Optimizing efficiency in oncology day hospitals

ONCOptimal

EXECUTIVE SUMMARY

A scientific initiative of:

eco Fundación para la Excelencia y la Calidad de la Oncología

ONCOptimal

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With the participation of:

eco Fundación para la Excelencia y la Calidad de la Oncología

sedisa sociedad española de directivos de la salud

Consejo General de Colegios Oficiales de Enfermería de España

sefh Sociedad Española de Farmacia Hospitalaria

With the collaboration of:

asociación española contra el cáncer

gepac PACIENTES/CÁNCER

With the collaboration, through an educational grant from:

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Optimizing efficiency in oncology day hospitals

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ONCOPTIMAL PROJECT

The **ONCOptimal** project (Optimizing the efficiency of oncology day hospitals) is a collaborative initiative between several entities related to the field of Oncology. The main goal was to **draw up a report of recommendations on optimizing efficiency in oncology day hospitals (ODH)** in Spain.

PARTICIPATING ENTITIES

- Foundation for Excellence and Quality in Oncology (ECO Foundation)
- Spanish Society of Health Managers (SEDISA)
- Spanish Society of Hospital Pharmacy (SEFH)
- General Nursing Council (CGE)

With the collaboration of the following patients associations:

- Spanish Association Against Cancer (AECC)
- Spanish Cancer Patients Group (GEPAC)

ONCOPTIMAL PROJECT PHASES

1- Creation of a scientific committee

ECO Foundation	Ruth Vera García Juan Antonio Virizuela Echaburu Ana Laura Ortega Granados
SEDISA	Candela Calle Rodríguez Dulce Ramírez Puerta
CGE	Diego Ayuso Murillo José Luis Cobos Serrano
SEFH	M.ª Estela Moreno Martínez Estefanía Zhan Zhou

2- Analysis of the situation:

a. **Review of the scientific evidence**
b. **Conducting of two national surveys** on the care situation:
   - Survey aimed at healthcare professionals from ODHs
     - 212 healthcare professionals belonging to
     - 116 public, private or subsidised Spanish centres
   - Survey of oncology patients articulated through AECC and GEPAC:
     - 248 cancer patients
c. **Study of the impact of technology on infusion times** of systemic treatments carried out by the Health Consultancy and Research Unit of the Francisco de Vitoria University.

3- Drafting of the document of recommendations of the participating entities.

The project has received support through an Educational grant from Becton Dickinson

ONCOLOGY DAY HOSPITAL

The day hospital is a care facility whose main distinguishing feature is **the assistance and care of patients in hospital for a few hours both for treatments**, that do not require hospital admission, **and for diagnostic studies, clinical research and/or multiple examinations**, including simple extractions, invasive procedures or observation of possible complications.[1-3]

The **results of the national survey**, in relation to the description of the oncology day hospital, are summarised in the following table.

Description of the ODH	
Accreditation, research and training	
Have an accreditation system for quality standards	**40%**
Have a separate clinical trials research area or unit	**20%**
Structure	
Average size	**142 m²**
Provision of an emergency response or crash cart	**95%**
Open from Monday to Friday	**89,5%**
Resources	
Have specific staff who provide information on consultations, treatments and side effects to patients	**69%**
Have procedures that are agreed upon and well-known by all staff for work related to healthcare processes	**73%**
Have patient volunteers	**49%**
Do not have a protocol in place to manage requests for new infusion devices for the administration of chemotherapy treatments	**41%**
Have the figure of a coordinator	**60%**
In most cases the figure of a coordinator is a Nurse, mainly dedicated to the running of the centre	**71%**
Pharmacist(s) responsible for validation, processing and dispensing of cytostatics have advanced specialized training	**47%**
Average number of treatments administered in the morning	**40**
Average number of treatments administered in the afternoon	**23**
Average number of infusion pumps per centreInfusion pumps:	**34**
Average number of patients per day attending the ODH	**75**
Approximate number of walk-in patients	**8**
Average number of chairs	**20**
Average number of beds	**5**

It is essential to ensure **early care and treatment for patients, reducing waiting lists**. Improved treatments and early detection have extended the life expectancy of cancer patients, and many patients are able to overcome the disease or reduce it to a chronic condition, with prolonged treatment over time.[8] In Oncology, lengthening the time to treatment **can significantly reduce patient survival**. In addition, the lengthening of patient waiting time for treatment leads to a significant reduction in patient satisfaction.[4-7]

THE PROBLEM IN DAY HOSPITALS IN SPAIN

The increase in demand for day hospital services, as a consequence of the increase in the number of cancer cases, has not been matched by a **proportional increase in human resources, material resources and technological resources**. This imbalance between demand and supply has led to **longer waiting times**[2] in the administration of oncology medication, **reducing survival expectancy and the satisfaction** of oncology patients.[4-7]

The **results of the national survey**, in relation to the processes of the oncology day hospital, are summarised in the following table.

Processes in the ODH	
Waiting lists for medication and waiting times	
Time from diagnosis or surgery to the start of oncology medication administration < 30 days	**85,8%**
Patient appointment for oncology treatment	
Electronic notification and appointment reminders via SMS, mobile app, email, etc.	**57%**
Electronic identification of patients on arrival, by means of a bar-coded wristband	**58%**
Blood collection and analysis	
Average waiting time from patient arrival at the ODH to blood collection	**1 h**
Average waiting time from blood collection to availability of lab results	**1,45 h**
Have a Point-of-Care system for blood collection	**46%**
Medical visit	
Average waiting time from the time the lab results are available to the consultation with the patient	**1,16 h**
Confirmation of the schedule	
Have a planning system in place for available chairs and for managing or prioritizing the patient treatment schedules (mainly: activity analysis)	**59%**
Preparation of medication	
Have a computerized or electronic system for prescribing cancer medication	**95%**
Includes information on, among other things, drug interactions, drug allergies, duplicate therapy, or dosage adjustments based on liver and kidney function	**70%**
Use an electronic/digital method to receive medication prescriptions and all have a pharmaceutical validation system for the prescription of oncology treatments	**80%**
Average number of preparations per week	**310**
Average number of delays per week in the preparation of cancer treatments in general	**11**
Are supported by standardized preparation software	**48%**
Have a gravimetric system to validate the preparation	**45%**
Have an automation system for all necessary calculations (size, number of vials, volume, etc.) for the preparation of medication	**92%**
Once ready to be administered the prepared treatment is delivered to the patient by an orderly	**75%**
Incidents occurring during clinical validation of the prescription (dosage, drug, other) are recorded	**70%**
This registration is mainly carried out in the Pharmacy Service	**76%**
Monitor and control incidents during the administration of treatment, mostly electronically/digitally)	**92%**

Processes in the ODH	
Administration of the treatment	
Do not have a bar code-based patient/medication/pump identification system	**71%**
Infusion pumps are programmed manually	**84%**
Average time from consultation to the start of administration of the medication	**1,59 h**
Average time to dispensing	**1 h**
Final check	
The activity of nurses is recorded electronically in the patient's electronic health record	**88%**
The clinical management of the patient is carried out electronically, which includes or integrates the patient's data, including lab results	**98%**
Percentage of the working day taken up by administrative work, as opposed to patient care	**35%**
Safety/hazardous drugs	
Average number of adverse events per month associated with the administration of oncology medication, mainly infusion-related reactions and extravasations	**9**
Closed Systems Transfer Devices (CSTD)	**62%**
Use safety syringes and needles	**12%**
Perform regular monitoring of surface contamination by cytostatic medication	**45%**
Perform this monitoring more than once a month	**74%**

The following table summarizes the inefficiencies and bottlenecks by care process in ODHs detected through the analysis of evidence and the results of the national survey.

Bottlenecks and inefficiencies	
Care process	**Problem**
Patient appointment for oncology treatment	**Bottleneck:** manual planning and management of appointments. **Inefficiencies:** in the available resources (availability of chairs and beds, of nursing staff).
Blood collection and analysis	**Bottleneck:** until the lab results are available, the patient cannot continue the care process in the ODH, resulting in a delay. **Inefficiencies:** lengthened hospital stays due to waiting time for results that reduce the capacity of the ODH and lengthen patients' stay in the facility.
Medical visit	**Bottleneck:** limited time for the consultation. **Inefficiencies:** • Delays due to waiting time for the medical visit reduce the capacity of the ODH and lengthen patients' stay in the facility. • Lack of electronic prescribing systems linked to the pharmacy service.
Confirmation of the schedule	**Bottleneck:** the number of existing chairs as well as human resources is the limiting factor when it comes to increasing the number of patients receiving medication. **Inefficiencies:** delays and lack of synchronization in the process up to the point of medication preparation are a major inefficiency, resulting in vacant, unoccupied chairs waiting for the patient to go through all the above processes and be ready to receive their medication.

	Bottlenecks and inefficiencies
Preparation of medication	**Bottleneck:** The capacity of the pharmacy service to prepare medication is limited. Until the medication is prepared, it cannot be sent to the administration area. **Inefficiencies:** • Lack of electronic prescribing systems linked to the pharmacy service. • Lack of a system that prioritizes the preparation of medication based on the patient's condition. • Lack of an electronic system for the preparation of medication. • Lack of an electronic system that displays the status of the preparation of medication by patient and that enables effective coordination between the pharmacy and the administration service, to avoid constant phone calls that reduce the efficiency of both services. • Delays due to waiting time in the preparation of medication reduce the capacity of the ODH and lengthen patients' stay in the facility. • If the synchronization between the pharmacy department and the medication administration department is not effective, it will result in inefficiencies in both departments, leading to delays and prolonged patient stays. • On top of this, if the Pharmacy and ODH are a significant distance apart there will be an added delay due to transport.
Administration of medication	**Bottleneck:** number of chairs as well as human resources as the limiting factor when it comes to increasing the number of patients receiving medication. **Inefficiencies:** • Delays and lack of synchronization in the process up to the point of assigning the medication are a major inefficiency, resulting in vacant, unoccupied chairs waiting for the patient to go through all the above processes and be ready to receive their medication. • Lack of protocols for selection of infusion systems and/or intravenous therapy teams in ODH treatment areas. • Lack of electronic systems that allow the identification of the patient/medication/pump by bar code. • Lack of smart pumps with safety and self-programming systems.
Final check	**Bottleneck:** availability of Nursing to document the administration of medication. **Inefficiencies:** • The time the Nursing service spends on manual documenting the administration is time that is not spent administering medication to other patients. • This manual process could be automated by means of electronic patient/medication/pump identification systems using bar codes and smart pumps.

It is crucial to understand that the **best way to prevent missed opportunities** in patients with cancer in **oncology day hospitals** is the **prioritization of time and mobilization of human and technological resources.**[9,10]

SOLUTIONS

The **introduction of new technologies is the most viable and cost-efficient solution to reduce waiting times** in Spanish oncology day hospitals, as well as to improve patient safety.[1,11]

Providing human and structural resources, along with the introduction of new technologies, especially electronic traceability systems **are the most immediate and cost-effective solution to reduce waiting lists and improve patient safety**.[1,11]

The results of the national survey and the Francisco de Vitoria University study, in relation to new technologies of the oncology day hospital, are summarised in the following table.

Technologies in the ODH	
Computerized Provider Order Entry (CPOE) and preparation systems	
Have a computerized provider order entry system	**95%**
Electronic medication preparation system	**48%**
Do not have a gravimetric preparation system	**55%**
Communication between Medical Oncology and the Pharmacy Service carried out using paper	**18%**
Electronic connection systems between departments	
Communication between Medical Oncology and the Pharmacy Service carried out electronically	**80%**
"Patient/medication/pump" bar code identification systems	**30%**
Smart pumps	
Average number of infusion pumps for the administration of treatment	**34**
Do not have dual-channel infusion pumps	**57%**
Infusion pumps are programmed manually	**84%**
Do not have sufficient infusion pumps available to care for unscheduled patients requiring unplanned care, ensuring their continuum of care	**84%**
Does not have a protocol in place to manage requests for new infusion devices for the administration of chemotherapy treatments	**41%**
Microbore* infusion systems	
Reduction in overall infusion times through the use of intravenous infusion devices with primary and secondary microbore systems such as those available in BD BodyGuard Duo	**9´11´´**
Point-of-care testing.	
Have a Point-of-Care system for blood collection	**46%**

* Francisco de Vitoria University Study

In short, the **degrees of implementation** of the **different systems** are as follows:

- Electronic prescription systems: 95%.
- Electronic medication preparation systems: 48%.
- Bar Code Medication Administration (BCMA): 30%.
- Microbore pumps: reduction of total infusion times by nine minutes and eleven seconds per session.
- Point-of-care testing: 46%.

The following table lists the **technologies available in ODHs and their impact on the efficiency and reduction of waiting lists** for the administration of oncology medication in Spain.

Solution	Efficiency generated	Penetration in the ODHs ONCOptimal	Average reduction in the number of waiting days
Electronic prescription systems	10 minutes	95%	Not significant due to high penetration
Gravimetric medication preparation systems (Hospital Pharmacy)	35%	26%	8 days
BCMA: Bar code medication administration	43%	30%	8 days
		TOTAL	8 days
Microbore system	9 minutes and 11 seconds	--	260 more patients per year per HDO of medium-sized*
Point-of-care blood sampling systems	No evidence available	46%	4,795 hours

*Estimated time reduction calculation for a Chemotherapy Unit type: 12 chairs, with a rotation of 1.5 patients per chair/day: 18 patients/day.

Furthermore, **patient safety in ODHs is also a top priority**. Adverse events in cancer patients are more prevalent than in other types of patients and have a high human, social and economic cost. The main adverse events that jeopardize patient safety in the administration of medication to oncology patients in ODHs are: **medication errors, catheter-related infections and those related to infusion therapy.**[1,12]

The following table summarizes the **adverse effects on cancer patients in ODHs, their economic impact and possible solutions.**

Adverse effects	Magnitude of the problem	Economic impact	Solutions
Medication errors	8.1 errors per 100 clinic visits	Spain: €2 billion	• **CPOE:** Computerized Provider Order Entry • Gravimetric medication preparation systems • **BCMA:** Bar code medication administration • **Smart pumps:** with DERS system (medication error reduction software) and infusion stations with centralization tablets, or pumps with self-programming capability.
Infections, phlebitis and extravasations	0.05 and 6.8/1000/day	Spain: €17,221,000/year	**Infusion therapy protocols** with algorithms for infusion system selection based on medication, patient's venous status and duration of treatment.
Bacteraemia			
Extravasations	3.454/año	España: 15.635.000 €	
Phlebitis	1.049/año	España: 1.257.400 €	
TOTAL		Spain: €2,034 million	

The **introduction of new technologies is the most viable and cost-efficient solution to reduce waiting times** in Spanish oncology day hospitals, as well as to improve patient safety.

Computerizing the processes, **from** prescription, preparation, and administration would:

- **Minimize adverse effects** throughout the process.
- **Reduce waiting time** by 8 days
- **Generate an estimated saving** for the Spanish health system of **€2.034 billion**.

RECOMMENDATIONS FROM ONCOPTIMAL SCIENTIFIC BODIES

HEALTHCARE MANAGEMENT

- Healthcare management is the cornerstone of the health system to function in terms of ensuring **health outcomes and efficiency**. Therefore, the **commitment of Health Managers and their professional approach** is necessary to understand the real needs, engage, and make decisions regarding the efficiency of the oncology day hospital.

DESCRIPTION OF THE ONCOLOGY DAY HOSPITAL

Accreditation

- The **quality of care** for cancer patients should entail the **accreditation of oncology day hospitals**, through objective and well-known criteria and recognized systems.
- Specialists working in these care areas must have **specific skills, training and experience** in caring for oncology patients.
- Progress is needed in creating **new professional roles, accreditation diplomas or the development of specialization in this field**.
- Pharmacy services should accredit/certify, through external entities, the **activities of the pharmacotherapeutic process** (validation, preparation and dispensing). These tools make it possible to incorporate continuous improvement systems, periodically analysing processes in order to evaluate their efficiency, establish prioritizations, etc.

Research and training

- Oncology day hospitals should have a **separate clinical trials research unit**.
- The services involved should actively participate in the establishment of **technological or process innovation programmes in the oncohaematological area** by promoting **ongoing training, accreditation**, as well as **specialization** in the area of specific professional training in oncohaematological pharmacotherapy.
- Nurses, in addition to having the necessary qualifications to perform their work, should be trained in **cardiopulmonary resuscitation**, be familiar with working in an environment of **good clinical practice, be trained in research, and trained in conducting pharmacokinetic studies, handling biological samples, hazardous drugs, and ensuring the biosafety** of patients and professionals. They should also have

extensive **care experience**, especially in the field of antineoplastic chemotherapy, with knowledge of adverse effects and precautions to be taken to maximize safety during administration.

STRUCTURE AND RESOURCES OF THE ONCOLOGY DAY HOSPITAL

Human resources: numbers, training and communication

- The oncology day hospital should be a unit where the patient is **received, cared for and discharged in the centre itself**, although sometimes it may require the support of other services to perform a specific procedure (diagnostic imaging, etc.).
- The functional design of an oncology day hospital should take into account the varying health conditions of patients, and facilitate patient movement between different areas. The recommendations establish a **minimum of one nurse per shift for every 6 treatment posts with specific training and expertise in oncology**. However, the staffing recommendations are made based on the increasing number of patients and treatments/procedures that are progressively occurring in healthcare centres due to both population growth and the growing prevalence of treatable neoplasms across multiple lines.

Beds/chairs

- The structure and resources of oncology day hospitals **must conform to the quality standards** established by scientific societies and competent bodies, and adapt to the increasing processes of meeting patient needs.
- The stations can take various forms (beds and/or chairs), depending on the specific characteristics of each treatment and the patient's condition. Given the wide range of possible therapeutic modalities, **flexible structures** are required that can easily adapt to the changing needs of the patient and accompanying persons in the centre.

PROCESSES IN THE ONCOLOGY DAY HOSPITAL

Bottlenecks to reduce waiting times and improve the different processes: appointments, blood sample collection, preparation of medication, etc.

- **Waiting times at the bottlenecks identified in this report should be reduced** by incorporating new technologies, bringing certain processes closer to the patient, through home hospitalization and telemedicine, by carrying out sample collections and analyses prior to the patient's stay in the oncology day hospital, by optimizing treatments, etc.
- **A periodic review of the pathways** should be carried out by a multidisciplinary team, with the aim of optimizing the activity.
- **A global view of the process** should be reflected in the review of the pathways to find solutions that improve the patient's experience while ensuring their safety.

Incorporation of new technologies to improve systems

- Procedures and actions should be **standardized, computerizing the process**, from prescription, preparation and administration, to avoid errors throughout. Computerizing the process could reduce the average medication administration time in Spain by up to 8 days and result in savings for the Spanish healthcare system through the prevention of medication errors.
- Oncology day hospitals should have a **comprehensive and integrated information**

system and across different levels of care for managing the pharmacotherapeutic process for oncohaematological patients.

- The **electronic prescription system** for medication should be integrated into the patient's health record and should include all the necessary elements to assist in decision-making, as well as to assist in the validation and traceability of the entire process of preparation, dispensing and administration.
- The continuum of care using **digital technologies can strengthen the system and ensure greater accessibility for health professionals**.
- Case manager nurses or oncology nurses can take on **these new roles by following up with patients prior to their visits or by addressing any queries that may arise after treatment**.
- Oncology day hospitals should have a **validated protocol for infusion system selection and algorithms for selecting the appropriate infusion set**, which should be of mandatory compliance. The creation of infusion therapy teams in oncology day hospitals is also recommended.

SAFETY

Healthcare professionals in the oncology day hospital

- Oncology day hospitals should have and use mandatory **closed systems for the preparation and administration of hazardous drugs(Closed Systems Transfer Devices, CSTD)**, airtight systems that prevent medication, when prepared and administered, from escaping to the outside.
- Oncology day hospitals should regularly **monitor the presence of hazardous drugs on work surfaces**, in both preparation and administration areas to determine the presence of hazardous drugs and evaluate the effectiveness of the safe drug handling programme, following the recommendations of the National Council of Nursing and the SEFH. The evaluation should include a study of the efficiency of engineering controls, work practices and cleaning and decontamination processes.

Patient

Preventing errors and improving safety

- Oncology day hospitals should have a **validated protocol for infusion system selection and algorithms for selecting the appropriate infusion set**, which should be of mandatory compliance. The creation of infusion therapy teams in oncology day hospitals is also recommended.
- Oncology day hospitals should undertake **improvement and prevention projects related to major patient safety issues**, such as medication errors, prevention of catheter-related infections, and therapy-related issues.
- The oncology day hospital should **actively participate in the development and maintenance of a risk management programme** applied to the prevention and resolution of health problems related to oncohaematological medication and participate actively in the establishment of processes for the safe management of antineoplastic therapy, taking into account not only patient risks, but also occupational risks, and covering all phases of the pharmacotherapeutic process.
- **Procedures and actions should be standardized**, with the computerization of gui-

delines, to prevent errors in reading and calculations. Electronic prescription is the safest method, and dual or multiple checks should be performed at each step of the process.

- **Pharmaceutical interventions**, carried out by all staff involved, **should be documented in the patient's health record** and should be evaluated in order to develop improvement measures.

Patient Experience

- Oncology day hospitals **should have procedures in place to assess the patient experience and incorporate their expectations and needs** into the improvement of their care process to ensure improved health outcomes.
- **Further research** is required on **satisfaction and quality of care received** from the point of view of the patient and family, to find areas for improvement.
- **A more humanized form of pharmaceutical care should be provided for the patient and caregiver** on an ongoing basis throughout their care process. This includes **offering information** about their treatment and adapting the pharmacotherapeutic plan to their health, considering individual needs, agreed-upon goals, and the necessary interventions to achieve them.
- **New technologies** should be incorporated to facilitate patient education, communication and active participation, as well as to allow the, access to information about their own process. This would include, for example, apps, mobile devices, telecare and platforms that open communication channels with patients.

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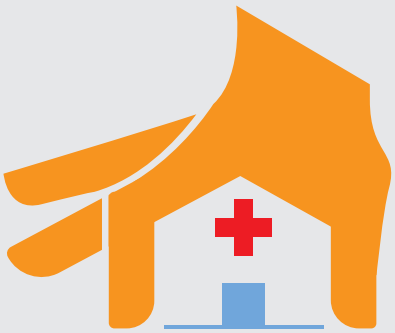

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