6	49.2	54.0	12	12	12
A	302 (7.8)	31.0	48.0	52.8	13	13	14
K	32 (0.8)	28.1	47.3	52.8	14	14	13
<b>Gender</b>							
Men	725 (19.4)	38.5	52.1	56.1	1	1	1
Women	3016 (80.6)	34.5	51.0	55.2	2	2	2
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	38.1	53.0	57.1	1	1	1
Biology, imaging, pharmacy	586 (15.1)	36.0	52.4	55.6	2	2	2
Surgery, gynecology, obstetrics	990 (25.5)	35.0	50.5	54.8	3	4	5
Medicine, psychiatry	1163 (29.9)	35.0	51.3	55.4	4	3	3
Anesthesia, reanimation, emergencies	771 (19.8)	34.1	50.3	54.8	5	5	4



**Annex 2 - Table 12: “Hospital handoffs and transitions” subgroups scores. Ordered according to the AHRQ M1 score, n=3888**

Variable	n (%)	Scores			Ranks		
		M1	M2	M3	M1	M2	M3
<b>Age classes (years)</b>							
45-54	967 (25.8)	27.0	47.7	52.1	1	1	2
<35	1406 (37.5)	26.3	47.1	52.2	2	2	1
35-44	966 (25.7)	24.0	46.1	51.2	3	4	3
>=55	415 (11.1)	22.2	46.6	50.8	4	3	4
<b>Occupation</b>							
Nursing assistant	706 (18.5)	34.7	48.9	53.6	1	1	1
Nurse	1323 (34.7)	29.0	46.6	51.7	2	3	3
Other non-healthcare	26 (0.7)	24.1	45.1	48.2	3	6	7
Other healthcare	179 (4.7)	23.7	45.7	51.3	4	5	4
Physicist	457 (12.0)	23.2	45.0	49.9	5	7	6
Technical	775 (20.3)	19.2	47.6	51.8	6	2	2
Administrative	347 (9.1)	11.4	46.2	51.2	7	4	5
<b>Department</b>							
G	310 (8.0)	31.4	47.1	52.4	1	6	4
D	591 (15.2)	29.0	48.5	53.0	2	1	2
F	153 (3.9)	28.7	47.6	52.3	3	4	6
B	415 (10.7)	28.6	46.8	51.9	4	8	8
H	466 (12.0)	28.5	47.1	52.2	5	7	7
J	337 (8.7)	28.4	48.3	52.8	6	2	3
E	300 (7.7)	26.7	46.0	51.3	7	9	9
N	158 (4.1)	25.9	47.9	53.2	8	3	1
A	302 (7.8)	24.8	47.5	52.3	9	5	5
C	266 (6.9)	21.9	45.3	50.4	10	11	10
K	32 (0.8)	21.1	41.2	47.3	11	14	14
M	97 (2.5)	14.4	44.6	48.7	12	12	12
L	150 (3.9)	13.6	43.7	48.8	13	13	11
I	303 (7.8)	9.4	45.5	48.5	14	10	13
<b>Gender</b>							
Women	3016 (80.6)	25.6	46.9	51.7	1	2	2
Men	725 (19.4)	24.6	47.2	52.1	2	1	1
<b>Specialty</b>							
Home care, nursing home, follow-up care, rehabilitation	378 (9.7)	32.4	48.5	53.5	1	2	1
Anesthesia, reanimation, emergencies	771 (19.8)	28.8	48.8	53.3	2	1	2
Surgery, gynecology, obstetrics	990 (25.5)	28.6	47.1	52.1	3	3	3
Medicine, psychiatry	1163 (29.9)	24.9	45.8	51.1	4	4	4
Biology, imaging, pharmacy	586 (15.1)	11.5	45.2	49.0	5	5	5

## Variabilité des méthodes de scorage de l'Hospital Survey On Patient Safety Culture

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### RESUME

**Objectifs** - Évaluer la variabilité des scores des dimensions de culture de sécurité et leurs rangs de classement associés selon trois différentes méthodes de scorage de l'*Hospital Survey On Patient Safety Culture*.

**Type d'étude** - Étude transversale utilisant un questionnaire auto administré, conduite entre avril 2013 et novembre 2014 au centre hospitalo-universitaire de Grenoble.

**Participants** - Tout personnel hospitalier présent depuis au moins 6 mois et travaillant à au moins 50% dans l'hôpital pouvait participer. Les répondants étaient secondairement exclus selon les critères définis par l'*Agency for Healthcare Research and Quality* (AHRQ).

**Méthode** - Les pourcentages de réponses positives (M1) recommandés par l'AHRQ, les moyennes individuelles (M2) et les sommes individuelles (M3) ont été calculés. Leurs intervalles de confiance à 95% (IC95) respectifs ont été estimés par une méthode bootstrap percentile après remise à l'échelle.

**Résultats** - Le taux de réponses était de 78.6% (n=3978), en majorité des infirmières. En comparaison avec M2 et M3, la méthode de référence sous estimait les scores dans les dimensions peu développées et donnait des résultats moins précis dans les dimensions plus développées. Il en résultait des variations substantielles des rangs de classement associés en fonction des classes d'âge, sexes, spécialités ou types de métiers. Les IC95 se chevauchaient quelle que soit la méthode évaluée.

**Conclusion** - Les scores des dimensions de culture de sécurité et leurs rangs de classement dépendaient de la méthode utilisée pour les estimer. La méthode de référence donnait les moins bons résultats et l'utilisation de moyennes individuelles semblerait plus judicieuse.

### MOTS CLES

culture sécurité, HSOPSC, variabilité, scores, rangs de classement

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