Learning from Errors in Hospitals: Implications for Performance and Suboptimal Care in Medical Departments[1]

Florina Spânu*
Mara Bria**
Adriana Băban***

Abstract: *Over the last twenty years, the Romanian health care system has been struggling with a never-ending reform process aiming at improving its performance as a whole. A way to improve organizational performance is through collective learning – by exploiting organizations past experiences as learning opportunities. This study investigates the relationship between collective learning practices, namely, communication and analysis of errors, and performance, and suboptimal care in medical departments. Survey data were collected from a sample of 946 health professionals in two county hospitals in Transylvania. The mean age of the participants is 38.91 (σ = 9.93), and most of participants are nurses (68%). Results indicate that communication and analysis of errors in medical departments is positively associated with performance (β = .365, p< .01) and negatively associated with suboptimal care behaviours (B = -.245, p<.01), after controlling for the effect of age, sex, organizational position and job demands. Results have implications for initiatives aiming at improving the performance of medical organizations, by stressing the role of human resources development and teamwork as important assets for success. They also stress the role of bottom-up, as opposed to top-down interventions, in improving medical performance and the quality of the medical care provided to patients.*

Keywords: hospitals; health professionals; collective learning; performance; suboptimal care.
Cuvinte-cheie: spital; personal medical; învățare colectivă; performanță; îngrijire suboptimă.

Introduction

After more than twenty years of restructuring, the Romanian health care system still struggles in its efforts to enhance its overall performance and to improve the health status of the population (Vlădescu et al., 2008). Over the years, structural and legislative changes have been made in order to optimize the use of funds and to improve health professionals' satisfaction and patients' access to high quality medical services (Bara et al., 2002; Scîntee and Vlădescu, 2006). In spite of all these efforts, the initial expectations are yet to be met. Romania still ranks low on the list of EU countries in terms of providing access to health care and answering

* Department of Psychology, Babes-Bolyai University, 37, Republicii Street, Cluj-Napoca, Romania. E-mail: florinaspanu@psychology.ro.
** Department of Psychology, Babes-Bolyai University, 37, Republicii Street, Cluj-Napoca, Romania. E-mail: marabria@psychology.ro.
*** Department of Psychology, Babes-Bolyai University, 37, Republicii Street, Cluj-Napoca, Romania. E-mail: adrianababan@psychology.ro.

patients' medical needs (Anton, 2012; Olaru, 2013; Rebeleanu et al., 2013; Vlădescu and Astărăstoae, 2012). Highly specialized health care professionals choose to work abroad more often than ever (Cehan and Teodorescu, 2012), while informal health care payments have transformed into a norm (Ungureanu et al., 2013; Vlădescu et al., 2008) and are considered to have an important contribution to the survival of the system.

The side effects of the never ending reform are pervasive. Throughout the system, individual initiatives for change are blunt. Performance improvement is thought to be the prerogative of top-down initiatives by means of legislative changes. At the same time, health professionals receive these top-down measures – often implemented without appropriate infrastructure – with resentment and frustration, as they add to the strain of an already understaffed workforce (Spânu et al., 2012). The highly trained personnel, which could have been one the most valuable assets of the system during the reform process, is again and again marginalized and deepens into a culture of organizational learned helplessness (Spânu et al., 2012). The same type of culture threatens the individual efforts for improvements. Local initiatives for increasing patient safety and quality of medical care – driven by individual health professionals, medical departments, clinics or even hospitals – are rarely heard of and no efforts are made to replicate the few exceptions. Failing to acknowledge these sort of bottom-up, local initiatives that have been successful in enhancing performance in small organizational units within the system is a drawback to the efforts of improving the performance of the system as a whole.

Research in the field of organizational behaviour shows that within the same larger organization, it is very common to have units that perform at very high standards, and units that perform in a rather mediocre manner (Edmondson, 1999; Edmondson, 2002). One way to improve the performance of an entire organizational system is to detect highly performing units – such as medical departments, clinics or even hospitals that function within it – and to use their experience by leveraging what lead to their success beyond their organizational boundaries. This captures the process of organizational or collective learning – through which organizations reflect on their current or past actions, and use the lessons learned to improve future performance (Argyris, 2000; Fiol and Lyles, 1985).

Collective learning in medical settings

In the early 2000s, the "To Err is Human" report issued by the US Institute of Medicine (IOM) brought the topic of collective learning to the attention of medical organizations around the world. The report estimated that every year, 44,000 – 98,000 US patients die in hospitals as a result of medical errors, and set learning from medical errors and failures as a priority for healthcare organizations in their efforts to increase patients' safety, improve quality of care, and reduce the costs associated with prolonged hospitalization and treatment due to medical mishaps (Kohn et al., 2000). IOM outlined several directions that could be followed in order to design safer and more reliable health care systems. Empowering patients, acknowledging the role of teams and teamwork in the medical field, and transforming health care organizations into learning organizations – capable of using their own and other organizations' experience in order to improve future performance – were set among the priorities (Committee on Quality of Health Care in America, IOM, 2001). Similar system level initiatives were also taken in other countries (NHS, An Organisation

with a Memory, 2000; Australian Commission on Safety and Quality in Healthcare, 2010). In 2004, The World Health Organization (WHO) launched the World Alliance for Patients Safety, praising the role of learning from experience as the most important path to improve patient safety, and encouraging the implementation of reliable error reporting systems in medical organizations around the world (WHO, 2012). To date, in Romania, no formal organizational learning mechanisms – such as an error reporting system – were implemented and there is a lack of reliable data on the magnitude of the phenomenon, as well as a lack of means to convert medical errors and mishaps in learning opportunities.

An alternative to formal collective learning from errors mechanisms in hospitals

Implementing error reporting systems was a major breakthrough in the efforts to avoid future failures by learning from past experiences, and has undeniable virtues (Aspden et al., 2006; Edwards, 2012; Leape, 2002; Woodward et al., 2004). Unfortunately, such formal learning mechanisms sometimes fail in real medical organizations (Iedema et al., 2006; Iedema et al., 2011; Waring, 2005), due to a professional culture often characterized as a culture of fear and defensiveness (Berwick and Leape, 1999; Catino, 2009; Collins et al., 2009). The alternative comes from field research into work group behaviour. Increasing support from both medical (Edmondson, 1996; Lipshitz and Popper, 2000) and non-medical settings (Edmondson, 1999; Edmondson, 2002) shows that learning from failures draws extensively on teamwork, trust and cooperation, irrespective of the available formal learning mechanisms (Edmondson, 1996; Iedema et al., 2011). This line of research shows that collective learning in organizations tends to be a local phenomenon that builds on the quality of the interpersonal climate within work units, such as medical teams (Edmondson, 1996; Edmondson, 2003) or medical departments (Lipshitz and Popper, 2000; Hirak et al., 2012). In a review of empirical studies investigating such collective learning practices in medical settings (Spânu and Băban, 2013) several organizational behaviours through which the process takes place were identified such as open communication about problems and errors, feedback seeking, experimenting new ways of doing things, information sharing among colleagues, or reflection on the day to day activities. The current study focuses on two distinct collective learning behaviours – error communication and error analysis – investigating their impact on outcomes such as department's performance and suboptimal care behaviours displayed by health professionals.

Consequences of collective learning practices in medical organizations

The same review (Spânu and Băban, 2013) found that very few studies report empirical data linking collective learning practices in medical organizations and outputs concerning patients or medical performance. Although empirical support is scarce, evidence was found that open communication, experimenting, and reflection on team's own actions increases the long-term success in adopting and implementation of a newly minimally invasive cardiac procedure in surgical teams (Edmondson et al., 2001; Edmondson, 2003). Field research also found that open communication about errors is associated with perceived unit performance in nurse units (Edmondson, 1996), and that learning from failures predicts self-rated unit performance three months later in medical

departments (Hirak et al., 2012). Based on these findings, we hypothesized that:

H1a. Error communication is positively associated with performance in medical departments.

H1b. Error analysis is positively associated with performance in medical departments.

Although there is still little empirical support on the link between learning from failures and better care provided to patients, in theory the two constructs are related. Better communication about errors and mishaps inside a medical unit should lead to avoiding making the same kind of mistakes within the unit (Kohn et al., 2000), and thus contribute to the quality of medical services provided by the unit as a whole. One way to measure the quality of care provided by a medical unit is to report on the amount of suboptimal care behaviours (Shanafelt et al., 2002) displayed by its members. We thus hypothesized that when departments' members engage less in error communication and error analysis, they will report higher levels of suboptimal care behaviours.

H2a. Error communication is negatively associated to suboptimal care behaviours in medical departments.

H2b. Error analysis is negatively associated to suboptimal care behaviours in medical departments.

Method

Participants and procedure

Cross-sectional survey data were collected in May 2012 from two hospitals in Transylvania, a county emergency hospital (N = 458) and an emergency teaching hospital (N = 488). Data collection was part of a larger research project also investigating organizational factors influencing health professionals' work experience and well-being. In April 2012 we contacted the heads of the two hospitals and informed them about the aims of our research and the data collection procedure. They agreed to collaborate and we provided a brief feedback report of the data collected on each site, in return. Questionnaires were distributed along with envelops that could be sealed after completion, in order to protect the confidentiality and the anonymity of the participants. Data collection was facilitated by the human resources manager, in one hospital, and by the quality of care manager, in the other.

A total number of 946 health professionals from 60 medical and surgical departments ($4 \leq N \geq 80$) filled in the questionnaire. The vast majority of the participants are women (83.2%). The mean age of the sample is 38.70 (SD = 9.87). Doctors represent 12.9% of the sample, residents represent 10.1%, nurses represent 68%, 7% have another organizational position (e.g. midwife, social worker, nurse assistant), and 1.2% did not provide information regarding their organizational position.

Instruments

All instruments used were adapted for medical settings. Items are presented in Appendix A, the initial English version of the scales and the adapted Romanian translation used for this study. The English version for the job demands items is not provided in Appendix A, as the translation was done from the initial Dutch version directly (Van Veldhoven et al., 2002).

Independent variables

Error communication (four items, e.g. "In our department, mistakes are discussed among each other") and error analysis (four items, e.g. "After making a mistake, the department tries together to analyse what caused it") were measured using two scales developed by Savelsbergh and collaborators (2009). The instrument was

developed to measure collective learning practices within teams working in organizations using a scale from 1 (never) to 5 (always). We adapted the items so that whenever they referred to "the team", they were rephrased, in order to refer to "the department". Although in the original instrument the eight items were design to measure two distinct learning behaviours, results of the confirmatory factor analysis revealed a very good fit to the data, when all items load on a single factor (see Results section), and we used all items to measure a single overall dimension that we called communication and analysis of errors.

Dependent variables

Department performance was measured using a self-rated instrument measuring overall performance, developed by Edmondson (1996). Participants were also instructed to refer to their department's performance and not to their unit's performance, as in the original scale. We used five items such as "Patients often complain about how this department functions (R)" or "Recently, this department seems to be "slipping" a bit in its level of performance and accomplishments (R)". Items were measured on a scale from 1 (strong agreement) to 5 (strong disagreement).

Suboptimal care was measured using five items from the instrument developed by Shanafelt and collaborators (2002) measuring behaviours that describe suboptimal care provided to patients. The items were adapted so that they would catch unit practices, and not individual behaviours, as the initial scale did. For example, the item "I found myself discharging patients to make the service 'manageable' because the team was so busy" was rephrased and used as "There were situation in which we discharged patients to make the service 'manageable' because the department was so busy." Items were measured on a scale from 1 (never) to 5 (weekly).

Control variables

Age, sex, organizational position, work volume (number of working hours per week) and job demands were used as control variables. We decided to control for job demands, after previous research has shown that it has a negative impact on performance (Bakker et al., 2004) and because high demands might interfere with health professionals' availability to engage in collective reflexive practices, such as error communication and analysis. Job demands were measured using three scales from the instrument developed by Van Veldhoven et al. (2002). The three scales measure: workload (11 items, e.g. "I work under time pressure"), cognitive demands (7 items, e.g. "I have to work with a lot of precision") and emotional demands (7 items, e.g. "My work puts me in emotionally upsetting situations"). All items were measured on a scale from 0 (never) to 3 (everyday). The scales were computed using the pondered formula provided in the manual (Van Veldhoven et al., 2002).

Data analysis

Prior to hypotheses testing, we conducted several preliminary analyses. We used confirmatory factor analysis (CFA) to test whether the translated versions of the scales preserved their sound psychometric properties (Byrne, 2010). Data are considered to fit the model when chi square (χ^2) is non-significant. Given that χ^2 is influenced by sample size, alternative fit indices are considered when investigating model fit: Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Normed Fit Index (NFI). Values of CFI, GFI and NFI above .95 indicate very good model fit, although values above .90 indicate appropriate fit. Root mean square

error of approximation (RMSEA) was also calculated. Values below .05 are recommended for a very good model fit, although this value is often considered too restrictive and values below .08, or even .10 are considered indicators of acceptable fit (Byrne, 2010).

Hypotheses testing was done using hierarchical multiple regression in SPSS 21.0 (Field, 2005).

Results

Preliminary analyses – psychometric properties of the scales

Given that in the original instrument (Savelsbergh et al., 2009) error communication and error analysis scales were supposed to measure two distinct learning behaviours, we tested the two factors model against an alternative one-factor model (Byrne, 2010). We found that both models have very good fit indices. The difference in chi square ($\Delta \chi^2 = 12.772$, $\Delta df = 1$, $p = .001$) showed a slightly, but significantly, better fit to the data of the two factors model ($\chi^2 = 102.908$, df = 19, CFI = .994, GFI = .974, NFI = .980, RMSEA = .068) over the one factor model ($\chi^2 = 115.680$, df = 20, CFI = .982, GFI = .970, NFI = .978, RMSEA = .071). Given that the one factor instrument also showed a high internal consistency coefficient ($\alpha = .933$), we decided to use the 8 items scale measuring overall communication and analysis of errors. We also tested if the two dependent variables, unit performance and suboptimal care, measure two distinct constructs. The two factors structure was tested against an alternative single factor structure. Results indicated a significantly better fit to the data of the two factors structure ($\chi2 = 154.002$, df = 34, CFI = .956, GFI = .967, NFI = .945, RMSEA = .061, $\Delta \chi2 = 412.709$, $\Delta df = 1$, $p = .001$) when compared to the single factor structure ($\chi2 = 566.711$, df = 35, CFI = .805, GFI = .861, NFI = .796, RMSEA = .127). The two scales also have good internal consistency coefficients with $\alpha = .802$ for suboptimal care, and $\alpha = .775$ for unit performance. The job demands scales also have high reliability coefficients ranging from .732 for cognitive demands to .831 for workload. All internal consistency coefficients are presented in bold in Table 1.

Preliminary analyses – descriptive statistics and Pearson correlations

Means, standard deviations and Pearson correlations are also presented in Table 1. Organizational position was dummy codded (Field, 2005). Sex was codded 0 for males and 1 for females. Age was positively associated with higher levels of reporting emotional demands ($r = .146$, $p<.01$), communication and analysis of errors ($r = 146$, $p<.01$), performance ($r = .092$, $p<.01$), and lower levels of suboptimal care ($r = -.082$, $p<.05$). Work volume was marginally, yet significantly, associated with suboptimal care ($r = .084$, $p<.05$). As expected, workload was positively associated with cognitive ($r = .404$, $p<.01$) and emotional demands ($r = .601$, $p<.01$), but also with suboptimal care ($r = .184$, $p<.01$), and negatively associated with learning from errors ($r = -.122$, $p<.01$) and unit performance ($r = - .280$, $p<.01$). Cognitive demands were not associated with unit performance ($r = -.028$, $p=.403$) or suboptimal care ($r = .004$, $p=.895$), and were excluded from further analyses. Emotional demands were significantly and positively associated with suboptimal behaviours ($r = .207$, $p<.01$), and positively associated with unit performance ($r = -.258$, $p<01$). Learning from errors was strongly correlated with both unit performance ($r = .400$, $p<.01$) and suboptimal care ($r = -.302$, $p<.01$).

Table 1: *Pearson correlation and internal consistency coefficients (in bold) for all the studied variables*

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Sex	-	-	-												
2. Age	38.917	9.930	-	-											
3. Doctor	-	-	-	-	-										
4. Resident	-	-	-	-	-	-									
5. Nurse	-	-	-	-	-	-	-								
6. Other	-	-	-	-	-	-	-	-							
7. Work volume	46.730	15.886	-.054	-.058	.058	-.053	-.018	-.022	-						
8. Workload	59.307	18.335	.083*	-.037	.011	-.012	.037	-.066*	.059	**.831**					
9. Cognitive demands	89.771	13.154	.023	.032	.065*	.049	.057	-.248**	.057	.404**	**.732**				
10. Emotional demands	49.156	20.075	.006	.146**	.210**	-.043	-.100**	-.048	.054	.601**	.329**	**.773**			
11. Communication and analysis of errors	3.870	1.080	.101**	.146**	-.088**	-.226**	.169**	.068*	.039	-.122**	.029	-.064*	**.933**		
12. Suboptimal care	1.543	0.739	-.126**	-.082*	.180**	.161**	-.184**	-.096**	.084*	.184**	.004	.207**	-.302**	**.802**	
13. Unit performance	3.932	0.878	.032	.098**	-.047	-.102**	.100**	-.001	-.038	-.280**	-.028	-.258**	.400**	-.498**	**.775**

Notes: Sex (0 = male, 1 = female); for measuring work volume, participants were asked to self-report the number of hours worked per week; when measuring communication and analysis of errors, suboptimal care and unit performance, participants were instructed to refer to their department as a whole, and not to individual behaviours.

*p<.05, **p<.01

Hypotheses testing

Multiple hierarchical analysis in three steps was used for hypotheses testing. Age, sex, organizational position, work volume were entered in step one, followed by job demands (emotional demands and workload) in step two, and learning from errors in step three. This way we were able to test for the effect of communication and analysis of errors, after controlling for the effects of the variables entered in the first two steps (Field, 2005). Two different regression analyses were performed, with suboptimal care and unit performance as criteria variables. Results are presented in Table 2. The difference in R^2 shows whether variables entered in each new step bring a significant contribution in explaining the variance of the dependent variable (Field, 2005).

Given that error communication and error analysis were measured as one overall dimension, we will be referring to H1a and H1b as the first hypothesis, and to H2a and H2b as the second hypothesis. We found support for our first hypothesis. Results of the regression analysis showed that the variable entered in the third step explain 12% of the variance of the performance score (ΔR^2 = .120, F(1, 898) = 141.209, p < .01). Communication and analysis of errors significantly predicts the performance level within the department, as assessed by its members (β = .365, p < .01). The second hypothesis was also supported by our data. Regression analysis found that the variable entered in the third step explain 5.4% in the variance of the suboptimal care behaviours reported by members (ΔR^2 = .054, F(1, 815) = 53.515, p < .01). Communication and analysis of errors was found to predict (β = - .245, p < .01) suboptimal care.

Results also found that job demands explain 9.1% of the variance in the performance score (ΔR^2 = .091, F(2, 899) = 45.940, p < .01), and that both workload (β = - .136, p < .01) and emotional demands (β = - .163, p < .01) predict unit performance as rated by departments' members. Only emotional demands was found to predict (β = .139, p < .01) suboptimal care, also (R^2 = .041, F(2, 816) = 19.123, p < .01). None of the variables entered in step one were found to predict unit performance, and only work volume (β = .066, p < .05) was found to predict suboptimal care.

Table 2: *Results of hierarchical regression analysis*

	Suboptimal care behaviours				**Unit performance**			
	β	ΔR^2	F	p	β	ΔR^2	F	p
Step 1		.089	11.393	.001		.024	4.353	.001
Sex	-.061							
Age	-.071				.063			
Doctor	.209				-.050			
Resident	.163				-.048			
Nurse	.096				-.059			
Other	-.013				-.070			
Work volume	.066*							
Step 2		.041	19.123	.001		.091	45.940	.001
Workload	.064				-.136**			
Emotional demands	.139**				-.163**			
Step 3		.054	53.515	.001		.120	141.209	.001
Communication and analysis of errors	-.245**				.365**			

Notes: *p<.05, **p<.01

Discussions

This study investigated the relation between collective learning behaviours, operationalized as communication and analysis of errors, and self-rated measures of unit performance and suboptimal care behaviours displayed by health professionals. We found that engaging in communication and analysis of errors is associated with both unit performance and suboptimal care. The results are in line with findings of previous studies conducted in medical settings. In a mixed methods study, Edmondson (1996) found that open communication about errors was associated with performance in nurse units, while Hirak and collaborators (2012) found similar results in a longitudinal study investigating learning from failures in medical departments. Outside the medical field, evidence for the relation between collective learning behaviours and performance was found across organizational settings in the construction industry (Savelsbergh et al., 2012), the manufacturing industry (Edmondson, 1999), the oil industry (Van der Vengt and Bunderson, 2005), or the pharmaceutical industry (Zellmer-Bruhn and Gibson, 2006).

Our findings show that departments that were assessed by health professionals as engaging more in collective learning behaviours, such as communication and analysis about errors, were also rated as having a better performance and as displaying less suboptimal care behaviours in relation with their patients. This suggest that reflecting on past experiences, especially failures, can act as a facilitator in the efforts to improve overall performance of medical departments and reduce the amount of suboptimal care behaviours displayed within the department. Such findings support the allegation that initiatives for performance improvement can come by means of local, bottom-up efforts driven by organizational units within the health system, such as medical departments, provided that these initiatives are leveraged beyond their organizational boundaries.

Some measures to improve the quality medical care for patients – such as medical services availability in remote areas – are dependent of structural and legislative changes, and are rather difficult to be influenced by local initiatives. Others – such as the prevention of drug-related errors or iatrogenic infections – can be more easily addresses by medical units and departments if incidents are acknowledged and openly discussed, in order to avoid them in the future. As the Romanian medical system currently lacks any effective means of monitoring medical errors, as well as any instruments for preventing them, health professionals' individual and collective initiatives to monitor and correct errors and mishaps is one of the few learning instruments available for improving quality and safety of medical care. This reality has implications for human resources development in the field, as previous research has found that leaders have an important contribution in facilitating reflective practices, such as error communication and analysis (Edmondson, 2003; Edmondson, 1996; Lipshitz and Popper, 2000; Spânu et al., 2013). Research has shown that leaders, either heads of medical teams (Edmondson, 1996; Edmondson, 2003) or heads of departments (Hirak et al., 2012; Lipshitz and Popper, 2000) that display behaviours such as admitting one's mistakes, sharing information or asking for feedback, are more likely to facilitate an interpersonal climate in which subordinates feel secure to speak openly about their problems and failures. Developing such a safe interpersonal climate stresses the importance of teamwork and collaboration among health professionals in the efforts to improve patients' safety and quality of care.

Romanian health professionals are often appreciated for their technical skills. But high quality medical care and patients' safety goes beyond technical training and draws on doctor – patient interaction, teamwork, coordination among medical units and a culture of trust in which failures are openly discussed, in order to improve future performance and not just to find someone to blame (Kohn et al., 2000). The challenges of nowadays medical organizations are organizational as much as clinical (Ramanujam et al., 2006), and the acknowledgement of this reality led to changes of policy in educating medical students around the world. In 2009, WHO World Alliance for Patient Safety launched the "WHO Patient Safety Curriculum Guide for Medical Schools". The document stresses the importance of a medical school curriculum that includes topics such as the role of human factors in patient safety, understanding complex organizational systems, being a team player, learning from errors, managing clinical risk, methods for quality improvement, interacting with patients and carers, infection control methods or safety medication (WHO, 2009). Medical schools in Romania ought to consider such topics in their curriculum, as they are one of the most powerful spreader of knowledge and professional culture.

Limitations

Our study is not without limitations. Data were collected in a cross-sectional design and the causality relation should be regarded with caution. Future research might consider testing the relation between collective learning and performance, in longitudinal designs. The sample consisted mostly in women and nurses, and one might argue that this can bias the results, although we found no evidence that either gender or organizational position has an important contribution in explaining the dependent variables. The items of the questionnaire might have trigger socially desirable answers. We tried to diminish the effect of this bias by distributing and collecting the questionnaires in sealed envelopes, to ensure anonymity and confidentiality of the answers.

Conclusions

Initiatives for improving the quality of medical services provided to patients can come from local organizational entities within the system, such as departments, through bottom-up processes. By encouraging and disseminating effective practices of successful departments beyond their organizational boundaries, the performance of the system as a whole can be improved. A simplistic understanding of institutional development as being driven exclusively by top-down processes is detrimental to the systems as a whole. Local initiatives for quality of care improvement should be nurtured, encouraged and disseminated across the system.

Note

[1] This work was possible with the financial support of: Investing in people! PhD scholarship, Project co-financed by the European Social Fund, SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCES DEVELOPMENT 2007-2013. Babeş-Bolyai University, Cluj-Napoca, Romania.

References

Argyris, C. (2000) *On Organizational Learning* (2nd Edition). Malden, MA: Blackwell.

Anton, S. G. (2012) Financing Health Care in Romania and Implications on the Access to Health Services. *The USV Annals of Economics and Public Administration*, 12, 195-200.

Aspden, P., Wolcott, J., Bootman, J. L. and Cronenwett, L. R. (2006) *Preventing Medication Errors: Quality Chasm Series* (1st edition). Washington, DC: The National Academies Press.

Australian Committee on Safety and Quality in Healthcare (2010) Australian Safety and Quality Framework for Health Care. Available at http://www.safetyandquality.gov.au/wp-content/uploads/2012/04/Australian-SandQ-Framework1.pdf. Accessed on August, 2012.

Bakker, A. B., Demerouti, E. and Verbeke, W. (2004) Using the job demands–resources model to predict burnout and performance. *Human Resource Management*, 43, 83-104.

Bara, A.-C., van den Heuvel, W. J. A. and Maarse, J. A. M. (2002) Reforms of Health Care System in Romania. *Croatian Medical Journal*, 43, 446-452.

Berwick, D. M. and Leape, L. L. (1999) Reducing errors in medicine. *Quality in Health Care*, 8, 145-146.

Byrne, B. M. (2010) *Structural Equation Modelling with AMOS*. Routledge.

Catino, M. (2009) Blame culture and defensive medicine. Cognition, *Technology & Work,* 11, 245-253. DOI: 10.1007/s10111-009-0130-y.

Cehan, I. and Teodorescu, C. (2012) Migration of Health Care Staff – Between Social Responsibility and the Right to Freedom of Movement. *Romanian Journal of Bioethics*, 10, 106-114.

Collins, M. E., Block, S. D., Arnold, R. M. and Christakis, N. A. (2009) On the prospects for a blame-free medical culture. *Social Science and Medicine*. 69, 1287-90.

Committee on the Quality of Health Care in America (2001) Crossing the quality chasm: a new health system for the 21st century. National Academy Press, Washington DC. Available at http://www.nap.edu/catalog/10027.html. Accessed on August, 2012.

Edmondson, A. C. (1996) Learning from mistakes is easier said than done: group and organizational influences on the detection and correction of human error. *Journal of Applied Behavioral Science*, 32, 5-28.

Edmondson, A. C. (1999) Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*, 44, 350-383.

Edmondson, A. C. (2002) The local and variegated nature of learning in organizations: A group-level perspective. *Organization Science*, 13, 128-146.

Edmondson, A.C. (2003) Speaking Up in the Operating Room: How Team Leaders Promote Learning in Interdisciplinary Action Teams. *Journal of Management Studies*, 40, 6, 1419–1452.

Edmondson, A. C., Bohmer, R. M. and Pisano, G. P. (2001) Disrupted Routines: Team Learning and New Technology Implementation Hospitals. *Administrative Science Quarterly*, 46, 4, 685-716.

Edwards, N. (2012) *Improving Hospitals and Healthcare Delivery Systems. A report on the priorities for strengthening the hospital and health care delivery systems in the WHO European Region.* World Health Organization.

Expert Group on Learning from Adverse Events in the NHS (2000) *An organisation with a memory*. London: Stationery Office.

Field, A. (2005) *Discovering Statistics using SPSS* (2nd ed.). London: Sage Publications.

Fiol, C. M. and Lyles, M. A. (1985) Organizational Learning. *Academy of Management Review*, 10, 803-813.

Hirak, R., Peng, A. C., Carmeli, A. and Schaubroeck, J. M. (2012) Linking leader inclusiveness to work unit performance: The importance of psychological safety and learning from failures. *The Leadership Quarterly*, 23, 107-117.

Iedema, R., Allen, S., Sorensen, R. and Gallagher, T. H. (2011) What prevents incident disclosure, and what can be done to promote it? *Joint Commission journal on quality and patient safety*, 37, 409-17.

Iedema, R., Jorm, C. M., Braithwaite, J., Travaglia, J. and Lum, M. (2006) A Root Cause Analysis of clinical error: Confronting the disjunction between formal

rules and situated practice. *Social Science & Medicine*, 63, 1201-1212.

Kohn, L. T., Corrigan, J. M. and Donaldson, M. S. (2000) *To Err Is Human: Building a Safer Health System*. Washington: National Academy Press.

Leape, L. L. (2002) Striving for Perfection. *Clinical Chemistry*, 48, 1871-1872.

Lipshitz, R. and Popper, M. (2000) Organizational learning in a hospital. *Journal of Applied Behavioral Science*, 36, 345-361.

Olaru, B. (2013) Inequalities in access to healthcare. A comparison between Romania and the European Union. *Revista Română de Bioetică* [*Romanian Journal of Bioethics*], 1, 111-122.

Ramanujan, R. and Rousseau, D. M. (2006) The challenges are organizational not just clinical. *Journal of Organizational Behaviour*, 27, 1, 811-827.

Rebeleanu, A., Şoitu, D., Gavrilovici, C. and Oprea, L. (2013) Equity and Respect of the Insured Rights – Implications Related to Access to Primary Healthcare. *Revista Română de Bioetică* [*Romanian Journal of Bioetics*], 11, 148-158.

Savelsbergh, C., Gevers, J. M. P., Heijden, B. I. J. M. van der and Poell, R. F. (2012) Effects of team role stress on team learning and performance in project teams. *Group and Organization Management*, 37, 1, 67-100.

Savelsbergh, C., van der Heijden, B. I. J. M. and Poell, R. F. (2009) The development and empirical validation of a multi-dimensional measurement instrument for team learning behaviors. *Small Group Research*, 40, 578-607.

Scîntee, S. G. and Vlădescu, C. (2006) Recent issues of the Romanian health financing system. *Journal of Public Health*, 14, 237-245.

Shanafelt, T. D., Bradley, K. A., Wipf, J. E. and Back, A. L. (2002) Burnout and self-reported patient care in an internal medicine residency program. *Annals of Internal Medicine*, 136, 358-367.

Spânu, F. and Băban, A. (2013) A Review of Empirical Studies Investigating Antecedents and Consequences of Collective Learning Behaviors in Hospitals. *Psihologia Resurselor Umane* [Human Resources Psychology], 11, 65-82

Spânu, F., Băban, A., Bria, M., Lucacel, R, Florian, I. S. and Rus, L. (2013) Error Communication and Analysis in Hospitals: The Role of Leadership and Interpersonal Climate. *Procedia - Social and Behavioral Sciences*, 84, 9, 949-953. doi: 10.1016/j. sbspro.2013.06.680

Spânu, F., Băban, A., Bria, M. and Dumitraşcu, D. L. (2012) What happens to health professionals when the ill patient is the health care system? [ORCAB Special Series] *British Journal of Health Psychology*. doi:10.1111/bjhp.12010

Ungureanu, M. I., Litan, C. M., Rus, I. A. and Cherecheş, R. M. (2013) A Brief Insight into the Study of Informal Health Care Payments in Romania. *Transylvanian Review of Administrative Sciences*, 39, 212-219.

Van Der Vegt, G. S. and Bunderson, J. S. (2005) Learning and Performance in Multi-disciplinary Teams: The Importance of Collective Team Identification. *Academy of Management Journal*, 48, 3, 532-549.

Van Veldhoven, M., Meijman, T., Broersen, J. and Fortuin, R. (2002) *Handleiding VBBA* [Manual QEEW]. Amsterdam: SKB.

Vlădescu, C. and Astărăstoae, V. (2012) Policy and Politics of the Romanian Health Care Reform. *Romanian Journal of Bioetics*, 10, 89-99.

Vlădescu, C., Scîntee, G., Olsavszky, V., Allin, S. and Mladovsky, P. (2008) Romania: Health system review, in S. Allin and P. Mladovsky (eds.), *Health Systems in Transition*, 10, 1-172. Copenhagen: European Observatory on Health Systems and Policies.

Waring, J. J. (2005) Patient safety: new directions in the management of health service quality. *Policy and Politics*, 33, 675-692.

Woodward, S., Randall, S., Hoey, A. and Bishop, R. (2004) *Seven steps to patient safety. The full reference guide* (2nd print). National Patient Safety Agency.

World Health Organization (2009) WHO Patient Safety Curriculum Guide for Medical Schools. Available at http://whqlibdoc. who.int/publications/2009/9789241598316_ eng.pdf. Accesed on December 17, 2013.

World Health Organization (2012) World Alliance for Patient Safety. Available at http://www.who.int/patientsafety/worldallia nce/en. Accesed on September 20, 2012.

Zellmer-Bruhn, M. and Gibson, C. (2006) Multinational organization context: implications for team learning and performance. *Academy of Management Journal*, 49, 3, 501-518.

Appendix A – Items used to measure all variables

Scale	English version	Romanian version (adapted for medical units)
Communication and Analysis of Errors (adapted from Savelsbergh et al., 2009)	*Error communication* 1. Department members communicate their mistakes, to prevent that others make the same mistake. 2. We discuss errors within our department, because errors and their solutions can deliver important information. 3. In our department, mistakes are discussed among each other. 4. Errors are discussed openly. *Error analysis* 1. After making a mistake, in our department we try together to analyze what caused it. 2. In this department, we think that it is useful to analyze errors. 3. If something has gone wrong, in our department we take the time to think it through. 4. After an error has occurred, it is analyzed thoroughly in this department.	*Comunicarea despre erori* 1. Angajaţii din această secţie discută despre greşelile pe care le fac, pentru ca alţii să nu facă aceeaşi greşeală. 2. În această secţie discutăm erorile medicale, pentru că erorile şi soluţiile găsite pentru a le rezolva pot oferi informaţii importante. 3. În secţia noastră, discutăm între noi greşelile. 4. Discutăm deschis erorile. *Analiza erorilor* 1. Dacă se produce o eroare, aceasta este analizată în profunzime în secţia noastră. 2. În această secţie credem că e util să analizăm erorile. 3. Dacă ceva nu a mers aşa cum ar fi trebuit, angajaţii din această secţie alocă timp pentru a analiza ce s-a întâmplat. 4. În cazul în care ce se produce o greşeală, personalul din această secţie încearcă să analizeze împreună cauzele care au condus la producerea ei.
Job demands (Van Veldhoven et al., 2002) All items were translated from the original Dutch version of the instrument.	*Workload*	*Volumul de muncă* 1. Trebuie să lucrez într-un ritm foarte alert. 2. Se întâmplă să fiu nevoit/ă să lucrez în grabă. 3. Pot să îmi desfăşor activitatea în ritmul propriu (R). 4. Consider că am prea puţin de lucru (R). 5. Mă deranjează să lucrez sub presiune. 6. Rămân în urmă cu rezolvarea sarcinilor de lucru. 7. Trebuie să lucrez foarte mult pentru a termina unele sarcini de lucru. 8. Mi-aş dori să pot lucra într-un mediu mai calm. 9. Mă deranjează ritmul de lucru din prezent. 10. Am prea mult de lucru. 11. Lucrez sub presiunea timpului.

	Cognitive demands	*Solicitări cognitive* 1. În munca mea trebuie să țin minte multe detalii. 2. Munca îmi solicită atenție sporită. 3. Munca mea necesită extrem de multă meticulozitate. 4. Trebuie să lucrez cu multă precizie. 5. Activitatea mea profesională mă solicită intelectual. 6. Când lucrez, trebuie să fiu atent/ă la mai multe lucruri în același timp. 7. Activitatea mea profesională necesită multă concentrare.
	Emotional demands	*Solicitări emoționale* 1. Am contact cu pacienți dificili/agresivi. 2. Primesc frecvent solicitări personale, din partea cunoștințelor sau colegilor mei, la locul de muncă. 3. Activitatea mea profesională este dificilă din punct de vedere emoțional. 4. În activitatea mea profesională este nevoie să conving sau să motivez alte persoane. 5. În munca mea mă confrunt cu lucruri care mă afectează personal. 6. Unele situații de la locul de muncă mă afectează foarte mult emoțional. 7. Se întâmplă să mă simt amenințat/ă sau agresat/ă personal la locul de muncă.
Unit Performance (adapted from Edmondson, 1996)	1. Recently, this department seems to be "slipping" a bit in its level of performance and accomplishments. (R) 2. Patients often complain about how this department functions. (R) 3. Drug-related errors occur frequently in this department (R) 4. This department shows signs of failing apart as an organization. (R) 5. Attending physicians often complain about how this department functions. (R)	1. În ultima vreme secția aceasta a avut unele "căderi" în ceea ce privește nivelul de performanță și realizări. (R) 2. Pacienții se plâng adesea de modul în care funcționează această secție. (R) 3. Erori medicale apar frecvent în această secție. (R) 4. Această secție pare că se destramă ca organizație. (R) 5. Doctorii din această secție se plâng frecvent de modul în care ea funcționează. (R)

Suboptimal Care Behaviors (adapted from Shanafelt et al., 2002)	1. There were situations in which we discharged patients to make the service 'manageable' because the department was so busy. 2. There were situations in which we did not fully discuss treatment options or answer a patient's questions. 3. There were situations in which in we made treatment or medication errors that were not due to a lack of knowledge or inexperience. 4. There were situations in which we ordered restraints or medication for an agitated patient without evaluating him or her. 5. There were situations in which we did not perform a diagnostic test because of the desire to discharge a patient.	1. Deoarece personalul medical era prea încărcat, s-a întâmplat să externăm pacienți pentru a eficientiza activitatea. 2. S-a întâmplat să nu discutăm toate opțiunile de tratament sau nu răspundem tuturor întrebărilor adresate de pacienți. 3. S-a întâmplat să apară erori în schemele de tratament sau în medicație, erori care nu se datorau necunoașterii sau lipsei de experiență. 4. S-a întâmplat să prescriem medicație unui pacient agitat înainte de a-l evalua. 5. S-a întâmplat să nu facem o analiză/un test unui pacient pentru că am vrut să îl externăm mai repede.