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Development of certified environmental management in hospital and outpatient haemodialysis units☆

Sergio García Vicente[a], *María Morales Suárez-Varela*[b,*], *Anna Martí Monrós*[c], *Agustín Llopis González*[b]

[a] *Departamento de Gerencia, Hospital Lluís Alcanyís, Conselleria de Sanitat, Generalitat Valenciana, Xàtiva (Valencia), Spain*
[b] *Unidad Docente de Medicina Preventiva y Salud Pública, Facultad de Farmacia, Universidad de Valencia, Burjassot (Valencia), Spain*
[c] *Servicio de Nefrología, Consorcio Hospital General Universitario de Valencia, Valencia, Spain*

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ABSTRACT

Introduction: The environmental impact of haemodialysis is very high. Institutional activity in this sense is important, even in the production of references. Voluntary environmental management systems (EMS), environmental management and auditing systems (EMAS) and the International Organization for Standardization standards (ISO 14001) are important tools for environmental protection, together with legislation, taxation and tax benefits.
Objectives: To determine the degree of implementation of EMS in hospital units and outpatient haemodialysis in the Spanish National Health System to provide a group of reference centres in environmental management in this healthcare activity.
Methods: Development of a list by autonomous communities showing hospital and outpatient dialysis units using an EMAS and/or ISO 14001 in 2012–2013. The sources of information were the Spanish National Catalogue of Hospitals, Spanish Registry of Healthcare Certification and Accreditation, European and regional EMAS records, world ISO registrations, dialysis centre lists from scientific societies and patients, responses from accredited entities in Spain for environmental certification and the institutional website of each haemodialysis centre identified.
Results: Of the 210 hospitals with a dialysis unit, 53 (25%) have the ISO 14001 and 15 of these also have an EMAS. This constitutes 30% of all hospital dialysis chairs in Spain: 1,291 (of 4,298). Only 11 outpatient clinics are recorded, all with the ISO 14001.
Discussion: There is no official documentation of the implementation of EMS in dialysis units. Making this list provides an approach to the situation, with special reference to haemodialysis because of its significant environmental impact.

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* *Corresponding author.*
E-mail address: sergarvi@alumni.uv.es (M. Morales Suárez-Varela).

Desarrollo de la gestión medioambiental certificada en unidades hospitalarias y ambulatorias de hemodiálisis

Palabras clave:
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RESUMEN

Antecedentes: El impacto ambiental de la hemodiálisis es destacado. Está destacando la actividad en este sentido incluso a nivel bibliográfico. Los sistemas de gestión medioambiental (SGMA) voluntarios, Environmental Management and Auditing System (EMAS) e International Organization for Standardization (ISO 14001), son instrumentos destacados para la protección medioambiental junto a legislación, impuestos y beneficios fiscales.
Objetivos: Conocer el grado de implantación de los SGMA en las unidades de hemodiálisis hospitalarias y ambulatorias del Sistema Nacional de Salud español, para disponer de un grupo de centros de referencia en gestión medioambiental en esta actividad sanitaria.
Métodos: Elaboración de un listado por comunidades autónomas que muestre las unidades hospitalarias y ambulatorias de diálisis que disponen en 2012–2013 de EMAS o ISO 14001. Fuentes de información: Catálogo Nacional de Hospitales, Registro Español de Certificación y Acreditación Sanitaria, registros europeo y autonómicos de EMAS, registro mundial de ISO, listados de centros de diálisis de sociedades científicas y de pacientes y, respuesta de entidades acreditadas para certificación medioambiental en España e información de web institucional de cada centro sanitario identificado.
Resultados: Un total de 210 hospitales cuentan con hemodiálisis, 53 (25% de centros hospitalarios con diálisis) disponen de ISO 14001 (y 15 de ellos, también EMAS), el 30% del total de puestos hospitalarios en España: 1.291 (de 4.298). Solo se registran 11 clínicas ambulatorias, todas con ISO 14001.
Discusión: No existe referente oficial que muestre la implantación de los SGMA en hospitales. Confeccionar este listado ofrece una aproximación a su situación, con especial referencia a la hemodiálisis por su destacada implicación ambiental.

Introduction

All human actions leave their mark on the environment, and health care activities are no exception. Health care professionals detect and prevent, care and cure, but their work generates both non-hazardous waste (glass, paper, cardboard, and non-infectious waste), and hazardous waste (radioactive, toxic, infectious, and pharmaceutical waste) and consumes a significant amount of natural resources. In general, there is little consideration for the environmental damage caused by the services provided.[1] However, in recent years, the global increase in awareness of environmental preservation and improvement has reinforced the international incentives to improve health care waste management and preserve natural resources, with the WHO[2–4] as a reference ("WHO's Health in the Green Economy Sector" www.who.int/hia/green_economy/en/).

Nephrology, and specifically haemodialysis, are not exempt from this: there are significant environmental consequences due the high use of natural resources[9,10] and generation of waste,[5–8] which can also be hazardous, such as sharps, dialysis lines, and arteriovenous fistula needles. Per dialysis session, it is estimated that up to 2.5 kg of solid waste is produced and 500 L of water are consumed. To this we must add the contamination of soil and underground and surface water, and the generation of allergic reactions, caused by contamination from dialysers, bicarbonate cartridges, bottled disinfectants, and by the release of polyvinylchloride (PVC), polychlorinated dibenzo-p-dioxins (PCDD) and di-(2-ethylexyl)-phthalate (DEHP).[11–14]

The scientific literature in the area of dialysis is beginning to advance, in an attempt to improve the environmental impact, with prominent authors writing on the subject, and one (JW Agar) even being referred to as the "spokesman of ecological dialysis".[15] This direction towards "green" management of haemodialysis, or "ecodialysis", is becoming a major goal in various settings. Notable initiatives include "Green Nephrology" (http://sustainablehealthcare.org.uk/green-nephrology) and "Green Dialysis" (www.greendialysis.org), and those of societies such as the European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA), with their recent Environmental Guidelines for Dialysis.[16]

In Europe, and indeed in Spain, there are outstanding instruments available for environmental protection. In addition to taxes and tax benefits, and current legislation and regulations on health care waste (bearing in mind that there is no national standard, but some autonomic communities of Spain have specific legislation on health care waste[17]), comes the emergence of voluntary environmental management systems (EMS). The Environmental Management and Auditing System[18,19] (EMAS III) and the International Organization for Standardization (ISO 14001:2004)[20] are 2 international

standards for EMSs, which allow institutions and businesses to be classified as "environmentally friendly".

Classically, an EMS is defined[21] as the framework used to guide an organisation to achieve and maintain an operation in accordance with established environmental goals, responding efficiently to changes in regulatory, social, financial, and competitive pressures, and to potential environmental risks. We will not debate here whether EMSs are positive or represent little more than a nostrum; however we consider that presenting a summary of their pros and cons is relevant. As a part of the general everyday management system of an organisation, EMSs offer a technological and informative solution for monitoring compliance with legislation and regulations, from a local level to an international level. They involve the use of a policy: a plan with procedures and environmental risks that are clearly defined and disclosed to the whole organisation. This should work to ensure that operations are consistent with environmental policy, and that the institution has an organisational structure for physical resources and the appropriate personnel to address and implement the environmental tasks. An EMS can help encourage the generalised development of better environmental practices and generate the "change" involved in converting health care centres into socially dependable organisations.

Likewise, EMSs help to manage and assess internal environmental concerns and provide the opportunity to make public the institution's environmental efficiency, improving its image of corporate citizenship to both an external community and an internal public, namely the professionals in the organisation. Other key elements characteristic of an EMS include the training and awareness-raising among the professionals for better environmental conduct, and an established frequency for audits and reviews. Such reviews verify the adequacy, efficacy, and performance of the system and it serves the purpose maintaining a constant improvement in performance and, in the case of failures or non-conformity with the agreed targets, correcting it.

Difficulties include the resistance that occurs in any organisation when management changes are introduced, and the increased time spent on implementation, including any specific training that may be required. Initial funding is required to introduce the changes in everyday practice and to make the reforms needed to meet the regulations and targets involved in the certification.

It must be noted that EMS certification is not accreditation of the environmental performance, but of the management system implemented. For example, it does not ensure that emissions are lower than a determined level, but that the organisation has the necessary components of an active management system that works adequately. An EMS dose not in itself mean an immediate decrease in environmental impact; it is an instrument that allows the organisation to meet the desired or required environmental standard: the EMS is the instrument, and the improvement of environmental damage is the goal.

The main aim of this article was to establish which haemodialysis units (public or private, inpatient or outpatient) of our National Health System (NHS) have implemented a certified EMS, and the type of EMS they use, to ascertain their involvement in the high environmental impact that haemodialysis clearly has, and to obtain references from which we could explore actions for environmental improvement.

Methods

To determine which inpatient and outpatient dialysis units in Spain worked with a certified EMS, the general approach focused on developing a database that showed these centres separated by autonomous community (regions). The EMS (EMAS III or ISO 14001-2004) had to be certified by a competent authority or company in 2012 and 2013.

Before developing the database, we look for, official databases either European, national, or regional. We used a general search system (Google©), examining the first 10 pages of results with the key words "dialysis centre, hospital, environmental management system, EMAS, and ISO 14001". At this point, we search for an updated registry containing the institutions with an EMS in Spain. To do so we contacted by e-mail and telephone the Spanish National Accreditation Body (*Entidad Nacional de Acreditación* [ENAC].[22] The ENAC is the only organisation in Spain that certifies accreditations to institutions on technical competency by conducting "conformity assessments", which determine the degree of compliance of an institution with the regulations it voluntarily deals with in its everyday running, independently of the sector in which it operates. The ENAC is a part of the Ministry of Industry, Energy, and Tourism.

We found no available official register at a ministerial (Health, Environment, Industry), regional, or company level. The ENAC reported that it did not keep an up-to-date database of organisations with an EMS. Therefore, we moved on and planned the creation of a list of hospitals and outpatient dialysis units certified with an EMS. Available data for assessment on health care centres and environmental certification in Spain came from the following public health and environmental management databases, in March 2013:

- The National Catalogue of Hospitals 2013 (*El Catálogo Nacional de Hospitales* [CNH]), a section of the Ministry of Health, Consumer Affairs, and Social Policy[23] and official register of hospitals in Spain. Hospitals with haemodialysis equipment declared in "high-technology equipment" were selected by autonomous community.
- The Spanish Register of Health Care Certification and Accreditation (*El Registro Español de Certificación y Acreditación Sanitaria* [RECAS])[24] of the Spanish Society of Health Care Quality. This register includes the centres and health care services that have obtained certification or accreditation. Its main purpose it to make the public aware of the work organisations do to improve the Spanish health system. Currently, the register is public access, free, and voluntary. Registration requires an application and evidence of certification.
- The responses of each of the Spanish bodies accredited by the ENAC to provide environmental certification.
- The EMAS registers for each autonomous community. At a national level, The Ministry of Agriculture, Food, and Environment is responsible for this. The European Union also

provides an updated list of EMAS-registered organisations, called the EU EMAS Register, which has its own website.[25]

The group of outpatient dialysis centres was assessed by consulting the public databases of dialysis centres of the leading Spanish scientific societies and patient associations:

- Spanish Society of Nephrology (*Sociedad Española de Nefrología* [SENEFRO]): www.senefro.org/modules.php?name=dialisis
- Spanish Society of Dialysis and Transplantation (*Sociedad Española de Diálisis y Trasplante* [SEDYT]): www.sedyt.org/centros-de-dialisis
- National Federation of Associations for the Fight Against Kidney Disease (*Federación Nacional de Asociaciones para la Lucha Contra las Enfermedades del Riñón* [ALCER]): http://alcer.org/servicios/centros-de-dialisis.

Analysis is provided of the environmental information available on the corporate or institutional web portal of each health centre identified as having an EMS. This information was searched and assessed by 2 of the authors, at different timing (observer 1, 10–13 January 2013; observer 2, 10–13 April 2013). The percentage agreement between the 2 observers was assessed. Each hospital and outpatient clinic website was searched individually, using the first 5 pages of results from the general search system Google©.

Finally, to obtain a global reference of environmental certifications in the health care sector, and to compare these figures with the national figures, the official registers of ISO 14001[26] and EMAS were assessed, via website, in March 2013.

All the information collected was entered in a data matrix in Excel® 2010 version. The unit of analysis was each inpatient and outpatient dialysis centre, separated by regions within Spain territory; absolute and relative frequencies were used.

Results

The 2013 CNH provided a register of 789 centres (432 of them are private). Of these, 210 centres had haemodialysis facilities.

RECAS provided a total of 305 registered centres; only 4 of them had ISO 14001, and only 1 of those offered haemodialysis in its service portfolio.

There were 19 certifying companies accredited by ENAC. We contacted all of them via e-mail and telephone during January to February 2013. Only 9 of these companies had certified environmental management systems in hospitals: 7 offered them selves to send their list of certified hospitals by email, and 2 of them referred their web portal or asked us to send a request to their offices. Of the 9 companies, only 6 had accredited hospitals and outpatient clinics with haemodialysis facilities. The individual results from each of these companies are not given to avoid commercial bias.

Evaluation of the regional EMAS register showed that only 8 of the 17 autonomous communities in Spain contained accredited hospitals. None of the outpatient clinics had EMAS.

In the group of hospitals specially formed from the data available from the certifying companies (Fig. 1), we can see that an EMS was implemented in 53 hospitals with haemodialysis units: this represents 6.7% of all national hospitals (789) and 25% of hospitals with haemodialysis units (210). Of these 53 hospitals, 14 were private. All 53 worked with ISO 14001; only 15 also had EMAS. Of the 4,298 haemodialysis stations registered on the CNH, from 210 centres, 1,291 stations were classified as having an EMS: 30% of all stations.

Of note were the autonomous communities of Madrid, Andalusia, and Valencia, that had 12, 10, and 7 hospitals, respectively functioning with an EMS. Catalonia was also notable with 4 hospitals with EMAS.

Regarding outpatient centres, the records from the different societies and patient associations, that included all the autonomous communities (regions) but were not up-to-date, were found to have discrepancies: (SENEFRO had, 191 registered outpatient centres; by contrast SEDYT and Alcer had 64 and 152 respectively). Therefore, only information from the lists obtained from the certifying bodies was assessed (6 companies). From this data, there were only 11 centres with certification, all with ISO 14001 alone: 2 centres in Andalusia (with no data available on treatment post), 4 in the Canary Islands (also with no data) and 5 in the Valencian Community (Fig. 2).

Regarding website information, 20 of the 53 hospitals with an EMS in the final sample group did not include information on environmental certification on their institutional web portals. In 2 of these 53 hospitals, no reference web site was found. For outpatient clinics, 10 of the 11 certified clinics had a web site and provided information about their environmental certification. The percentage agreement between the 2 observers on the information assessed and provided was 100%.

The review of the ISO and EMAS studies showed that Spain had a high level of awareness of environmental certification, despite the socioeconomic context, being the fifth country worldwide in ISO-14001 certifications (16,051 of the 301,647 certifications worldwide: 5.32% of the total). However, there was a distinct lack of these certifications in social and healthcare activities, representing just 0.33% globally (Fig. 3), with a similar figure in Spain. The EMAS register contained 1,014 organisations: 49 of them were hospitals (4.8%), and 15 of those were in Spain (1.5% of the total), a significant number from the total hospitals with EMAS.

Discussion

The number of patients on dialysis continues to grow, as does the quantity of natural resources consumed and the waste generated. The lack of environmental awareness in health care professionals and organisations is a significant problem that needs assessment and improvement. Likewise, we must assess and improve the high environmental impact of dialysis. The need for long-term sustainability in this service and in the health system as a whole is pushing some professional groups to develop environmental initiatives, to avoid compromising future generations' capacity to adequately meet their health care needs, as well as and global environmental health.

The question of whether a dialysis unit should be a healthy place ought to be beyond all doubt. The environmental sustainability of health care, and of dialysis in particular, working in a way that does not damage the planet,[27] must

REGION	HOSPITAL AND LOCATION	ISO +/- EMAS	PUBLIC/ PRIVATE	DIALYSIS STATIONS
ANDALUSIA	Hospital Virgen del Mar - Almería	ISO	Private	10
	C. H. de Poniente - Almería	ISO	Public	18
	Complejo Hospitalario de Jaén	ISO	Public	48
	Área Hospitalaria Juan Ramón Jiménez - Huelva	*ISO + EMAS*	Public	44
	Hospital Regional Universitario Carlos Haya - Málaga	ISO	Public	56
	Empresa Pública Hospital Costa del Sol - Málaga	*ISO + EMAS*	Public	18
	Hospital Univ. Virgen de la Victoria - Málaga	ISO	Public	2
	Hospital Universitario Virgen del Rocío - Seville	ISO	Public	45
	Hospital Universitario Virgen de Macarena - Seville	ISO	Public	48
	Hospital Universitario Virgen de las Nieves - Granada	*ISO + EMAS*	Public	56
ARAGON	Hospital San Juan de Dios - Zaragoza	ISO	Private	36
BALEARIC ISLANDS	Fundación Hospital Son Llátzer - Mallorca	ISO	Public	21
	Fundación Hospital Manacor - Manacor	*ISO + EMAS*	Public	14
CANARY ISLANDS	Hospital Quirón - Tenerife	*ISO + EMAS*	Private	22
	Hospital U. Ntra Sra de la Candelaria - Tenerife	ISO	Public	35
	Hospiten Bellevue - Tenerife	ISO	Private	4
	Hospiten Sur - Tenerife	ISO	Private	27
	Clínica San Roque - Las Palmas	ISO	Private	7
CASTILE-LA MANCHA	Hospital General Universitario de Ciudad Real	ISO	Public	47
CASTILE AND LEON	Hospital de El Bierzo - Ponferrada (León)	ISO	Public	13
CATALONIA	Hospital General de Vic (Consorci Hospitalari)	*ISO + EMAS*	Public	26
	Hospital Sant Joan de Déu - Barcelona	*ISO + EMAS*	Private	2
	Hospital de Palamós - Fundación Mossen Miquel Costa	*ISO + EMAS*	Public	17
	Fundació Salut Empordà - Hospital de Figueres	*ISO + EMAS*	Public	20
VALENCIAN COMMUNITY	Consorcio Hospital General Universitario - Valencia	*ISO + EMAS*	Public	24
	Hospital Universitario y Politécnico La Fe - Valencia	ISO	Public	20
	Hospital Universitario de la Ribera - Alzira	ISO	Public	35
	Hospital Imed Levante - Benidorm	ISO	Private	15
	Clínica Vistahermosa - Alicante	ISO	Private	43
	Hospital Perpetuo Socorro - Alicante	ISO	Private	73
	Hospital General Universitari d'Elx - Elche	ISO	Public	25
GALICIA	Hospital Da Costa - Burela - Lugo	*ISO + EMAS*	Public	19
	Complejo Hospitalario de Pontevedra	ISO	Public	26
	Hospital Nuestra Señora de Fátima - Vigo	ISO	Private	5
LA RIOJA	Fundación Hospital Calahorra - La Rioja	*ISO + EMAS*	Public	20
MADRID	Hospital Universitario Sanchinarro	ISO	Private	1
	Hospital Universitario La Paz - Madrid	ISO	Public	37
	Hospital Universitario 12 de Octubre - Madrid	ISO	Public	31
	Hospital Central de la Defensa Gómez Ulla - Madrid	ISO	Public	19
	Hospital Clínico San Carlos - Madrid	*ISO + EMAS*	Public	16
	Hospital General Universitario Gregorio Marañón - Madrid	ISO	Public	28
	Hospital Universitario Príncipe de Asturias - Alcalá de H.	ISO	Public	28
	Hospital Universitario Fundación Alcorcón	ISO	Public	37
	Hospital Universitario de Getafe	ISO	Public	25
	Hospital Infanta Elena (Valdemoro - Madrid)	ISO	Public	16
	Hospital Universitario del Henares - Coslada	ISO	Public	8
	Hospital Infanta Cristina - Parla	ISO	Public	16
MURCIA	Hospital Universitario Virgen de la Arrixaca - Murcia	ISO	Public	33
BASQUE COUNTRY	Hospital Galdakao-Usansolo - Bilbao	ISO + EMAS	Public	22
	Clínica Virgen Blanca - Bilbao	ISO	Private	15
	Hospital San José - Vitoria-Gasteiz	ISO	Private	1
	Hospital de Zumárraga - Zumárraga	ISO + EMAS	Public	17

Fig. 1 – Extent of EMSs in NHS hospitals with haemodialysis facilities. List of hospitals by autonomous community with haemodialysis and EMS certification: ISO 14001 and EMAS; those with both are highlighted.

REGION	OUTPATIENT CLINIC AND LOCATION	ISO +/- EMAS	PUBLIC/ PRIVATE	DIALYSIS STATIONS
ANDALUSIA	Asenefro (Dos Hermanas - Seville)	ISO	Private	N.A. (*)
	Hemodiálisis Sevillana (San Juan de Aznalfarache-Seville)	ISO	Private	N.A.
CANARY ISLANDS	Avericum - Arrecife - Lanzarote	ISO	Private	N.A.
	Avericum - Maspalomas - Gran Canaria	ISO	Private	N.A.
	Avericum - Sta Mª de Guía - Gran Canaria	ISO	Private	N.A.
	Avericum - Telde - Gran Canaria	ISO	Private	N.A.
VALENCIAN COMMUNITY	Alcer-Cediat Aldaia - Valencia	ISO	Private	10
	Alcer-Cediat Cullera - Valencia	ISO	Private	10
	Alcer-Cediat Llíria - Valencia	ISO	Private	25
	Alcer-Cediat Requena - Valencia	ISO	Private	15
	Alcer-Cediat Torrent - Valencia	ISO	Private	20

Fig. 2 – Extent of EMSs in NHS outpatient haemodialysis centres. List of outpatient haemodialysis centres by autonomous community with EMS certification. *Data not available.

be an ethical issue rather than a fashion or a one-off event. Reflecting on our current routine practice and re-thinking the processes involved could reap rewards, not just clinically and in terms of health care, but also socially, economically, and environementally.[28] There are many areas for improvement and innovation: consumption of water and electricity, generation of hazardous waste, use of solar energy, recycling of plastics, and use of alternative materials. We could even consider the use of other therapeutic techniques (see, for example, the decision involving the patient on the possibility of peritoneal dialysis, which offers a lower environmental impact,[29] an aspect that is not mentioned in recent literature[30,31]). The use of other, less harmful materials in the equipment,[32] the impact of the carbon footprint,[33,34] and the need for a real transformation in health care, including haemodialysis, to meet global and national objectives and to plan strategies for reducing CO_2 emissions, all bear consideration. There are initiatives in our country, such as the carbon footprint register, managed by the Spanish Office for Climate Change (www.magrama.gob.es/es/cambio-climatico), that show whether an organisation has calculated, reduced, or offset its carbon footprint.[35] If we launch a project locally and we value its benefits, the improvements obtained at an individual level have an extraordinary potential on a macroeconomic scale[36] (regionally and nationally), due to the multiplier effect.

Regarding ISO 14001 certification, there was no official updated reference showing its implementation. This is basic information, and it is surprising that it is not supplied by a competent public body. In contrast, the EMAS register is available and updated officially at a European level. Certain autonomous communities have been seen to implement the environmental certification with great impetus, particularly in hospitals.

Compiling this list of hospitals and outpatient haemodialysis clinics that work every day with a certified EMS could be relevant in developing an official up-to-date register that provides information and helps make public the environmental practices of health care organisations. Regarding hospitals and the volume of certified dialysis stations, the level of participation may be considered acceptable: 25% of hospitals with dialysis facilities in our country; this was not the case for outpatient units, based on the information obtained.

It is worth noting that the registers were openly available on the web portals of the various scientific societies. By working

2009		2010		2011		2012		2013	
China	55,316	China	69,784	China	81,993	China	91,950	China	104,735
Japan	39,556	Japan	35,016	Japan	30,397	Japan	27,774	Italy	24,662
Spain	**16,527**	Spain	**18,347**	Italy	21,009	Italy	19,705	Japan	23,723
Italy	14,542	Italy	17,064	Spain	**16,341**	Spain	**19,470**	United Kingdom	16,879
United Kingdom	10,912	United Kingdom	14,346	United Kingdom	15,231	United Kingdom	15,884	Spain	**16,051**
South Korea	7,843	South Korea	9,681	South Korea	10,925	South Korea	11,479	Romania	8,744
Romania	6,863	Romania	7,418	Romania	9,557	Romania	8,633	Germany	7,983
Germany	5,865	Czech Republic	6,629	France	7,771	France	7,975	France	7,940
USA	5,225	Germany	6,001	Germany	6,253	Germany	7,034	USA	6,071
Czech Republic	4,684	France	5,251	USA	4,957	USA	5,699	India	5,872
Total worldwide	222,974		251,548		261,926		284,654		301,647
Growth:	34,400		28,574		10,378		22,728		16,993
No. of participating countries	160		156		157		167		171
Health care sector (*)	869		1,046		873		1,004		1,008

Fig. 3 – Changes 2009–2013 in the global number of ISO 14001certifications, with particular reference to Spain. *Source*: Compiled from The ISO Survey of Management System Standard Certifications (2009–2013). *Companies and institutions identified as belonging to the "health care sector".

together with these societies, it would be possible to create an initiative to provide an exhaustive, reliable, up-to-date source of information that was more well-known, at both a professional level and a public level. This could include other quality management systems certifications[37] and tried and tested management practices and systems, particularly in clinical, healthcare, social, economic, innovative, and environmental areas.

This study is the starting point of a wider investigation to ascertain if the everyday use of environmental management systems in haemodialysis improves the environmental impact, starting with the management of hazardous waste and the consumption of natural resources.

We must recognise, at least, that "ecodialysis" is here to stay.

Conflicts of interest

The authors declare no conflicts of interest.

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