

7 foro
sobre el

Sistema de Información del Sistema Nacional de Salud

In memoriam Víctor Barranco Ortega

**La investigación médica basada en
los registros CMBD de atención
hospitalaria y atención ambulatoria**

Angel Gil

Catedrático de Medicina Preventiva y
Salud Pública

Universidad Rey Juan Carlos (URJC)



- *Un SIS es según la OMS :*



“ el mecanismo por el cual es recogida, analizada y difundida la información necesaria a los planificadores sanitarios, que les permite evaluar prioridades y decidir la manera de satisfacer las necesidades prioritarias, así como medir posteriormente los resultados de sus acciones”



Flujo de información en los SIS

PRODUCCIÓN

DATOS

RECOGIDA

PROCESAMIENTO

ANÁLISIS Y ELABORACIÓN DE INDICADORES

UTILIZACIÓN

UTILIZACIÓN Y DIFUSIÓN

DIFUSIÓN



PLANIFICACIÓN

INVESTIGACIÓN

GESTIÓN

EVALUACIÓN



En estos momentos el Portal Estadístico del SNS tiene como prioridad su web que aglutina de forma significativa los esfuerzos de difusión:

<http://www.msssi.gob.es/estadEstudios/estadisticas/sisInfSanSNS/home.htm>

Otras web de interés:

<http://pestadistico.inteligenciadegestion.msssi.es>

Registro de Altas CMBD:

<http://www.msssi.gob.es/estadEstudios/estadisticas/cmbdhome.htm>



Principales SIS

Conjunto Mínimo Básico de Datos (CMBD)

Encuesta de Morbilidad Hospitalaria

Registros de Cáncer

Registros de otras Enfermedades

Encuesta Nacional de Salud (ENS)

Red Nacional de Vigilancia Epidemiológica

Sistema de Información en Atención Primaria

(SIAP)

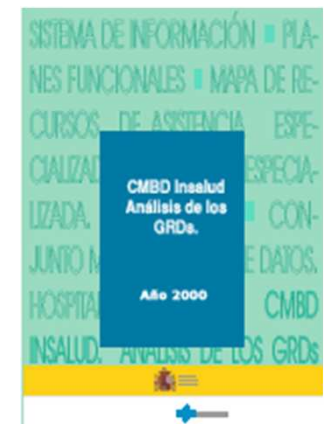


- Datos básicos recogidos sistemáticamente en el proceso asistencial de un paciente.
- Útil para:
 - Clínicos
 - Gestores.
 - Planificadores.
 - Epidemiólogos.



Variables:

- Código del centro.
- Número de historia clínica.
- Código de identificación individual.
- Fecha de nacimiento.
- Sexo.
- Domicilio habitual.
- Fecha de ingreso.
- Diagnóstico principal.
- Diagnósticos secundarios.
- Procedimientos realizados.
- Fecha de alta
- Circunstancias al alta.
- Médico responsable.
- Centro al que se traslada, si procede.





CMBD

5 : M2

	FECNAC	SEX O	RES IDE	RE GF IN	FECING	TIPING	FECALT	TIPALT	FECINT	M1	M2	DIAG1	DIAG2	DIAG3	DIAG4	DIAG5	DIAG6
1	28-DEC-2003	2	30	1	28-DEC-2003	1	01-JAN-2004	2	.			76408	6202				
2	15-OCT-2003	1	28	1	15-OCT-2003	1	01-JAN-2004	1	.			76514	36221	7485	769	7746	
3	29-NOV-2003	2	28	1	29-NOV-2003	1	01-JAN-2004	1	.			76517	7470	769	7707	7746	78559
4	29-DEC-2003	2	28	1	29-DEC-2003	1	01-JAN-2004	1	.			7684	76409	76529	7671	77089	
5	26-NOV-2003	1	28	1	26-NOV-2003	1	01-JAN-2004	1	.			76516	7615	76526	7742		
6	26-NOV-2003	2	28	1	26-NOV-2003	1	01-JAN-2004	1	.			76516	7615	76526	7706	7742	7756
7	06-DEC-2003	1	28	1	06-DEC-2003	1	01-JAN-2004	1	.			76517	76526	7706	7756	7758	7778
8	05-DEC-2003	1	36	1	08-DEC-2003	1	01-JAN-2004	1	.			76518	0414	76526	769	77189	7746
9	25-DEC-2003	2	6	1	25-DEC-2003	1	01-JAN-2004	1	.			76519	7600	76528	7683	77181	70189
10	31-DEC-2003	1	46	1	31-DEC-2003	1	01-JAN-2004	1	.			76408	7017				
11	09-DEC-2003	1	3	1	09-DEC-2003	1	01-JAN-2004	1	.			76517	7683	7706	7742		
12	07-DEC-2003	1	46	1	13-DEC-2003	1	01-JAN-2004	1	.			76510	7615	76520	7746		
13	07-DEC-2003	1	46	1	13-DEC-2003	1	01-JAN-2004	1	.			76510	7615	76520	7746		
14	29-DEC-2003	2	13	1	31-DEC-2003	1	01-JAN-2004	1	.			76528	7634				
15	25-DEC-2003	1	11	1	25-DEC-2003	1	01-JAN-2004	1	.			76518	7671	7742	7793	70189	7290
16	27-DEC-2003	1	4	1	27-DEC-2003	1	01-JAN-2004	4	.			76503	769	77210			
17	31-DEC-2003	2	43	1	31-DEC-2003	1	01-JAN-2004	2	.			76514	769	7706			
18	31-DEC-2003	2	43	1	31-DEC-2003	1	01-JAN-2004	2	.			76515	7615	7706			
19	30-DEC-2003	2	8	1	31-DEC-2003	1	01-JAN-2004	1	.			76408					
20	09-OCT-2003	1	25	1	26-NOV-2003	2	01-JAN-2004	4	.			76515	27549	3314	36221	42760	7469
21	23-DEC-2003	1	17	1	23-DEC-2003	2	01-JAN-2004	1	.			76519	7615	7706	7742	7290	
22	23-DEC-2003	1	17	1	23-DEC-2003	2	01-JAN-2004	1	.			76518	7615	7742			
23	21-DEC-2003	2	8	1	21-DEC-2003	1	01-JAN-2004	1	.			76408	7424	7611			
24	28-DEC-2003	2	8	1	30-DEC-2003	1	01-JAN-2004	1	.			7746	76529	7784			
25	18-DEC-2003	2	8	1	18-DEC-2003	1	01-JAN-2004	1	.			7702	76519	76529	7708	73000	
26	20-DEC-2003	2	8	1	20-DEC-2003	1	01-JAN-2004	1	.			76408	76529	7290	7293	73000	
27	29-DEC-2003	1	41	1	29-DEC-2003	1	01-JAN-2004	1	.			76496	76516	76528	7673		
28	25-DEC-2003	2	41	1	29-DEC-2003	1	01-JAN-2004	1	.			77083	76529				
29	31-DEC-2003	1	41	1	31-DEC-2003	1	01-JAN-2004	1	.			7686	7602	7608	76529	70251	
30	19-DEC-2003	1	26	1	19-DEC-2003	1	02-JAN-2004	1	.			76519	7706	7742			
31	13-DEC-2003	2	26	1	14-DEC-2003	1	02-JAN-2004	1	*****			76517	75433	7686	7706	7742	
32	18-DEC-2003	2	26	1	18-DEC-2003	1	02-JAN-2004	1	*****			76518	75432	7611	7742		

Tabla I: 25 procesos más frecuentes hospitalares SNS. Año 2005

Código	Descripción	Total altas	Porcentaje	Estancia media (días)
373	Parto sin complicaciones	200.877	5,67%	2,7
541	Trast.respiratorios exc. Infecciones, bronquitis, asma con cc mayor	108.722	3,07%	10,5
372	Parto con complicaciones	80.124	2,26%	3,2
127	Insuficiencia cardiaca & shock	59.256	1,67%	8,5
371	Cesárea, sin complicaciones	51.327	1,45%	5,5
359	Proc. Sobre útero & anejos por ca.in situ & proceso no maligno sin cc	45.652	1,29%	4,7
381	Aborto con dilatación & legrado, aspiración o histerotomía	41.404	1,17%	1,7
629	Neonato, peso al nacer >2499 g, sin p.quir.signif., diag neonato normal	39.671	1,12%	3,1
88	Enfermedad pulmonar obstructiva crónica	37.616	1,06%	8,0
14	Trastornos cerebrovasculares específicos excepto ait & hemorragia intracraneal	36.298	1,03%	10,2
162	Procedimientos sobre hernia inguinal & femoral edad>17 sin cc	35.604	1,01%	2,2



Research article

Open Access**Hospitalizations associated with rotavirus gastroenteritis in Spain, 2001–2005**

Ana López-de-Andrés*, Rodrigo Jiménez-García, Pilar Carrasco-Garrido, Alejandro Alvaro-Meca, Patricia Graciela Galarza and Ángel Gil de Miguel

Address: Preventive Medicine and Public Health Teaching and Research Unit, Health Sciences Faculty, Rey Juan Carlos University, Avda de Atenas s/n, Alcorcón 28402 Madrid, Spain

Email: Ana López-de-Andrés* - ana.lopez@urjc.es; Rodrigo Jiménez-García - rodrigo.jimenez@urjc.es; Pilar Carrasco-Garrido - pilar.carrasco@urjc.es; Alejandro Alvaro-Meca - alvaro@mac.es; Patricia Graciela Galarza - patricia.graciela@urjc.es; Ángel Gil de Miguel - angel.gil@urjc.es

* Corresponding author

Published: 8 April 2008

BMC Public Health 2008, 8:109 doi:10.1186/1471-2458-8-109

Received: 13 September 2007

Accepted: 8 April 2008



Table 1: Acute gastroenteritis by infectious etiology among children ≤ 5 years from year 2001 to 2005 according to Minimum Basic Data Set (MBDS).

	Number of hospitalizations (%)					
	2001	2002	2003	2004	2005	2001–2005
Etiology unspecified						
Presumed infectious	4,715 (42.9)	3,916 (41.7)	3,844 (38.2)	3,935 (36.7)	3,468 (31.7)	19,878 (38.1)
Etiology specified						
Viral coxsa	3,090 (28.1)	2,405 (25.5)	3,009 (29.8)	4,109 (38.3)	5,131 (46.8)	17,744 (34.0)
Rotavirus	2,977 (27.1)	2,129 (22.6)	2,723 (27.0)	3,718 (34.7)	4,708 (43.0)	16,255 (31.2)
Others	113 (1.0)	276 (2.9)	286 (2.8)	391 (3.6)	423 (3.8)	1,489 (2.8)
Bacterial coxsa	3,125 (28.4)	3,040 (32.3)	3,158 (31.3)	2,610 (24.3)	2,304 (21.0)	14,237 (27.3)
Salmonella	1,942 (17.7)	1,892 (20.1)	2,074 (20.6)	1,743 (16.2)	1,479 (13.5)	9,130 (17.5)
Others	1,183 (10.7)	1,148 (12.2)	1,084 (10.7)	867 (8.1)	825 (7.5)	5,107 (9.8)
Parasitic	41 (0.6)	26 (0.5)	48 (0.7)	42 (0.7)	30 (0.5)	187 (0.6)
Total	10,971	9,387	10,059	10,696	10,933	52,046



Table 2: Hospital admissions by acute gastroenteritis of any aetiology and by rotavirus for years 2001–2005 according to Minimum Basic Data Set (MBDS).

Year	Total admissions by acute gastroenteritis			Total admissions by rotavirus			% Acute gastroenteritis owed to rotavirus
	Total	Mean Stay (SD)	Incidence * 100,000 (CI95%)	Total	Mean Stay (SD)	Incidence * 100,000 (CI95%)	
2001	19839	3.79 (3.08)	868 (856–880)	2977	4.30 (2.61)	130 (126–135)	15.0
2002	17882	3.73 (2.97)	776 (765–787)	2129	4.36 (3.39)	92(88–96)	11.9
2003	18565	3.86 (4.18)	776 (765–787)	2723	4.43 (4.51)	114(109–118)	14.6
2004	19527	3.73 (3.24)	784 (773–795)	3718	4.26 (3.08)	149(144–154)	19.0
2005	19241	3.68 (3.67)	745 (735–756)	4708	3.99 (2.43)	182(177–188)	24.4
Total	95054	3.76 (3.45)	789 (784–794)	16255	4.23 (3.17)	135(133–137)	17.1

SD: Standard deviation

CI: Confidence interval



Am. J. Trop. Med. Hyg., 85(5), 2011, pp. 820–825
doi:10.4269/ajtmh.2011.11-0310
Copyright © 2011 by The American Society of Tropical Medicine and Hygiene

Epidemiology of Leishmaniasis in Spain Based on Hospitalization Records (1997–2008)

Ruth Gil-Prieto,*† Stefan Walter,† Jorge Alvar, and Angel Gil de Miguel

Department of Preventive Medicine and Public Health and Medical Immunology and Microbiology, Rey Juan Carlos University, Madrid, Spain; Department of Public Health, Erasmus MC, Rotterdam, The Netherlands; Department of Epidemiology, Erasmus MC, Rotterdam, The Netherlands; Leishmaniasis Control Program, Department of Neglected Tropical Diseases, World Health Organization, Geneva 27, Switzerland

Abstract. All the records from the Spanish information system for hospital data of patients diagnosed with leishmaniasis during a 12-year period (1997–2008) were studied. The 2,028 individuals were hospitalized because of leishmaniasis, as indicated by the principal diagnostic code. The average hospitalization rate was 0.41/100,000 inhabitants. One-third of them were co-infected with human immunodeficiency virus (HIV). The incidence of hospitalization in the adult population with leishmaniasis co-infected with HIV increased with age, peaked at 35–39 years of age and subsequently declined. In the pediatric population, all leishmaniasis cases occurred in HIV-negative children. Incidence of hospitalizations was highest in Madrid and in the Mediterranean coast. The cost per inpatient hospital care was \$9,601 corresponding to an annual direct cost of more than \$1.5 million for inpatient care alone. The economical burden of leishmaniasis is not neglectable and in the 12-year study period it represented more than \$19 million.



MATERIAL AND METHODS

This retrospective study used the National Information System for Hospital Data (Conjunto Mínimo Básico de Datos; CMBD) maintained by the Ministry of Health. It provides a complete record of all hospitalizations and is not subject to the limitations of outpatient surveillance systems, such as underdiagnosis or deficiencies in reporting. This system uses clinical codes for the Spanish version of the 9th International Classification of Diseases (Modificación Clínica Clasificación Internacional de Enfermedades; CIE-9-MC) and covers ~98% of the public hospitals in Spain. Compulsory health insurance covers an estimated 99.5% of the Spanish population, although persons not covered by health insurance can receive treatment in public hospitals.¹⁰⁻¹² This database has been shown to be a reliable tool for estimating cases of other illnesses that required hospitalization.¹³

All hospital discharges for leishmaniasis (ICD 9 CM 085.0-085.9; first diagnosis position) reported during a 12-year period (January 1, 1997 through December 31, 2008) were reviewed. For each entry, the following data were collected: age, sex, average length of hospitalization, diagnosis (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD 9 CM]), and outcome. For patients with multiple entries to the hospitals, only the first episode of leishmaniasis was included in the study.

TABLE 1
Hospitalizations related to leishmaniasis in Spain (1997–2008)*

	Hospitalization, any diagnostic position	Incident hospitalization, any diagnostic position	Incident hospitalization, first diagnostic position		
			All	HIV-positive	HIV negative
n	6,585	3,745	2,028	683	1,345
Sex (male)	5,290 (80%)	2,894 (77%)	1,479 (73%)	579 (85%)	900 (67%)
Age (SD) (years)	36.85 (17.13)	36.01 (19.09)	33.46 (22.62)	37.65 (8.19)	31.32 (26.91)
HIV (%)	4,356 (66%)	2,097 (56%)	683 (34%)		
Hospitalization stay (days)	15.98 (17.18)	19.93 (18.57)	17.25 (13.72)	18.80 (15.30)	16.47 (12.78)
Exitus	405 (6%)	250 (7%)	68 (3%)	24 (4%)	44 (3%)
085.0 Leishmaniasis visceral (kala-azar)	5,347 (81%)	2,896 (77%)	1,667 (82%)	585 (86%)	1,082 (80%)
085.1 Cutaneous leishmaniasis urban	58 (1%)	40 (1%)	18 (1%)	4 (1%)	14 (1%)
085.2 Cutaneous leishmaniasis asian desert	6 (0%)	5 (0%)	1 (0%)	0 (0%)	1 (0%)
085.3 Cutaneous leishmaniasis ethiopian	8 (0%)	4 (0%)	2 (0%)	1 (0%)	1 (0%)
085.4 Cutaneous leishmaniasis american	20 (0%)	16 (0%)	12 (1%)	2 (0%)	10 (1%)
085.5 Mucocutaneous leishmaniasis (American)	79 (1%)	49 (1%)	34 (2%)	4 (1%)	30 (2%)
085.9 Leishmaniasis unspecified	1,067 (16%)	735 (20%)	294 (14%)	87 (13%)	207 (15%)

* HIV = human immunodeficiency virus.



TABLE 2
Epidemiology of first attack of hospitalized leishmaniasis in Spain (1997–2008)*

Year	Population of Spain	No. cases†	Hospitalization rate (×100,000)	95% CI	Case-fatality rate (%)	95% CI	Mortality rate (×100,000)	95% CI	Re-admission rate
1997	38,734,929	161	0.42	0.351; 0.48	3.11	0.43; 5.79	0.01	0.002; 0.024	1.17
1998	39,055,598	117	0.3	0.245; 0.354	2.56	−0.30; 5.43	0.01	−0.001; 0.016	1.09
1999	39,398,117	111	0.28	0.229; 0.334	4.50	0.65; 8.36	0.01	0.002; 0.024	1.19
2000	39,689,795	151	0.38	0.32; 0.441	3.97	0.86; 7.09	0.02	0.003; 0.027	1.21
2001	40,294,505	202	0.5	0.432; 0.57	3.96	1.27; 6.65	0.02	0.006; 0.034	1.30
2002	41,001,136	177	0.43	0.368; 0.495	4.52	1.46; 6.65	0.02	0.006; 0.033	1.36
2003	41,862,723	191	0.46	0.392; 0.521	4.19	1.35; 7.03	0.02	0.006 ; 0.032	1.48
2004	42,333,730	204	0.48	0.416; 0.548	2.94	0.62; 5.26	0.01	0.003; 0.026	1.29
2005	43,226,359	182	0.42	0.36; 0.482	1.65	−0.20; 3.50	0.01	−0.001; 0.015	1.40
2006	43,814,785	192	0.44	0.376; 0.5	2.60	0.35; 4.86	0.01	0.001; 0.021	1.47
2007	44,296,722	203	0.46	0.395; 0.521	3.94	1.26; 6.62	0.02	0.006; 0.031	1.47
2008	45,234,666	137	0.3	0.252; 0.354	2.19	−0.26; 4.64	0.01	−0.001; 0.014	1.64
TOTAL	498,943,065	2,028	0.41	0.389; 0.424	3.35	2.57; 4.14	0.01	0.01; 0.017	1.35

* 95% CI = 95% confidence interval.

† Cases: number of individuals hospitalized with leishmaniasis in the first diagnostic position for the first time during the study period (incident hospitalization).



Epidemiología de los ingresos hospitalarios por leishmaniasis en España (1999-2003)

Yolanda Valcárcel^a, Rafael Bastero^b, María Anegón^a, Silvia González^a y Ángel Gil^a

^aUnidad de Docencia e Investigación en Medicina Preventiva y Salud Pública. Facultad de Ciencias de la Salud. Universidad Rey Juan Carlos. Madrid. España. ^bInstituto Hospitalario Jacques Cartier. Massy. Francia.

OBJETIVO. Conocer la epidemiología de las hospitalizaciones producidas por *Leishmania* durante el período 1999-2003. **PACIENTES Y MÉTODOS.** Estudio retrospectivo en el que hemos utilizado el conjunto mínimo de bases de datos de alta hospitalaria (CMBD).

RESULTADOS. Se registraron 1.180 hospitalizaciones por leishmaniasis, el 34% de las cuales fueron reingresos, lo que supone un total de 786 casos nuevos de leishmaniasis, y una tasa de incidencia de 0,4 casos por 100.000 habitantes/año. La leishmaniasis afecta principalmente a menores de 5 años y a varones de entre 25 y 44 años. La forma de presentación más frecuente fue visceral (el 83,6% de las hospitalizaciones totales). Por comunidades autónomas, Madrid y Castilla-La Mancha presentaron las mayores tasas de incidencia, mientras que Galicia y Extremadura presentaron las más bajas. El 42% de las hospitalizaciones correspondieron a pacientes coinfectados con el virus de la inmunodeficiencia humana (VIH), si bien entre los años 2000 y 2003 se observó un descenso del número de hospitalizaciones en este subgrupo y un aumento de hospitalizaciones en los pacientes no coinfectados con el VIH.

CONCLUSIÓN. El aumento de las tasas de hospitalizaciones por leishmaniasis en España es un indicador de que esta zoonosis evitable continúa siendo un problema de salud pública en nuestro país.

RESULTS. There were 1180 hospital admissions with a primary diagnosis of leishmaniasis, 34% of which were readmissions, yielding a total of 786 new cases of leishmaniasis and an incidence rate of 0.4 per 100 000 population/year. The disease mainly affected children under five years of age and adults between 25 and 44. The most frequent form of presentation was visceral leishmaniasis, which was documented in 83.6% of hospitalizations. Among the autonomous communities of Spain, Madrid and Castilla-La Mancha showed the highest incidence rates, whereas Galicia and Extremadura presented the lowest rates. Patients coinfecting with HIV accounted for 42% of hospital admissions for leishmaniasis. Nonetheless, between 2000 and 2003, a decrease was observed in the number of hospitalizations in this subgroup and an increase of patients without HIV coinfection.

CONCLUSION. The increase in hospitalization rates for leishmaniasis in Spain indicates that this avoidable zoonosis remains a considerable public health problem in our country.

Key words: Leishmaniasis. Hospitalization. Incidence.



TABLA 1. Casos, reingresos y tasas de leishmaniasis por grupos de edad y por año

Edad	1999					2000					2001				
	Hospitalizaciones			Tasas		Hospitalizaciones			Tasas		Hospitalizaciones			Tasas	
	H	C	R	T _c	T _{hop}	H	C	R	T _c	T _{hop}	H	C	R	T _c	T _{hop}
≤4	24	19	5	0,99	1,25	42	30	12	1,55	2,17	55	38	19	1,85	2,82
5-14	8	8	0	0,20	0,20	2	2	0	0,05	0,05	7	7	0	0,18	0,18
15-24	23	5	18	0,09	0,40	8	7	1	1,13	0,14	19	15	4	0,28	0,28
25-34	28	27	1	0,41	0,43	34	33	1	0,50	0,52	38	22	14	0,33	0,55
35-44	31	27	4	0,46	0,53	57	38	19	0,64	0,96	78	48	30	0,76	1,26
45-54	14	11	3	0,23	0,29	19	17	2	0,35	0,39	21	17	4	0,35	0,43
55-64	7	6	1	0,14	0,16	10	9	1	0,21	0,23	19	13	6	0,29	0,43
≥65	20	16	4	0,26	0,32	22	15	7	0,34	0,35	37	30	7	0,47	0,58
<i>Total</i>	<i>155</i>	<i>119</i>	<i>36</i>	<i>0,30</i>	<i>0,39</i>	<i>194</i>	<i>151</i>	<i>43</i>	<i>0,38</i>	<i>0,49</i>	<i>270</i>	<i>186</i>	<i>84</i>	<i>0,47</i>	<i>0,68</i>

C: primera hospitalización (casos); H: hospitalizaciones totales; R: reingresos; T_c: tasa de incidencia de leishmaniasis; T_{hop}: tasa de hospitalización por leishmaniasis.



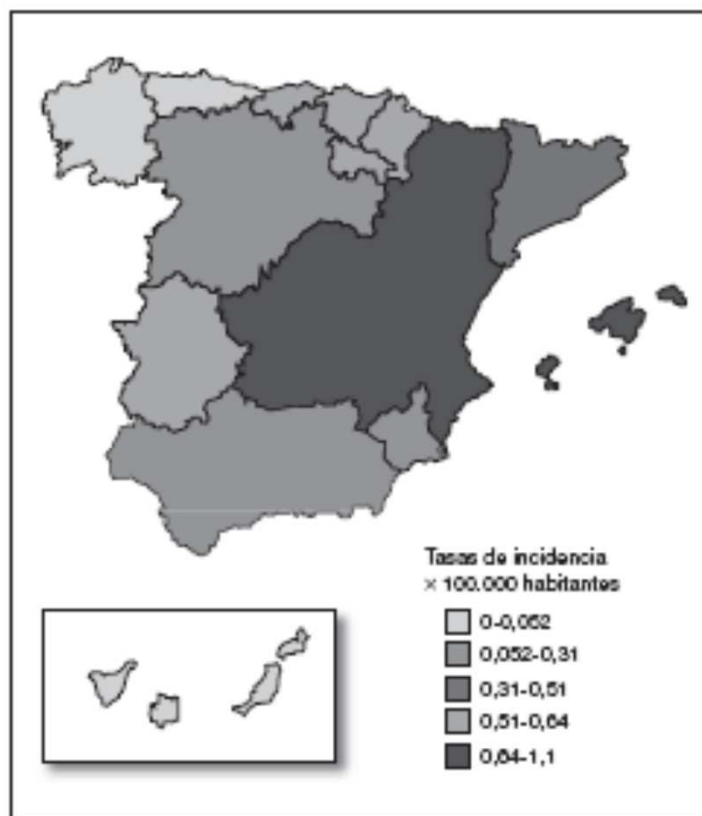


Figura 1. Distribución geográfica de las tasas de incidencia nacionales.

TABLA 2. Características de las hospitalizaciones por leishmaniasis en pacientes con o sin infección por VIH. Distribución de los casos y tasas de incidencia por grupos de edad, en el periodo 1999-2003

	No coinfectados con el VIH	Coinfectados con el VIH
Sexo masculino	86%	63,5%*
Media de edad (DE)	32,7 años (27,5)	38,0 años (8,6)*
Mediana de edad	32,5 años	37 años
Estancia media (DE)	16,7 días (12,2)	18,8 días (15,4)*
Mediana	14 días	15 días
Porcentaje que reingresa	23	28*
Letalidad	20 (4,0%)*	17 (5,8%)*

Grupos de edad	Nº de casos (reingresos)	T _{hop}	Nº de casos (reingresos)	T _{hop}
< 5	153 (75)	2,33	0 (0)	0,00
5-14	26 (3)	0,15	0 (0)	0,00
15-24	32 (25)	0,22	8 (1)	0,03
25-34	47 (9)	0,17	91 (69)	0,49
35-44	58 (21)	0,26	149 (106)	0,85
45-54	51 (21)	0,29	29 (11)	0,16
55-64	35 (15)	0,25	10 (10)	0,10
> 65	92 (27)	0,35	5 (1)	0,02
Total	494 (196)	0,35	292 (198)	0,25

*Diferencia estadísticamente significativa, $p < 0,05$.

DE: desviación estándar; T_{hop}: tasa de hospitalizaciones totales; VIH: virus de la inmunodeficiencia humana.

Pandemic influenza hospitalization in Spain (2009)

Incidence, in-hospital mortality, comorbidities and costs

Cristina Rodríguez-Rieiro, Pilar Carrasco-Garrido, Valentín Hernández-Barrera, Ana Lopez de Andres, Isabel Jimenez-Trujillo, Angel Gil de Miguel and Rodrigo Jiménez-García*

Preventive Medicine Unit; Rey Juan Carlos University; Madrid, Spain

Key words: pandemic influenza, hospitalization, chronic condition, in hospital mortality, hospital costs

Abbreviations: ICD-9-CM, international classification of diseases ninth revision, clinical modification; IHM, in hospital mortality; DRG, diagnosis-related groups; MBDS, minimum basic data system



Introduction

On 25 April 2009, upon the emergence of the new pandemic influenza strain A (H1N1) in humans, the World Health Organization declared an international public health emergency.¹ In Spain the highest incidences of pandemic influenza in 2009–2010 were 7,550 cases per 100,000 inhabitants between 5 and 14 y, and 5,240 per 100,000 inhabitants in younger than 5 y. Most of the cases across all age groups had fever (97%) and cough (92%) as main symptoms, and a high percentage of patients (87%) did not require hospital admission.²

While annual impact of seasonal influenza in terms of incidence, co-morbidities and economic burden of hospitalized patients has been widely studied and published on, information on the clinical spectrum of illness and risk factors for severity among patients who were hospitalized with 2009 H1N1 influenza is still emerging. To date, published studies of hospitalizations for

pandemic influenza are based on specific registries developed to monitor the illness as part of surveillance networks or to determine critically ill patients admitted in Intensive Care Units.^{3–5}

To the authors' knowledge, however, there are no studies based on the Minimum Basic Data System (MBDS), which is the largest clinical and administrative database available in Spain and compiles information obtained at the discharge of all hospitalization episodes, covering more than 95% of hospital discharges.⁶ This database contains information related to inpatient characteristics such as patient variables, admittance/discharge variables and clinical variables such as diagnostics and procedures.

Therefore in this study, the authors aim to describe data related to hospitalization, co-morbidities, in hospital mortality (IHM), median stays and the costs associated with hospitalization cases of pandemic influenza in Spain in 2009 according to the data available on the MBDS registry.



Table 1. International classification of diseases-ninth revision clinical modification (ICD-9-CM) codes for chronic conditions that constitute an indication for annual influenza vaccination in Spain, pregnancy and obesity⁷

Underlying Conditions	ICD-9-CM codes
Chronic Cardiovascular disease	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 410.x, 412.x, 425.4–425.9, 428, 093.0, 437.3, 440.x, 441.x, 443.1–443.9, 447.1, 557.1, 557.9, V43.4
Asthma	493.x
Chronic respiratory disease (Asthma not included)	416.x, 490.x–492.x, 494.x–505.x, 506.4, 508.1, 508.8
Diabetes	250.x
Endocrine disease (Diabetes not included)	de 240.x–249.x, 251.x–260.x
Neoplasms	140.x–172.x, 174.x–209.3
HIV and other immunity disorders	042, 079.53, 279.x
Diseases of the blood and blood-forming organs	280.x–289.x
Hereditary and degenerative diseases of the central nervous system	330.x–337.x
Chronic liver disease	572.2–572.8
Chronic kidney disease	403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 582.x, 583.0–583.7, 585.x, 586.x, 588.0, V42.0, V45.1, V56.x, V45.1, V45.11, V56.0
Epilepsy	345.x
Pregnancy	633.x–679.x, v.22–v.23.9
Obesity	278.00 y 278.01, 649.1x



Table 2. Underlying medical conditions in patients admitted to Spanish hospitals due to pandemic influenza, 2009, according to age group

Underlying chronic disease	0-14 y		15-64 y		65 y or more		Total	
	N	%	N	%	N	%	N	%
Cardiovascular disease	-	-	132	1.79	103	8.89	235	2.05
Asthma	308	10.62	1329	17.98	122	10.54	1759	15.36
Chronic respiratory disease (Asthma not included)	42	1.45	759	10.27	383	33.07	1184	10.34
Obesity (BMI >40)	18	0.62	849	11.49	103	8.89	970	8.47
Diabetes	29	1	650	8.8	354	30.57	1033	9.02
Endocrine disease (Diabetes not included)	43	1.48	358	4.84	83	7.17	484	4.23
Neoplasms	70	2.41	333	4.51	109	9.41	512	4.47
Diseases of the blood and blood-forming organs	214	7.38	570	7.71	108	9.33	892	7.79
Epilepsy	98	3.38	144	1.95	15	1.3	257	2.24
Hereditary and degenerative diseases of the central nervous system	23	0.79	37	0.5	59	5.09	119	1.04
Chronic liver disease	2	0.07	32	0.43	3	0.26	37	0.32
Chronic kidney disease	19	0.65	246	3.33	122	10.54	387	3.38
HIV and other immunity disorders	21	0.72	225	3.04	8	0.69	254	2.22



Table 3. Description of fatal cases and In hospital mortality (IHM) rate in patients admitted to Spanish hospitals due to pandemic influenza and with an underlying chronic condition, according to age group

	0-14 y		15-64 y		65 ore more years		Total	
	Cases	IHM rate %	Cases	IHM rate %	Cases	IHM rate %	Cases	IHM rate %
Man	15	0.92	100	2.93	46	8.27	161	2.80
Woman	8	0.64	84	2.22	29	5.50	121	2.13
Cardiovascular disease	-	-	8	6.45	10	10.75	18	7.66
Asthma	-	-	13	0.99	2	1.67	15	0.85
Chronic respiratory disease (Asthma not included)	-	-	20	2.71	21	5.80	41	3.46
Obesity (BMI >40)	1	5.88	42	5.20	6	6.19	49	5.05
Diabetes	-	-	19	3.01	19	5.67	38	3.68
Endocrine disease (Diabetes not included)	1	2.38	14	4.07	4	5.06	19	3.93
Neoplasms	7	11.11	35	11.74	16	17.20	58	11.33
Diseases of the blood and blood-forming organs	9	4.39	57	11.11	16	17.39	82	9.19
Epilepsy	7	7.69	8	5.88	0	0.00	15	5.84
Hereditary and degenerative diseases of the central nervous system	3	15.00	5	15.63	7	13.46	15	12.61
Chronic liver disease	-	-	8	33.33	-	-	8	21.62
Chronic kidney disease	1	5.56	13	5.58	14	12.96	28	7.24
HIV and other immunity disorders	-	-	11	5.14	-	-	11	4.33



National Trends over One Decade in Hospitalization for Acute Myocardial Infarction among Spanish Adults with Type 2 Diabetes: Cumulative Incidence, Outcomes and Use of Percutaneous Coronary Intervention

Ana Lopez-de-Andres*, Rodrigo Jimenez-Garcia, Valentin Hernandez-Barrera, Isabel Jimenez-Trujillo, Carmen Gallardo-Pino, Angel Gil de Miguel, Pilar Carrasco-Garrido

Preventive Medicine and Public Health Department. Rey Juan Carlos University. Alcorcón, Madrid, Spain

age, sex, year and comorbidity. Results: From 2001 to 2010, 513,517 discharges with AMI were identified (30.3% with type 2 diabetes). The cumulative incidence of discharges due to AMI in diabetics patients increased (56.3 in 2001 to 71 cases per 100,000 in 2004), then decreased to 61.9 in 2010. Diabetic patients had significantly higher IHM (OR, 1.14; 95%CI, 1.05–1.17). The proportion of diabetic patients that underwent PCI increased from 11.9% in 2001 to 41.6% in 2010. Adjusted incidence of discharge in patients with diabetes who underwent PCI increased significantly (IRR, 3.49; 95%CI, 3.30–3.69). The IHM among diabetics patients who underwent a PCI did not change significantly over time.

Conclusions: AMI hospitalization rates increased initially but declining slowly. From 2001 to 2010 the proportion of diabetic patients who undergo a PCI increased almost four-fold. Older age and more comorbidity may explain why IHM did not improve after a PCI.

Table 1. Hospital discharges due to acute myocardial infarction among patients with and without type 2 diabetes in Spain, 2001–2010.

Year	With Type 2 Diabetes				Without Diabetes			
	Total	Incidence	LOS (SD)	%IHM	Total	Incidence	LOS (SD)	% IHM
2001	12235	56.3	10.4(8.5)	13.2	34131	156.9	9.9(9.4)	11.2
2002	13864	62.9	10.6(9.1)	13.8	36904	167.5	9.8(9.6)	10.5
2003	15955	70.7	10.4(9.1)	12.9	36870	163.5	9.3(8.6)	10.3
2004	16396	71	10(8.3)	11.8	36550	158.3	9.1(10.3)	9.7
2005	16608	70.4	9.8(8.4)	12.1	36187	153.4	8.8(8.8)	9.2
2006	15754	65.4	9.6(8.7)	11.2	35566	147.5	8.5(8.4)	8.5
2007	16082	65.3	9.2(8.6)	11.0	35537	144.4	8.3(8.9)	8.5
2008	16221	64.6	9.2(8.3)	10.6	35799	142.5	8.1(8.7)	8.3
2009	16390	63.9	8.9(9.6)	9.8	35309	137.7	7.8(8.3)	7.9
2010	16171	61.9	8.6(9)	9.8	34988	133.8	7.7(9.5)	7.7
Total Men	94199	83.1	9.5(8.9)	9.4	262013	231.1	8.6(9.1)	7.4
Total Female	61477	50.1	9.9(8.6)	14.9	95828	78.1	9(9.1)	14.1
Total	155676	65.2	9.6(8.8)	11.5	357841	149.9	8.7(9.1)	9.2

Cumulative Incidence per100,000. Cumulative Incidence was calculated using the Spanish National Statistics Institute census projections [11]. LOS (SD): Mean length of stay (standard deviation). %IHM: In-Hospital Mortality.

doi:10.1371/journal.pone.0085697.t001



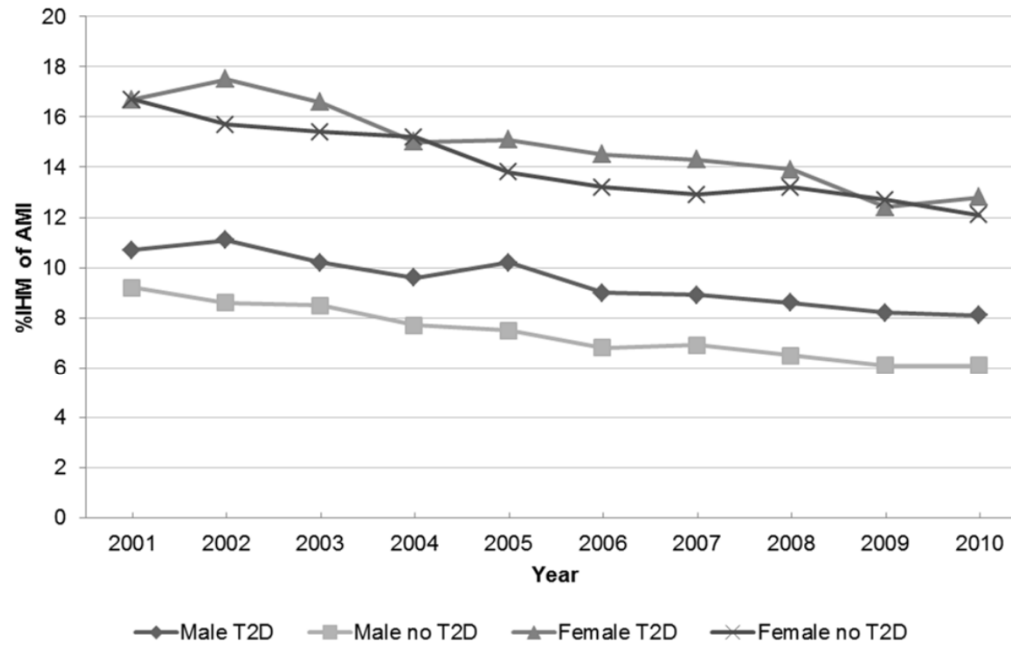


Figure 1. In-hospital mortality after AMI in patients with and without type 2 diabetes according to sex. IHM of AMI: In-hospital mortality after acute myocardial infarction. Male T2D: Men with type 2 diabetes. Male no T2D: Men without type 2 diabetes. Female T2D: Women with type 2 diabetes. Female without T2D: Women without type 2 diabetes.
doi:10.1371/journal.pone.0085697.g001



Table 4. Multivariate analysis of the factors associated with cumulative incidence and mortality after percutaneous coronary intervention in patients with type 2 diabetes in Spain, 2001–2010.

		Incidence (IRR)*	In-hospital mortality (OR)†
Age (years)	35–60 years	1	1
	61–70 years	0.87 (0.85–0.89)	1.37 (1.16–1.61)
	71–80 years	0.70 (0.68–0.71)	2.56 (2.21–2.98)
	>80 years	0.33 (0.32–0.35)	3.31 (2.78–3.94)
Sex	Men	1	1
	Female	0.80 (0.79–0.82)	1.32 (1.20–1.46)
Charlson Index	0	1	1
	1–2	0.74 (0.73–0.76)	2.39(2.17–2.64)
	≥3	0.51 (0.49–0.53)	3.19 (2.73–3.73)
Year	2001	1	1
	2002	1.32 (1.24–1.41)	1.27 (0.92–1.76)
	2003	1.53 (1.43–1.62)	1.04 (0.76–1.43)
	2004	1.86 (1.75–1.98)	0.83 (0.60–1.14)
	2005	2.25 (2.12–2.39)	1.08 (0.80–1.46)
	2006	2.52 (2.38–2.67)	1.07 (0.80–1.45)
	2007	2.86 (2.70–3.03)	1.03 (0.77–1.38)
	2008	3.16 (2.98–3.34)	1.02 (0.75–1.36)
	2009	3.40 (3.21–3.60)	0.89 (0.66–1.19)
	2010	3.49 (3.30–3.69)	0.92 (0.69–1.23)

*IRR: Incidence Rate Ratios calculated using multivariate Poisson regression.
 †OR: Odds Ratio calculated using logistic regression models.
 The logistic regression multivariate model and Poisson regression model were built using as dependent variables “death (yes/no)” and “Cumulative incidence of PCI” respectively, and as independent variables year, sex, Charlson comorbidity index, and age.
 doi:10.1371/journal.pone.0085697.t004



Contents lists available at [ScienceDirect](#)

Vaccine

journal homepage: www.elsevier.com/locate/vaccine



Different vaccination strategies in Spain and its impact on severe varicella and zoster[☆]

Ruth Gil-Prieto^{a,b,*}, Stefan Walter^c, Alba Gonzalez-Escalada^a, Laura Garcia-Garcia^a, Patricia Marín-García^a, Angel Gil-de-Miguel^a

^a Department of Preventive Medicine & Public Health & Medical Immunology & Microbiology, Rey Juan Carlos University, Madrid, Spain

^b Department of Population Medicine, Harvard Medical School, Boston, MA, USA

^c Department of Social and Behavioural Sciences, Harvard School of Public Health, Boston, MA, USA



2. Methods

The national information system for hospital data (Conjunto Mínimo Básico de Datos; CMBD) includes an estimated 98% of admissions in public hospitals, covering 99.5% of the Spanish population [13–15].

All varicella or herpes zoster related hospitalizations reported in any diagnostic position from January 1st, 2005 through December 31st, 2010 were analyzed. The 9th International Classification of Diseases ICD-9-CM (CIE-9-MC) codes for varicella (052.0, 052.1, 052.2, 052.7, 052.8, 052.9), and herpes zoster (053.0, 053.1, 053.10, 053.11, 053.12, 053.13, 053.19, 053.2, 053.20, 053.21, 053.22, 053.29, 053.7, 053.71, 053.79, 053.8, 053.9) were selected. Diagnostic codes in the primary diagnostic position were used for sensitivity analyses.



Hospitalization rate due to varicella by age in Spain (2005-2010).

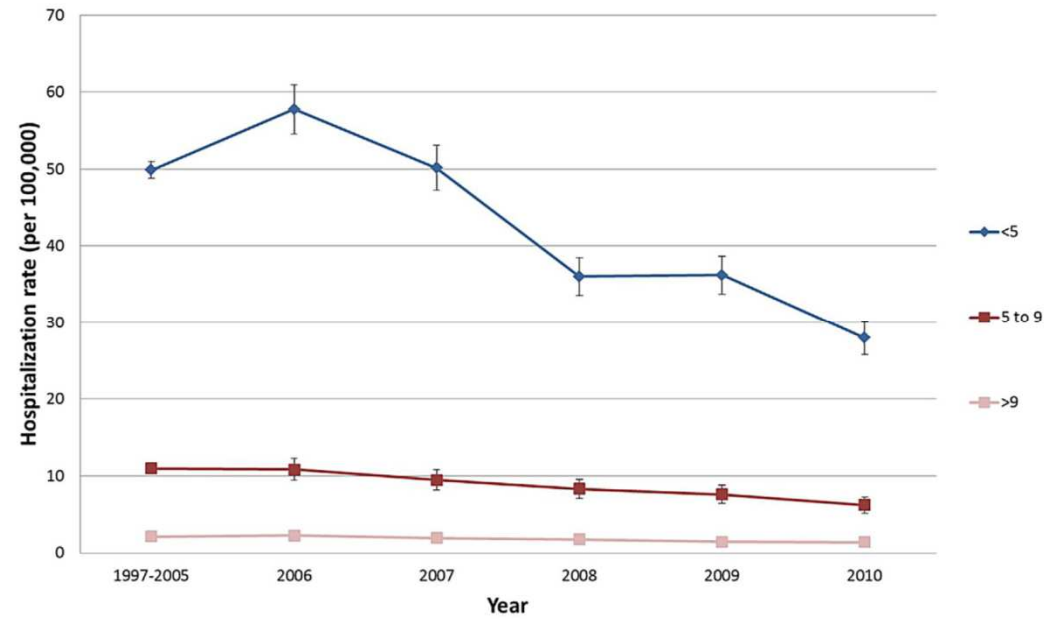


Fig. 1. Trends in hospitalization rate due to varicella by age in Spain (2005-2010).



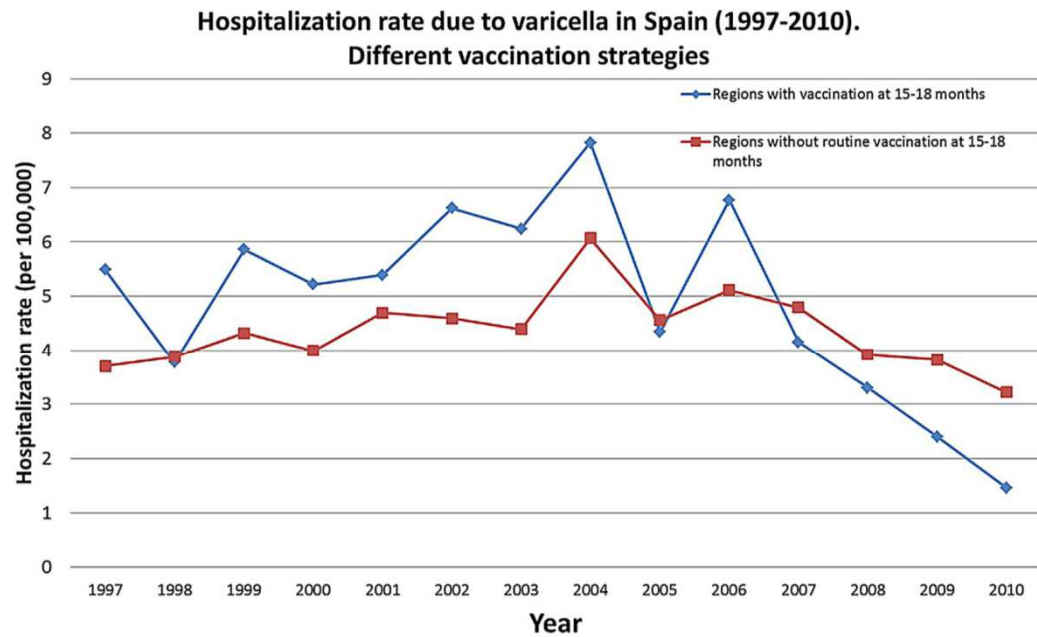


Fig. 3. Hospitalization rate due to varicella in Spain (1997–2010). Different vaccination strategies.



Sugerencias de mejora

- Peticiones grandes que requieren varias bases de datos, puede ser complicada la fusión de las bases por:
 - 1) variación en los nombres de las variables,
 - 2) no se incluyen siempre las mismas variables.
- Para identificar **reingresos** de pacientes, la variable Historia recodificada da muchos problemas. Sería de gran utilidad tener una variable que permitiera localizar reingresos y complicaciones de los pacientes.
- Costes: La estimación de costes resulta complicada de explicar en las publicaciones y no conocemos bien cómo se compone.
- Hay problemas de codificación de los códigos postales así como muchos registros en los que no figuran lo que dificulta el análisis de esta variable.
- Potencialidad para unirse con bases de datos de Atención Primaria



Consejo Superior de Estadística

Propuestas y recomendaciones previas a la formulación del Anteproyecto del Plan Estadístico Nacional 2013-2016, sobre las necesidades nacionales en materia estadística, y la adaptación y mejora de los medios existentes



Encuesta de morbilidad hospitalaria

- "debe trabajarse en la confluencia y consolidación en una sola operación estadística del Registro de Altas CMBD elaborada por el Ministerio de Sanidad y de la Encuesta de Morbilidad Hospitalaria elaborada por el INE. La operación resultante, será responsabilidad del Ministerio de Sanidad, Política Social e Igualdad y deberá constituir la fuente oficial de la información sobre morbilidad atendida con internamiento y de forma ambulatoria por el nivel hospitalario público y privado"



Muchas gracias por su atención

