

# Insights into healthcare and societal costs of subcutaneous injection and intravenous infusion of trastuzumab for HER2 positive breast cancer and rituximab for non-Hodgkin's lymphoma in The Netherlands

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## Introduction

In 2013 and 2014, the European Medicines Agency (EMA) approved the subcutaneous (SC) formulation of trastuzumab (Herceptin®) and rituximab (MabThera®), respectively. Previously, both drugs were only administered intravenously (IV). Several studies showed that a SC injection is more time efficient than an IV infusion.<sup>1-7</sup> In the context of continuously increasing healthcare expenditures, it is essential to optimize the allocation of healthcare resources. There is, however, limited evidence on cost associated with IV and SC administration of oncology drugs in The Netherlands. Societal costs (costs outside the hospital) were not previously studied. The aim of this study is to investigate healthcare and societal costs associated with SC injections and IV infusions of two oncology drugs (i.e. trastuzumab and rituximab) in The Netherlands.

## Methods

Patients were recruited in six hospitals. Patients were eligible for inclusion if they were 18 years or older, diagnosed with HER2+ early breast cancer (EBC), HER2+ metastatic breast cancer (MBC) or non-Hodgkin lymphoma (NHL) and treated with either trastuzumab or rituximab. Participation was voluntary; patients who were willing to participate signed an informed consent. Healthcare professional time, patient chair time, and the use of disposables were registered using case record forms at the pharmacy department and oncology day-care centres. A correction for time and resource use was applied in case patients received a combination of different therapies. Health care professional time was valued using wage rates.

Unit costs for resources were retrieved from day-care centres and complemented with market prices. Overhead costs for time spent at the day-care unit were computed from financial administration of the participating day-care centres and distributed over patients according to their time spent on the day-care centre. Patient questionnaires were used to obtain information on societal costs including travelling expenses, informal care costs and productivity losses. These costs were valued according to the Dutch costing manual. Drug costs were derived from the Z-index (i.e. Dutch list-price).

## Results

A total of 126 patients were included in the study: 82 received trastuzumab (37 IV and 45 SC) and 44 received rituximab (23 IV and 21 SC). Patients received monotherapy (51%) as well as combination therapy (49%). The costs for one administration (including societal cost but excluding drug costs) were between 45% to 54% lower in case the drug was administered subcutaneously. Total administration costs were €167 and €264 for IV and €76 and €146 for SC administration of trastuzumab and rituximab, respectively. The costs were lower in all cost categories (see Table below).

The largest cost component was overhead costs which was related to time spent at the day-care unit. These costs were approximately 63% (53%) lower for SC administration of trastuzumab (rituximab) compared to IV injection. Patient chair time was on average 61.8 and 90.7 minutes shorter for SC trastuzumab and SC rituximab, respectively. A subcutaneous route of administration also resulted in a 14% to 21% reduction of labour time for nurses (a reduction of 5.1 [8.6] minutes for SC trastuzumab [rituximab]). Similar, pharmacy preparation time was between 73% and 26% shorter (11.5 [4.5] minutes shorter for SC preparation of trastuzumab [rituximab]). This resulted into total healthcare staff-related savings of €9 in case the drug was administered subcutaneously, irrespectively of the type of drug. Of the healthcare staff-related costs, 14-31% was related to preparation of the drug at the pharmacy and 69-86% was related to its administration at the day-care unit. Resource usage of disposables resulted in €12 savings for both drugs. Costs of premedication were negligible in all patients.

Societal costs (travelling expenses, informal care costs, and productivity losses) were lower in case the drug was administered subcutaneously (€22 [€28] lower for patients receiving trastuzumab [rituximab]). Finally, drug costs for trastuzumab were similar for both routes of administration (€1,654 IV versus €1,651 SC); drug costs for rituximab were €49 higher for IV infusions than for SC injections (€1,871 versus €1,822, respectively).

## Conclusion

This study showed that subcutaneous administration of two oncology drugs (trastuzumab and rituximab) results in 45% to 55% cost savings per administration compared to their intravenous route of administration. Total administration costs were €167 and €264 for IV and €76 and €146 for SC administration of trastuzumab and rituximab, respectively.

Table: Average costs per one IV and one SC administration of trastuzumab and rituximab

	trastuzumab (n=82)			rituximab (n=44)		
	IV	SC	Difference	IV	SC	Difference
<i>Preparation and administration costs</i>						
Total staff costs	€ 29	€ 20	€ 9	€ 33	€ 24	€ 9
Staff costs administration	€ 20	€ 17	€ 3	€ 26	€ 18	€ 7
Staff costs preparation	€ 9	€ 3	€ 6	€ 7	€ 6	€ 2
Material costs	€ 14	€ 2	€ 12	€ 15	€ 3	€ 12
Premedication	€ 0	€ 0	€ 0	€ 1	€ 0	€ 0
Overhead	€ 75	€ 27	€ 47	€ 130	€ 61	€ 69
Societal costs	€ 49	€ 26	€ 22	€ 85	€ 57	€ 28
<b>Total costs</b>	<b>€ 167</b>	<b>€ 76</b>	<b>€ 90</b>	<b>€ 264</b>	<b>€ 146</b>	<b>€ 118</b>
Drug costs	€ 1,654	€ 1,651	€ 2	€ 1,871	€ 1,822	€ 49
<b>Total costs per route of administration (including drug costs)</b>	<b>€ 1,820</b>	<b>€ 1,728</b>	<b>€ 93</b>	<b>€ 2,135</b>	<b>€ 1,968</b>	<b>€ 167</b>

## References

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