# RNFC

ANNUAL REPORT 2018

# Coordinating Centre:



### **Technical Secretariat:**





# ANNUAL REPORT 2018

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# RNFC

# Authors:

Pilar Sáez López Juan Ignacio González Montalvo Cristina Ojeda Thies Paloma Gómez Campelo



Data Managers:

Laura Navarro Castellanos Rocío Queipo Matas



Co-authors:

Ana Isabel Hormigo Sánchez Angelica Muñoz Pascual Teresa Pareja Sierra

# FOREWORD

The Ministry of Health, Consumer Affairs and Social Welfare is responsible for proposing and executing the Government's policy on health, planning and health care and consumer affairs, as well exercising the powers of the General Administration of the State to ensure the citizens' right to health protection.

Quality of care and patient safety are among the strategic priorities of this Ministry, so it is an honour for us to write the foreword to the 2018 Report of the Spanish National Hip Fracture Registry (RNFC), managed by the "Ageing and Fragility" Group of the Instituto de Investigación del Hospital La Paz [La Paz Hospital Research Institute]. The objective is to improve care provided to elderly patients who have suffered a hip fracture and to reduce the incidence of new fractures by continuously monitoring the quality of health care.



This Project began its activities in 2016, and a year later it was formally presented to this Ministry at the Dirección General de Salud Pública [General Directorate of Public Health]. Since its creation, the RNFC working group has developed a broad list of care, teaching and research activities. For these activities, it has received recognition from the Institutes of Health Research of the Fundación Jiménez Díaz and the Hospital La Paz, the Regional Ministries of Health and the Carlos III Institute of Health. All this, together with the endorsement of 21 scientific societies, fosters support of this Initiative.

Recently, it was honoured by the WHO at the 72nd World Health Assembly with the "His Highness the Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah" State of Kuwait Prize for Research on Health Care for the Elderly and Health Promotion. This is, without a doubt, a tribute to all the professionals who add additional registration and research work to their dedication to daily care.

Hip fractures are one of the main health problems associated with ageing and fragility. They have a great impact on quality of life and a notable increase in mortality among the elderly. In Spain, an incidence of 104 cases per 100,000 inhabitants is estimated, involving between 45,000 and 50,000 hip fractures per year, with an annual cost of €1.6 million and a loss of 7,200 quality-adjusted life years. The incidence is expected to continue to increase, especially among people over the age of 80.

The Spanish National Hip Fracture Registry collects continuous information on the evolution of patients. The Registry has established explicit good practice criteria, has defined indicators for its measurement and has proposed standards to achieve an excellent level of quality.

This Report references the data and activities of the RNFC corresponding to 2018, with 11,431 patients from 72 hospitals in 15 Autonomous Communities.

This project is an example of good practice and of great usefulness for the quality of care and efficiency of health services. It will be necessary to assess the sustainability and impact of this and other National Networks to achieve integration into the global health system and thereby reduce clinical variability by improving the quality and equity of the Spanish National Health System.

### María Luisa Carcedo Roces

Minister of Health, Consumer Affairs and Social Welfare

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# The second secon



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 National Coordinator: *Pilar Sáez López*

• Director of IdiPAZ [Instituto de Investigación Sanitaria del Hospital Universitario La Paz (La Paz University Hospital Institute of Health Research)] Group 27, "Ageing and Fragility in the Elderly": Juan Ignacio González Montalvo

• Deputy Director IdiPAZ: Paloma Gómez Campelo

 International Relations: Cristina Ojeda Thies

• Methodology and Epidemiology: Ángel Otero Puime, Rosario López Giménez, Daniel Toledo Bartolomé.

• RNFC [Registro Nacional de Fracturas de Cadera (Spanish National Hip Fracture Registry)] documentation:

Angélica Muñoz Pascual, Jesús Mora Fernández, Raquel Vállez Romero.

 Related bibliographic documentation: Cristina González Villaumbrosia, Noelia Alonso García and Cristina Ojeda Thies.

 Coordination of Research Projects: Francisco José Tarazona Santabalbina, Iñigo Etxebarría Foronda, Enric Duaso Magaña, José Manuel Cancio Trujillo, Concepción Cassinello Ogea, Pilar Sáez López, Juan Ignacio González Montalvo, Cristina Ojeda Thies.

 Principal investigator of subprojects and/or scientific articles: *Paloma Gómez Campelo* (PI: Mutua Madrileña), *Pilar Sáez López* (PI: MAPFRE), *Cristina Ojeda Thies, Teresa Alarcón Alarcón, Patricia Condorhuamán Alvarado, Peggy Ríos Germán, Pablo Castillón Bernal, Teresa Pareja Sierra, Jesús Mora Fernández, Ángel Otero Puime, Concha Cassinello Ogea.*  Indicators and Standards Committee: *Patricia Ysabel Condorhuamán Alvarado, Angélica Muñoz Pascual, Teresa Pareja Sierra, Juan I. González Montalvo*.

 Community Managers: Nuria Montero Fernández, Luis Tejedor López.

 Data Manager: Laura Navarro Castellano, Rocio Queipo Matas.

 Technical Secretariat: Jesús Martín García (BSJ-Marketing)

• Advisory Group:

Tomás López-Peña Ordóñez, Teresa Alarcón Alarcón, Pilar Mesa Lampré, Ricardo Larrainzar Garijo, Enrique Gil Garay, Adolfo Díez Pérez, Daniel Prieto Alhambra, Jose Ramón Caeiro Rey, Iñigo Etxebarria Foronda.

### Autonomous Communities' Coordinators:

Anabel Llopis Calvo (Catalonia). Pilar Mesa Lampré (Aragon). Teresa Pareja Sierra (Castile-La Mancha). Jesús Mora Fernández (Madrid). Angélica Muñoz Pascual (Castile and León). Francisco Tarazona Santabalbina (Autonomous Community of Valencia) Marta Alonso Álvarez (Principality of Asturias). Raquel Ortés Gomez (Extremadura). Marta Pérez García (Galicia). Iñigo Etxebarria Foronda (Basque Country).

### · Representatives of the National Scientific Societies:

Manuel Díaz Curiel – Fundación Hispana de Osteoporosis y Enfermedades del Metabolismo Óseo [Hispanic Osteoporosis and Bone Metabolism Diseases Foundation] (FHOEMO). Ricardo Larrainzar-Garijo – Sociedad Española de Cirugía Ortopédica y Traumatología [Spanish Society of Orthopaedic Surgery and Traumatology] (SECOT). Juan Ignacio González Montalvo – Sociedad Española de Fracturas Osteoporóticas [Spanish Society of Osteoporotic Fractures] (SEFRAOS). Alfonso González Ramírez – Sociedad Española de Geriatría y Gerontología [Spanish Society of Geriatrics and Gerontology] (SEGG). José Ramón Caeiro Rey – Sociedad Española de Investigación Ósea y del Metabolismo Mineral [Spanish Society for Bone and Mineral Metabolism Research] (SEIOMM). Alfonso González Ramírez – Sociedad Española de Medicina Geriátrica [Spanish Society of Geriatric Medicine] (SEMEG). José Luis Pérez Castrillón – Sociedad Española de Medicina Interna [Spanish Society of Internal Medicine] (SEMI).

• Representatives of Regional Scientific Societies:

**Noelia Alonso García** – Sociedad Castellano Leonesa Cántabro y Riojana de Traumatología [Castilian Leonese Cantabrian and Riojan Society of Traumatology] (SCLECARTO). **Pilar Mesa Lampré** – Sociedad Aragonesa de Geriatría y Gerontología [Aragonese Society of Geriatrics and Gerontology] (SAGGARAGON). **Angélica Muñoz Pascual** – Sociedad de Geriatría y Gerontología de Castilla y León [Society of Geriatrics and Gerontology of Castile



and León] (SGGCYL). Anabel Llopis Calvo – Societat Catalana de Geriatria i Gerontologia [Catalan Society of Geriatrics and Gerontology] (SCGIG). Raquel Vállez Romero - Sociedad Matritense de Cirugía Ortopédica y Traumatología [Madrid Society of Orthopaedic Surgery and Traumatology] (SOMACOT). Jesús Mora Fernández - Sociedad Madrileña de Geriatría y Gerontología [Madrid Society of Geriatrics and Gerontology] (SMGG). Francisco Tarazona Santabalbina - Sociedad Valenciana de Geriatría y Gerontología [Valencian Society of Geriatrics and Gerontology] (SVGG). Raquel Ortés Gómez -Sociedad Extremeña de Geriatría y Gerontología [Extremadura Society of Geriatrics and Gerontology] (SOGGEX). Teresa Pareja Sierra - Sociedad Castellano Manchega de Geriatría y Gerontología [Society of Geriatrics and Gerontology of Castile-La Mancha] (SCMGG). Marta Alonso-Álvarez - Sociedad de Geriatría y Gerontología del Principado de Asturias [Society of Geriatrics and Gerontology of the Principality of Asturias] (SGGPA). José Ramón Caeiro – Sociedad Gallega de Cirugía Ortopédica y Traumatología [Galician Society of Orthopaedic Surgery and Traumatology] (SOGACOT). Vicente Canales Cortés - Sociedad Aragonesa de Cirugía Ortopédica y Traumatología [Aragonese Society of Orthopaedic Surgery and Traumatology] (SARCOT). Pedro Carpintero Benítez - Sociedad Andaluza de Traumatología y Ortopedia [Andalusian Society of Traumatology and Orthopaedics] (SATO). Inés Gil Broceño - Sociedad Murciana de Geriatría y Gerontología [Murcian Society of Geriatrics and Gerontology] (SMGG).

 Representatives of International Scientific Societies: Collin Currie – Fragility Fracture Network (FFN).

Those responsible in the participating hospitals:

Consult in ANNEX 2

# 2 SCIENTIFIC SOCIETIES THAT SUPPORT THE PROJECT





















# 4 EXECUTIVE SUMMARY



The Spanish National Hip Fracture Registry (RNFC) originated in 2016. It is a large database on the care provided to patients with hip fractures (HF) during the acute phase and until the following month. Its goal is to improve the care of patients with HF through reliable knowledge of the situation, a proposal of standards and objectives, benchmarking methodology and continuous improvement of quality of care.

Professionals from 72 hospitals across Spain share their cases, collected continuously in an internationally validated format, the *Minimum Common Dataset Set* proposed by the *Fragility Fracture Network*. The data is shared voluntarily and altruistically by the professionals themselves and, once processed and refined, quarterly and annual reports are generated that, in addition to being communicated to the participating centres, are published periodically.

Currently, the RNFC has data from 18,188 patients, and this report reflects the activity from 2018, in which 11,431 cases were included. The average age of the patients was 87 years, 76% were women and 25% lived in residences. A total of 97% of patients were operated on, after an average delay of 66 hours, with a mean length of stay of 10 days. One month after the episode, 50% walked independently and 48% received osteoprotective treatment.

During this year, work was also carried out on clinical variability, quality standards, comparison with other registries and analysis by Autonomous Communities, among others, which will contribute to improvements in different aspects of care. In 2018, the RNFC obtained research grants from the Mutua Madrileña Foundation and the MAPFRE Foundation and, in early 2019, it received the State of Kuwait Prize for Research in Health Promotion granted by the World Health Organization.

The current recommendations of the RNFC working group focus on reducing surgical delay and increasing early mobilisation, reducing the incidence of pressure ulcers, improving secondary fracture prevention and improving the functional status one month after the episode. In this report, you will find this information expanded upon. More details can be found on the website www.rnfc.es.



# 5 INTRODUCTION



We will find the way and if one doesn't exist... we will make one

Hannibal Barca (218 BC) crossing the Alps

After a previous phase of definition, organisation and initial planning that took place in 2016, the Spanish National Hip Fracture Registry (RNFC) began continuous data collection in 2017, with 7,208 cases included from 54 hospitals (from January to October) and published in the <u>previous report</u>.

The number of hospitals and the number of cases have been increasing to a cumulative total of 18,188 hip fracture patients recorded at the end of 2018, from hospitals in 15 Autonomous Communities.

This Report refers to the data and activities corresponding to 2018 with 11,431 patients included from 72 participating hospitals. This introduction aims to serve as a prelude to the contents that the reader will find in the different sections of the Report.

# <sup>5.1</sup>> Justification and purpose

Hip fracture (HF) is one of the main health problems associated with ageing and fragility, as it has a serious impact on the quality of life and significantly increases mortality in the elderly people suffering from one. In Spain, an incidence of 104 cases per 100,000 inhabitants is estimated, amounting to about 45,000 to 50,000 hip fractures per year with an annual cost of €1.591 million and a loss of 7,218 quality-adjusted life years. The incidence is expected to continue to increase, especially among people over the age of 80.

Regional and national hip fracture registries provide relevant information for clinicians and administrators. Establishing and studying these registries makes it possible to audit the care provided during the process, detecting the departments' strengths and weaknesses, identifying and proposing areas for improvement, monitoring the impact of changes in clinical and management results and, ultimately, improving healthcare outcomes.

The Spanish RNFC has the purpose of consecutively including all patients diagnosed with HF in each participating hospital in a continuous registry, and achieving a breadth of the sample that epidemiologically ensures representativeness at the national level, with the ultimate goal of including all HF patients hospitalised in the country.

# <sup>5.2></sup> Objectives

The main objective of the RNFC is to determine the demographic, clinical, surgical, functional and care characteristics of patients with HF, analyse the presence and magnitude of the existing clinical variability and establish measures to improve quality of care. Knowledge of the model of healthcare allows for evaluation of results, detection of deficits and implementation of improvement interventions, as well as the comparison and imitation of best practices. Another goal of the RNFC working group has been to establish explicit criteria of good practice, define the indicators for their measurement, and propose standards to be achieved to reach an excellent level of quality.

# <sup>5.3></sup> Method

The registry comprises a multicentre observational descriptive study of the epidemiological, clinical and care characteristics and the results obtained after suffering a fragility HF in patients 75 years and older admitted to each of the participating hospitals. The variables are collected using the Spanish language version of the Minimum Common Dataset proposed by the Fragility Fracture Network (FFN), an international organisation dedicated to the study and improvement of the care of people who have suffered an osteoporotic fracture. ANNEX 1

The inclusion criteria are having been admitted to one of the participating hospitals with the main diagnosis of HF due to fragility (due to a fall from a subject's own standing height), being older than 74 years of age and understanding and signing an informed consent form (by the patient or his/her next of kin). The exclusion criterion is the HF having occurred as a result of high-energy trauma.

Data collection takes place in two phases. In the hospital phase, the doctor in charge of the patient collects data corresponding to baseline condition and those referring to the process until the time of discharge. In the post-hospital phase, the healthcare professional collects the data corresponding to that period one month after the fracture by means of a telephone call or in the follow-up review.

There is a representative in each participating hospital acting as the person locally responsible for the Registry, in charge of sending and safeguarding the data. Each centre's lead clinician provides the data on patients treated for hip fracture in their hospital on a quarterly basis, including follow-up at one month after discharge. Data is sent encrypted for analysis. A data manager is responsible for assembling the data from all hospitals, assigning an identifier to each centre, debugging the databases, performing the pertinent descriptive analyses and associations and participating in the preparation of reports.

# <sup>5.4></sup> Implementation and development of the RNFC

Before commencing data collection, and after defining the project, performing a literature review and publishing its founding principles, the following tasks were carried out: the database proposed by the FFN was adapted, the promoters of the FFN Registry were contacted, endorsement was requested from the Scientific Societies, the first hospitals were included. Approval by the Clinical Research Ethics Committees/Medicines Research Ethics Committees (CRECs/mRECs) was requested, as well as classification by the Spanish Agency of Medicines and Medical Devices (Agencia Española de Medicamentos y Productos Sanitarios or AEMPS), support from the Ministry of Health (General Subdirectorate for Health Planning), and registration with the Spanish Data Protection Agency (Agencia Española de Protección de Datos). The project was integrated into a Research Institute, which acts as a coordinating centre (Instituto de Investigación Sanitaria del Hospital Universitario La Paz, IdiPAZ). From then on, the continuous collection of data in the participating hospitals and the analysis of the results began.

The results have been reported in internal quarterly reports for the participating hospitals and published in official Registry reports. An annual Report is prepared with the overall results, this being the Second Annual Report. The reports are sent to the people in charge at each hospital, to the Registry representatives of the Autonomous Communities, to the scientific societies that endorse it and to the sponsors.



# <sup>5.5></sup> The great team of the participants in the RNFC: those who created a path.

This annual Report includes the representatives and collaborators of the hospitals participating in the RNFC. Day after day, they, and with them many other professionals whose names do not appear for reasons of space, have not only treated hip fracture patients with their greatest dedication, but have also altruistically used their time and energy to collect data on their processes and their outcomes, with the meritorious objective of knowing their way of care better, to be able to compare it with others and to build a unique and invaluable source of information on the care for this condition together. Others receive this information, process and analyse it and make it understandable and useful. Further collaborators work to establish links and information and communication pathways, to keep such a large group of people connected and coordinated. Along with these people, there are those responsible for making the task visible and well known, which goes beyond the key players. Several people, generously, believe that this company is worthy of their financial support and contribute to making it viable. And some among the multitude try to keep the helm, or advise, or ensure that the work method is the most proper one, or design new uses of so much information, or constantly ask questions and how to answer and research them, or are dedicated to writing scientific publications. Through all of them, with the necessary effort of everyone, this path is made, a path that did not exist, that is being created. Just as great as the Carthaginian army that did the "impossible" task of crossing the Alps, this is a great team, performing a task that also seemed impossible.



Photograph 1 Participants during the 2nd RNFC Meeting in 2019

# 6 INFOGRAPHIC AND SUMMARY OF THE 2018 RNFC RESULTS

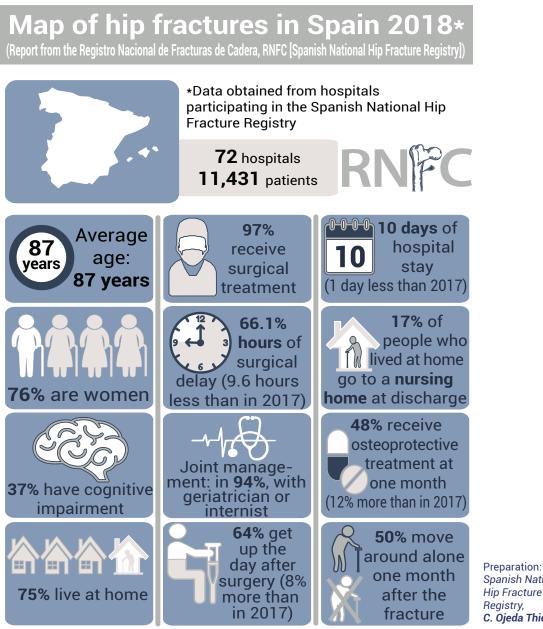
As a general conclusion, the data obtained through the RNFC provides very relevant information regarding the clinical, epidemiological, functional and care process characteristics of patients with hip fractures in Spain.



The general profile of the 11,431 patients included during 2018 is a woman, in 76% of cases, with an average age of 87, who usually lives at home (75% of patients) and presents prior cognitive impairment in approximately one third of the cases (37% of patients). Also, one third are transferred to nursing homes upon discharge (32.7%).

Regarding the care process, the average time from admission to surgery in 2018 is 66 hours, almost 10 hours less than in 2017; the average length of stay has also been reduced by one day (currently 10 days). Clinical care for these patients is carried out mostly in teams, between Geriatricians or Internists with Traumatologists (94% of cases). Most anaesthetists choose regional anaesthesia in almost all hospitals.

An improvement in early mobilisation on the first post-operative day is observed compared to 2017, and half of the patients achieve autonomous walking within 30 days. Another outcome that has improved compared to last year is a slight increase in osteoprotective treatment.



Spanish National **Hip Fracture** C. Ojeda Thies

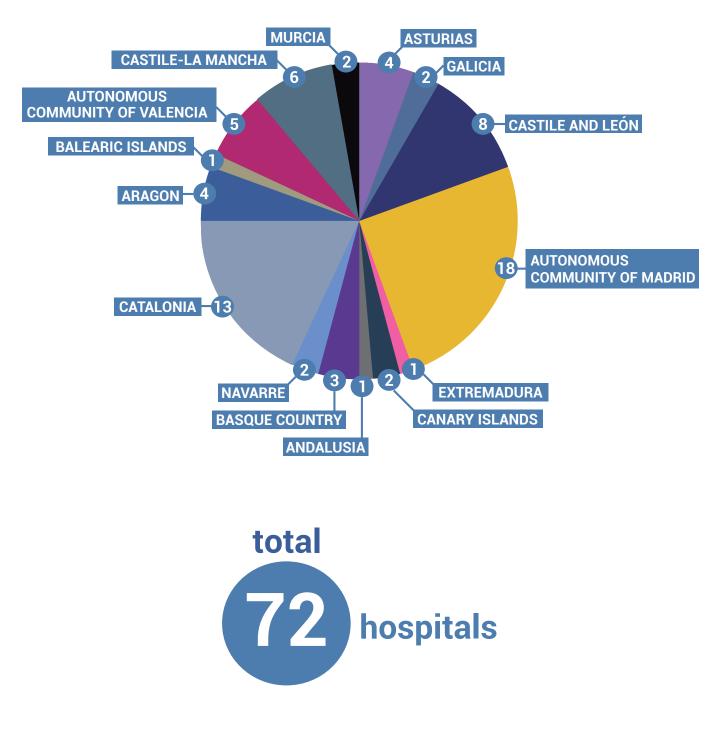
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# 7 PARTICIPATING HOSPITALS AND EVOLUTION OF THE RNFC 2017-2018



# 7.1> Geographic distribution of hospitals participating in the RNFC 2018

The graph represents the location and number corresponding to each autonomous community of the 72 hospitals participating in the RNFC in 2018<sup>•</sup>



 $^{*}\text{A}$  list of all the professionals who have collaborated with the RNFC is presented in ANNEX II.

### **ASTURIAS**

- Hospital de la Cruz Roja (Gijón)
- Hospital Universitario de Cabueñes (Gijón)
- Hospital Vital Álvarez-Buylla (Mieres)
- Hospital Monte Naranco (Oviedo)

## GALICIA

- Hospital Álvaro Cunqueiro (Vigo)
- Hospital Clínico Universitario de Santiago

# **CASTILE AND LEÓN**

- Complejo Asistencial de Ávila
- Complejo Asistencial de Segovia
- Complejo Asistencial Universitario de León
- Complejo Asistencial Universitario de Palencia
- Complejo Asistencial Universitario de Salamanca
- Hospital Clínico Universitario de Valladolid
- Hospital del Bierzo (Ponferrada, León)
- Hospital Santos Reyes (Aranda de Duero, Burgos)

# **AUTONOMOUS COMMUNITY OF MADRID**

- Hospital Central de la Defensa Gómez Ulla (Madrid)
- Hospital Clínico San Carlos (Madrid)
- Hospital del Henares (Coslada, Madrid)
- Hospital General de Villalba (Collado Villaba, Madrid)
- Hospital General Universitario Gregorio Marañón (Madrid)
- Hospital La Luz Grupo Quirónsalud (Madrid)
- Hospital Universitario de Getafe (Getafe, Madrid)
- Hospital Universitario del Sureste (Arganda del Rey, Madrid)
- Hospital Universitario Fundación Jiménez Díaz (Madrid)
- Hospital Universitario Infanta Elena (Valdemoro, Madrid)
- Hospital Universitario Infanta Leonor (Madrid)
- Hospital Universitario Infanta Sofía (S.S. de los Reyes, Madrid)
- Hospital Universitario La Paz (Madrid)
- Hospital Universitario de Móstoles (Móstoles, Madrid)
- Hospital Universitario Puerta de Hierro (Majadahonda, Madrid)
- Hospital Universitario Ramón y Cajal (Madrid)
- Hospital Universitario Rey Juan Carlos (Móstoles, Madrid)
- Hospital Universitario Severo Ochoa (Leganés, Madrid)

## **EXTREMADURA**

- Hospital Virgen del Puerto (Plasencia, Cáceres)

### **BASQUE COUNTRY**

- Hospital Comarcal de Alto Deba (Guipúzkoa)
- Hospital de Urduliz Alfreso Espinosa (Vizcaya)
- H. Universitario de Cruces (Barakaldo, Vizcaya)

4

### **CANARY ISLANDS**

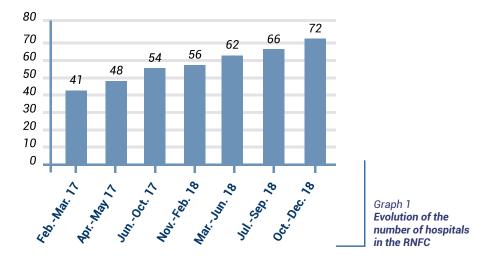
- Hospital Doctor José Molina Orosa (Las Palmas)
- Hospital Universitario Nuestra Señora de la Candelaria (Santa Cruz de Tenerife)



- Hospital Regional Universitario de Málaga (Málaga)

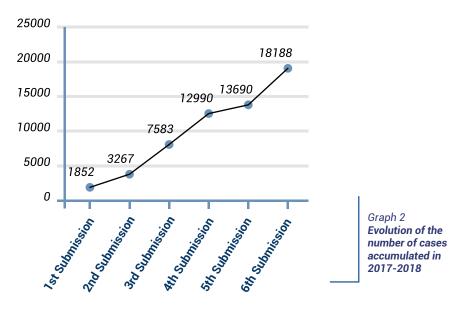
# 7.2> RNFC evolution in figures 2017-2018

The number of participating hospitals rose from 54 in 2017 to 72 in 2018. The number of cases contributed per year also increased, from 7,208 in 2017 to 11,431 in 2018



### - Evolution of the number of hospitals in the RNFC

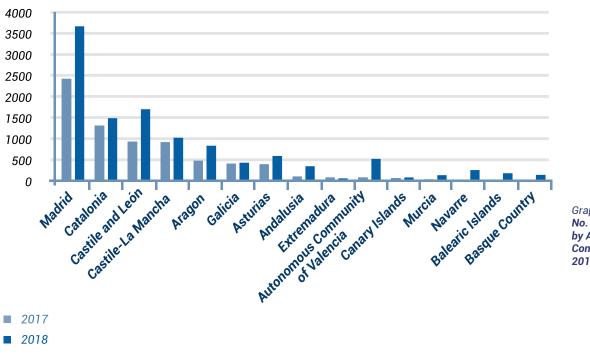
- Evolution of the number of cases accumulated in 2017-2018



- Number of cases by Autonomous Community

	2017	2018
Madrid	2423	3664
Catalonia	1308	1487
Castile and León	933	1697
Castile-La Mancha	919	1023
Aragon	473	831
Galicia	405	433
Asturias	388	589
Andalusia	102	346
Extremadura	79	58
Autonomous Community of Valencia	77	524
Canary Islands	68	83
Murcia	33	130
Navarre	0	251
Balearic Islands	0	175
Basque Country	0	140

Table 1 No. of cases by Autonomous Community



Graph 3 No. of cases by Autonomous Community 2017-2018

# OVERALL RESULTS AND COMPARATIVE SAMPLE 2017-2018

RI

# 8.1> RNFC 2017-2018 Results Tables

- General Information

Below are the tables with the main outcomes of the RNFC and its evolution over the two years, fulfilling the first objective, determining the reality of care.

	2017	2018	
Hospitals/Cases	54/7,208	72/11,431	1
Age (mean)	86.7	86.8	
Gender (% female)	75.1	75,6	
			Table 2

Table 2
General Information

### - Type of Fracture, Surgical Intervention

Type of fracture (%)	2017	2018	
Intertrochanteric	51.9	51.6	
Subcapital	39.2	39.6	
Subtrochanteric	7.2	7.5	
Surgery (%)	95.4	95.4	Table 3 <b>Type of Fracture</b>

Type of surgical intervention (%)	2017	2018	
Cannulated screws	2.0%	2.4%	
Sliding hip screw	1.0%	1.1%	
Intramedullary nail	56.8%	56.0%	
Hemiarthroplasty	32.5%	33.1%	
Total hip replacement	2.9%	2.1%	
Total interventions	92.7%	93.7%	۲ ۲
			i

Table 4 Type of Surgical intervention - In-hospital Evolution

	2017	2018	
Average surgical delay (mean hours)	75.7	66.1	
Hospital stay (mean days)	10.9 (SD 6.7)	10.1 (SD 6)	
In-hospital mortality (%)	4.4	4.7	
30-day mortality (%)	7.1	7.9	Table 5
			In-hospital

- Functional and clinical features

	2017	2018
Patients with cognitive impairment (%)*	36.4	36.9
ASA >= 3 (%)	67.4	69.9
Pre-fracture autonomous mobility (%)	81.2	81.8
Autonomous mobility at 30 days (%)	48.9	50.2
Readmission at 30 days (%)	2.4	2.9
Reoperation at 30 days (%)	2.0	2.2
Collaborating Clinician Geriatrics/ Internal Medicine (%)	76.6/13.3	76.3/18.1
Tx OP Discharge / 30 d (% valid)	36.7/41	45.5/47.9

# **OP. Osteoporosis**

\*Cognitive impairment: Pfeiffer > or equal to 3

Table 6 Functional and Clinical Features

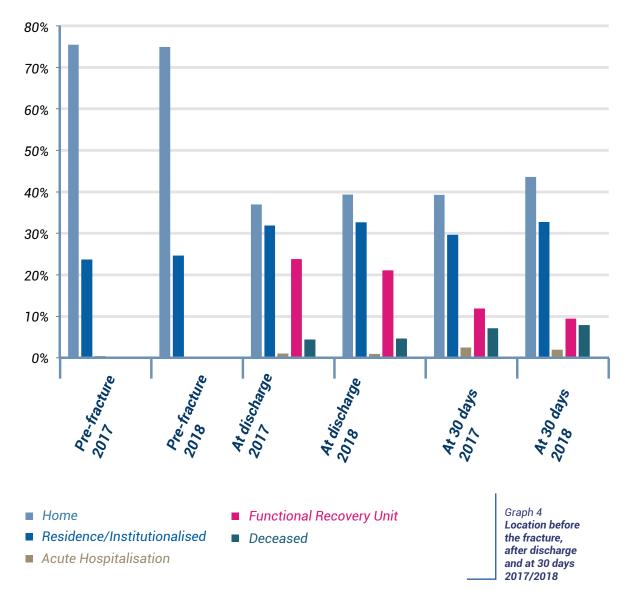
# 8.2> Graphic Results of the RNFC 2017-2018

Some results of the RNFC and its evolution over the two years of data collection are shown in the form of a graph.

# 8.2.1> Origin and location of RNFC patients 2017-2018

The reduction in patients who can return to their own homes 30 days after the fracture and the small percentage who are referred to functional recovery units is noteworthy.

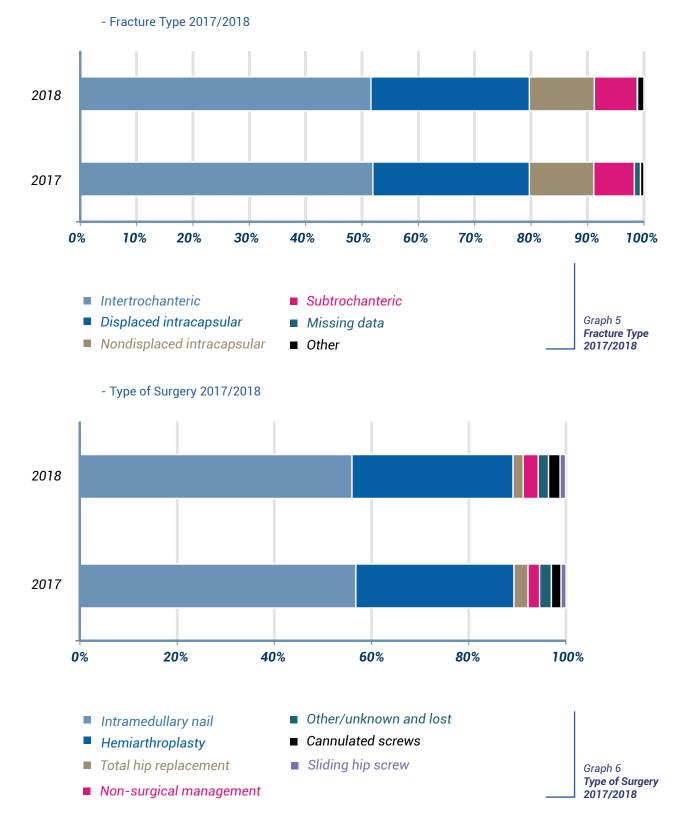
- Location before the fracture, after discharge and at 30 days 2017/2018



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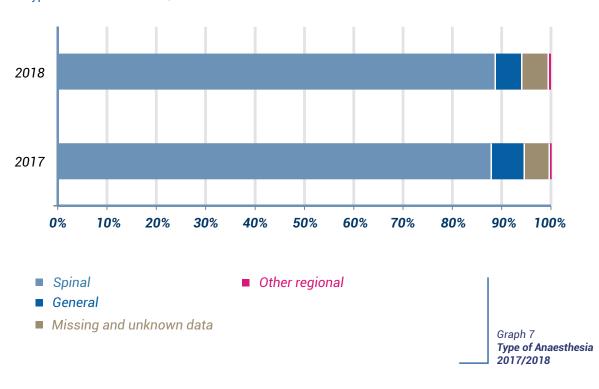
# 8.2.2> Type of Fracture, Surgery and Anaesthesia

The graphs show the distribution of the types of fractures and the type of surgery used in the patients of the RNFC in 2017 and 2018. There is a slight predominance of intertrochanteric fractures. The most common surgical technique is internal fixation with an intramedullary nail followed by hemiarthroplasty.





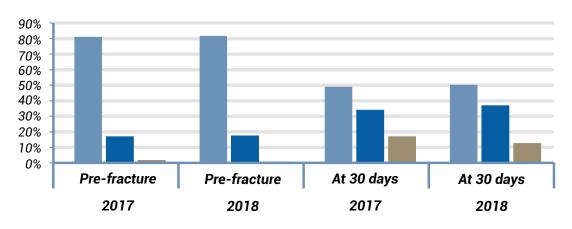
# The most-used type of anaesthesia in patients of the RNFC was spinal anaesthesia with an increasing percentage in 2018 compared to the previous year.



- Type of Anaesthesia 2017/2018

#### <sup>8.2.3></sup> Functional and clinical features: Baseline and at 30 days.

Similarly to what happened in 2017, in 2018 half of the patients achieved autonomous ambulation, at least with a walking frame, 30 days after the fracture.



- Mobility prior to fracture and at 30 days 2017-2018

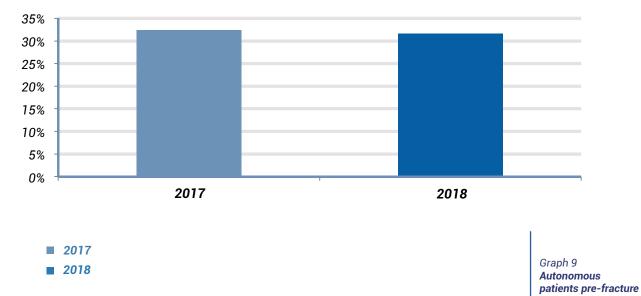
- Independent mobility inside and outside the home (1, 2, 3, 4, 5 and 6)
- Mobility within the home with the help of people or non-mobility (7, 8, 9 and 10)
- Missing and unknown data

Graph 8 Pre-fracture mobility and at 30 days 2017/2018

- Autonomous patients at 30 days

#### - Functional loss

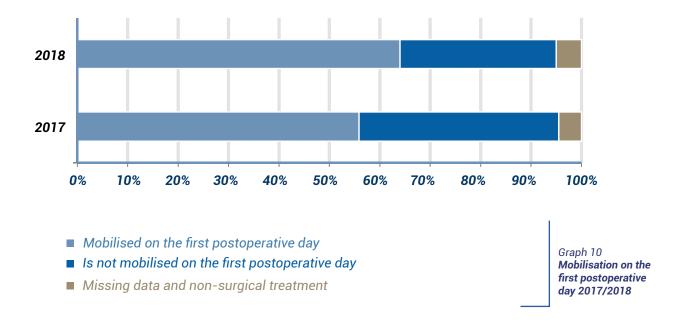
The functional loss, described as the percentage of patients who have lost the previous ability to walk at least with a walking frame 30 days after the fracture, is similar in both years.



38

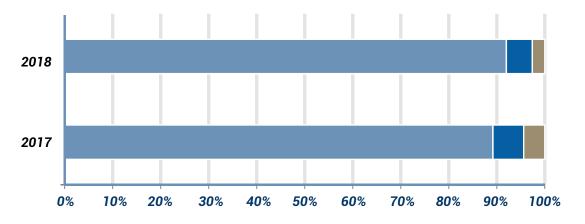
#### - Early mobilisation (on the first postoperative day)

The percentage of patients mobilised on the first postoperative day increased in the last year, from 55.9% to 64% in 2018, which is an improvement in this healthcare practice.



- Pressure ulcers in RNFC patients

The development of new-onset pressure ulcers (grade 2 or higher) was reduced from 6.4% of patients in 2017 to 5.4% in 2018.



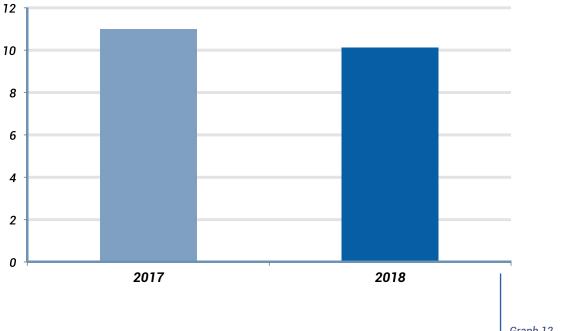
- No pressure ulcers
- Had pressure ulcers
- Missing and unknown data

Graph 11 **Pressure ulcers in** RNFC patients

# 8.2.4> In-hospital evolution

#### - Hospital Length of Stay

The average hospital length of stay of RNFC patients has been reduced by one day in the last year.

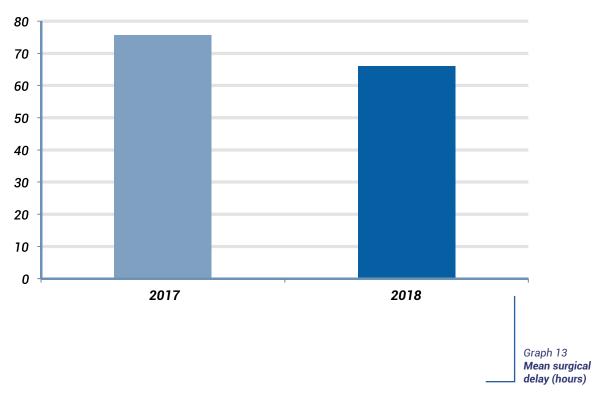


Graph 12 **Average hospital stay (days)** 



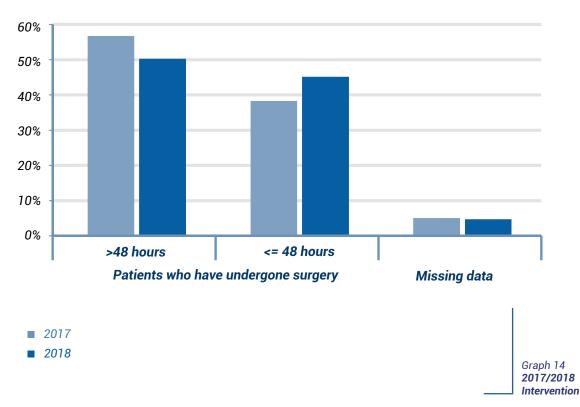
#### - Surgical Delay

Surgical delay is a variable that has undergone a very significant reduction, decreasing by an average of 10 hours, in 2018 compared to 2017.

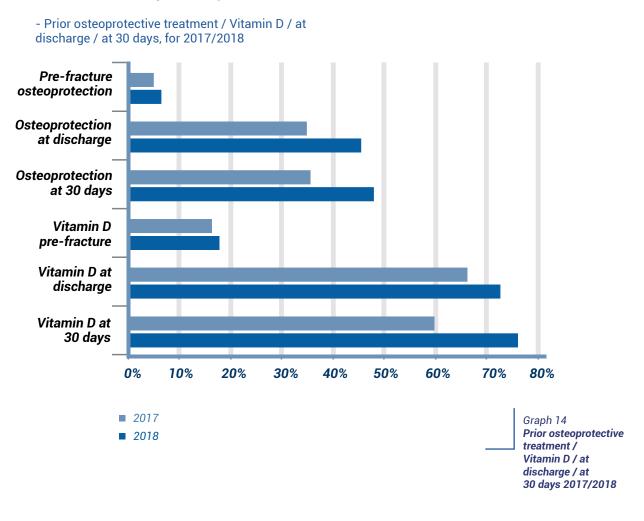


- Surgical delay (% of those operated on in the first 48 hours after admission)

In other words, the number of patients operated on in the first 48 hours is 45%, a figure that can still be improved on, although it has increased in the last year.



# 8.2.5> Secondary fracture prevention.

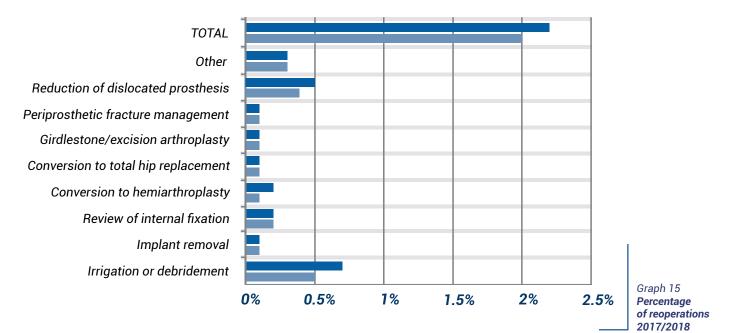


#### 8.2.6> Reoperations at 30 days

The incidence of complications that require reoperation in the first 30 days after the fracture is low (2% and 2.2% in 2017 and 2018, respectively). The most common interventions were irrigation/debridement and reduction of dislocated prostheses.

	<b>Reoperations 2017</b>		<b>Reoperations 20</b>	ations 2018	
	No. of cases	%	No. of cases	%	
Reduction of dislocated prosthesis	31	0.4	50	0.5	
Irrigation or debridement	38	0.5	72	0.7	
Implant removal	9	0.1	15	0.1	
Revision of internal fixation	14	0.2	20	0.2	
Conversion to hemiarthroplasty	8	0.1	22	0.2	
Conversion to total hip replacement	9	0.1	10	0.1	
Girdlestone/excision arthroplasty	7	0.1	6	0.1	
Periprosthetic fracture management	4	0.1	12	0.1	
Others	21	0.3	31	0.3	
Total	141	2.0	238	2.2	

Table 7 **Reoperations at 30 days** 



# 9 QUALITY STANDARDS

RNFC



#### 9.1> Description of Indicators and Standards

Among the goals of the RNFC is to ascertain knowledge of the care process, and continuous improvement of said process. After the first year of data collection, areas for improvement were detected, for which quality indicators and standards are proposed.

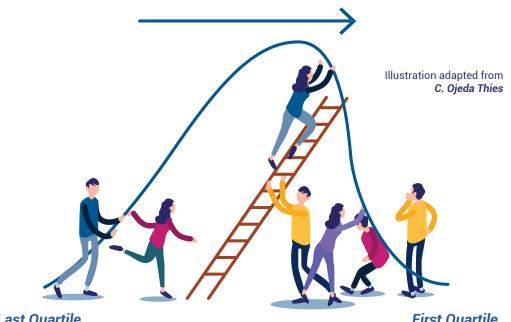
A group of experts from the RNFC called the Indicators Committee (IC) developed a proposal of seven indicators, standards and objectives to be achieved by the group of hospitals collaborating in the registry (Table 8). The selection of indicators representing the process, the quantification of standards, the dissemination of them as "expert recommendations" to the entire work group, the implementation of the measures in each hospital and the measurement of the results is the RNFC-related project that most correlates with the fundamental goal of improving the guality of care for the patient and preventing new fractures.

This improvement attempts to focus on aspects considered important for patients and priorities by the members of the Registry. The indicators chosen by the Committee are based on the criteria of the RNFC experts and are consistent with those of other databases and Clinical Guidelines, and try to take into account adaptation to our healthcare environment.

The proposed approach is to try to come closer to the results achieved by the best hospitals in the group in each aspect. To reach this goal, the data corresponding to the first guartile obtained by the group of hospitals in each chosen indicator was proposed as the standard.

The indicators, standards and objectives were presented at the 1st National Conference of the RNFC, subsequently submitted for internal debate and published thereafter. The ultimate goal is for elderly patients with a fragility fracture to be treated in accordance with an interdisciplinary clinical pathway, swiftly, with good technical and health outcomes, and with a functional recovery which is as quick as possible, in order to rationalise the resources used to care for this injury that generates so much morbidity and disability.

Regardless of the degree of improvement in each hospital, which is in itself an important goal, we intended, above all, to achieve an overall improvement of all hospitals included in the Registry.



Last Quartile

**First Quartile** 

The list of the seven indicators chosen, the average results achieved in the 2017 Report and the intended standard (value of the first quartile of the total group of hospitals) are presented in the following table:

	Current average	Standard
Patients undergoing surgery in less than 48 hours	44%	63%
Patients mobilised on the first postoperative day	56%	86%
Patients with antiosteoporotic treatment at discharge	32%	61%
Patients with calcium supplementation at discharge	46%	77%
Patients with vitamin D supplementation at discharge	67%	92%
Patients with in-hospital pressure ulcers	7.2%	2.1%
Patients with independent mobility at 30 days	58%	70%

\*Current average of the result of the variables reported in May 2017

Table 8 Selection of indicators and definition of standards

#### <sup>9.2></sup> Recommendations made by the RNFC Indicators Committee

The IC developed a list of recommendations for each indicator based on the available evidence. The Delphi method was used to agree on the recommendations with all the representatives of the hospitals participating in the RNFC and, subsequently, their suggestions were incorporated into the initial recommendations. A very interesting aspect that emerged from this exchange was the proposal to compare the quality indicators and parameters suggested by other international authors, which turned out to coincide largely with ours. The final document including 25 recommendations designed to attempt to reach the goals set as standards is attached in <u>ANNEX III</u>.

The recommendations were shared throughout 2018, firstly through the corporate newsletter to all participants (200) in all hospitals (72), and secondly by printing 1,000 copies in a pocket card format and thirdly, through a publication in the Revista Española de Geriatría y Gerontología [Spanish Journal of Geriatrics and Gerontology] in 2019.



# <sup>9.3></sup> Evolution of the result of the 2017-2018 indicators

The indicators are evaluated quarterly, and the partial results are reported to each hospital.

The evolution of the results of the indicators in the two years of data collection is presented below, with improvement in surgical delay and in early mobilisation of patients. The indicators are evaluated quarterly and the partial results are reported to each hospital.

	2017	2018
Surgical delay (mean in hours)	75.7	66.1
<i>Mobilisation on the 1st postoperative day (%)</i>	55.9	64
Osteoprotective treatment at discharge (%)	36.7	45.5
Calcium at discharge (%)	49.6	52.8
Vitamin D at discharge (%)	70.6	72.6
Pressure ulcers (%)	6.4	5.4
Independent mobility at 30 days (%)	48.9	50.2

Table 9 Evolution of some results of the overall sample of the RNFC

# **10** EXPERIENCES IN THE USEFULNESS OF RNFC IN THREE HOSPITALS

The evolution of the results of the indicators throughout the two years of data collection is presented below, with improvement in surgical delay and in early mobilisation of patients.

#### <sup>10.1></sup> Hospital Universitario Fundación Jiménez Díaz [Jiménez Díaz University Hospital Foundation] (HUFJD)

The indicators are evaluated quarterly, and the partial results are reported to each hospital.

The evolution of the results of the indicators in the two years of data collection is presented below, with improvement in surgical delay and in early mobilisation of patients. The indicators are evaluated on a quarter basis, and the partial results are reported to each hospital.

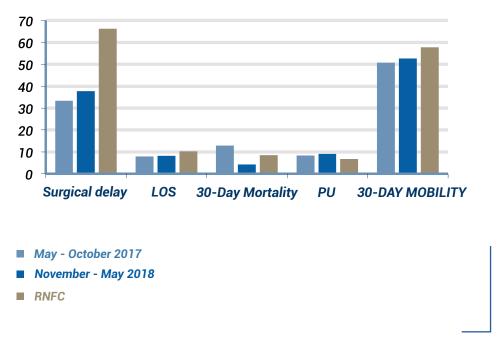


Photograph 2 Front of the Hospital Universitario Fundación Jiménez Díaz

The HUFJD has an estimated incidence of fragility hip fractures of around 450-500 patients/ year. The clinical figure of orthogeniatric collaboration commenced in our hospital in November 2017.

Prior to this date, in May 2017, we began participating in the RNFC to learn about the reality of the hip fracture care process in our hospital. Through this initial data, we observed the need for collaboration with Geriatrics in the care of elderly patients admitted to Traumatology, in order to reach the standards and objectives set by Clinical Practice Guidelines (CPG).

The objectives for geriatric intervention and evaluation were proposed initially, based on the medical optimisation of patients and the reduction of perioperative complications, improving morbimortality. In addition to this main objective, we proposed achieving other demonstrated benefits of orthogeriatric collaboration. Graph 1 shows some results of HUFJD before and after the start of orthogeriatric collaboration, compared with the RNFC data:



Graph 16 Results before (May-October 2017) and after (from Nov. 2017) the start of Orthogeriatrics in the HUFJD and comparison with the RNFC.

According to data obtained from the RNFC, our 30-day mortality was 8.5%, below that obtained by our first cut-off date, though in-hospital mortality in our hospital was initially similar to the national average. In the next wave of data, mortality improved significantly, but further deficits related to the other secondary objectives already proposed were still evident, such as a higher percentage of pressure ulcers (PU), the highest rate of institutionalisation at discharge and worse functional outcomes at one month follow-up.

Management, the Medical Direction, Rehabilitation, Traumatology and Geriatrics Department, as well as Nursing management departments adopted the following measures to improve these parameters:

- Early surgery programme, with an efficient post-operative period, with early radiologic controls and mobilisation, and early commencement of ambulation.

- Presence of a gait therapist during the morning and afternoon shifts to stimulate and reeducate gait, as well as support for families when initiating ambulation.

- Increased presence of a specialist pressure ulcer nurse as well as awareness of measures to prevent their occurrence, such as early mobilisation, early ambulation, nutritional improvement, and active surveillance for signs that precede ulcers (erythema, etc.).

- Multidisciplinary meetings between Nursing, Social Work, Rehabilitation and Geriatrics departments to help plan discharge and continuity of care.

With the continuous and comparative audit with the RNFC, subsequent analysis of the data after introducing all these measures showed better results with significant relevance (Table)

	May 2017 to April 2018	May 2018 to February 2019	Р
Surgical delay (hours)	28.2 (34.4)	23.4 (27.0)	0.013
Hospital stay (days)	6.9 (4.6)	6.1 (3.4)	0.042
In-hospital pressure ulcers ( <grade 1)<="" td=""><td>26 (9.8%)</td><td>17 (4.5%)</td><td>0.027</td></grade>	26 (9.8%)	17 (4.5%)	0.027

Table 10 Evolution of the process: Hip fracture at HUFJD after implementation of quality improvement measures

As described with the details mentioned in the previous paragraphs, there are many interdependent actions that must be carried out by several members of a multidisciplinary team. This is a complex process to organise, and each staff member must know his or her responsibilities and obligations to achieve the desired end result. The work done to date has produced very positive improvements, but continuous monitoring such as auditing and regular meetings are essential for the continued success of this programme.

In general, the achieved efficiencies are the result of these five factors: Knowledge of our internal reality, Communication, Collaboration, Commitment to excellence, Comparison and continuous internal auditing and feedback with the RNFC data.

Ana Isabel Hormigo and Orthogeriatric Unit of Hospital Universitario Fundación Jiménez Díaz

#### <sup>10.2></sup> Hospital General de Segovia [Segovia General Hospital]

The Hospital General de Segovia serves a population of more than 150,000 inhabitants, of which 13% are older than 75 years old. This involves 225 to 250 patients with hip fracture older than 75 years old per year.



Photograph 3 Hospital General de Segovia

In our hospital, the Traumatology, Anaesthesia and Geriatrics Departments have collaborated since 2009, for the evaluation and comprehensive treatment of patients with hip fracture, not only during the hospital phase, but also on an outpatient basis. This provides a multidisciplinary assessment that goes beyond the surgical aspect of the fracture. In this sense, the registry does not only collect data, it also provides a clinical aspect and promotes patient follow-up. In some cases, it allows us to detect more fragile patients at an early stage, who require closer and more thorough continuity of care at other levels, such as in outpatient clinics or in the Geriatric Day Hospital.

Since the start of orthogeriatric activity in our centre, data collection has been done in a regulated manner, participating in the Registro de Fractura de Cadera de Castilla y León [Hip Fracture Registry of Castile and León] in 2014 - 2015 and continuously in the RNFC since its creation in 2017.

In addition to participating in the registry and the establishment of quality standards, we developed a Perioperative Management Plan for hip fractures. The fundamental participants in this plan were representatives of the Traumatology, Geriatrics and Anaesthesiology Department. In this protocol, times were marked to reduce the pre-surgical length of stay, emphasising the comprehensive geriatric assessment for better stabilisation and optimisation of the patient's comorbidities, and, on behalf of the anaesthesiologists, the

management of oral anticoagulation and antiplatelet therapy. Anaesthesia also performs a preoperative assessment of the patient during overtime hours in many cases.

The Emergency Department at our hospital is committed to the protocol, so that from the moment the hip fracture is diagnosed, it can be activated and the preoperative study carried out there.

In the Traumatology Department, the nurses, nursing care technicians, and orderlies are familiar with the quality standards proposed by the RNFC, with everyone committed to the early mobilisation of patients, with preoperative sedestation and mobilisation before 24 hours after surgery, provided there is no recommendation of non-weight bearing by the Orthopaedic Surgeon. These measures are intended to minimise the occurrence of immobility-related lesions, functional loss and dependence.

In this sense, a protocol has been developed to prevent the onset of pressure ulcers in these patients, which is pending approval by the Sub-commission on Wounds of the Management of Hospital General de Segovia.

Our hospital is so committed to this care process that it is carried out without increasing human or material resources. However, we have seen improved coordination and collaboration not only of the Traumatology, Geriatrics and Anaesthesia Departments, but of other professionals such as the Rehabilitation Department and the hospital's Social Services Unit.

Detection of social risk at the time of admission allows the Social Worker to inform and advise of the resources available at hospital discharge and to ensure continuity of care and that the patient's functional recovery can be continued either at home or in a residential centre. The Social Services Unit has collaborated in training and sharing knowledge regarding the different social resources at regional congresses.

Finally, we are in the process of developing an information flyer, to be distributed to both the patient and their relatives, where they can find a graphic and visual presentation of what has happened to their family member, the importance of falls and what exercises should be done to make rehabilitation more effective.

The RNFC has been a useful tool to know our areas in need of improvement compared to other centres, and to evaluate the evolution of results over time. This way, it has allowed us to establish the aforementioned strategies, increasing the satisfaction of professionals and patients, even promoting a project to request a Fracture Liaison Service, participating in different regional and national congresses, and fostering training and research activities.

We can conclude that since this Project has been carried out, patients who suffer a hip fracture have a higher quality of care, reducing the preoperative stay, fracture-related complications, increasing their mobility and encouraging greater monitoring and treatment after hospital discharge.

Angélica Muñoz Pascual and Orthogeriatric Unit of Hospital General de Segovia

# <sup>10.3></sup> Hospital Universitario de Guadalajara [University Hospital of Guadalajara]

The Hospital Universitario de Guadalajara is a tertiary level hospital with 400 beds that cares for a total population of 250,000 people, with a high rate of elderly patients, partly due to being a province with a large number of nursing homes. Since 2006, about 250 hip fractures have been managed surgically and treated in the Functional Orthogeriatric Unit per year.



Photograph 4 **Hospital Universitario de Guadalajara** 

Data collection for the Spanish National Hip Fracture Registry began in 2017. Since then, the evaluation of its results has allowed us to see data that had not been evaluated until now, and permitted the implementation of some measures aimed at improvement.

1- The average preoperative stay in the centre's Traumatology Department, compared to the national average, has helped raise awareness of the importance of early surgery in these patients. Although the number of operating rooms available for surgery in the first 24 hours after admission has not changed, more hips are operated on during the weekend and greater efforts are made to minimise surgical delay. This has led to a reduction in preoperative delay from 70 to 65 hours in the last quarterly report. Even so, we must continue making efforts to improve this figure.

2- The professionals of the Orthogeriatric Unit have received presentations on the importance of mobilisation the day after surgery. The nurses' work is essential for this objective and we have managed to raise awareness among all of the ward's staff on the importance and consequences of early mobilisation so it is practically protocolised. On behalf of Orthopaedic Surgery, organisation of the post-surgical radiological controls is no longer an obstacle to early mobilisation. This has allowed 61% of patients be mobilised the day after the surgery, compared to 45% at the start of the study.



3- The comparison in medium-term functional results to national data and, specifically with other centres in the same autonomous community, has allowed for quantification of the difference in functional recovery one month after the fracture between the centres with and without a specific convalescence unit such as ours. Based on a similar functional situation, access to mid-term geriatric rehabilitation units clearly provides a better result in terms of physical recovery, compared to convalescence in nursing homes, which is the usual practice in this hospital. The comparative results were given to the Hospital management, and were highly regarded, due to them being a reliable, objective and concrete demonstration of the need to establish this type of unit to guarantee the best care for patients with hip fractures, when comparing with the data from similar and nearby centres that are equipped with them.

4- The administration of nerve blocks by the Anaesthesiology departments for pain control in other centres participating in the Registry has fostered interest in the development of these analgesic techniques, not performed in this centre until now. Although their application has not yet been protocolised, we are beginning to consider the necessary structure to be able to do so.

5- The Orthogeriatric Unit has the same nurse every day in the morning. Her deep knowledge in orthogeriatrics and continuity throughout the week on the ward enables us to offer more specific care and greater health education. It is also a key point for the coordination of the multidisciplinary working group. Currently, work is being done on the preparation of graphic documents to support information on patient and family care as a measure to improve functional results and prevent complications.

Teresa Pareja Sierra and Orthogeriatric Unit of Hospital Universitario de Guadalajara.

# 11 Sharing the rnfc results



# <sup>11.1></sup> Sharing the Results with the Participating Hospitals

All hospitals receive quarterly reports with the coded results of their own data and the rest of the hospitals (each hospital knows only its own code and its own results and compares it with the rest without knowing which hospital the other data corresponds to). This information and the comparison between centres (benchmarking) stimulates adopting measures and continuing quality improvement.

As an example, three variables with their 2018 results are shown by hospitals with the numerical codes on the left and a vertical line that corresponds to the average of all hospitals.

The variables surgical delay, type of surgical treatment and osteoprotective treatment are presented.

The representatives of all participating hospitals already have the information of all the variables corresponding to 2018, and they are available on the RNFC website (**www.rnfc.es**), which is why they are not included in this Report.

## 11.1.1> Surgical delay, by hospital

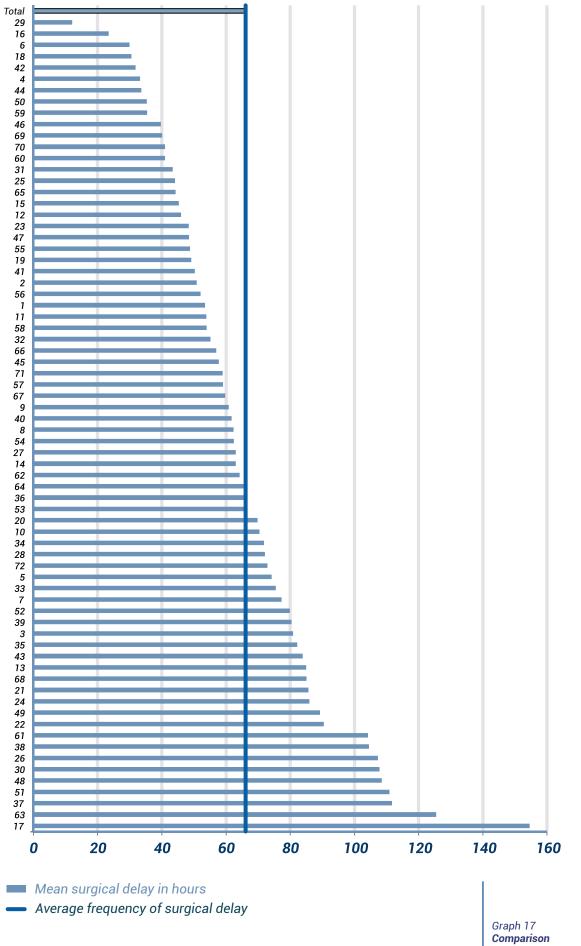
The average delay to surgery for a hip fracture is 66.1 hours, according to the RNFC.

The graph shows the great variability between hospitals.

	Statistical
Mean	66.1
Median	50.7
Minimum	0
Maximum	1030.6
Interquartile range	65.0
Standard deviation	62.4

Table 11 Comparison between centres: Benchmarking





Comparison between centres: Benchmarking

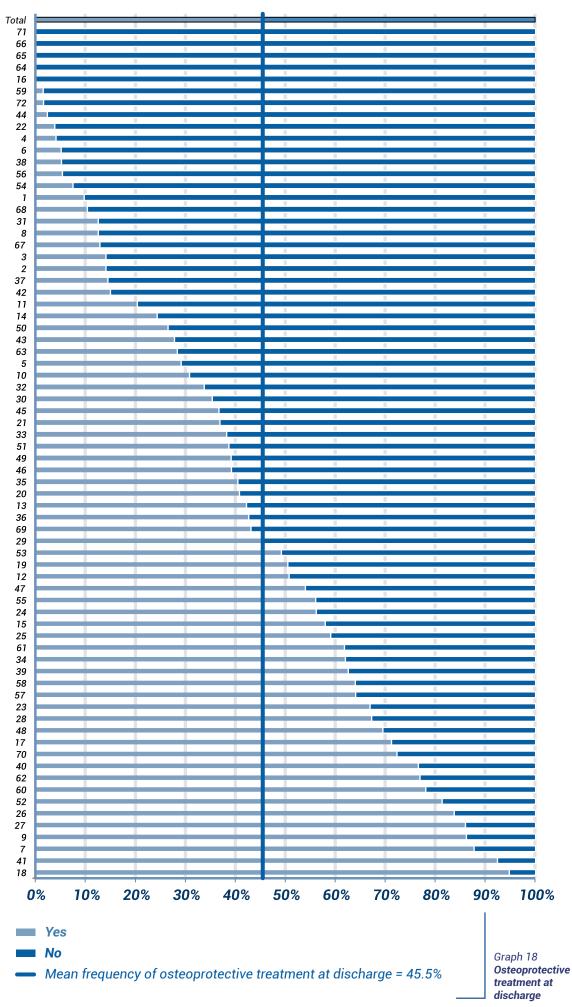
59

# 11.1.2> Osteoprotective treatment at hospital discharge

Osteoprotective treatment at discharge is another of the results that shows great variability, with an average in the overall sample of 45.5%.

		At discharge Number of cases	% Valid
<b>Osteoprotection</b> (Antiresorptives or Bone-forming agents)	Yes	4785	45.5
	No	5730	54.5

Table 12 Osteoprotective treatment at discharge



61

# 11.1.3> Type of surgical treatment by hospital

The type of surgical treatment is a somewhat more uniform parameter, as shown in **graph 19**, although with some differences in therapeutic options.

		Number o cases	of %	% Valid
Surgery performed	Cannulated screws	269	2.4%	2.6%
	Sliding hip screw	126	1.1%	1.2%
	Intramedullary nail	6183	56.0%	59.1%
	Hemiarthroplasty (cemented and uncemented)	3654	33.1%	34.9%
	Total hip replacement (cemented and uncemented)	231	2.1%	2.2%
	Total	10463	94.8%	100%
	Others/Unknown	60	0.5%	
Missing	Non-surgical management	340	3.1%	

Missing

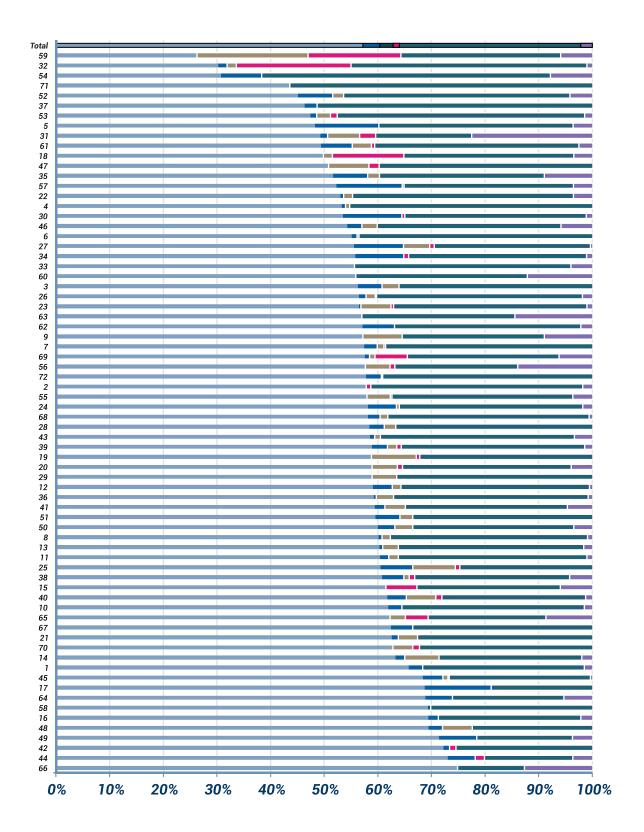
System	173	1.6%
Total	573	5.2%

Total

11036 100%

Table 13 Surgical treatment





- Intramedullary nail
- Sliding hip screw
- Non-surgical management
- Hemiarthroplasty (cemented and not uncemented)
- Cannulated screws
- Total hip replacement (cemented and uncemented)

63

64

#### <sup>11.2></sup> Dissemination of the results in scientific meetings

In February 2018, the II Jornada Nacional Monográfica [II National Monographic Conference] of the RNFC was held as a meeting point between the participants and, just like the first conference in 2017, it served to provide an in-person update, sharing of results and debate on the most relevant aspects and issues of controversy.

In addition, external dissemination of the contents and results has been carried out both through invited presentations as well as through scientific communications at meetings and conferences of different national and international scientific societies.

Listed below are the congresses at which the project has been presented through invited presentations:

#### Meeting of the Spanish National Hip Fracture Registry (two annual meetings)

#### International Congresses:

Fragility Fracture Network (FFN): 2017 and 2018

#### National Congresses:

- Sociedad Española de Geriatría y Gerontología (SEGG): 2017 - 2019

- Sociedad Española de Traumatología y Ortopedia (SECOT): 2017 and 2018
- Sociedad Española de Fracturas Osteoporóticas (SEFRAOS): 2016, 2017 and 2018
- Sociedad Española de Investigación Ósea y del Metabolismo Mineral (SEIOMM) 2018
- Osteoporosis Course of the Sociedad Española de Medicina Interna 2018
- Orthogeriatrics Course at Hospital La Paz: 2016, 2017 and 2018
- Orthogeriatrics Course of Avila
- II Hospital Benchmarking Day at the Fundación Jiménez Díaz 2018

#### **Regional congresses and courses:**

- Sociedad Matritense de Cirugía Ortopédica y Traumatología (SOMACOT): 2017 and 2018

 Sociedad Castellano Leonesa Cántabro y Riojana de Traumatología (SCLECARTO): 2017, 2018 and 2019

- Orthogeriatrics Course of Catalonia: 2018 and 2019

Orthogeriatrics Course of the Autonomous Community of Valencia

- Orthogeriatrics Course of Valladolid (Hospital Clínico Universitario de Valladolid

[University Clinical Hospital of Valladolid]) – Orthogeriatrics Course of Balearic Islands

- General Session at Hospital La Paz
- Session for the Rehabilitation Department at Hospital Ramón y Cajal
- Session for the Internal Medicine and Traumatology Department of Hospital
- Universitario Fundación Alcorcón [Alcorcón Foundation University Hospital]

- FFN Recap Madrid 2017 and 2018



# <sup>11.3></sup> Sharing of the results on social media and online

Although they are actually part of the planned actions for the first semester of 2019, both the Twitter profile (@RNFCadera) and the website (www.rnfc.es) of the Registry are already available at the time of publication of this report, and they undoubtedly serve to expand the presence and dissemination of the results and activities of the Registry, without detracting from the usefulness of the existing "Spanish Orthogeriatrics Project" group on the Telegram messaging application for many other practical tasks.

# 12 RESEARCH PROJECTS



The usefulness and production of interest of the Registry from a care-related and scientific point of view is going much further than its initial proposed objectives, since data exploitation has gone beyond overall and single-hospital analyses and the study of the case reports nationwide; other complementary activities and lines of work of enormous interest have also started to be developed. Several of these are discussed in this Report-2018. Some of these lines are already very advanced and/or published, such as the comparison with data from other international and national registries and the development of indicators and quality standards with corresponding proposals for improvement. Others are pending acceptance or completion of analysis, such as the study of patient profiles in whom secondary fracture prevention is initiated, the study of patients suffering from functional impairment as a result of the fracture, the multilevel analysis of the detected clinical variability, the representativeness of the RNFC's cases compared to the Minimum Basic Dataset (MBDS) of all Spanish hospitals, the comparison of results between the different Autonomous Communities and the differences defining patients living in nursing homes, both regarding baseline status and their evolution. Other lines of study are starting, or being developed, such as the analysis of the differences present in patients with cognitive impairment, the differences in characteristics according to age (older and younger than 75 and older and younger than 100 years old) or the outcomes of different types of healthcare organisation.

#### 12.1> Publications by the RNFC Working Group

Listed below are the bibliographic references most related to the RNFC, either because they are publications by the working group or because they are closely related to it and have significantly participated with the RNFC group.

Many countries such as England, Ireland, Scotland, Australia and New Zealand have national hip fracture registries as a quality control audit, and have observed an improvement in clinical and care parameters since implementing the registry. In 2016, members of the RNFC research team interested in importing this benefit to our country carried out a comprehensive literature review of these international registries to assess the possibility of implementing one in Spain. This is the starting point that has allowed us to learn from the advanced work of other countries and to seek alliances. This review has been published in the prestigious journal Osteoporosis International.

- Sáez-López P, Brañas F, Sánchez-Hernández N, Alonso-García N, González-Montalvo JI. Hip fracture registries: utility, description, and comparison. Osteoporosis International 2017; 28(4):1157-1166

Several members of the RNFC research team have experience and have established elderly hip fracture registries in two autonomous communities between 2014 and 2016 in Castile and León and Madrid, with the participation of 13 and 8 hospitals, respectively. The two experiences have been published recently in the Revista Española de Geriatría y Gerontología [Spanish Journal of Geriatrics and Gerontology]. This initiative has served as a pilot phase for the RNFC. Although they were considered temporary registries in both cases, both working groups have established a way of inter-professional and inter-hospital coordination that greatly facilitated the subsequent organisation on a national level.

- Muñoz-Pascual A, Sáez-López P, Jiménez-Mola S, Sánchez-Hernández N, Alonso-García N, Andrés-Sainz A et al. Ortogeriatría: Primer registro multicéntrico autonómico de Fracturas de Cadera en Castilla y León (España) [Orthogeriatrics: First regional multicentre Hip Fracture registry in Castile and León (Spain)]. Rev Esp Geriatr Gerontol [Spanish Journal of Geriatrics & Gerontology] 2017, 52: 242-8.

- Molina Hernández MJ, González de Villaumbrosia C, Martín de Francisco de Murga E, Alarcón Alarcón T, Montero-Fernández N, Illán J et al. Registro de fracturas de cadera multicéntrico de unidades de Ortogeriatría de la Comunidad Autónoma de Madrid. [Multicentre hip fracture registry of Orthogeriatric units of the Autonomous Community of Madrid.] Rev Esp Geriatr Gerontol 2019;54(1):5-11. Once the literature on hip fracture registries was reviewed and the RNFC group was created, a work plan was developed to implement a hip fractures registry in Spain. To this end, international experts were contacted, the method was designed and it was published for the knowledge of all participants. Consequently, we prepared, wrote and published the RNFC's methodolgy in the Revista Española de Geriatría y Gerontología.

- Sáez-López P, González-Montalvo JI, Ojeda-Thies C, Mora-Fernández J, Muñoz-Pascual A, Cancio JM, Tarazona FJ et al. Spanish National Hip Fracture Registry (SNHFR): a description of its objectives, methodology and implementation. Rev Esp Geriatr Gerontol 2018; 53: 188-95.

The description of quality standards was the reason for another article also accepted in the Revista Española de Geriatría y Gerontología.

- First proposal of quality indicators and standards and recommendations to improve the healthcare in the Spanish National Registry of Hip Fracture. Condorhuamán-Alvarado PY, Pareja-Sierra T, Muñoz-Pascual A, Sáez-López P, Ojeda-Thies C, Alarcón-Alarcón T, Cassinello-Ogea MC, Pérez-Castrillón JL, Gómez-Campelo P, Navarro-Castellanos L, Otero-Puime Á, González-Montalvo JI. Rev Esp Geriatr Gerontol. 2019 Sep - Oct;54(5):257-264. doi: 10.1016/j.regg.2019.04.001.

After one year of data collection, in 2018, the RNFC research team prepared and designed the first report with the 2017 results. This book, published in hard copy and digitally, was sent to all participants, to scientific societies and to the Ministry of Health. It has been a good way to disseminate the work done so far and the importance of registering in order to improve. It can be downloaded on some of the websites of the scientific societies that support the project (SEGG and SEIOMM) and on the RNFC website:

- "Registro Nacional de Fracturas de Cadera por Fragilidad. Informe Anual 2017" [National Hip Fragility Fracture Registry. 2017 Annual Report]". Sáez López P, Ojeda Thies C, Otero Puime A and González-Montalvo JI, coordinators. Madrid: RNFC. IdiPAZ. 2018. (ISBN: 978-84-09-02513-8). (http://rnfc.es/wp-content/uploads/2019/07/Informe-Anual-RNFC-2017.pdf)

Subsequently, an analysis comparing the results of the Spanish registry (RNFC) with the registries of 13 other countries was carried out, leading to a high-quality article that was published in Osteoporosis Int.

- Ojeda-Thies C, Sáez-López P, Currie CT, Tarazona-Santalbina FJ, Alarcón T, Muñoz-Pascual A, et al. Spanish National Hip Fracture Registry (RNFC): analysis of its first annual report and international comparison with other established registries. Osteoporos Int. 2019; 30:1243–1254. doi: 10.1007/s00198-019-04939-2.

The last article accepted for publication in the Revista Española de Salud Pública [Spanish Journal of Public Health] contemplates the comparison of the RNFC's results with those from other multicentre studies and the two Spanish regional registries

- Sáez-López P, Ojeda-Thies C, Alarcón T, Muñoz Pascual A, Mora-Fernández J, González de Villaumbrosia C, Molina Hernández MJ, Montero-Fernández N, Cancio Trujillo JM, Díez Pérez A, Prieto Alhambra D, Caeiro Rey JR, Etxebarria Foronda I, Gómez Campelo P, Pareja Sierra T, Tarazona-Santabalbina FJ, López Giménez R, Otero Puime A, Navarro-Castellanos L, Queipo Matas R, Jiménez Mola S, López-Peña T, Cassinello Ogea C, González-Montalvo JI. Registro Nacional de Fracturas de Cadera (RNFC): resultados del primer año y comparación con otros registros y estudios multicéntricos españoles. [Spanish National Hip Fracture Registry (RNFC): first year results and comparison with other Spanish multicentre registries and studies]. Rev Esp Salud Pública [Spanish Journal of Public Health]. 2019;93: 18 October e201910072.



#### 12.2> Research projects related to the RNFC

Listed below are the projects related to the RNFC at different stages of development. **1-** A working group led by Angel Otero Puime and Daniel Toledo Bartolomé are comparing the characteristics of RNFC patients with all hip fracture patients nationwide collected in the MBDS, thus verifying the representativeness of the RNFC nationally (in the analysis phase)

**2-** Teresa Alarcón Alarcón has studied the profile of RNFC patients who are prescribed treatment for osteoporosis and the differences between hospitals. This paper is pending acceptance for publication

**3-**Pablo Castillón Bernal, Raquel Vallez Romero and their team have analysed the results of the RNFC by autonomous community and are compiling the results.

**4-** A project has been presented to study the variability of the results in the different hospitals; for this purpose, a multilevel analysis is proposed that will begin soon. The principal investigator of this project is Paloma Gomez Campelo and she has obtained a grant from the Fundación Mutua Madrileña to carry out this research.

**5-** Another project, which has also received the Beca Primitivo de Vega [Primitivo de Vega Grant] from the Fundación Mapfre [Mapfre Foundation], seeks to quantify the functional loss in patients 30 days after hip fracture and to discover the factors that influence this functional loss. The principal researcher is Pilar Sáez López and it is in the analysis process.

**6-** Teresa Pareja Sierra will coordinate an observational study on nutritional aspects related to fracture; pending the start of data collection.

**7-** Peggy Rios German is analysing the difference between community-dwelling RNFC patients versus those living in nursing homes, regarding their baseline situation as well as their clinical evolution (pending writing).

8- Other projects are in the process of developing the method, among which are:

a. Repercussions of surgical delay (Concepción Cassinello Ogea)

b. Evaluation of the use of THR vs PHR in subcapital fracture (Cristina Ojeda Thies)

c. Evolution of hip fracture in patients with and without cognitive impairment (Jesús Mora Fernández)

d. Comparison of patients younger and older than 75 (Ricardo Larrainzar Garijo)

e. Comparison between hospitals with different resources (FLS, clinical collaboration) Grupo Ortogeriatría Cataluña [Catalonia Orthogeriatrics Group]

f. Study of centenarian patients in the RNFC (Bernardo Abel Cedeño Veloz, María Belén Gonzalez Glaria, Cristina Bermejo Boixareu and Juan Ignacio González Montalvo)

g. Study of subtrochanteric vs pertrochanteric fractures (Hector Aguado Hernández)

## 12.3> RNFC reports at congresses

- Castillon P, Nuñez J, Ojeda Thies C, Sáez-López P, Gonzalez Montalvo JI. Osteoporotic Hip Fractures In Spain. Are We On The Right Track?: Data From The Prospective Spanish Hip Fracture Registry. 20th EFORT Congress in Lisbon, Portugal from 05 to 07 June 2019. Oral presentation

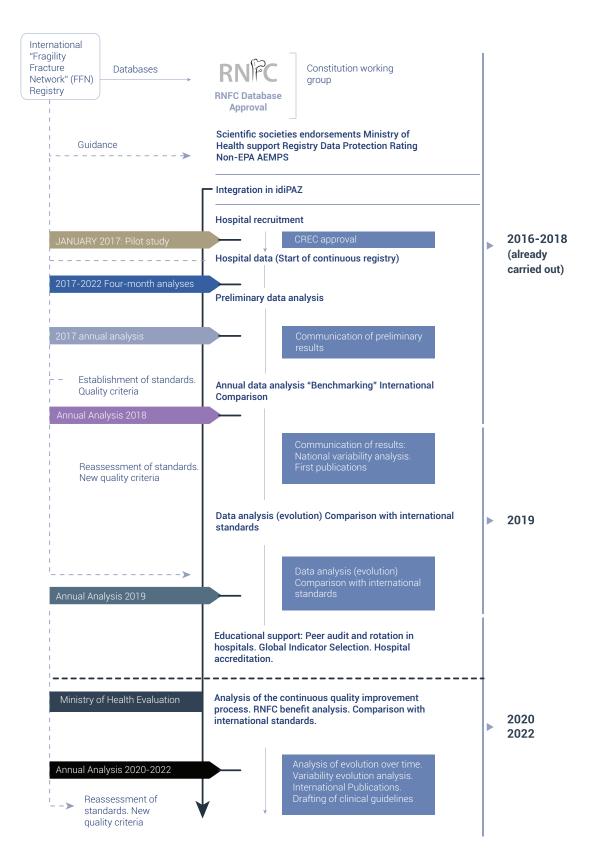
- Nuñez J, Castillon P, Ojeda Thies C, Sáez-López P, Gonzalez Montalvo JI. Low Incidence Of Anti-Osteoporosis Treatment After A Hip Fracture: Data From The Prospective Spanish Hip Fracture Registry. 20th EFORT The European Federation of National Associations of Orthopaedics and Traumatology Congress in Lisbon, Portugal from 05 to 07 June 2019. Poster presentation

- Ojeda-Thies C, Sáez-López P, Tarazona-Santabalbina F, Alarcón-Alarcón T, Montero Fernández N, Mora Fernández J et al. Spanish National Hip Fracture Registry (RNFC): Analysis Of Its First Annual Report And Comparison With Other Established Registries. 20th EFORT The European Federation of National Associations of Orthopaedics and Traumatology Congress in Lisbon, Portugal from 05 to 07 June 2019. Poster presentation.

# 13PRESENT ANDFUTUREOF THE RNFC

## 13.1> Work schedule

This graph was designed as a road map of the activities to be carried out in the RNFC. It includes those completed in the three years of operation and those planned for the future.



#### <sup>13.2></sup> RNFC activity 2016-2017-2018

#### 2016

- Bibliographic review of the functioning of fracture registries in other countries, justifying the need to create one in Spain.

- Constitution of the RNFC group composed of professionals related to the hip fracture process who wished to collaborate. Professionals with this profile have the possibility of joining the group at any time.

- Request for Support from scientific societies of all disciplines related to fragility fractures (ongoing 2016-2019).

#### 2017

- In January-February 2017, a pilot registry was developed with 15 participating hospitals. Once the viability was verified, data collection began in a progressively larger number, reaching 53 hospitals at the end of 2017.

- From the beginning, periodic reports with the results were analysed every three months and sent to all participating hospitals.

- Start of dissemination in scientific meetings at the request of the Scientific Committees of each congress or meeting (in this report we attach the meetings in which information on the RNFC has been presented)

#### 2018

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Continuous data collection and preparation of quarterly reports is maintained.
 Writing and publication of the 2017 RNFC Report (accessible at rnfc.es/wp-content/uploads/2019/05/2017-ANNUAL-report-RNFC.pdf).

- Design, discussion and drafting of the project for the development of indicators and quality standards by the Indicators Committee. Dissemination of the recommendations of said Committee.

- Modifications of some variables in the data collection sheet to avoid errors, and updating (minimal changes) of the database. ANNEX I

- Update and writing of the Document with a description of the variables to improve the quality of the data and unify its collection. Link on the RNFC website

- Drafting of the data transfer document for researchers participating in RNFC sub-projects.

- Preparation of reports for grants, research grants and award applications listed below: Fundación Mutua Madrileña, Fundación Mapfre, Caser, State of Kuwait Prize for Research in Health Promotion granted by the World Health Organization and Instituto Carlos III [Carlos III Institute] Health Research Grants. - Publication of the scientific articles mentioned earlier in this Report.

- Preparation and review of sub-projects related to the RNFC that are presented by their participants.

- 1st National Meeting of the RNFC (Hospital Fundación Jiménez Díaz, February 2018).

- Presentation of the RNFC in scientific meetings with publication of the first results.

### <sup>13.3</sup> > RNFC future work plan 2019-2020

Below is a brief description of the activities planned for the next two years.

- Ongoing data collection, analysis, periodic reports and annual report and updated scientific dissemination on the evolution of the RNFC.

- Ongoing audit of the degree of compliance with the selected standards, after disseminating the recommendations. Development of new strategies for quality improvement.

- Preparation of an observational survey on the type of care and human and material resources dedicated to treating hip fracture patients in each hospital.

- Presentation of the RNFC at the Ministry of Health and the Regional Ministries of Health of the different Autonomous Communities, for their information, and a request for collaboration in decisions to improve care.

- Regarding research activity, completion and publication of sub-projects that are very advanced, such as the implementation of quality standards, representativeness of the RNFC compared to the national MBDS, 2017 results and comparison with other national studies and profile study of patients treated for osteoporosis.

- Other sub-projects that currently are in the data collection and analysis phase are intended to be completed. These are the study of clinical variability, quantification of functional loss after fracture and associated factors, comparison of characteristics and evolution between institutionalised patients and residents in their own homes and nutritional evolution.

- New projects are being proposed on a continuous basis by various participants, which are in the review, authorisation and development promotion phases. All of them share the objective of better knowing the care process for patients with hip fractures and contributing to the improvement of quality of care.

# 14 GRANTS AND RECOGNITIONS



During 2018, the RNFC received two important awards. The first was the Research Grant the **Fundación Mutua Madrileña** with the project entitled "**Registro Nacional de Fracturas de Cadera: Estudio RNFC**" [National Hip Fracture Registry: RNFC Study] whose Principal Investigator is Paloma Gómez Campelo, and whose overall objective is to quantify and analyse the clinical variability in the care of fragility hip fractures in Spain, and to launch a specific programme to improve the quality of care to decrease this variability and improve patient health outcomes. This project has completed the descriptive analysis and is in the multilevel analysis phase.



La FUNDACIÓN MUTUA MADRILEÑA, en su XV Convocatoria de Ayudas a la Investigación, ha decidido apoyar al equipo de investigación liderado por la Dra. D<sup>a</sup> Paloma Gómez Campelo para la realización del proyecto "Registro nacional de fracturas de cadera estudio RNFC", que se desarrollará en el IDIPAZ (Instituto de Investigación Sanitaria Hospital La Paz) de Madrid.

Madrid, 3 de julio de 2018

D. Ignacio Garralda Ruiz de Velasco Presidente Fundación Mutua Madrileña

D. Rafael Matesanz Acedo Presidente Comité Científico

Scan 1 Research Grant from the Fundación Mutua Madrileña



Photograph 5 **RNFC members during the presentation of the certificate of support**.

From left to right: Back row: Jesús Mora Fernández, Cristina Ojeda Thies, Ricardo Larraínzar Garijo. Middle row: Teresa Alarcón Alarcón, Rosario López Giménez, Nuria Montero Fernández. Front row: Pilar Sáez López, Concepción Cassinello Ogea, Paloma Gómez Campelo, Teresa Pareja Sierra. The second was the **Primitivo de Vega Grant from the Fundación MAPFRE** with the project "**Evaluación de la pérdida funcional y de los factores relacionados al mes de sufrir una fractura de cadera en el anciano [Evaluation of functional loss and related factors one month after suffering a hip fracture in the elderly]**" of which *Pilar Sáez López* is Principal Investigator. The factors associated with functional loss are currently being analysed and the results report will be written at the end of the year.

These grants are both an external recognition of the work performed by the Registry and an injection of funds to continue covering the costs, few but inevitable, allowing it to survive.

Área de Promoción de la Salud Paseo de Recoletos, 23 - 28004 MADRID saludiôtundacionmaptre.org



Antonio Guzmán Córdoba, Director del Área de Promoción de la Salud de FUNDACIÓN MAPFRE con domicilio social en Paseo de Recoletos, 23 de Madrid,

### CERTIFICA

Que Dña. **María del Pilar Sáez López**, con documento de identidad número es Investigadora Principal del equipo de investigación que desarrollará el proyecto titulado *Evaluación d de la pérdida funcional y de los factores relacionados al mes de sufrir una fractura de cadera en el anciano.* Dicho proyecto ha obtenido una "Beca Primitivo de Vega de Atención a las Personas Mayores" concedida por Fundación MAPFRE en la convocatoria 2018, en un proceso de concurrencia competitiva, abierta y pública, con una dotación económica de 15.000€, y un plazo de ejecución de un año.

> Scan 2 Mapfre Foundation Grant

Photograph 5 Members of the RNFC during the presentation of the grant

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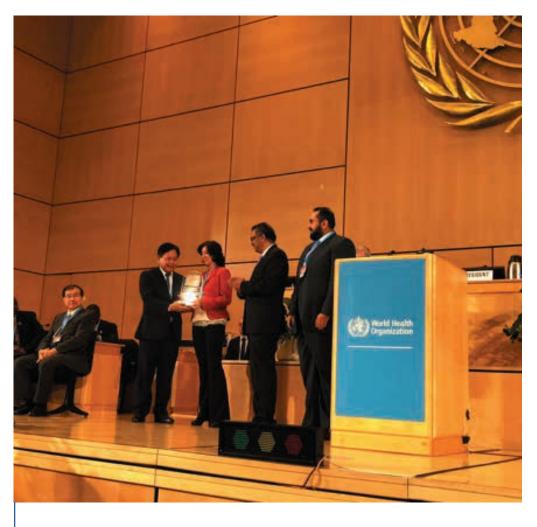
The intense work of preparing the documentation to apply for the "His Highness the Sheikh Sabah al-Ahmad al-Jaber al-Sabah" **State of Kuwait Prize for Research on Health Care for the Elderly and Health Promotion** was also carried out in 2018, although the prize was awarded in 2019. The Executive Committee of the World Health Organization debates and awards this prize, which was given to IdiPAZ Group 27 ("Ageing and Fragility in the Elderly") on behalf of the RNFC, which is administratively housed within it. The award was received by **Pilar Sáez López in Geneva during the 72nd World Health Assembly** (May 2019), which she attended accompanied by **Paloma Gómez Campelo** and **Cristina Ojeda Thies**, who together made up the Registry's Delegation.

This award "aims to reward outstanding work in the field of research on health care for the elderly and health promotion, already carried out and far more extensive than those limited to strict compliance with normal obligations", fitting perfectly with the current RNFC philosophy, carried out daily thanks to the generosity and desire to succeed of the health professionals who collect data for it every day.

	World	d Health Organiz	ation	
	aud.	له الصحة العا	atio	
In recogniti	on of outstanding	g contribution to re	esearch in health promotio	m,
لصحة	<i>جال تعزيز ا</i>	الليحوث في ه is awarded to	n in Health Promotion جائزة دولة الكويت de las Personas Mayores	
		Investigaciones del		
		for the year <b>2019</b>	Dr Tedros Adhanom Ghebrey	J
			Director-General	

Scan 3 STATE OF KUWAIT FOUNDATION Prize to the RNFC

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Photograph 6 Award ceremony of the State of Kuwait Foundation Prize granted by the Executive Committee of the World Health Organization

From left to right: Bounkong Syhavong, President of the 72nd World Assembly of the WHO, Pilar Sáez López, Tedros Adhanom Ghebreyesus (Secretary General of the World Health Organization), Sheikh Basel Hamoud Hamad Al Sabah, Minister of Health of Kuwait.





Photograph 7 **The RNFC delegation, in front of the Palace of Nations in Geneva, Switzerland**. From left to right: Cristina Ojeda Thies, Paloma Gómez Campelo, Pilar Sáez López

# <section-header><text>



The RNFC, a database that results from of the work of a collaborative group of professionals who treat patients with hip fractures in 72 Spanish hospitals, has been shown to be a useful tool for:

- At the healthcare level, to describe the characteristics of Spanish patients affected by this major health problem, to learn about the healthcare model for this process and to evaluate the results of the administered hospital treatment.

- At the research level, to observe clinical practice and its variability in Spanish hospitals, for comparison with that of other countries, and for the detailed study of certain types of patients and the factors that are associated with the different results obtained.

- At the level of quality management and its continuous improvement, for the audit and comparison of processes and results, both inside the hospital itself and between the different hospitals and Autonomous Communities, to establish goals and recommendations and to monitor the evolution of care over time.

- At the level of the clinical and scientific community, the existence of the multidisciplinary and multicentre RNFC working group brings a benefit in itself. The professionals who form it work voluntarily with a commendable desire to strive for excellence. The results presented in this Report are the result of their unconditional effort, which deserves the recognition that we give here.

## 16 RECOMMENDATIONS

We recommend that:

- Hospitals that care for hip fractures become familiar with this working group, value its usefulness for their own organisation and for improvement in care in the Spanish National Health System and progressively join the group of participating hospitals The RNFC is permanently open to the inclusion of new centres. The contact procedure is carried out through the technical secretariat whose details appear in this report.

- This **initiative be supported from the institutional level**. We hope that health administrations discover the usefulness that the RNFC's information and activities can offer for administrators and we hope they consider **different forms of support**, both organisational and financial, to **guarantee continuity and effectiveness**, as has already happened in other countries.

- Attention be paid to the **concrete recommendations** provided by **detection of the deficits observed** in some areas of care, and that proposals be made to **try to improve them**. Specifically, efforts should be made in Spanish hospitals, in general, to shorten preoperative time, foster early mobilisation of patients after surgery, prevent the onset of pressure ulcers, increase the initiation of secondary fracture prevention in these patients, and make the **resources necessary for patients' functional recovery available** in order to achieve a better quality of life.

# **17 ACKNOWLEDGEMENTS RNIRC**

The endorsement from scientific societies from different specialties has been very necessary in bringing the health professionals that comprise them together and in amplifying and communicating the Registry's objectives and initial results, especially at the time of the Registry's launch. We hope that new societies, from other specialties and other professions continue to provide their support in the coming months and years.

### Institutions

The presence and explicit support of certain institutions have resulted in a certificate of trust, which has been especially valued in the application for the State of Kuwait Prize for Research in Health Promotion awarded by the WHO.

Participation in the call for this important award would not have been possible without the impetus, advice, coordination and intense work, sometimes against the clock, of Tomás López-Peña Órdoñez, Head of the Global Health and Development Research Area, in the General Subdirectorate of International Research Programmes and Institutional Relations of the Instituto de Salud Carlos III. It is also necessary to express thanks here for the support obtained from the Minister of Health, the European Union and International Relations Affairs Service (Servicio de Asuntos para la Unión Europea y Relaciones Internacionales) and the General Directorate of Public Health, Quality and Innovation of the Ministry of Health, Consumer Affairs and Social Welfare (Dirección General de Salud Pública, Calidad e Innovación del Ministerio de Sanidad, Consumo y Bienestar Social), the Permanent Mission of Spain to the United Nations and other international organisations based in Geneva, as well as the Instituto de Salud Carlos III, the Regional Ministries of Health of Catalonia (Consejería de Sanidad de Cataluña), the Institutes of Health Research of the Hospital Universitario La Paz, the Management of Hospital La Paz and the Fragility Fracture Network that all supported the application.

### Thanks to sponsors and the coordinating centre

During 2018, the RNFC received donations from AMGEN, UCB MEDICAL, FAES FARMA and ABBOTT, channelled through the Research Foundation of the La Paz University Hospital (Fundación de Investigación del Hospital Universitario La Paz or FIBHULP). These donations and their administration make the economic sustainability and pure survival of the project possible, so those responsible for the RNFC consider these companies and the staff of the Foundation itself part of our great team and thank them for their company on this path. The companies mentioned have had no influence on the Project's objectives, methods or procedures.

### **Patients and relatives**

Behind each of the more than 18,000 cases included in the RNFC today is much more than a fractured femur. There is a patient who suffers a painful, disabling and serious, life-threatening injury. And there are also family members, close relatives and carers without whom patients could not move forward. They, along with their illness, are the raison d'être of this Registry. They have generously given their consent and allowed their data to be used so that the health professionals who serve them can better learn what happens to them, how it happens, how to treat the patients, and so that we can study how to make this condition less painful, disabling and serious for those to which it happens at a later date. They do not know how we will do it, they do not even ask, but they trust that we will do it well, as best we can.

We hereby express our gratitude for their trust, which is another responsibility that we add to our commitment.

Acknowledgements

### **Recognition of all participants**

We want to reiterate our gratitude to all the professionals who, through their daily work and different forms of collaboration, make this registry possible.

### Call to potential participants.

This publication of results, like all publications by the RNFC, should serve to remind us of the RNFC's vocation to include the largest possible number of hospitals that treat patients with fragility fractures throughout Spanish territory.

Doctors caring for patients with these characteristics can contact the Technical Secretariat at the email address rnfc@bsj-marketing.es if they wish to participate in the Registry.



### ANNEX 1

### MINIMUM COMMON DATA SET OF THE SPANISH NATIONAL HIP FRACTURE REGISTRY

### 1. Datos del paciente

1.01 Consentimiento informado	1.02 Número de registro*	1.03 Sexo	1.04 Edad
Sí No		Masculino Femenino	(años)
1.05a Comunidad Autónoma*	1.05b Código Postal	1.06 Hospital*	

### 2. Características del paciente

2.01 Lugar de residencia	2.02 Movilidad pre-frac	tura		
pre-fractura				
<ul> <li>Domicilio</li> <li>Residencia /</li> </ul>	Movilidad independiente dentro y fuera de casa, sin ayudas técnicas			
Institucionalizado	Movilidad independiente dentro y fuera de casa, con una ayuda técnica			
Hospitalización aguda	Movilidad independiente dentro y fuera de casa, con dos ayudas técnicas o un andador			
Desconocido	Movilidad independiente sólo dentro de casa, sin ayudas técnicas			
	Movilidad independiente sólo dentro de casa, con una ayuda técnica			
	Movilidad independiente sólo dentro de casa, con dos ayudas técnicas o un andad			
	Movilidad independiente sólo dentro de casa, vigilado por una persona			
	Movilidad sólo dentr	o de casa, con pequeña a	yuda de una persona	
	Movilidad sólo dentro de casa, con gran avuda de una persona			
	Movilidad con 2 personas, o no movilidad			
	Desconocido			
2.03 Valoración mental preoperatoria		2.04 Categoría ASA		
Pfeiffer/10 errores			V 🗆 Desconocido	
No realizado / paciente s	e negó			
2.05 Lado de la fractura		2.06 Fractura patológica	9	
Izquierdo		No	Atípica	
Derecho		Malignidad	Desconocida	
2.07 Tipo de fractura		2.08 Tratamiento osteoprotector pre-fractura		
Intracapsular no desplaza	da (Las fracturas	🗆 No 🗆 Sí (Se	auto-rellena solo, si toma antirresortivos u	
Intracapsular desplazada	basicervicales se	05	teoformadores en el momento de la fx)	
<ul> <li>Pertrocantérea</li> <li>Subtrocantérea</li> </ul>	clasificarán como pertrocantéreas)	2.08.a-e Si es "Si", indic	ar tipo (puede marcar más de uno)	
Otra		Antirresortivos	Calcio	
		Osteoformadores	Vitamina D	
		_ osconorineadores		

### 3. Datos sobre el manejo agudo 3.01 Fecha / hora de ingreso en urgencias

5.01 Pecha / Hora u	e ingreso en urgencia	5				
(D D / M M / A)	_/(H H	: / M M) (24 horas)				
3.02 Situación vital / mortalidad			3.03 Cirugía realizada			
U Vivo			<ul> <li>Manejo no quirúrgico</li> <li>Hemiartroplastia no ceme</li> <li>Prótesis total de cadera</li> </ul>			
Falleció pre-cirugía			Tornillos canulados cementada			
Falleció en quirófano			Tornillo deslizante de	Prótesis total de cadera no		
Falleció post-cirugía			cadera	cementada		
			Clavo intramedular			
			cementada	Otros / desconocido		
3.04 Fecha / hora d	e cirugía primaria *		3.05 Demora quirúrgica (horas / fracción decimal)			
/	_/			(Se auto-rellena solo)		
	AA) (HH/MM) (2	4 horas)	, horas			
3.06a Tipo de	3.06b Bloqueo	3.07 Úlceras por	3.08 Implicación de	3.09 Se sentó el primer		
anestesia	anestésico	presión intrahospitalarias	especialista clínico	dia postoperatorio		
anestesia	anestésico		especialista clínico			
		intrahospitalarias		dia postoperatorio		
General	O No	intrahospitalarias	Internista	dia postoperatorio		
<ul> <li>General</li> <li>Neuroaxial</li> </ul>	□ No □ Sí	intrahospitalarias O No Sí	<ul> <li>Internista</li> <li>Geriatra</li> </ul>	dia postoperatorio No Sí		
General Neuroaxial Otra regional	□ No □ Sí	intrahospitalarias O No Sí	<ul> <li>Internista</li> <li>Geriatra</li> <li>Otros</li> </ul>	dia postoperatorio No Sí		

Se auto-rellena solo, si en 3.03 se pone "Manejo no quirúrgico")

### 4. Datos al alta – ignorar 4.04 y 4.04.a-e si el paciente falleció en 3.02

4.01 Destino al alta	4.02 Fecha / hora de alta de cuidados ortopédicos (de la hospitalización de agudos donde se intervino)
Domicilio Unidad Recup. Funcional     Residencia / Institucionalizado Fallecido     Sopitalización agudos Desconocido     Hospital de Larga Estancia	//
4.03 Estancia hospitalaria (días / fracción decimal)	4.04 Tratamiento osteoprotector al alta
,días (Se auto-rellena sólo)	(Se auto-reliena solo, si toma     No Sí antirresortivos u     osteoformadores)
	4.04.a-e Si es "Si", indicar tipo (puede marcar más de
	uno)
	Antirresortivos     Calcio
	Osteoformadores
	Otros

(Se auto-rellena solo, si en 3.02 se pone "Fallecido")

### 5. Seguimiento a los 30 días - ignorar si el paciente falleció en 3.02 o 4.01

5.01 Reingreso a los 30	5.02 Reintervención dentro de los 30 días postoperatorios					
días relacionado con la	(sólo la IQ más significativa	)				
fractura de cadera						
🗆 No	🗆 No		Conversión a próte	sis to	tal de cadera	
Sí por causa médica	Reducción de prótesis luxada Girdlestone / artropl				a de resección	
Sí por causa	Lavado o desbridamient	to 🗆	Manejo de fractura	a perip	protésica	
quirúrgica	Retirada de implante		Otros			
Desconocido	<ul> <li>Revisión de fijación inte</li> </ul>	rna 🗆	Desconocido			
	B Conversión a hemiartrop	lastia				
5.03 Vivo a los 30 días						
No <sup>•</sup> Desconocido	Si está vivo a los 30 días, rel	lenar 🔪	1	•	(Se auto-rellena solo)	
🗆 Sí	5.04 hasta	5.06 🔍	·			
5.04 Movilidad a los 30 días					5.05 Lugar de	
					residencia a los 30 días	
Movilidad independiente	dentro y fuera de casa, sin a	yudas técni	cas		Domicilio	
					Residencia /	
Movilidad independiente	dentro y fuera de casa, con	una ayuda t	écnica	- 1	Institucionalizado	
Movilidad independiente	dentro y fuera de casa, con	dos ayudas	técnicas o un andad	lor	Hospitalización	
Movilidad independiente	sólo dentro de casa, sin ayu	das técnicas		- 14	agudos	
Movilidad independiente	sólo dentro de casa, con una	a ayuda técr	nica		Hospital de Larga	
	sólo dentro de casa, con dos			- 1	Estancia	
Movilidad independiente	Movilidad independiente sólo dentro de casa, vigilado por una persona     Unidad de					
Movilidad sólo dentro de casa, con pequeña ayuda de una persona     Recuperación Funcio						
Movilidad sólo dentro de casa, con gran ayuda de una persona						
Movilidad con 2 personas, o no movilidad						
Desconocido						
5.06 Tratamiento osteoprote	ector a los 30 días fractura	5.06.a-e	Si es "Si", indicar tin	o (pu	ede marcar más de uno)	
🗌 No 🗆 Sí (Se auto-relle	na solo, si toma					
		2 Antirre	sortivos		ilcio	
antirresortivo	s u osteoformadores)	2 Osteof	ormadores		tamina D	
© Otros					tros	

### 6. Descarga al alta hospitalaria (nueva variable)



### \*NOTAS\*

- Cada investigador que envíe los datos debe guardar una lista que relacione cada número de registro con el número de historia clínica del paciente.
- El número de registro, la Comunidad Autónoma y el número del hospital lo tiene que poner cada investigador en relación a su Hospital.
- Tened en cuenta las variables que se rellenan solas.

### ANNEX 2

REPRESENTATIVES AND COLLABORATORS FROM HOSPITALS PARTICIPATING IN THE RNFC SINCE ITS BEGINNING

- > Hospital Álvaro Cunqueiro [Álvaro Cunqueiro Hospital]: Vigo Marta Pérez García\*, Dimas Luis Tito Fernández-Baca, Lucía Ferradás García, Patricia María Balvís, Constantino Iglesias Núñez, Julia Veríssimo Guillén, Alberto Carpintero Vara
- > Complejo Asistencial de Ávila [Ávila Care Complex]: Natalia Sánchez\* and Lorena Hunicken
- > Complejo Asistencial de León [León Care Complex]: Sonia Jiménez Mola\*, Javier Idoate Gil, Carmen Emilia Benítez González, Isabel Porras, Laura Mostaza Antolín, Gonzalo Alonso Claro.
- > Complejo Asistencial de Palencia [Palencia Care Complex]: Ana Andrés\*
- > Complejo Asistencial de Segovia [Segovia Care Complex]: María Teresa Guerrero\*, Elena Ridruejo, Ángelica Muñoz, Maria Cruz Macias and Pilar del Pozo Tagarro
- > Complejo Hospitalario de Toledo [Toledo Hospital Complex]: Carmen Barrero Raya\*, Romeo Enrique Rivas Espinoza and Miguel Antonio Araujo Ordóñez
- CSS El Carme [El Carme Social Health Service]. Badalona Serveis Asistencials [Badalona Care Service]: José Manuel Cancio\*, Maite Trullols Cardona
- Hospital Central de la Defensa Gómez Ulla [Gómez Ulla Central Defence Hospital]: Raquel Vállez Romero
- > Hospital Clínico Universitario de Santiago [Santiago University Clinical Hospital]: Maria Carmen Cervera\*, Virginia García Virto and Luis García Florez
- > Hospital Clínico Universitario San Carlos [San Carlos University Clinical Hospital]: Jesús Mora Fernández\*, Victoria Garay Airaghi, Esther Lueje Alonso, Yolanda Parada de Freitas, Blanca Carballido de Miguel and María Galán Olleros, Ana María Moreno Morillo
- > Hospital de Barbastro [Barbastro Hospital]: Maria Paz García Díaz\*, Clara Bibián Getino
- > Hospital de la Cruz Roja [Red Cross Hospital]: Francisco Suárez\*
- > Hospital de la Línea de la Concepción [Línea de la Concepción Hospital]: María Prado Cabillas\*
- > Hospital de Manises [Manises Hospital]: José Salvador Barreda Puchades\*, Anca Dragoi Dragoi
- > Hospital de Mataró [Mataró Hospital] (Consorci Sanitari del Maresme [Maresme Health Consortium] (CSdM): Anabel Llopis\*, Gustavo Adolfo Lucar López, Adrián Oller Bonache, Montserrat Méndez Brich, Macarena Morales Yáñez, Estela Mañana Vázquez, Marcela Camps Ferrer
- Hospital Universitario Rey Juan Carlos [King Juan Carlos University Hospital]: Cristina González de Villaumbrosia\*, Javier Martínez Peromingo, Carlos Oñoro, Elena Baeza, Helena Gómez Santos
- Hospital General Universitario de Ciudad Real [General University Hospital of Ciudad Real]: Nuria Fernández Martínez\*, Francisco Manuel García Navas, Javier Gil Moreno and Virginia Mazoteras Muños.
- > Hospital General Universitario Gregorio Marañón [Gregorio Marañón General University Hospital]: Nuria Montero Fernández\*, Virginia Moreno
- Hospital Monte Naranco [Monte Naranco Hospital]: Carmen Fidalgo\*, Francisco Jiménez Muela, Laura Pellitero Blanco
- > Hospital Obispo Polanco [Bishop Polanco Hospital]: Ángel Castro Sauras\*, Marta Osca Guadalajara, María Teresa Espallargas Donate, María Pilar Muniesa Herrro, Miguel Ranera García, Nuria Pérez Gimeno, José Adolfo Blanco Llorca, Antonio de Barros Gómez, Alejandro Urgel Granados, María Royo Agustín, Agustín Rillo Lázaro, Jorge García Fuente
- Hospital Nuestra Señora de Gracia [Our Lady of Grace Hospital]: Pilar Mesa\*, Esther Álvarez, Mamadou Bengaly, Gabriela Jiménez, Carmen Elías, Daniel Schadegg and Vicente Canales Cortés
- > Hospital Provincial Sagrado Corazón de Jesús [Sacred Heart of Jesus Provincial Hospital], Huesca: Elena Ubis Diez\*, Isabel Peralta and Amparo Fontestad
- > Hospital San Juan de Dios Bormujos [San Juan de Dios Bormujos Hospital]: Pablo Alejandro Blanco Alba\*
- > Hospital Santos Reyes de Aranda de Duero [Santos Reyes de Aranda de Duero Hospital]: Noelia Míguez Alonso\*
- Hospital Sociosanitari Francolli Eugenia [Francolli Eugenia Social-Health Hospital]: Sonia Sopena Bert\*

- > Hospital Universitari de Bellvitge [Bellvitge University Hospital]: Abelardo Montero Sáez\*
- > Hospital Universitari Mútua de Terrassa [Mútua de Terrassa University Hospital]: Laura Puertas Molina\* and Pablo Castillón Bernal
- > Hospital Universitario de Cabueñes [Cabueñes University Hospital]: Maria Luisa Taboada Martínez\*
- > Hospital Universitario de Getafe [Getafe University Hospital]: María Auxiliadora Julia Illán Moyano\*, María Asenjo Cambra
- > Hospital Universitario de Guadalajara [Guadalajara University Hospital], SESCAM: Teresa Pareja Sierra\*, Juan Rodríguez Solis, Irene Bartolomé Martín
- > Hospital Universitario de Móstoles [Móstoles University Hospital]: Inmaculada Boyano\*, Francisco Javier Cid Abasalo, Agustín Prieto Sánchez, Sonia Nieto Colino
- > Hospital Universitario Infanta Elena [Infanta Elena University Hospital]: Berta Alvira Rasal\*, Elisa Martín de Francisco
- Hospital Universitario Infanta Leonor [Infanta Leonor University Hospital]: Fátima Brañas Baztan\* and María Alcantud
- > Hospital Universitario Infanta Sofía [Infanta Sofia University Hospital]: Dr Marta Neira Álvarez\*, Dr Ana María Hurtado Ortega, Adoración Morales Fernández, María Lorena Vicente Díaz
- > Hospital Universitario La Paz [La Paz University Hospital]: Patricia Ysabel Condorhuamán Alvarado\*, Juan Ignacio González Montalvo, Teresa Alarcón, Enrique Gil Garay, Isabel Martín Maestre, Victoria Déniz González, Juan Carlos Rubio Suárez, Aitor Ibarzabal Gil, José Manuel Martínez Díez, Javier Pallarés San Martín, Carlos Kalbakdij Sánchez
- > Hospital Universitario Nuestra Señora de la Candelaria [Our Lady of Candelaria University Hospital]: *Raquel Bachiller\**
- > Hospital Universitario Santa María/Arnau de Vilanova [Santa María/Arnau de Vilanova University Hospital]: Mariano de Miguel Artal\*, Ana Scott-Tennet de Rivas, Amer Mustafa Gondolbeu, Olga Roca Chacón
- > Hospital Universitario Severo Ochoa [Severo Ochoa University Hospital]. Leganés: María Jesús Molina Hernández\*
- Hospital Virgen del Puerto [Virgen del Puerto Hospital]. Plasencia: Raquel Ortés Gómez\*, Guadalupe Lozano Pino, Estela Villalba Lancho, Jean Carlos Heredia Pons, Pilar Cabezas Alfonso, Ainhoa Paulete García, Cristina Jiménez Carrasco
- > Hospital Vital Álvarez-Buylla [Vital Álvarez-Buylla Hospital]: Marta Alonso Álvarez\*
- > Hospital Clínico Universitario de Santiago [Santiago University Clinical Hospital]: José Ramón Caeiro\*, Eduardo del Río Pombo and Aurora Freire Romero
- > Hospital 12 de Octubre [12 October Hospital]: Cristina Ojeda Thies\*
- > Consorcio Sanitario del Anoia [Anoia Health Consortium]. H. de Igualada [Igualada Hospital]: Enric Duaso\*
- > Hospital de la Santa Creu [Santa Creu Hospital]. Tortosa-Tarragona: María Cristina Rodríguez González\*, Pablo Alessandro Garibaldi Tolmos
- > Hospital Moisés Broggi Consorci Sanitari Integral [Moisés Broggi Comprehensive Health Consortium Hospital]: Manuel Lafuente Salinas\*, José María Santiago, Teresa Casanova
- > Hospital Universitario Fundación Jiménez Díaz: Teresa de la Huerga Fernández-Boffil\*, María Almudena Milán Vegas, Myriam Rodríguez Couso, Virginia Ruiz Almarza, Manuel Vicente Mejia Ramírez- Arellano, Javier Sánchez Martín, Ana Isabel Hormigo Sánchez
- Hospital Universitario Ramón y Cajal [Ramón y Cajal University Hospital]: María Isabel Pérez Millán\*, Concepción Fernández Mejía and María Jesús López Ramos
- > Complejo Hospitalario Universitario de Cartagena [Cartagena University Hospital Complex]: Inés Gil Broceño\*
- > Hospital del Mar [Del Mar Hospital]: Santos Martínez Diaz\*, María José Robles Raya
- > Centre Fòrum (Consorci Mar Parc de Salut de Barcelona [Mar Consortium Health Park of Barcelona]): Cristina Roqueta Guillén\* and Marisa Garreta
- > Hospital Sagrado Corazón de Sevilla [Sacred Heart Hospital of Seville]: Gracia Megías Baeza\*
- > Consorci Sanitari del Garraf [El Garraf Health Consortium]: Laura Alexandra Ivanov\*, Alfred Dealbert Andres, Oscar Macho Pérez
- > Hospital General de Villalba [Villalba General Hospital]: Verónica García Cárdenas\*, Nuria El Kadaooui Calvo
- > HLA Clínica Vistahermosa [HLA Vistahermosa Clinic]. Alicante: Javier Sainz Reig\*
- > Hospital Comarcal Alto Deba [Alto Deba County Hospital]: Iñigo Etxebarría\*, Amaia Santxez and Uxue Barrena

- > Hospital d'Olot i Comarcal de la Garrotxa [Hospital of Olot and Garrotxa County]: Hugo Briceno García\*, Gemma Badosa Collell and José Ernesto Matamoros Díaz
- Hospital Universitario del Sureste [Southeast University Hospital], Arganda: Miriam Rosa Ramos Cortés\* and Ángela Francisca de Tena Fontaneda
- > Complejo Hospitalario de Navarra [Hospital Complex of Navarre]: María Gonzalo\*
- > Hospital Doctor José Molina Orosa [Doctor José Molina Orosa Hospital]: Néstor Pereyra Venegas\*
- Complejo Asistencial Universitario de Salamanca [Salamanca University Care Complex]
   María del Carmen Pablos Hernández\*, Alfonso González Ramírez
- > Hospital Universitario de la Ribera [La Ribera University Hospital]: Francisco Tarazona\*
- > Hospital Universitario Miguel Servet [Miguel Servet University Hospital]: Concepción Casinnello Ogea\*
- Hospital Universitario de Cruces [Cruces University Hospital]: Josu Merino Pérez\*, Nera Hernández González, Iraia Arteagoitia Colino, Ane Badiola Cue
- > Hospital de Terrassa Consorci Sanitari de Terrassa [Terrassa Hospital Terrassa Health Consortium]: Leonor Cuadra Llopart\*, Georgina Cerdá Más, Nilieska Cano Santana
- Hospital Universitari i Politècnic La Fe [La Fe University and Polytechnic Hospital].
   Valencia: Mariano Barres Carsi\*, María José Pérez Dura
- > Hospital General de Almansa [Almansa General Hospital]. Albacete: José Luis Navarro López\*, Miguel Fernández Sánchez, Teresa Flores Ruano
- Hospital Regional Universitario de Málaga [Malaga Regional University Hospital]:
   Verónica Pérez del Rio\*, David García de Quevedo Puerta
- > Hospital General de Villarrobledo [General Hospital of Villarrobledo]. Albacete: Esther Martínez Sánchez\*
- Hospital General Universitario Morales Meseguer [Morales Meseguer General University Hospital]. Murcia: Amparo Cerón González\*
- > Hospital de Manacor [Manacor Hospital]: Baleares Cristina Corral Martínez\*
- > Complejo Hospitalario Universitario de Albacete [Albacete University Hospital Complex]: Amalia Navarro Martínez\*, Lourdes Sáez, Sergio Iosa Palacios, María Ester Ladrón de Guevara Córcoles, Ainara Achaerandio de Nova, Joaquín Alfaro Mico, María del Carmen Viejobuena Mayordormo, Leticia García Sánchez, Virginia Parra Ramos, Cristina Rosa Felipe, María Cortés Avilés Martínez
- > Parc Hospitalari Marti i Julià [Marti and Julia Hospital Park]. Girona: Regina Feijoo\*
- > Hospital La Luz Grupo Quirónsalud [La Luz Hospital Quirónsalud Group]: Madrid: Paloma Muñoz Mingarro\*, Pedro Gray, Javier García Lázaro, Jesús Campo, José Juarez, Oscar Pérez, Carlos Prato, Abdrés Díaz, Rafael Navarro, Diego García Rodríguez, Cesar Escribano, Beatriz de Francisco, Miguel san Miguel, José Antonio Arrebola, José Miguel Guijarro, Ignacio Maestre
- > Hospital Vega Baja [Vega Baja Hospital] (Orihuela, Alicante): José Eduardo Salinas Gilabert\*
- Hospital Reina Sofia [Queen Sofia Hospital] Tudela: Pablo Díaz de Rada Lorente\*, María Rosa González Panisello, José Ramón Mora Martínez
- > Hospital Universitario Puerta de Hierro [Puerta de Hierro University Hospital]. Majadahonda: Cristina Bermejo\*, Jesús Campo Loarte, Gema Piña Delgado, Juan Martínez Candial, Ainhoa Guijarro Valtueña, Fernando S Jáñez Moral, Samuel González González, Armando J Pardo Gómez
- Hospital del Bierzo [Bierzo Hospital]. Ponferrada: Javier Pérez-Jara Carrera\*, María Ángeles Helguera de la Cruz
- > Hospital de Urduliz-Alfredo Espinosa [Urduliz-Alfredo Espinosa Hospital]. Vizcaya: Iratxe Lafuente Pérez\*
- Hospital Universitario de Basurto [Basurto University Hospital]. Vizcaya: Daniel Escobar\*, Unai García de Cortázar Antolín, Josu Lauzirika Uranga, Estibaliz Castrillo Carrera, César García Puertas
- Hospital de Henares [Henares Hospital]. Coslada-Madrid: Sonia Bartolomé\*, Cristina Castro, Francisco Coca
- > Hospital Universitario Fundación Alcorcón [Alcorcón Foundation University Hospital]: Pilar Sáez López\*, Beatriz Pérdomo Ramírez, Miguel Ángel Marín Aguado, Álvaro López Hualda, José Luis Patiño Contreras, Irene Blanca Moreno Fenol, Isabel González Anglada, Natalia Mayoral Canalejas, Javier Martínez Martín

### ANNEX 3

### Proposal of recommendations to reach the quality standards in the Spanish National Hip Fracture Registry.

Indicator	Current average	Standard	Recommen	dations
Proportion of patients operated on <48h	44%	63%	Early medical assessment at admission. Joint protocols for procedures and organisation of functions consensual management of the patient on antiplatelet, anticoagulant therapy, transmission of information, designation of a person responsible for each specialty. Guarantee the availability of human resources and operating rooms. Prioritise over scheduled surgeries.	
Proportion of patients mobilised the first day after surgery	56%	86%	Institute protocol of mobilising the patient the day af surgery. Early post-surgical X-ray and drainage removal, where appropriate. Daily medical care: pain control, hydroelectrolytic balance, anaemia, delirium preventi Staff training on the effects of bed rest and the importance of early mobilisation. Early intervention o physical/occupational therapist.	
Proportion of patients with antiosteoporotic treatment at discharge	31%	61%		of calcium and vitamin D is ensured, g antiosteoporotic treatment at <b>Contraindication</b>
-			Weekly Alendronate/ Risedronate	Oesophageal or gastric pathology, inability to remain in an upright position, hypocalcaemia or CrCl <30ml/ min. Need for dental/jaw surgery.
			Zoledronate	CrCl <30ml/min. Need for dental/jaw surgery.
			Denosumab	Hypocalcaemia. Need for dental/jaw surgery.
			Teriparatide	Hypercalcaemia, severe chronic kidney disease, metabolic bone diseases (hyperparathyroidism, Paget's disease), unexplained elevation of alkaline phosphatase, history of external radiation or radiation therapy in bone, bone tumours or bone metastases.
Proportion of patients with calcium prescripti at discharge	46% ion	77%	Request levels of calcium, phosphate and vitamin D during admission. Upon discharge, ensure adequate intake of calcium (1000 mg per day). If calcium intake >1000 mg (250 cc of milk = 300 mg calciur 1 yoghurt (125 cc) = 200 mg; 100 g cheese = 150-200 mg no supplement will be given. Otherwise, prescribe calcium carbonate or calcium citrate (if taking PPI) to meet the recommended daily dose. If this dose is included in the nutritional supplement, it will not be prescribed separately. If the patient has a kidney disease with associated ion disorders, prescribe only vitamin D without calcium.	

Indicator	Current average	Standard	Recommendations
Proportion of patients with vitamin D prescription at discharge	67%	92%	Request levels of vitamin D and PTH in the first days of admission. Prescribe treatment according to vitamin D level: Deficiency (<21 ng/ml): Actions: a. During admission: drink 1 ampoule of calcifediol 180,000 IU. b. Per month: vitamin D 16,000 IU. c. Daily: 800 IU of vitamin D. Insufficiency (21-30 ng/ml): Actions b + c. Normal (31-40 ng/ml): Daily: 400-800 IU of vitamin D.
Proportion of patients with pressure ulcers a discharge		2.1%	Evaluate the risk of pressure ulcers with validated scales. Perform meticulous skin care, inspect. Perform nutritional screening using the MNA-SF. Assess oral supplementation if there is a risk of malnutrition and/or inadequate nutritional intake. Early surgical intervention (<48 hours), sitting up the day after surgery and early walking. Relief of pressure with postural changes and passive exercises when necessary.
Proportion of patients with independent mobility at 30 days	<sup>s</sup> 58%	70%	Early surgical intervention, mobilisation the day after surgery, early ambulation. Start a physical exercise and rehabilitation programme early, even before the intervention. Prevent and treat complications during the hospital stay. Evaluate the previous cognitive status and functional capacity, and adjust the level of care upon discharge to try to achieve maximum recovery in mobility and in activities of daily living (at home or in a geriatric rehabilitation unit). Instruct and involve the patient, family and carers in the process of functional recovery. Start a falls prevention programme: for example Vivifrail.

**PPI:** Proton-pump inhibitors. **MNA-SF:** Mini Nutritional Assessment - Short Form. **CrCI:** creatinine clearance.







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