

# An Integral Approach to Assess the 3 Human Normal Immunoglobulin formulations for Primary Immunodeficiency in Portugal: Combining Costs, Patient's Preferences, and HCP Choices

Lemos MS<sup>1</sup>, Cruz JP<sup>2</sup>, Faria M<sup>3</sup>

<sup>1</sup> Pharmacological Sciences Department, Unidade Local de Saúde São João, Portugal; <sup>2</sup> Pharmacological Sciences Department, Unidade Local de Saúde Santa Maria, Portugal; <sup>3</sup> Takeda Portugal, Lisbon, Portugal

## INTRODUCTION

Primary immunodeficiency diseases (PID) are a group of rare, heterogeneous disorders composed of approximately 485 genetic conditions that impair the production or function of proteins with critical roles in the immune system.<sup>1</sup> According to the European Society for ImmunoDeficiencies (ESID) registry, 68% of PID patients receive Immunoglobulin (Ig) replacement therapy.<sup>2</sup>

In Portugal, a total of 487 PID cases were registered in 2022, of which 44% (n=214) were adults, which places Portugal as one of the TOP 6 Europe countries with the highest PID prevalence in 2022 (4.73/100.000 inhabitants).<sup>2</sup>

Currently, there are three immunoglobulin administration formulations commonly available, namely facilitated subcutaneous immunoglobulin replacement therapy (**fSCIG**), conventional subcutaneous immunoglobulin replacement therapy (**cSCIG**) and intravenous immunoglobulin replacement therapy (**IVIG**).<sup>3</sup> IVIG requires hospital administration, while both subcutaneous options allow for self-administration at home.<sup>4</sup> cSCIG often requires multiple injection sites and frequent infusion due to limited administration volume, while fSCIG (a dual-vial unit of immunoglobulin (IG) 10% and recombinant human hyaluronidase (rHuPH20)) allows for high-rate, increased volume, and low-frequency administration (once every 3-4 weeks), potentially improving patient care, treatment adherence, and reducing healthcare costs.<sup>5,6</sup>

## RESULTS

In Portugal, subcutaneous and intravenous routes of administration imply differences that must be evaluated. Some inputs found in the literature do not correspond with Portuguese reality, namely the time spent during treatment management and some associated costs (all inputs included are presented in table 1). Direct medical, direct non-medical and indirect costs were assessed and validated by a group of Portuguese experts. All data assessed for the first year of treatment are presented below.

|       | Mean weight (kg) | Average dose (g/kg/month) | Frequency of ADM | Treatment frequency (year) | PM  | Treatment sites | Infusion time (h) | Training sessions time (h) | Number of TS | Dispensing time (h) | Dispensing rounds (year)* | Employed patients (adults) | Employed caregivers | Distance to hospital (km) | Travel time (h) |
|-------|------------------|---------------------------|------------------|----------------------------|-----|-----------------|-------------------|----------------------------|--------------|---------------------|---------------------------|----------------------------|---------------------|---------------------------|-----------------|
| fSCIG | 75 (adult)       | 0,4                       | Q4W              | 13                         | No  | 1               | 0,75              | 2                          | 3            | 0,35                | 9                         | 50%                        | 72%                 | 92,3                      | 3,97            |
| cSCIG | 30 (child)       |                           | Q1W              | 52                         | No  | 3-4             | 1,5               | 2                          | 3            | 0,35                | 9                         |                            |                     |                           |                 |
| IVIG  |                  |                           | Q4W              | 13                         | Yes | 1               | 2,7               | -                          | -            | -                   | -                         |                            |                     |                           |                 |

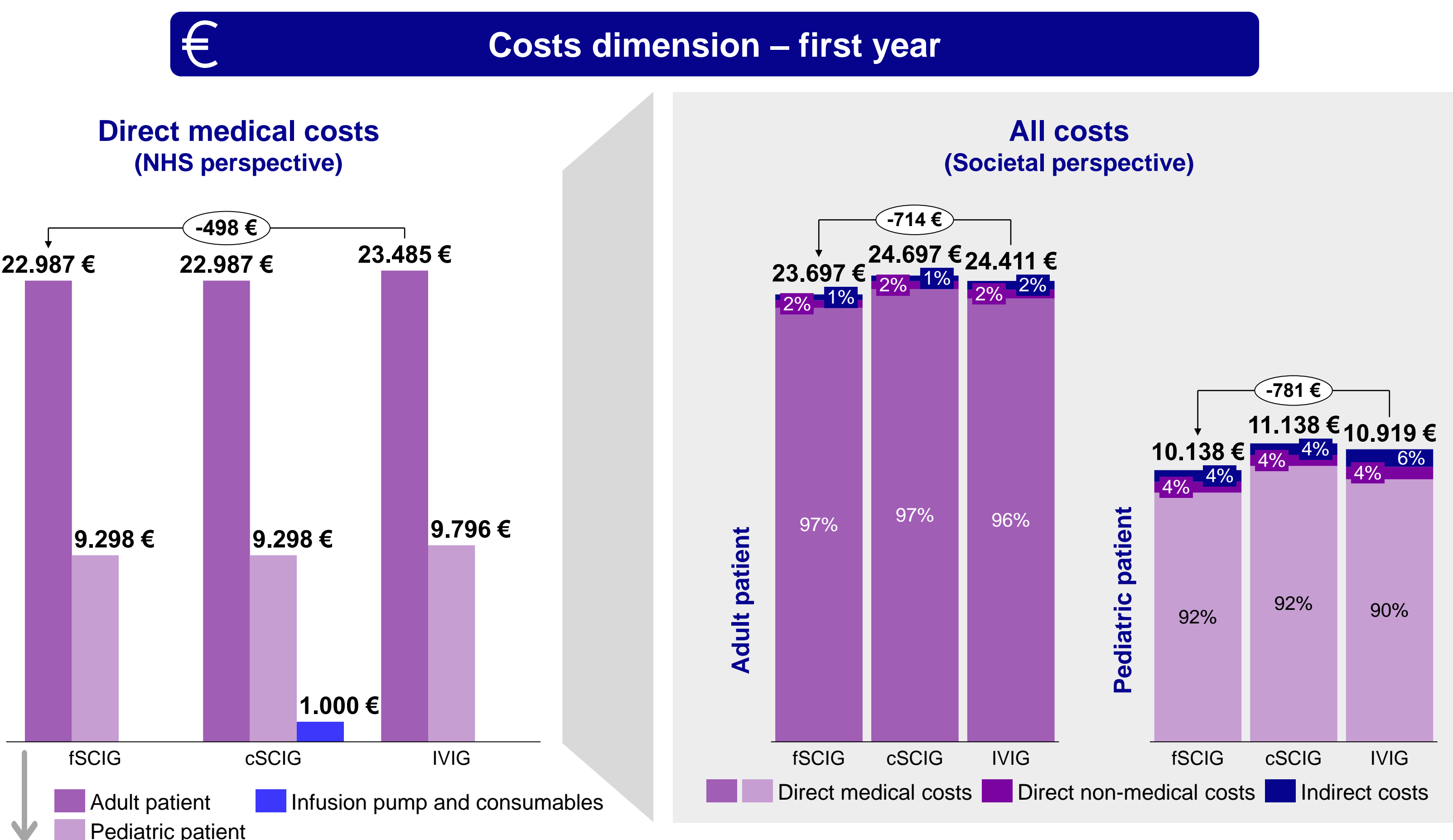
Table 1 – Inputs considered in cost-minimization analysis

ADM (administration), PM (pre-medication), TS (training sessions assumed to enable self-administration), Q4W (every 4 weeks), Q1W (every week/seven days).

Note: The same price per gram was considered for the 3 formulations, as the vast majority of Igs available in Portugal have a comparable list price per gram.

\*The majority of inputs were similar between Portugal and the literature, except the frequency of pharmacy dispensing (need to ensure correct storage and controlled dosage for shorter periods of time).

## QUANTITATIVE RESULTS



**Direct medical costs (DMC)** include Ig costs (representing ≥96% of these costs), premedication costs, hospital administration, training sessions, pharmacy dispensing.

• 3% and 7% of DMC are related with **hospital administration** (IVIG context) in adults and children, respectively

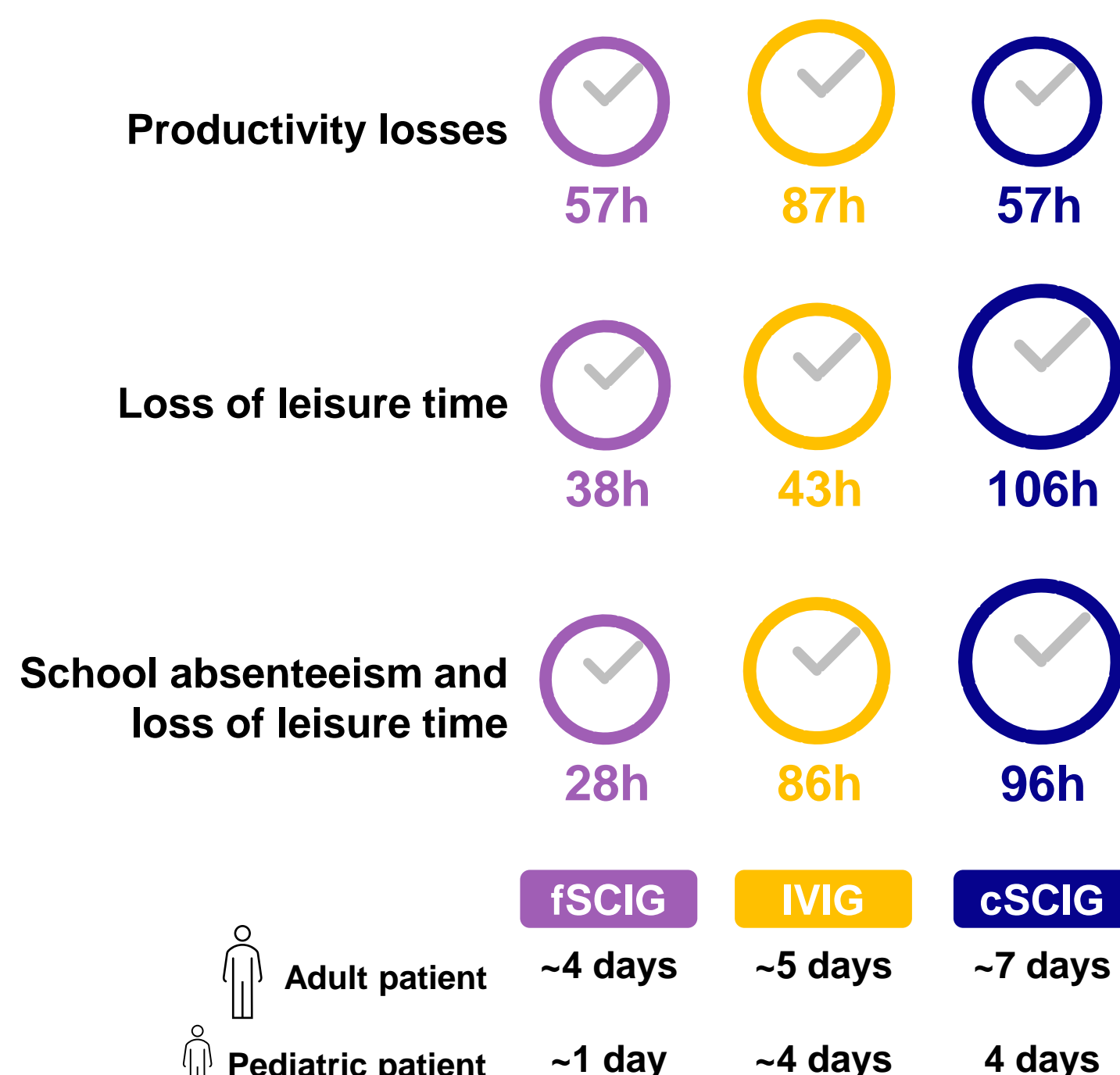
• **Around 1%** of DMC are related with **patient training** (first year of SCIG treatment context)

• **Less than 1%** of DMC are related with **hospital pharmacy dispensing**

Subcutaneous formulations require the use of an infusion pump and consumables. Currently, in Portugal, **only the cSCIG carries costs associated with the infusion pump and its consumables**, which can amount to up to **4% of direct costs** for the adult population and **10%** for the pediatric population. However, these costs may vary amongst vendors and hospitals.

**Subcutaneous formulations are less costly than IVIG formulation. Between those, fSCIG is the most affordable choice, since it does not include infusion pump and consumables costs for the NHS.**

**Average annual hours spent in Ig administration, per patient**<sup>7,8,9</sup>



During the discussion of the literature-based data with the group of experts, some data was identified that would be different in Portugal, with an impact on the number of hours spent on each route of Ig administration. When it comes to subcutaneous formulations, the number of times patients need to pick up their medication from the pharmacy is higher in Portugal, as certain storage conditions need to be guaranteed, and stock needs to be managed for existing patients (apart from PID patients). These divergences from the literature have a direct impact both in terms of costs (direct and indirect) and in terms of time spent per patient, given the travel required.

**fSCIG requires less of patients' personal time than IVIG and, specially, cSCIG formulation.**

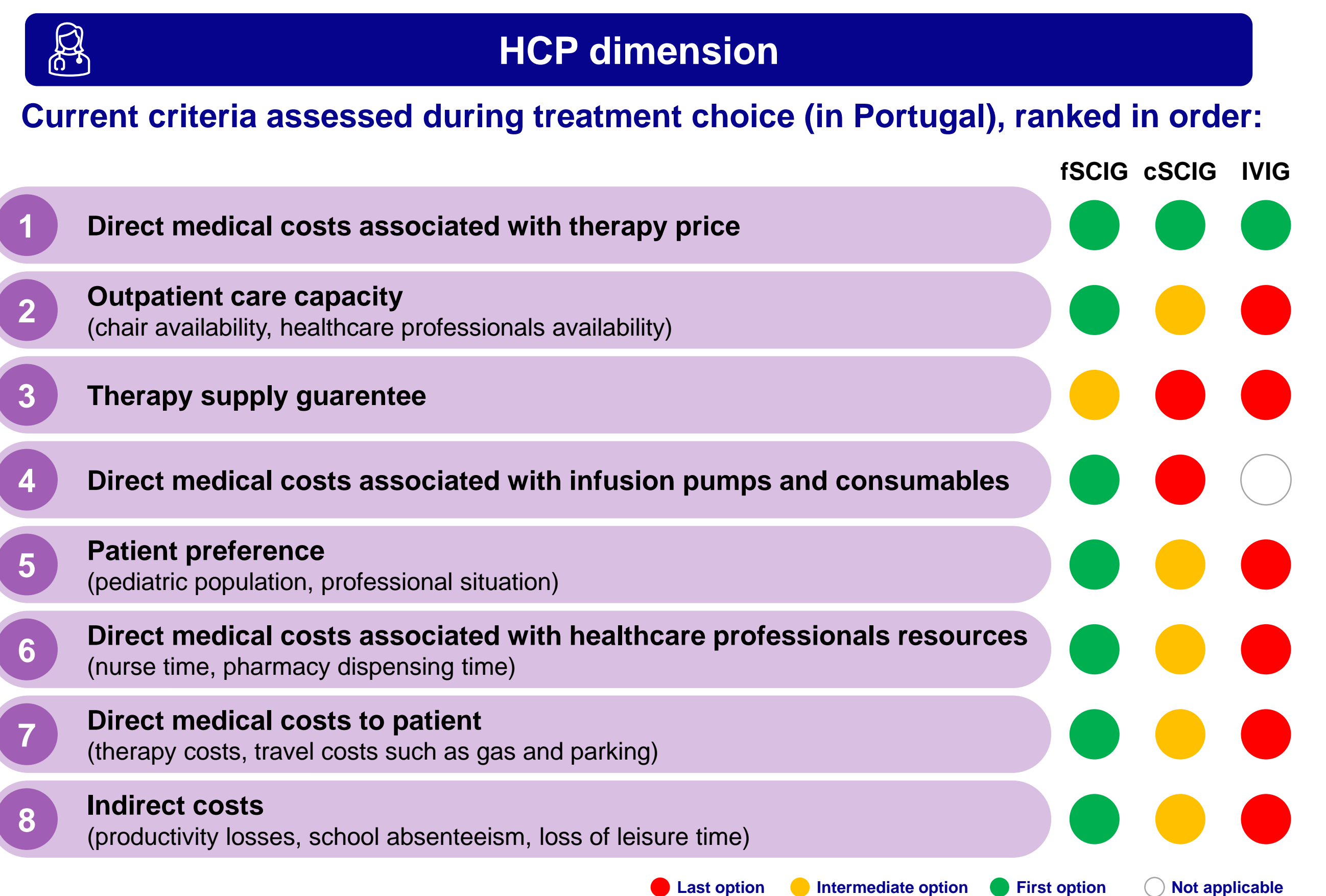
## OBJETIVE

The aim of this study was to evaluate the available Ig formulations (fSCIG, cSCIG and IVIG) for the treatment of PID in children and adults in Portugal, considering three different dimensions: costs per treatment, patient preferences and healthcare professionals' choice.

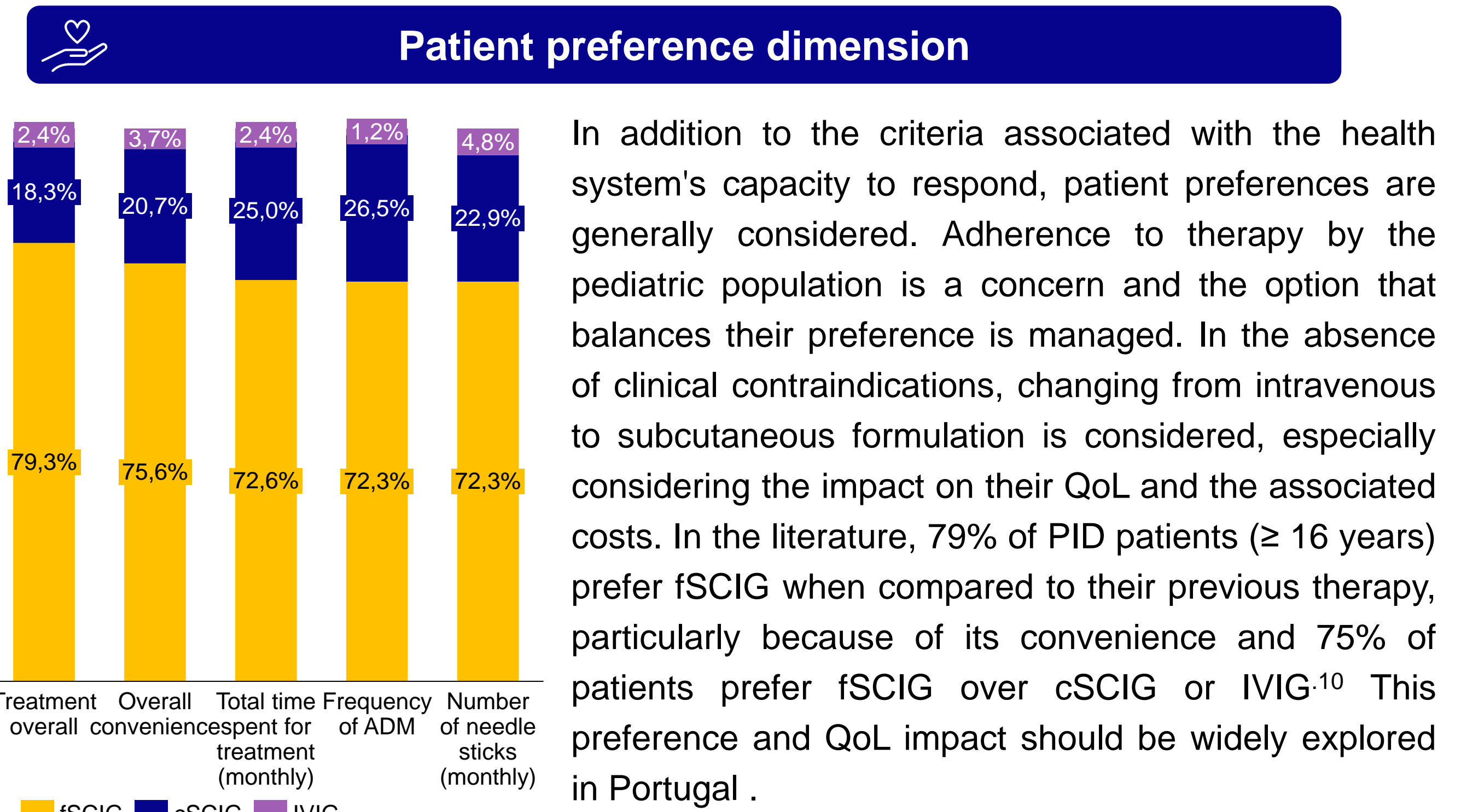
## METHODS

A cost-minimization analysis (CMA) was performed to compare the costs for all IG formulations, assuming equivalent outcomes (efficacy and safety). The CMA was performed for both National Healthcare System (NHS) and societal perspectives over a two-year time horizon, based on a literature review and official sources (namely *Instituto Nacional de Estatística*, *INFARMED* reports, Organisation for Economic Co-operation and Development (OECD)). Healthcare resources, unit prices, and dosages were collected from official sources and literature. An expert panel was conducted with 3 hospital pharmacists of the most experienced healthcare centers treating PID patients in Portugal to validate the assumptions and healthcare resources used, ensuring its adequacy to the Portuguese reality, in 2024. Qualitative insights were also discussed in this panel, to capture HCPs preferences. Patient preferences were taken from the literature. Variables as treatment, travel, productivity, school absenteeism, leisure time costs, treatment criteria, outpatient care capacity, and patient preference were assessed.

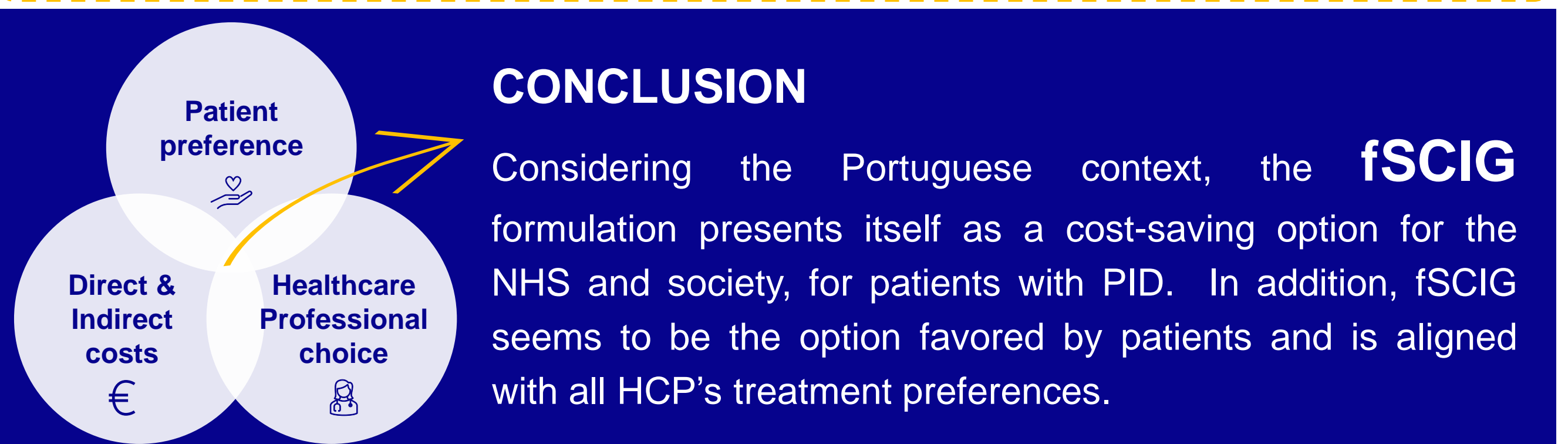
## QUALITATIVE RESULTS



**Considering Healthcare Professionals' perspective, fSCIG seems to be the preferred therapy choice, since it enables to combine the majority of criteria.**



**On a patients' perspective, fSCIG formulation enables patients to combine their personal preferences with therapy choice.**



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