

Call identifier: H2020-SC1-2017-Single-Stage-RTD  
PECUNIA  
Grant agreement no: 779292



**ProgrammE in Costing, resource use measurement and outcome valuation for Use in multi-sectoral National and International health economic evaluAtions**

**Deliverable D1.4**

Standardised costing template for selected costing approaches:  
health and social care

Contractual delivery date:  
M24

Actual delivery date:  
M24: 19.09.2019

Lead beneficiary:  
P1-MUW



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 779292.

**Suggested citation:**

Mayer S, Fischer C, Simon J, on behalf of the PECUNIA Group (2019): Standardized costing template for selected costing approaches: health and social care. Deliverable D1.4: PECUNIA project. Department of Health Economics, Center for Public Health, Medical University of Vienna, Vienna.



<b>Grant agreement no.</b>	H2020 - 779292
<b>Project full title</b>	PECUNIA – ProgrammE in Costing, resource use measurement and outcome valuation for Use in multi-sectoral National and International health economic evaluations
<b>Deliverable number</b>	D1.4
<b>Deliverable title</b>	Standardised costing template for selected costing approaches: health and social care
<b>Type / Nature</b>	<input type="checkbox"/> R - Document, report (excluding the periodic and final reports) <input checked="" type="checkbox"/> DEM - <i>Demonstrator, pilot, prototype, plan designs</i> <input type="checkbox"/> DEC - <i>Websites, patents filing, press &amp; media actions, videos, etc.</i> <input type="checkbox"/> OTHER - <i>Software, technical diagram, etc.</i>
<b>Dissemination level</b>	<input checked="" type="checkbox"/> Public (PU) <input type="checkbox"/> Confidential, only for members of the consortium and the Commission Services (CO)
<b>Work package number</b>	WP1
<b>Work package leader</b>	P2-UKE
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<b>Other contributors</b>	
<b>Language</b>	English
<b>Keywords</b>	Harmonization of costing of services, health and social care sectors, methodology, unit cost template

The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 779292.

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## Abbreviations

CUB	Budapesti Corvinus Egyetem
D	Deliverable
DESDE-LTC	Description and evaluation of services and directories in Europe – long term care
EU	European Union
EURICE	EURICE European Research and Project Office GmbH
EUR	Erasmus Universiteit Rotterdam
HA	Horizontal Activity
M	Month
MUW	Medical University of Vienna
O	Objective
P	Partner
PECUNIA	ProgrammE in Costing, resource use measurement and outcome valuation for Use in multi-sectoral National and International health economic evaluAtions
Psicost	Asociacion Cientifica Psicost
RUM	Resource Use Measurement
SESCS	Servicio Canario de la Salud
TC	Telephone Conference
UC	Unit Cost
UKE	Universitätsklinikum Hamburg-Eppendorf
UM	Universiteit Maastricht
UnivBris	University of Bristol
WP	Work Package



## 1 Introduction

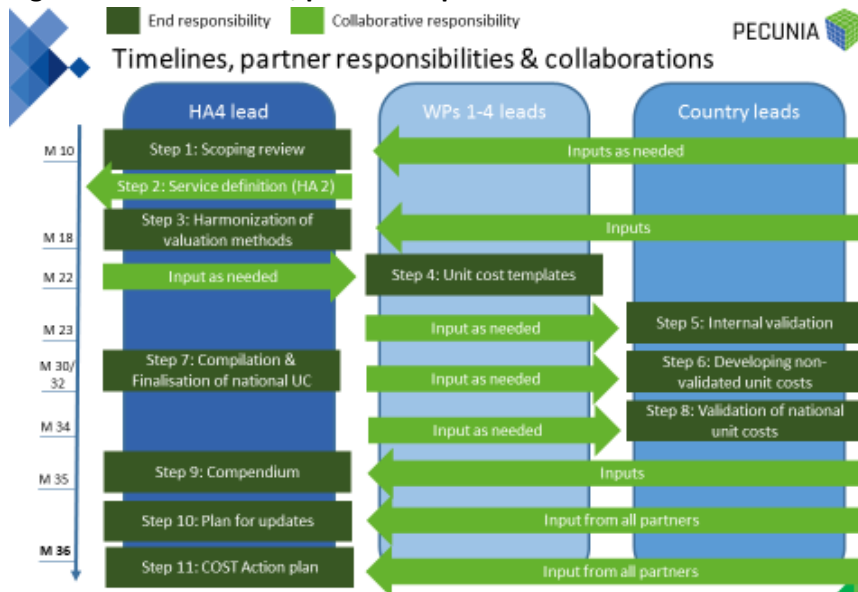
Due to currently lacking internationally comparable measurement and valuation methods for services for mental disorders delivered in the health and social care sectors, **Work Package (WP) 1 of the ProgrammE in Costing, resource use measurement and outcome valuation for Use in multi-sectoral National and International health economic evaluAtions (PECUNIA)** focuses on the development of these methods. The first aim of WP1 was to establish harmonised health and social care service lists and and/or resource descriptions for the six participating PECUNIA countries (Austria, Germany, Hungary, the Netherlands, Spain and United Kingdom) for mental disorders (O1.1). Further, a standardized health and social care module for a multi-sectoral service and resource-use measurement (RUM) instrument was to be developed ensuring cross-country comparability and transferability (O1.2). In line with the final objective of WP1 (O1.3), based on the identified services and their descriptions and compatible with the developed resource-use measurement instrument (Horizontal Activities 1-3, HAs1-3), **standardized costing templates for health and social care services** were to be developed (O1.3) in line with HA4 ('Valuation'), corresponding to Deliverable 1.4 (D1.4).

**Deliverable 1.4** presents the activities and results related to O1.3, i.e. the development of standardized unit cost templates for the health and social care sectors by P1-MUW (task lead) until December 2019 (M24). Note that in agreement with the European Commission, all materials that may violate copyrights and impair publication options were taken out of this public deliverable report.

## 2 Description of Activities

Based on the findings of the scoping review on costing methods conducted in year 1 (M10; by P1-MUW), the conceptual framework of the PECUNIA care atom (D7.1, by P1-MUW and P7-Psicost); and the results of horizontal activities 'Identification' (HA1, led by P2-UKE), 'Definition' (HA2; led by P7-Psicost) and 'Measurement' (HA3, led by P4-UM and P9-UnivBris, supported by P1-MUW), following the harmonization strategy 'Valuation' (HA4, led by P1-MUW) developed for WPs1-4 in year 2 (M18; by P1-MUW), WP1 unit cost templates for the standardized valuation of services were designed (D1.4) by the MUW team. In line with the **steps detailed in the HA4 strategy** (by P1-MUW) applicable to WPs1-4 (**Figure 1**), the steps outlined in **Sections 2.1 and 2.2** in the WP1 unit cost template development were taken in year 2. Note that P1-MUW holds a triple role with regards to the PECUNIA valuation activities by 1) being responsible for HA4 'Valuation' across WPs1-4 (henceforth referred to as P1-MUW: HA4 lead), 2) leading the development of the unit cost templates for WP1 (P1-MUW), and 3) acting as country lead for testing all WPs1-4 unit costing templates in Austria.

**Figure 1: HA4 timelines, partner responsibilities and collaborations**



Source: Own compilation by P1-MUW (cf. PECUNIA concept paper, D7.1). Note: UC = unit cost.

## 2.1 WP1 unit cost template development (until October 2019; M22)

The WP1 unit cost template development (by P1-MUW) followed the guidance provided in the **HA4 harmonization strategy** developed for WPs1-4 (P1-MUW: HA4 lead, until M18). The HA4 harmonization strategy was shared with the WPs1-4 leads in writing (July 2019, M18) and complemented with an illustrative example of a unit cost template developed as a worksheet in Microsoft Excel. The HA4 harmonization strategy was also presented and discussed at the 2<sup>nd</sup> PECUNIA Progress Meeting held in Basel (17-18 July 2019). The **instructions** included the HA4 harmonization document contained two parts. Firstly, general suggestions for developing harmonized unit cost templates from a reporting, formatting and structural perspective. Secondly, guidance on harmonization of the unit cost templates from a content and methodological perspective by determining several areas of costing that may impair the comparability of unit cost estimates and proposing harmonized ways forward.

The HA4 harmonization strategy generally followed the logic of the conceptual framework outlined in the **PECUNIA care atom** (see D7.1, concept paper; Simon, König et al. (2019)). Likewise, the valuation approach suggested for organisational inputs (resources) in the PECUNIA care atom determined the main structure and aim of the WP1 unit cost templates. In line with the PECUNIA care atom, based on the lists of resource use items identified in WPs1-4 (D1.1 by P2-UKE, D2.1 by P4-UM, D3.1 by P5-EUR, D4.1 by P3-CUB) it was established that the **WP1 costing approach was not only applicable to services in the health and social care sectors (WP1) but should also be designed to cover services identified as part of other WPs2-4.**

International unit costing calculators and/or **databases with established methodology from PECUNIA partner countries** (collected as part of the HA4 harmonization strategy by P1-MUW: HA4 lead) served as further illustrative examples in the unit cost template development phase. Examples included the UK, the Netherlands and Germany, where unit cost programmes typically follow a systematic methodology and are usually accompanied by transparent descriptions of the calculation approaches.

Additionally, documentation from the sixth Framework Programme (FP6)-funded **EU project HealthBasket** (2004-2007), which focused on harmonization of costing in the health care sector, was consulted in the



developmental phase of the WP1 unit cost templates. Specifically, the HealthBasket literature review (Mogyorosy and Smith 2005) provided a comprehensive overview of relevant methodological issues.

The WP1 templates for costing services (D1.4) were developed by P1-MUW, i.e. a **multi-disciplinary research team** including expertise within health economics, economics, medicine, public health, and health services research. Several internal MUW meetings were set-up between July and December 2019 (M19-M22) to critically appraise the internally developed costing templates and ensure alignment of the WP1 unit cost templates with the HA4 strategy. In addition, the draft templates were shared and discussed with the WPs1-4 teams (P2-UKE, P4-UM, P5-EUR, P3-CUB) to confirm the **cross-sectorial (and cross-country) transferability of the WP1 unit cost and data collection templates to services from the other sectors** (e.g. joint TC on 29 October 2019). Relevant changes to the WP1 costing templates were incorporated by P1-MUW.

For **external expert feedback on the WP1 costing templates**, a health economic expert with extensive experience in the unit cost development of health and social care services was consulted by P1-MUW. To assess the comprehensibility of the templates and the general unit cost development approach, the expert was first asked to review the templates without further instructions beyond what was given in the templates. All open questions, potential issues and suggestions for improvement were then discussed in a joint Skype call (25 October 2019). While the expert deemed the overall costing approaches implemented in the WP1 costing templates as appropriate, solutions to several minor issues were explored jointly and later incorporated by P1-MUW.

In line with the HA4 'Valuation' strategy, all materials (in English) were developed in Microsoft Excel (2013) in separate worksheets based on the illustrative HA4 costing template example as a starting point. The **unit cost template "SERVICE-1 (WP1)"** was designed as unit cost calculation template per setting-specific average direct client contact based on a **bottom-up costing approach** and consists of seven modules. The **unit cost template "SERVICE-2 (WP1)"** was developed as a template for unit cost calculation per day, night or average contact based on a **bottom-up costing approach or top down-costing approach** if only selected modules out of the seven modules are filled-in. Both templates may be completed based on published national-level secondary data or primary data collected specifically for unit costing purposes. To facilitate the unit cost development based on primary data, a **complementary cost collection template ("WP1 data collection template")** was developed by P1-MUW to be self-completed by a service provider.

The **template designed for primary data collection from a service provider ("WP1 data collection")** was developed to collect all cost information required to complete either one of the two unit cost templates (and hence to apply either costing approach). In its draft version (prior to the country-level validation), it included seven main modules, 1. Name; 2. Code DESDE 2.0 PECUNIA; 3. General information; 4. Service team costs (direct costs), excluding administrative staff; 5. Other direct costs; 6. Annual overhead costs for the service (including administrative staff); 7. Annual total costs.

End of October 2019, prior to the country-level pilot test of all WPs1-4 costing templates (see **Section 2.2**), the WP1 costing templates were further **harmonized following a HA4 review of the WPs1-4 templates** (by P1-MUW: HA4 lead). For WP1, this step mostly included minor formatting changes as well as the inclusion of a standardized module collecting basic unit cost information.



## 2.2 Internal validation of WP1 unit cost templates (until November 2019; M23)

In line with the WPs1-4 validation approach planned as part of **HA4 'Valuation'** (P1-MUW: HA4 lead) for November 2019 (M23), the WP1 costing templates were **pilot-tested in the five PECUNIA countries** except Spain (Austria, Germany, Hungary, the Netherlands and United Kingdom) **by the relevant country leads** (P1-MUW, P2-UKE, P3-CUB, P5-EUR, P9-UnivBris).

For the validation of the WP1 service costing templates, **three services from two WPs applying two costing approaches** were selected by P1-MUW (responsible for WP1, health and social care sectors) and P4-UM (responsible for WP2, education sector and (criminal) justice sectors):

- WP1: general practitioner consultation in a single practice based on the bottom-up costing approach, i.e. testing the SERVICE-1 (WP1) unit cost template
- WP1: day care centre for mentally-ill patients based on the top-down costing approach, i.e. testing the SERVICE-2 (WP1) unit cost template
- WP2: education services provided in the special education school based on the top down costing approach, i.e. testing the SERVICE-2 (WP1) unit cost template

Depending on the national data availability, it was up to the country leads to decide if the templates were to be validated based on **secondary national data** (not older than 10 years) **and/or by collecting primary data** from service providers. As presented by HA4 at two PECUNIA consortium TCs (19 September 2019; 10 October 2019), a **qualitative** (rather than quantitative) **research approach** was suggested for validation by P1-MUW (HA4 lead), essentially calling for an in-depth assessment of the all costing and data collection templates based on feedback from the person(s) who filled it in. On 7 November 2019, P1-MUW (HA4 lead) shared the detailed **WPs1-4 validation instructions together with the harmonized WPs1-4 costing templates** with the relevant country leads.

The country leads responsible for the validation of the WP1 costing templates in their country (P1-MUW, P2-UKE, P3-CUB, P5-EUR, P9-UnivBris) gave a summary of these issues in the PECUNIA consortium TC on 5 December 2019 and shared the completed WP1 unit cost and the data collection templates together with a detailed documentation of the validation process with P1-MUW. All issues and suggestions for improvement for the WP1 costing templates were discussed within the MUW team (13 December 2019) and if relevant and feasible, **incorporated in the final versions of the unit cost templates (by P1-MUW)**. Future adaptations of the templates may be expected e.g. based on feedback from the comprehensive country-level unit cost calculation foreseen in year 3 (D1.5).

As one consequence of the feedback from the country-level validation, the **WP1 data collection template was split into two different data collection templates** (by P1-MUW) to be in line with SERVICE-1 and SERVICE-2 unit cost templates, respectively, and to allow for more efficient data collection not beyond what is necessary. Furthermore, to allow for additional validation of the unit costs calculated based on primary data, the note included at the bottom of the SERVICE-1 and SERVICE-2 unit cost templates **prompting the user to critically reflect on the calculated estimate** was extended. It is now suggested that the user also inquires feedback on the calculated estimate from the service provider as an another quality assurance check.

Overall, all **country leads managed to successfully complete the relevant documents** for the validation of the WP1 costing templates and develop first (preliminary) unit cost estimates. From a methodological standpoint, the calculation approach of these unit costs based on the application of the WP1 costing templates is harmonized in the sense that e.g. the long-run marginal opportunity cost principle could





generally be applied in all cases but two cases in Germany (education services provided in a special education school; day care centre for mentally-ill patients). The **time needed for the completion of the costing templates** ranged between 10 and 90 minutes, also depending on the applied data collection approach.

Beginning of December 2019, prior to the finalization of costing templates (see **Section 3**), the WP1 costing templates were again **harmonized following a final HA4 review of the WPs1-4 templates** (by P1-MUW: HA4 lead). For WP1, this step mostly included minor formatting changes of the WP1 costing templates.

In addition to the pilot-test, P1-MUW sought **methodological validation of the unit cost templates based on input from a cost accountant** (5 December 2019). The expert confirmed the overall validity of the structure of the templates and the cost components including overhead costs and the reasonability of the different units of analysis.

### 3 Results

Four Microsoft (2013) Excel-based worksheets were developed as part of D1.4 by P1-MUW. The **two validated service unit cost templates** may be self-completed by e.g. a researcher, either based on existing national-level data or primary data collected with the two complementary primary data collection templates. Unit cost calculations in the costing templates are based on formulas and references included in the background of the Excel worksheets, linking relevant input cells and allowing for a mostly automated unit cost calculation. The **validated WP1 data collection templates** were designed to be self-completed by a representative of the service provider. To allow for the calculation of a representative, national-level unit cost based on primary data collected from several local or regional service providers, a complementary WP1 data collection strategy is currently under development by P1-MUW with input from P2-UKE.

The results (**D1.4**), i.e. **the validated service unit cost templates and data collection worksheets, are fully in line with objective O1.3 of WP1**, i.e. to design tools to develop harmonized country-specific unit costs for health and social care services across selected EU countries allowing for regular, sustainable updates. The unit cost templates are also the **final link in the chain of the PECUNIA horizontal activities**. The costing templates were designed for the valuation of health and social care services (WP1) as well as services from other sectors identified in HA1 (by P2-UKE), to incorporate the definitions and DESDE-LTC/DESDE 2.0 PECUNIA codes from HA2 (by P7-Psicost), to match the PECUNIA RUM instrument and unit of analysis from HA3 (by P4-UM and P9-UnivBris, supported by P1-MUW) and to deploy the harmonized valuation approach proposed by P1-MUW (HA4 lead).

### 4 Conclusions

The **WP1 unit cost templates** are the first unit cost calculation templates developed for costing services not only provided by the health and social care sectors but also for services provided in other sectors affected by the spillover effects of healthcare interventions. The WP1 costing templates were designed to allow for **standardized** unit cost development across sectors while at the same time providing **flexibility** in the choice of the costing approach. They can be fed both with readily available national **data** or, if not available, primary data based on a collection template specifically designed for these purposes. The templates introduce **transparency** in the unit cost development by detailing the different elements needed for the unit cost calculation including their data sources. By adopting a long-run marginal opportunity cost principle, a step towards the **methodological** harmonization in the unit cost development was implemented.





In addition to the **methodological validation by two experts**, the WP1 costing templates were validated in the course of a first **pilot-test based on three services from three sectors in five European countries** (by P1-MUW, P2-UKE, P3-CUB, P4-UM, P5-EUR, P9-UnivBris), resulting in a first set of preliminary unit cost estimates as a by-product. Based on this first pilot-test, the WP1 costing templates seem to be suitable for calculating harmonized unit costs. However, further refinement of the templates with regards to the inclusion the overhead costs and further testing e.g. by applying the templates to a wider variety of services in additional sectors (e.g. (criminal) justice sector) will be necessary (and is foreseen) in year 3.

Note that **several limitations** apply to the WP1 unit cost and data collection templates. Firstly, the templates are currently available in English language only. While this should not be a barrier to usability by e.g. researchers, based on the country-level validation it seems that some data providers from non-English speaking countries may find it difficult to understand the technical language in the data collection worksheet. Translation into national languages will therefore have to be considered in year 3. Secondly, while the unit cost calculation in the WP1 templates is mostly automated, some calculation options may not be captured in the currently included formulas. It is therefore imperative that the user who completes the templates remains critical of the calculated unit cost estimate. A “warning sign” asking about the reasonability of the unit cost(s) was therefore included in the templates, prompting the user to conduct additional checks and seek further validation. Thirdly, to allow for automated calculations, the unit cost templates were designed for electronic use. Due to their size, printing the entire WP1 costing templates and data collection worksheets in a standard format (e.g. A4) is currently not feasible and incorporating the templates in a re-structured web-based format should be considered in the future.

Based on the WP1 costing templates, the PECUNIA country leads (P1-MUW, P2-UKE, P3-CUB, P4-UM, P5-EUR, P8-LSE, P9-UnivBris) will develop a **set of national-level unit costs for selected services in year 3** (until M32). These WP1 unit costs together with the unit costs developed within WPs2-4 will be included in an electronic compendium of harmonized unit costs (D1.5, D2.5, D3.5 and D4.5, due in M36) coordinated by P1-MUW. **External validation** of the calculated unit costs will be sought via three channels: Firstly, with regards to the general methodology via presentation of selected results (valuation approaches, unit cost calculation) at relevant international conferences and peer-reviewed publication. As proposed by the SAB at the last SAB meeting in May 2019, external feedback will potentially also be sought from other future end-users of the costing templates, e.g. national health insurances and ministries. Secondly, a comparative evaluation of PECUNIA unit costs against existing national/regional unit costs as well as other publicly available relevant estimates will be conducted by the country leads on a convenience sample of the developed unit costs to determine e.g. the variability in the calculated estimates. Thirdly, P6-SESCS will conduct a full validation of the PECUNIA unit cost tools for Spain (D6.1) and for Health Technology Assessment (D6.2) in year 3.

The development of a business plan by the management team (P1-MUW and P10-EURICE) is currently ongoing to make the PECUNIA templates accessible in the future while also guarding their integrity and sustainability via proper licensing (open access to non-profit purposes).

## 5 References

Mogyorosz, Z. and P. Smith (2005). The main methodological issues in costing health care services: a literature review. Simon, J., H.-H. König, V. Brodzky, L. Hakkaart-van Roijen, P. Serrano Aguilar, L. Salvador-Carulla, A.-L. Park, W. Hollingworth and S. V. o. b. o. t. P. Group (2019). "Inter-sectoral Costs and Benefits of Mental Care in Europe: European Research Project PECUNIA." *Journal of Mental Health Policy and Economics* **22**(Suppl 1): S32.



## Annex 1: Additional metadata information

<b>Attachment file name</b>	
<b>Digital Object Identifier (DOI) of current version if available</b>	10.5281/zenodo.4279100
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