

Modelling Time And Costs Associated With Daratumumab Treatment Delivery In The Home Care Setting Versus The Hospital In Spain To Understand Potential Benefits To Patients And Hospitals

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INTRODUCTION

- Daratumumab is recombinant monoclonal IgG1k antibody against the CD38 antigen, indicated for treating multiple myeloma and light chain amyloidosis
- Subcutaneous (SC) formulations of daratumumab replace the previous need for intravenous infusion, enabling the possibility that treatment could be provided at alternative sites of care

OBJECTIVES

- This research aims to evaluate if daratumumab SC injection for multiple myeloma in the home care setting can provide value to patients and hospitals vs. receiving treatment in the Spanish hospital setting
- As a proof of concept, provision of a single regimen (daratumumab in combination with lenalidomide and dexamethasone) at home for a limited period (24 weeks) is assessed
- Results are evaluated in terms of time and costs spent on treatment preparation and administration

METHODS

Qualitative research insights

- 3 haem-oncologists were engaged to understand steps of SC treatment administration, key challenges for hospitals and physician receptivity to home treatment for multiple myeloma

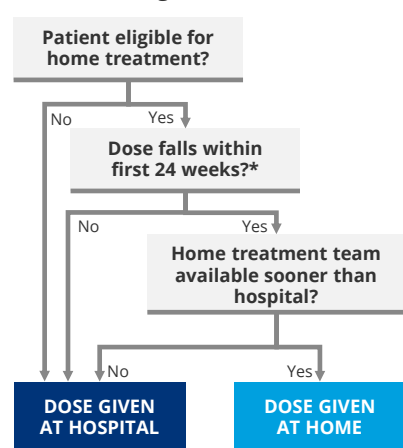
Quantitative survey for input data

- A quantitative survey of 60 haem-oncologists, oncology nurses, hospital pharmacists and hospital payers was conducted to inform numerical inputs for the analysis
 - Data included information about hospital capacity, time taken for steps of treatment, associated costs, and the breakdown of patient groups according to characteristics

Discrete event simulation

- A tool was developed to model SC daratumumab delivery using discrete event simulation, based on insights from qualitative research
- Doses were modelled over a continuous timeframe, and patient characteristics were assigned probabilistically
 - Patient characteristics included eligibility for home treatment, mobility independence, accompaniment by a caregiver, and duration of therapy
- Each dose generated was assigned to either the hospital or home setting according to rules illustrated in Figure 1
- Scenarios were compared where home treatment was available via a third-party provider versus where all patients are treated at hospital
- Since a range of responses were obtained from the survey, several setups were tested to understand how varying the inputs impacts the level of benefit to patients and hospitals

FIGURE 1: Dose allocation across treatment settings



RESULTS

Setup 1: Benefits of the availability of a home treatment program for a limited number of patients at a typical hospital

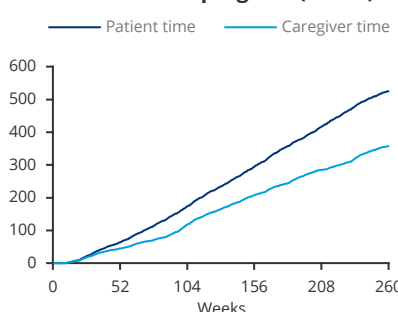
- Median survey data showed that a typical chemotherapy unit is open for 12 hours per day (most frequently Monday to Friday only), uses up to 4 chairs for treating patients with daratumumab, and starts 20 new patients per year on daratumumab regimens (equivalent to 5.4 patients treated with daratumumab in combination with lenalidomide and dexamethasone according to epidemiology). 10 simulations were run using these inputs for a 5-year timeframe and results were averaged (mean) across repeats
 - For each simulation, two scenarios were run using patients with the same recorded characteristics – where home treatment was available versus not (i.e., all patients treated in hospital if not available)
- Results (see Table 1 and Figure 2) showed that 865 doses were provided over 5 years, with 234 doses at home when the home treatment program was available
 - This was associated with reduced costs to the hospital of €363 per patient, and reductions in patient, caregiver and physician time dedicated to treatment (21.6, 14.1 and 2.2 hours per patient, respectively), while third party provider costs were €1,009 per patient

TABLE 1: Summary of results for a typical Spanish hospital

Result	Home treatment not available	Home treatment available	Change (Δ) in result
Results over 5-year timeframe			
Patients treated	27	27	-
Doses administered in hospital	865	631	- 234
Doses administered at home	0	234	+ 234
Results per patient over 5-year timeframe			
Patient time	100 hrs	78 hrs	- 22 hrs
Caregiver time	59 hrs	45 hrs	- 14 hrs
Physician time	8.0 hrs	5.8 hrs	- 2.2 hrs
Hospital cost (pp)	€ 1,653	€ 1,290	- € 363
Provider cost (pp)	€ 0	€ 1,009	+ € 1,009

Mean data from 10 simulations, setup 1. pp = per patient

FIGURE 2: Cumulative patient and caregiver time saved over 5-year timeframe with availability of a home treatment program (hours)



Mean data from 10 simulations, setup 1. Total time is summed cumulatively across all patients and caregivers at each week over 5-year timeframe

Setup 2: Benefits of a home treatment program for a hospital where capacity is constrained to meet a high patient volume

- In this setup, the maximum reported number of patients treated per year (10-fold greater than the median, i.e., 200 vs. 20 new patients per year) was used to reflect a hospital with a high patient volume
- Simulations with 10-fold more patients (where all other inputs were kept the same as setup 1) showed a large impact on the amount of free time available across the simulated treatment chairs (measured in 'chair-days' and displayed as the difference when home treatment was vs. was not available, Figure 3)
- This shows that hospitals currently dedicating a high proportion of chemotherapy chairs to delivering daratumumab could free up a large amount of capacity for delivering other treatments (~37 chair-days in one year in the setup tested)

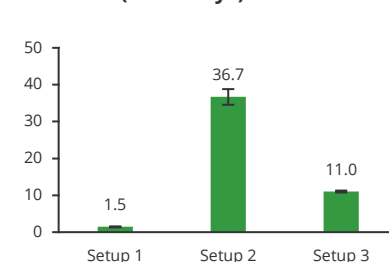
Setup 3: Benefits of a home treatment program for a large hospital with both high capacity and a high patient volume

- Some survey respondents reporting high patient numbers also reported that their hospitals use a larger number of chairs to deliver treatment (i.e., 20 chairs for daratumumab delivery vs. median 4 chairs)
- When both the number of patients and hospital chairs were increased as reported, the effect on freed up chair time was reduced vs. setup 2 (see Figure 3) - this demonstrates that capacity at the hospital will continue to be used for daratumumab treatment where available, assuming capacity to deliver treatment at home remains limited
 - Further testing showed that when the capacity to deliver home treatment (i.e., 10 vs. 2 home treatment delivery teams) was increased, results (not shown) were similar to setup 2
- However, regardless of hospital capacity to deliver treatment, hospital cost savings associated with the home treatment program showed an increase with increased patient volume (vs. setup 1, see Figure 4)

Setup 4: Benefits of extending the home treatment program eligibility and duration

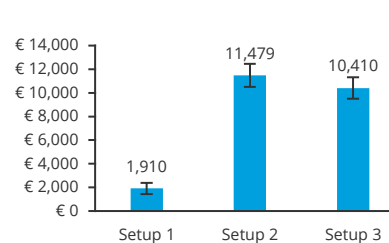
- Several tests were run where the percentage of patients eligible for home treatment was varied; however, the impact on total results was limited, since all patients were still required to receive both the first dose and doses from week 25 onwards in the hospital
- Instead, extending the home treatment program for patients beyond 24 weeks strongly increased the number of doses delivered at home overall by more than 2-fold (56% vs. 27% of doses given at home over 5-year time horizon)
- This increased the total time saved per patient (vs. setup 1, see Figure 5) by physicians (4.7 vs. 2.2 hours) and nurses (6.6 vs. 3.0 hours), as well as other benefits such as hospital savings (not shown)

FIGURE 3: Total increase in free chair capacity when a home treatment program is available vs. not available (chair-days)



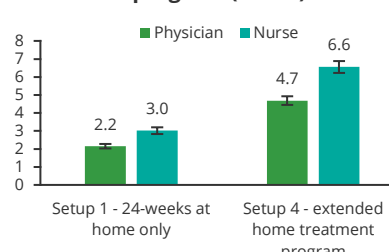
Chair-days represent capacity over time such that 10 chair-days could mean either 10 chairs available for 1 day each, or 1 chair available for 10 days. Results display mean data from 10 simulations over a 1-year time horizon. Error bars show standard error. Note further tests were run – selected results shown for illustration

FIGURE 4: Total hospital savings associated with home treatment



Mean data from 10 simulations over a 1-year time horizon. Error bars show standard error. Note further tests were run – selected results shown for illustration

FIGURE 5: Hospital physician and nurse time saved per patient over 5-year timeframe with extended home treatment program (hours)



Mean data from 10 simulations over a 5-year time horizon. Error bars show standard error. Note further tests were run – selected results shown for illustration

KEY TAKEAWAY



The results of this simulation study have demonstrated that there may be benefits to patients and hospitals of engaging in daratumumab home treatment programs

CONCLUSIONS



The availability of a home treatment program is likely to be associated with considerable reductions in patient, caregiver and physician time dedicated to treatment, as well as hospital savings



Where hospitals have high patient volume and limited capacity to deliver daratumumab, home treatment has potential to free up a large amount of capacity that could be repurposed to deliver other treatments



A more comprehensive or extended home treatment program may be associated with greater benefits to the hospital, including reduced physician and nurse time required per patient treated with daratumumab



Wider benefits of home treatment, beyond those demonstrated in this analysis, are possible, such as improved patient quality of life and satisfaction with treatment

DISCLOSURES

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