ITALIAN JOURNAL OF PUBLIC HEALTH

Appropriateness of admission and stay in obstetrics wards: a new tool assessing unnecessary days of hospital care

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Abstract

Introduction: The Appropriateness Evaluation Protocol (AEP) is a widely used assessment tool that identifies and measures the inappropriateness variables of hospital healthcare related to unjustified admission and/or length of stay, however it does not apply specifically to gynaecology or obstetrics wards.

Objectives of the study: The main objectives of the present study were to develop a new tool for the evaluation of the appropriateness of admission and hospital stay in obstetric settings; as well as to analyze the main determinants of inappropriate admission and days of hospital stay within all the units of the Pediatric Hospital "Regina Margherita" and the Obstetrics and Gynaecology Teaching Hospital "S.Anna" in Turin.

Methods: A multidisciplinary team of reviewers, composed of gynaecologists, paediatricians and obstetricians, was established and the appropriateness evaluation criteria, the operational handbook and the plan were all defined. Data were collected during the period between September and December 2005 and then put in an ad hoc database. Data analysis and evaluation were performed by univariate analysis (chi-square test) and multivariate analysis using a multiple logistic regression model. The level of significance was set at p<0.05.

Results: Out of 734 clinical records, 598 were considered for the study. The prevalence of inappropriateness of admission was 3.34%. The total number of examined days was 2888, 801 of which (27.74%) were considered to be inappropriate. The variables "place of residence" (χ^2=6.272; p=0.0435) and "type of admission" (χ^2=14.223; p<0.001) were significantly associated with the inappropriateness of the admission. Between the 2nd and the 8th day of hospital stay the percentage of inappropriate days exponentially increased (up to 56%).

With regards to the quality of the clinical records almost all of them were characterized by the presence of anamnesis, objective exams, discharge letters, clinical diary entries and the signature of the responsible healthcare professional. Objective examination was often incomplete or partially complete or absent.

Conclusions: The proposed Obstetric AEP was demonstrated to be useful for the evaluation of the appropriateness of obstetric admissions and hospital stays, as well as the determinants for when these were inappropriate. This specific tool, in the future, could be used to monitor hospital usage and the allocation of resources related to this health care area.

Key words: appropriateness evaluation protocol, appropriateness of admission, appropriateness of stay, obstetric unit

Introduction

In recent times, the concept of appropriateness in health care has progressively became one of the guiding principles of health systems with more and more attention being given to both quality improvement and the effectiveness of health care [1].

The need to improve health care quality through costs rationalization and reduction is a common theme related to the discussion about health systems efficacy and effectiveness. Health care provided by hospitals is characterized by a significantly variable inappropriateness - related to unjustified admission and/or length of stay - which needs to be identified and measured in
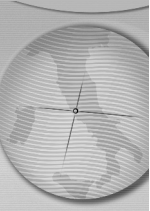
order to implement improvements. To date, the Appropriateness Evaluation Protocol (AEP) has represented a widely used assessment tool, characterized by satisfactory validity and high reproducibility [2, 3]. It has been translated, tested and well adapted to the Italian context and it is usually indicated by the term PRUO (Protocollo Revisione Utilizzo Ospedale, Revision Protocol of Hospital Use) [4-6].

PRUO examines each day of hospital stay, classifying it as appropriate when the patient is provided services which cannot be provided by other structures/levels of care, i.e. when the service is typical of acute hospital, concerning issues requiring a substantial, focused and limited in time commitment of resources [7, 8]. Moreover specific tools for the emergency department and paediatric hospitalization have been implemented and are widely used [9-24].

In order to determine the extent of inappropriate hospital admissions and days of stay and to identify the related variables, Angelillo et al. [1] applied PRUO to different clinical care settings (medicine, surgery, gynaecology and traumatology/orthopaedics) within five hospitals of Northern (Toscana), Central (Lazio) and Southern (Calabria) Italy and found low level of inappropriateness in gynaecology wards.

However, the AEP was not specifically designed for gynaecology and/or obstetrics settings, and therefore it would be of interest to extend the hospitalization appropriateness review and analysis to the obstetric discipline, by developing specific tools to monitor the use of hospitals and the allocation of resources related to this health care area.

The objectives of the present study were:
• to support the development and the knowledge of performance evaluation methodologies within health care professionals;
• to develop a new tool for the appropriateness of admission and hospital stay in the obstetric setting;
• to evaluate the applicability of this tool in the obstetric setting;
• to estimate the prevalence of obstetric hospitalizations both in terms of admission and days of hospital stay within all the units of the Pediatric Hospital "Regina Margherita" and the Obstetrics and Gynaecology Teaching Hospital "S. Anna" in Turin;
• to analyze the main inappropriateness determinants during hospital admission and days of hospital stay.

Materials and methods

The study has been based on two phases.

Phase 1

The establishment of a team of multidisciplinary reviewers, composed of gynaecologists and paediatricians, who were identified by the Heads of the Units and the Head of the Department, as well as obstetricians who were identified by the Obstetrics Nursing Health Technicians and Rehabilitation Service (Servizio Infermieristico e Ostetrico, Tecnico Sanitario e della Riabilitazione, IOTSR). This team was also supported by the physicians during the surveying process.

Definition of the scheme of appropriateness evaluation criteria and the operational handbook.

In order to determine the criteria for the evaluation of appropriateness we first reviewed a previous study regarding the application of PRUO to the obstetric setting carried out by the Obstetric Unit of the "Spedali Civili" Hospital in Brescia [25]. Given the lack of ad hoc scientific literature about the evaluation of hospitalizations during pregnancy, the team defined the criteria arbitrarily and on the basis of clinical experience. Successively the criteria have been validated both in terms of reasonableness and reproducibility, through the analysis of guidelines and recommendations from scientific associations (Società Italiana di Ginecologia e Ostetricia, SIGO; Associazione Ostetrici Ginecologi Ospedalieri Italiani, AOGOI; Associazione Ginecologi Universitari Italiani, AGUI). Ordinary hospitalization is adequate if the patient or the foetus needs continuous medical or obstetric assistance or medical or obstetric services, which cannot be provided, because of their quantity and quality, through another type of admission. The delivered criteria scheme characteristics are the following:
• the surveying form criteria are normed and explicit and cannot be changed or adapted to the local situations;
• the tool, evaluating the general appropriateness, is unrelated to diagnosis;
• the tool has been validated through the "face validity" technique: i.e. when it has been really applied, its validity appeared to be the same;
• the tool is reproducible, i.e. it allows different surveyors using the same tool to measure the same phenomenon to obtain the same result;
• the tool is versatile, i.e. it can be used in order to evaluate the admission day and the days of hospital stay.

The defined appropriateness criteria regarding the admission day are related to the patient
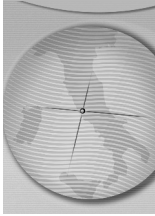
clinical conditions and health services to be provided within the first 24 hours. The defined appropriateness criteria regarding the days of hospital stay are related to medical services, obstetric and/or nursing services and patient clinical conditions.

In order to define the general criteria, the handbook written in 2000 by the Piedmont Region, aimed at the PRUO study within the Piedmont Hospitals, was used [26].

For each admission social and personal data (age, gender, civil status), distance between residence place and hospital, admission type, unit type, day of the week of admission were collected.

Data related to the quality of the clinical record (presence of family-physiologic-remote-near anamnesis; clinical diary drawing up; complete or partial objective exam or its absence; presence of discharge letter; responsible person's signature) was also collected.

Definition of operational plan
• Type of study and sample size: the study design was cross-sectional, based on data from clinical records of patients discharged from hospital within the first three working days of the first seven months of the year 2005. Sample size was calculated on the basis of the hospital's yearly number of ordinary hospitalizations and by an expected inappropriateness estimate of 25%. Hospitalizations with a length of stay less than 24 hours were excluded from the sample. Gynaecologic hospitalizations whose discharge was characterized by an obstetric Diagnosis Related Group were also not considered.
• Involved Units: all the Obstetric Units (Units codes: 3701, 3702, 3703, 3704, 3705, 3706 and 3710) of the Hospital "Regina Margherita" and Teaching Hospital "S. Anna" were considered.
• Definition of surveying methods: one appropriateness criterion for the number of days of stay in hospital was considered to be appropriate. For each clinical record the admission day and all the days of stay in hospital were analyzed.

Phase 2
Data collection: data were collected during the period from September to December 2005.

Data entry: collected data were entered into an ad hoc database created by using Microsoft Access©.

Data analysis and evaluation:
The sample has been described through absolute frequencies in terms of socio-demographic (age, gender, civil status, place of residence) and admission characteristics variables (type of admission, day of admission, type of Hospital).

The univariate analysis (chi-square test) tested if inappropriateness was associated with any of the variables.

The inappropriateness causes were described using frequencies and percentages.

In order to identify variables that explained the admission day inappropriateness, a multivariate analysis using a multiple logistic regression model was performed. Admission inappropriateness, stated on the basis of the defined criteria, was considered to be the dependent variable. The following variables have been considered and codified as explicative variables being the modality = 1 always the reference:
• **patient age** (1=<25 years, 2=25-30 years, 3=31-35 years, 4=>35 years);
• **civil status** (1=married, 2=unmarried/separated/divorced/not declared);
• **place of residence** (1=Turin; 2=Piedmont Region, but not Turin; 3=other Regions);
• **admission type** (1=emergency, 2=planned);
• **day of admission** (1=within the week; 2=during the week-end);
• **Unit type** (1=Hospital Unit; 2=Teaching Hospital Unit).

Odds ratios (OR) and related 95% confidence intervals (95% CI) have been calculated.

The distribution of inappropriate days of hospital stay was described using frequencies.

The level of significance was set at p<0.05. Analyses have been performed using the statistical software SAS (SAS Institute, Cary, NC).

Results
Description of the sample
The total number of clinical records identified was 734, of which 136 were not considered for the study due to erroneous SDO (Scheda di Dimissione Ospedaliera, Hospital Discharge Form) codes or a length of stay less than 24 hours. The final number of clinical records considered in the study was 598.

The socio-demographic characteristics (age, civil status, place of residence) of the sampled women are shown in table 1.

Concerning the type of hospital admission, 523 (87.46%) admissions were urgent and 75 (12.54%) were planned.

The number of inappropriate hospitalizations was 20 (3,34%), of which 7 were from Hospital Units and 13 from Teaching Hospital Units. The reasons for their inappropriateness were:
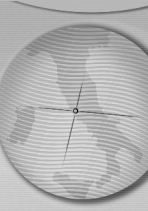
diagnostic tests (12 cases; 60%), surgical intervention/waiting childbirth (5 cases; 25%), other causes (3 cases; 15%). Moreover 12 of the 20 cases of inappropriateness became inappropriate during the patient's stay in hospital, the remaining 8 were inappropriate from the point of admission.

Analysis of admission appropriateness

Table 1 shows the results of univariate analysis performed in order to evaluate the possible associations of admission inappropriateness versus socio-demographic variables and other variables regarding hospitalization. The significant associations detected were for the following variables: place of residence ($\chi^2=6.272$; p=0.044) and type of admission ($\chi^2=14.223$; p<0.001).

The multivariate logistic regression model (table 2) included the following variables, on the basis of the p-value obtained in the univariate analysis: age groups, civil status, place of residence, type of admission, day of week of admission and type of hospital. Data did not fully apply to the model (Log-Likelihood Ratio = 116.005, p = 0.067, df = 9), this maybe due to a few cases of inappropriateness. The probability of inappropriate admission was higher for planned

than urgent admissions, this was the only significant variable (p=0.009).

Analysis of hospital stay appropriateness

The reason for inappropriateness, its description and the related total number of inappropriateness days of stay in hospital are reported in table 3. The total number of days examined was 2888, of which 801 (27.74%) were inappropriate.

The data showed that during hospital stay, between the 2nd and the 8th day, the percentage of inappropriate days increased exponentially (up to 56%) (Figure 1).

Quality of clinical records

Clinical records were almost always characterized by the presence of anamnesis, objective exams, a discharge letter, clinical diary entries and the signature of the responsible healthcare professional.

Objective exams, in the opinion of the surveyors, was incomplete in 60% of the analyzed clinical records, partially complete in 37% and absent in 4%.

Discussion

Table 1. Socio-demographic variables and admission characteristics of the sample.

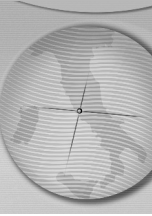| Variables	Total	Appropriate N	Appropriate (%)	Inappropriate N	Inappropriate (%)	p*
Age (years)						
<25	66	65	98.48	1	1.52	0.644
25-30	140	135	96.43	5	3.57	
31-35	242	235	97.11	7	2.89	
>35	150	143	95.33	7	4.67	
Civil Status						
Married	421	407	96.67	14	3.33	0.968
Other	177	171	96.61	6	3.39	
Place of residence						
Turin	293	290	98.98	3	1.02	**0.044**
Piedmont Region, but not Turin	256	242	94.53	14	5.47	
Other	47	46	97.87	1	2.13	
Admission type						
Urgent	523	511	97.71	12	2.29	**<0.001**
Planned	75	67	89.33	8	10.67	
Day of admission						
Week-end	211	206	97.63	5	2.37	0.383
Other days	387	372	96.12	15	3.88	
Unit type						
Hospital	296	289	97.64	7	2.36	0.187
Teaching Hospital	302	289	95.70	13	4.30	

*p-value of chi-square test

Table 2. Multivariate logistic regression model illustrating the predictors of inappropriateness of hospital admission.

Variables	OR	95% CI		p
		Lower limit	Upper limit	
Age (years)				
<25	1	-		-
25-30	1.95	0.21	18.12	0.557
31-35	1.35	0.15	12.08	0.786
>35	2.27	0.26	20.14	0.461
Civil Status				
Married	1	-		-
Other	1.19	0.42	3.35	0.746
Place of Residence				
Turin	1	-		-
Piedmont Region, but not Turin	2.83	0.97	8.23	0.056
Other	1.42	0.15	13.22	0.759
Admission type				
Urgent	1			
Planned	**4.20**	**1.42**	**12.35**	**0.009**
Day of admission				
Week-end	1.16	0.36	3.75	0.803
Other days	1	-		-
Unit type				
Hospital	1	-		-
Teaching Hospital	1.36	0.51	3.60	0.535
L. Ratio chi-square= 116.0045, p=0.0667, df=9				

Table 3. Distribution of reasons of inappropriateness days of hospital stay.

Description	N(days)	%
Patient waiting surgical intervention	2	0.25
Patient waiting diagnostic test	22	2.75
Patient waiting visit	3	0.37
Patient waiting result of diagnostic test	13	1.62
Other reasons depend of the Hospital	756	94.38
Socio-environmental reasons	4	0.50
Other	1	0.12
Total	**801**	**100**

PRUO criteria are not directly applicable to pregnancy clinical issues. In Italy only two papers regarding PRUO application specifically addressed to the obstetric setting are known. The first one, carried out in the Sicilia Region by the Quality Office of the "Niguarda Ca' Granda" Hospital considered only spontaneous or caesarean birth admissions (the list of appropriateness/inappropriateness criteria and reasons considered in this study is not available) [27]. The second one was carried out by the Unit of Obstetrics of the "Spedali Civili" Hospital in Brescia [25].

Adoption of a protocol dedicated exclusively to obstetrics (Obstetric AEP) is not actually present in a structured and validated form in Italy. The proposed tool (see Appendix) for the evaluation of the appropriateness of admission and hospital stay in obstetric settings has shown to be useful for analyzing the main determinants of inappropriate admissions and hospital stays.

Engagements that often involves clinical placement and the monitoring of complicated pregnancies and, on the contrary, the surplus obtained by avoiding a large number of admissions, must be sufficient in order to adopt alternative forms of surveillance that are different from an ordinary stay in hospital.

This study showed a different pattern of inappropriateness for hospital admission and stay
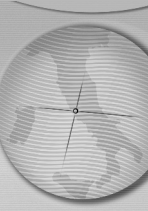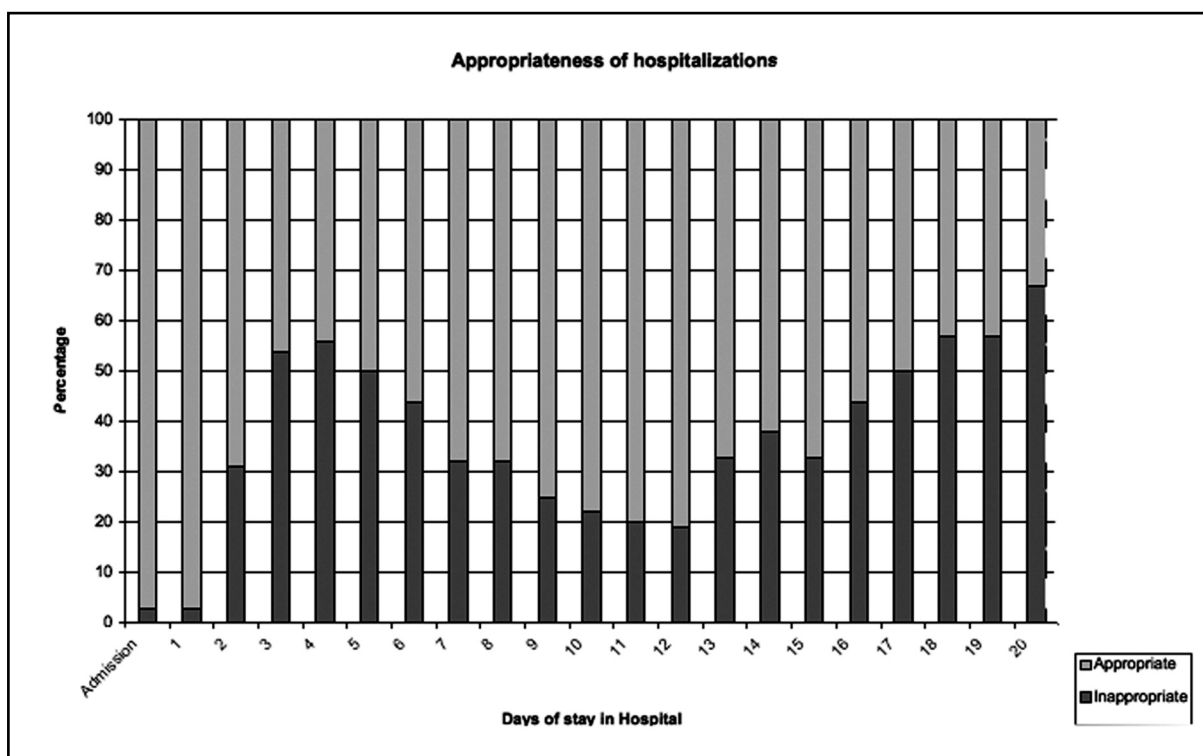
Figure 1. Graph-bar of appropriateness of hospital stay.

in the obstetric setting. In fact, while a very low level of inappropriateness was found at admission (less than 4%), more than one fourth of hospital days were deemed to be inappropriate.

With regard to the hospital stay mode, we notice that 87,46% of these were emergencies, and this was due to a specific featured of pregnancy and child birthing - nature can't be planned.

One variable significantly associated to the probability of inappropriateness in admission stands out from both the univariate model (p=0.009) than the multivariate model (p<0,001) is the kind of admission: a planned hospitalization is four times more likely than an emergency to be inappropriate. One possible reasons for this may be subsequent hospitalization for an acute hospital services (monitoring, childbirth, etc.), or the need for a caesarean delivery.

Distance from the hospital, represented by the variable "Place of residence" (Turin/Piedmont region/out of district), even if it did not estimate the exact distance in kilometers, was shown to be significantly associated (p = 0.044) and from multivariate analysis results that women living in Piedmont, but not in Turin, had a risk almost three times (OR=2.828) higher for inappropriate admissions compared to women living in the city.

Age and civil status aren't significantly associated to inappropriateness risk, however we notice that older women had higher risk versus younger and unmarried versus married.

With regard to the days of hospital stay, the first day, defined as admission, has the identical percentage of inappropriateness as the first day of stay in hospital (3%).

From the second day to the 8th day of stay in hospital there is an exponential increase in of inappropriate days reaching a total of 56%, this is likely to be due to the specificity of obstetrics.

Both child birthing and abortion and other complications of pregnancy are resolved in 24-48 hours of stay in hospital, making appropriated the admission to hospital in these periods of time.

From the second day of hospital stay onwards at least 1/3 of hospital patients do not satisfy the criteria to stay in hospital, since this relates to pediatric causes.

From the 9th to the 12th day we observed a reduction in the inappropriateness of hospital stays. This might be explained by the fact that patients need services that only a hospital for emergencies can supply.

From thirteenth day the trend of inappropriateness is similar to the trend described from the 2nd to 8th day, compared with an absolute number of days of stay in hospital of 18 to 6.

Quality of clinical record can be described by the presence of anamnesis, objective exam, discharge letter, clinical diary and the signature of
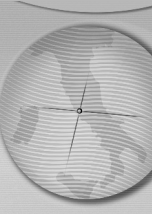
the responsible healthcare professional.

According to reviewers only 60% of clinical records examined were completed and included an objective examination, they were partially completed in 37% of cases, while 4% of clinical records did not record any objective examination.

This information can be explained as obstetric patients almost always are in good health and urgency and swiftness in phases of evolution of labor don't allow for the carrying out of objective exams.

What determines health is not a single analysis, or a single performance or their addition, but rather their insertion into a cycle in which the ability of management meets the health care request and is able to respond appropriately.

In the sphere of their own knowledge and his/her professional role, obstetricians are involved in organization and the application of care profiles, guaranteeing more than just respect for individual patients, as it also involves the efficient use of resources.

Therefore more than the clinical role, the obstetrician, in the physiological pregnancy, might also have absolute competence in terms of management.

This means that the obstetrician must organize a mode in which to produce services-performances, adopting fair choices and ensuring the optimal use of resources. In Italy many studies have been published about the application of valuation tools for inappropriate admissions [28-30] as they apply to specific departments such as pediatrics or the emergency department [9-24].

This study has some limitations. First of all, this was the first time that this tool was applied and the results need to be considered with care. Concerning the internal validity, a low level of inappropriateness of hospital admission was detected, and this could have affected the strength of the analysis, in particular for the multivariate model. Moreover, further research on this topic is needed, since this will allow the researchers to verify the applicability of the tool in other settings (external validity).

However, this tool has been shown to be applicable in the obstetric setting and is easy to use.

This specific tool, in the future, could be used to monitor hospital usage and the allocation of resources related to this health care area.

References

1) Angelillo IF, Ricciardi G, Nante N, Boccia A and Collaborative Group (Bianco A, La Torre G, Vinci V and De Giusti M). Appropriateness of hospital utilisation in Italy. Public Health 2000; 114: 9-14.
2) Gertman PM, Restuccia JD. The appropriateness evaluation protocol: a technique for assessing unnecessary days of hospital care. Med Care 1981; 19(8): 855-71.
3) Restuccia JD, Gertman PM, et al. The Appropriateness of Hospital Use. Datawatch, Health Affairs 1984:130-8.
4) Alonso J, Munoz A, Antò J. Using length of stay and inactive days in the hospital to assess appropriateness of utilization in Barcelona, Spain. Epidemiol Comm Health 1996; 50:196-201.
5) Bare ML, Prat A, Lledo L, Asenjo MA, Salleras L. Appropriateness of admission and hospitalization days in an acute-care teaching hospital. Rev Epidemiol Santé Publique 1995; 43 (4) : 328-36.
6) Fellin G, Apolone G, Tampieri A. Appropriateness of hospital use: an overview of Italian studies. Int J Quality Health Care 1995; 7: 219-26.
7) Liberati A, Apolone G, Lorenzo S. A European project assessing the appropriateness of hospital utilization: background, objectives and preliminary results. Int J Quality Health Care 1995; 7: 187-200.
8) Liberati A, Apolone G, Fellin G and collaborating group. La valutazione dell'uso dell'ospedale: quadro di riferimento, strumenti di misurazione ed esperienze italiane. [The evaluation of hospital use: background, measures and Italian experiences]. Ricerca & Pratica 1994; 58: 99-126.
9) Siliquini R, Rocca N, Rocca G, Minniti D, Pianino MM, Renga G and collaborating group. Understanding hospital admission of patients presenting to the Emergency Department. Ital J Public Health 2005; 2:33-41.
10) Esmail A, Quayle JA, Roberts C. Assessing the appropriateness of paediatric hospital admission in the United Kingdom. J Public Health Med 2000; 22:231-8.
11) Formby DJ, Mc Mullin ND, Danagher K, Oldham DR. The appropriateness evaluation protocol: application in an Australian children's hospital. Aus Clin Rev 1991; 11:123-31.
12) Waldrop R, Peck GQ, Hutchinson S, Randall Z. Comparison of paediatric hospitalisation using the pediatric appropriateness evaluation protocol at three diverse hospitals in Louisiana. J La State Med Soc 1998; 150:211-7.
13) Werneke U, Smith H, Smith IJ, Taylor J, MacFaul R. Validation of the paediatric appropriateness evaluation protocol in British practice. Arch Dis Child 1997; 77:294-8.
14) Celestini E, Filocamo A, Prota F, Di Roma S, Passafaro S, Langiano T, et al. Organizational appropriateness evaluation of hospital discharge related to DRGs at high risk of in a paediatric observation a ward from 2000 to 2004. Ann Ig 2007; 19(4):355-67.
15) Chiaradia G, de Waure C, La Torre G, Paparatti M, Ricciardi W. Appropriatezza del ricovero e della degenza in reparti pediatrici: l'esperienza di un Policlinico Universitario di Roma. [Appropriateness of admission and hospital stay in pediatric wards: the case of a teaching hospital in Rome]. Ann Ig 2008; 20(1):17-27.
16) Soto EC, Frederickson AM, Trivedi H, Le A, Eugene MC, Shekher M, et al. Frequency and correlates of inappropriate paediatric psychiatric emergency room visits. J Clin Psychiatry
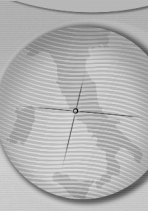
2009; 70(8):1164-77.

17) Mahant S, Peterson R, Campbell M, MackGregor DL, Friedman JN. Reducing inappropriate hospital use on a general pediatric inpatient unit. Pediatrics 2008; 121(5): 1068-73.

18) De Marco G, Mangani S, Correra A, Di Caro S, Tarallo L, De Franciscis A, et al. Reduction of inappropriate hospital admissions of children with influenza-like illness through the implementation of specific guidelines: a case-controlled study. Pediatrics 2005; 116(4): 506-11.

19) Gomez Llorente JL, Bonillo Perales A, Gonzales-Ripoll Garzon M, Jimenez Liria R, Aguirre Rodriguez FJ, Lopez Munos J. Utility of the Pediatric Appropriateness Evaluation Protocol (pAEP) to detect deficiencies in the healthcare circuit. Anales de Pediatría 2004; 60 (3): 228-35.

20) Bianco A, Pileggi C, Trani F, Angelillo IF. Appropriateness of admissions and days of stay in pediatric wards of Italy. Pediatrics 2003; 112(1):124-8.

21) Frost SA, Alexandrou E, Bogdanovski T, Salamonson Y, Parr MJ, Hillman KM. Unplanned admission to intensive care after emergency hospitalisation: risk factors and development of a nomogram for individualising risk. Resuscitation 2009; 80(2):224-30.

22) Teke K, Kisa A, Demir C, Ersoy K. Appropriateness of admission and length of stay in a Turkish Military Hospital. J Med Syst 2004; 28(6): 653-63.

23) Cheema ST, Sotirovic S, Ahmad K, Grace P, Naqvi SA. Accuracy of admitting diagnosis in acute surgical patients by non consultant hospital doctors. Ir Med J 2005; 98(4):108-9.

24) David M, Schwartau I, Anand Pant H, Borde T. Emergency outpatient services in the city of Berlin: Factors for appropriate use and predictors for hospital admission. Eur J Emerg Med 2006; 13(6): 352-7.

25) Frusca T, Zacchi V. Valutazione di appropriatezza dei ricoveri in ostetricia: l'esperienza degli Ospedali Civili di Brescia [Assessment of appropriateness of discharge in Obstetrics Unit: an experience in the civil hospitals in Brescia, North Italy]. Tendenze nuove 2005; 2: 171-81.

26) Regione Piemonte – Assessorato alla Sanità. Qualità delle prestazioni sanitarie. Rilevazioni dell'uso delle risorse ospedaliere mediante l'utilizzo del PRUO. Valutazione della qualità delle cartelle cliniche. Torino: Regione Piemonte; 2000 [Survey about the use of hospital resources using PRUO. Evaluation of the clinical charts. Turin. Piedmont Region 2000].

27) Rapporto sul Programma Regionale. RS-PVA Regione siciliana – Protocollo di valutazione dell'appropriatezza dell'uso dell'ospedale – Palermo, settembre 2004. [Report on the Regional Programme: Sicilian Region- Protocol on the assessment of the appropriateness of hospital use- Palermo 2004]. GURS parte I n. 32 del 2007. Available from: www.gurs.regione.sicilia.it . [Accessed on December 2009].

28) Carnessale G, Staniscia T, Matarrese D. Valutazione dell'appropriatezza dei ricoveri con la metodica P.R.U.O. nell'ospedale clinicizzato di Chieti [Appropriateness of hospitalization in the teaching hospital of Chieti using the P.R.U.O. approach]. Ann Ig 2002; 15: 117-22.

29) Maurici M, Rosati E, Pozzato S, Polistena A, Panà A. Studio multicentrico sulla valutazione della qualità della codifica della scheda di dimissione ospedaliera relativamente ai ricoveri per acuti in cui non è stato eseguito il trattamento. Individuazione di un possibile indicatore di appropriatezza organizzativa [Multicentric study to evaluate the quality of discharge abstract coding of admissions in which the treatment was not performed and to identify a possible appropriateness indicator]. Ig Sanità Pubbl 2007;63:543-60.

30) Manzoli L, Ceccagnoli M, Di Corcia T, Di Candia V, Rosetti A, Angeli G, et al. Evaluation of the appropriateness of public hospital use using AEP in the Abruzzo Region of Italy: results by hospital and ward, main predictors and potential implications. Ann Ig 2008; 20(4): 365-87.
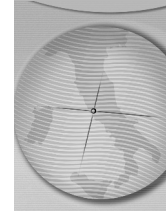
Appendix

Audit Tool of Appropriateness Evaluation Admission and Hospital stay in Obstetric Unit

Reviewer's name ....

Unit Type   < > Teaching Hospital   < > Hospital

Code Unit ....   N° Clinical Records ....

Patient Notes: Surname.........................Name..

            Age................................

Date of admission (dd.mm.yyyy) ....

Date of discharge (dd.mm.yyyy)....................................

Admission diagnosis ....

Admission type: < > planned   < > urgent

Day	Appropriateness/ Inappropriateness Conditions (NUMBERS CODES)	Comments	Judgment	
			Appropriate ✕	Inappropriate ✕
Admission				
Hospital stay				

Final judgment of the admission :   <> appropriate   <> inappropriate

SCHEME SURVEY CLINICAL RECORDS

MEDICAL HISTORY: familiar   < > present   < > absent

                 physiological   < > present   < > absent
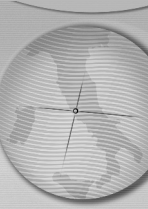
                 remote   < > present   < > absent

                 recent   < > present   < > absent

OBJECTIVE EXAMINATION   < > complete   < > partial   < > absent

CLINICAL DIARY   number of days (complete) _____

DISCHARGE LETTER   < > present   < > absent

RESPONABILE MEDICAL DOCTOR SIGNATURE   < > present   < > absent

ADMISSION CONDITIONS

Appropriateness criteria

a. Patient condition factors

1. Blood pressure: systolic <90 or > 140, diastolic <60 or > 90

2. Armpit Temperature > 38°C for 5 days

3. Bleeding from external genitalia in act or in the last 48 hours

4. Loss of amniotic fluid from external genitalia

5. Finding of uterine contractile activity from 1 hours (3 contractions in 10')

6. RCTF/AFI non satisfying criteria

7. Finding of cervical dilation at gestation time <34 W

8. Acute thoracic or epigastria pain with hemodynamic alterations

9. Hydroelectrolytic, acid-base or metabolic imbalance

10. Abdominal pelvic pain that need pain-killer i.v. therapy

11. Presence of breathing, neurological, circulating, sensitive, motor illness

b. Performances in first 24 hours

12. Medical/obstetric observation (three times or more) in 24 hours

13. Obstetric/nursing observation (four times or more) in 24 hours

14. Monitoring vital parameters – BCF (three times or more)

15. Invasive diagnostic/ therapeutic procedures

16. Therapy and side effects control

17. I.V. Administration in 24 hours

c. Other conditions

18. other causes that justify the admission ....

19. presence of the causes that justify the admission, but not appropriated ……………………..…………….

Inappropriateness reasons

20. Execution of diagnostic tests

21. Execution medical therapeutic interventions

22. Execution of surgical intervention, childbirth waiting

23. Basic obstetric/nursing assistance

24. Therapeutic obstetric/nursing assistance

25. Overall critic clinic situation

26. Familiar critical situation

27. Social critical situation

28. Other (specify) ....
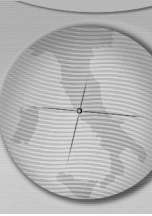
HOSPYTAL STAY (for each day of hospitalization)

Appropriateness criteria

d. Medical performances

29. Procedures in operating room or delivery room in the day

30. Procedures in operating room in the next day, but requiring pre operative consultations or valuations extra routine

31. Medical/obstetrician observation at least three times

32. First post partum post surgical day

e. Obstetric/nursing performances

33. Monitoring vital parameters/ BCF more times in a day

34. Complicated surgical wounds and/or drainages controlled in the day

35. Administration E.V. more times in a day

36. Careful obstetric/nursing control (four times in a day)

f. Patients conditions

37. High blood pressure (systolic >140mmHg and/or diastolic > 90mmHg)

38. Temperature > 38°C in the last 48 h

39. Bleeding in act in the day, or in the last 24/48 h

40. Presence of contractile uterine activity in one hour (3 contractions in 10')

41. Loss of amniotic fluid from external genitalia

42. RCTG/ AFI not satisfying reactivity criteria

g. other conditions

43. Other causes that justify the hospital stay ……………………………………………………………………………………...

44. Presence of the causes that justify the hospital stay , but not appropriated …………………………………………

Inappropriateness reasons

45. Patient waiting surgical intervention – carrying out childbirth

46. Patient waiting diagnostic tests

47. Patient waiting specialist examination

48. Patient waiting tests results

49. Others causes depend to the Hospital (specifying _____)

50. Social – environmental causes

51. Other causes (specifying, especially if it's dealing with performance of medical and/or physical/rehabilitation therapy)