



**PRUDENT: P**rioritization, incentives and  
**R**esource use for **sU**stainable **DENT**istry

## **Work Package 6 Protocol**

Full title

Deliberative multi-criteria processes for priority setting and resource allocation

Protocol version number and date

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## STUDY SUMMARY

Study Title	PRUDENT: Deliberative multi-criteria processes for priority setting and resource allocation
Internal ref. no. (or short title)	PRUDENT WP6
Study Design	Case studies and mixed methods evaluation
Planned Study Period	2024 – 2027
Research Question/Aim(s)	<ol style="list-style-type: none"><li>1. Conduct priority setting and resource allocation (PSRA) utilising different approaches in 3 settings in collaboration with stakeholders</li><li>2. Evaluate PRSA exercises and identify cross-country implementability</li><li>3. Identify best practice principles for PSRA in oral health set out in manual.</li></ol>

# Study Protocol

## 1. Background

Dentistry accounts for a significant share of healthcare expenditures within the European Union (EU), and these costs are projected to rise substantially in the future (Jevdjevic et al., 2021, Listl et al., 2021, Thomson et al., 2019). This trend is driven by factors such as aging populations, increasing demand for dental services, and shortages in the oral health workforce, which have led to widening inequalities in accessing oral healthcare (Kossioni, 2012, Winkelmann et al., 2022).

In EU countries, oral health policy and financing are typically managed independently of the general healthcare system (Eaton et al. 2019). There is significant variation across nations, with diverse public and private organizational structures delivering oral health services, differing degrees of out-of-pocket expenses for patients, and a range of financing models.

Despite these differences; resources, including funding, staff, time, and space, have consistently been limited, posing significant challenges to oral health interventions and programme delivery (Watt et al. 2019). In the context of these constraints, efficient allocation of healthcare funding within publicly funded systems is critical to ensure that the healthcare system, particularly in dentistry, can meet growing demands. However, this process is often complex and fraught with difficulties (Holmes et al., 2009). Understanding and addressing these challenges is vital for developing sustainable solutions to improve dental care access and outcomes across the EU.

Healthcare systems have addressed the challenge of resource allocation in various ways, often with differing outcomes. A common approach is to rely on historical allocation to guide the distribution of resources within healthcare systems (Mitton and Donaldson, 2009). This method of allocation often lacks clear justification and thorough evaluation of opportunity costs, and perpetuates distortions and inefficiencies, which has led researchers and policymakers to look at alternative methods for prioritising and allocating resources to maximise the limited healthcare budget (Seixas et al., 2021). Although classical economic evaluations used in health technology assessment (e.g. cost-effectiveness analysis) can provide useful information to inform resource allocation decisions, they can only address one objective of a health system and often still leave difficult choices between potential different services or programmes when multiple programmes all meet any agreed cost-effectiveness threshold.

Priority setting and resource allocation (PSRA) exercises such as Multiple Criteria Decision Analysis (MCDA), Programme Budgeting and Marginal Analysis (PBMA), Advanced Value Framework, Evidence and Value: Impact on Decision-Making (EVIDEM), and Socio-Technical Allocation of Resources (STAR) provide guidelines and processes that can help guide resource allocation within healthcare systems, including dentistry (Mitton and Donaldson, 2009). PSRA

can be applied at the micro level (e.g. within an individual organization), the meso level (e.g. regionally) or the macro level (e.g. nationally). Since each level has its own unique contexts and objectives, these decision-making processes take on varying procedural formats and involves diverse groups of stakeholders (Seixas et al., 2021).

There is limited information on the effectiveness of PSRA methods and the implementation of PSRA outcomes within practice. Hence the main aim of this work package is to conduct three different case studies in various settings using a variety of PSRA methods to test their applicability in dentistry and to do a follow-up evaluation to understand embedding of PSRA exercises within the dental system.

## 2. Research question/aim(s)

The main aims of this research are the following:

1. Conduct priority setting and resource allocation (PSRA) utilising different approaches in 3 settings in collaboration with stakeholders
2. Evaluate PRSA exercises and identify cross-country implementability
3. Identify best practice principles for PSRA in oral health set out in manual.

## 3. Study Design/Methods

The study design is based on a case study approach with qualitative evaluation. The three case studies will involve the use of PSRA methods within policy setting practice to address different policy problems in specific policy contexts.

The project will be divided into three phases:

1. Undertaking the case studies
2. Evaluating the case studies
3. Generalising the insights from the case studies

The study will follow the Participatory Action Research approach (Waterman et al. 2001) with the PSRA exercises embedded in policy making practice rather than as separate academic exercises.

Methods for each of the three case studies are described below followed by the methods for Phase 2 and 3.

### Phase 1: Case studies

#### **3.1 Case study 1 – Based in the Netherlands (regional)**

##### 3.1.1 Study setting

This PSRA case study will be carried out in the municipality of Nijmegen, the Netherlands, between 2025 and 2027. The study focuses on addressing the oral health care needs of people experiencing homelessness in Nijmegen, a population with significant unmet dental needs and limited access to sustainable care solutions. Currently, there is little to no

structured policy to provide dental care for this group, leaving many dental issues untreated. These untreated issues can lead to worsening physical pain, broader health complications, and social consequences, such as stigma and reduced self-esteem.

This study aims to identify the most suitable dental care options for this population. Using a multicriteria analysis framework, the research will systematically compare and prioritise potential interventions based on value and effectiveness. By ranking these interventions, the study seeks to provide insights that support local policy development in Nijmegen and offer guidance for similar efforts in other cities across the Netherlands and Europe.

An essential part of the methodology is the explicit and transparent inclusion of perspectives from various experts and stakeholders. To this end, an advisory panel will be established, in which we aim to represent key stakeholders such as end users, shelter staff, social workers, dental and general care providers, experiential experts/population representatives and policymakers. Over a series of sessions, guided by the research team, the panel members will define the scope of the prioritisation study by identifying interventions to include (assisted, if necessary, by literature-based suggestions), evaluate these interventions against criteria they select, and develop a weighted ranking of the options. During the exercise, we also strive to estimate the current oral health budget and funding possibilities for people experiencing homelessness in Nijmegen. The multicriteria analysis framework provides the panel with a unique opportunity to actively contribute to shaping recommendations for the allocation of resources in (essential) oral health care, specifically aimed at improving the oral health of people experiencing homelessness.

The Radboudumc research team's goal is to apply this methodology to value-driven prioritisation of oral health care for homeless individuals in Nijmegen. Throughout the process, the team will gather data from the panel sessions, surveys, and literature to facilitate prioritisation.

### 3.1.2 Sample and recruitment

To ensure diverse roles are included, providing a rich and varied range of relevant perspectives that cover the study's context, the research population of this study consists of representatives from stakeholders such as end users, shelter staff, social workers, dental and general care providers, experiential experts/population representatives and policymakers. As the study focuses on people experiencing homelessness, incorporating the views of end users may present challenges; however, we will explore the feasibility of their inclusion in the panel.

#### Inclusion criteria

To be eligible to participate in this study, a subject must meet all the following criteria:

- Participants must represent relevant stakeholders such as end users, shelter staff, social workers, dental and general care providers, experiential experts/population representatives and policymakers, from the Netherlands.

- Participants must either reside in the Nijmegen region or possess knowledge or experience related to its regional context.
- Participants must be over the age of 18.
- Participants must be able to speak either Dutch or English.

### Sampling: size and technique

We aim to include 5-10 participants in the advisory panel. Participants will be purposively sampled to capture perspectives of diverse roles. Participants will be identified through existing contacts from previous research, personal networks and snowball sampling.

### Consent

Participants will be invited to this study via email and/or telephone and will receive an information letter as well as consent form. Participants are given the opportunity to ask any questions about the study and enrolment is voluntary. Once participants have submitted a signed consent, they will be enrolled in the study and a first meeting with the participants will be scheduled as part of the first step for the PSRA.

### Process for obtaining ethical approval

Ethical approval for this PSRA case study was sought from the Radboudumc ethical review committee. According to the Medical Ethics Committee Eastern Netherlands (case number 2024-17649), no evaluation was required for its implementation as the study did not fall under the Medical Research Involving Human Subjects Act (WMO). Additionally, the Radboudumc Human Research Committee, the local review committee for non-WMO research, reviewed the study and concluded that there were no objections to its execution.

#### 3.1.3 Priority setting exercise design and delivery

Over a series of sessions guided by the research team, the panel members will define the scope of the PSRA case study, identify suitable interventions to address the oral health care needs of people experiencing homelessness in Nijmegen, weigh and score these interventions against criteria selected by the participants, and develop a weighted ranking of the options. Finally, they will provide concrete recommendations on which oral care programs to prioritise in order to maximise the benefits of available resources.

#### 3.1.4 Data collection and analysis

Data collection and analysis for the conduct of the PSRA is described below. Data collection and analysis relating to the evaluation of case studies will be common across case studies and is described in phase 2 (Evaluation) below.

### Data collection

The various data collection procedures described below occur during a series of advisory panel meetings.

- Mapping the potential interventions to include in the prioritisation study.
- Based on the defined scope, an estimation of the current dental budget and funding possibilities for the research population will be mapped using anonymised data (including municipal-level data, if available) collected from publicly and, if possible, non-publicly available sources and publications, as well as expert opinions.
- Relevant decision-making criteria will be determined through a semi-structured group discussion, where participants are asked which criteria are relevant to compare interventions within our scope. A clear definition should be established for each criterion, along with a corresponding range (e.g., “accessibility” could range from 0-100, where 0 = not accessible, 50 = somewhat accessible, 100 = easily accessible). The ranges will be set by the research team between meetings, with participants reflecting on them in the following session.
- Weights will then be assigned to the criteria. Participants will allocate a fixed number of points (e.g., 100) among the criteria, with more points indicating greater importance.
- Scores for interventions on each criterion will be based on data collected by the study team and presented alongside indicators of evidence quality. Participants will then provide their expert opinions to finalise the scores for each intervention. These scores will be combined with the weights to create a ranking of interventions, which participants will review and provide feedback on.
- Finally, with cost and budget estimations incorporated, a ranking of cost-benefits will be presented, showing which interventions are recommended based on the PSRA. A group discussion will then be held to reflect on the results and re-evaluate the PSRA steps.

### Statistical analysis

The analysis will follow a method similar to that used in previous literature (Vernazza et al., 2021). Through a panel discussion, criteria for evaluating the benefits of interventions will be determined. Criteria weights will be deduced by asking participants to allocate a fixed number of points (e.g., 100) among the criteria. Scores and estimated costs will be derived from available data and expert opinions. No formal statistical analyses are required for this case study.



### **3.2 Case study 2 – Based in England (national)**

#### **3.2.1 Study setting**

The second case study will be based in England, United Kingdom and carried out between 2025 and 2027. The study will focus on priority setting and resource allocation decisions undertaken at a national level in National Health Service (NHS) England Dentistry. NHS dentistry provision in England is currently in crisis and whilst this is a complex multi-factorial problem, one of the key factors that has led to failure of the system is a lack of resource (financial and workforce) to fulfil all of the current objectives of the system (Nuffield Trust, 2023). One potential solution that has been discussed is to more clearly define (and potentially limit) the coverage and eligibility criteria for NHS dentistry in terms of which services are covered, for which population groups and to what extent (Nuffield Trust, 2023). Whilst the NHS dental system operates in various settings including general dental practice, community dental services (dentists who provide care for those unable to access general practice) and hospital-based dentistry, however the vast majority of service is undertaken within general dental practices. The goal of this case study is to determine which services and population groups should be covered in NHS general dental practices.

The study design is adopting a participatory action approach (PAR) among NHS workers, policymakers, academics and the general population. It aims to identify how best to prioritise and allocate the limited resources available for general dentistry in England and assess the feasibility and appropriateness of using formal priority-setting exercise in a macro-setting context.

#### **3.2.2 Sample and Recruitment**

Participants will be recruited to form a panel that will help carry out the PSRA exercise along with the research team. Participants will be recruited from the following groups:

1. NHS England Dental commissioners (who are charged with “purchasing” appropriate dental care services from providers on behalf of the population they serve as well as overseeing the quality of dental care and ensuring that dental services provide the best outcomes).
2. Dental professionals from:
  - a. Local Dental Networks (LDN), who advise on dental commissioning
  - b. Local Dental Committees (LDC) who represent dentists with a General Dental Services (GDS) contract or a Primary Dental Services (PDS) agreement.
3. Consultants in Dental Public Health
4. Academics
5. Citizen representatives including NHS dental patients and non-service users

To ensure balance and practicality, no more than two representatives will be selected from each specified group.

#### **Inclusion criteria**

- Participants must represent relevant stakeholders such as dental commissioners, dental professionals, consultants in Dental Public Health, and citizen representatives in England.
- Participants must be over the age of 18.
- Participants must be able to communicate in English.

### Sampling and recruitment

We will identify participants from existing contacts used in previous research and through snowball sampling. Approximately 10 participants will be recruited to form a panel for the PSRA exercise. Purposive sampling will ensure diverse roles are included, providing a rich and varied range of perspectives. Consent

All participants will be invited to this study via email and/or telephone and will receive a Participant Information Sheet (PIS) and consent form. Participants will be allowed to ask any questions about the study and enrolment is voluntary. Once participants have submitted a signed consent, they will be enrolled in the study and a first meeting with the participants will be scheduled as part of the first step for the PSRA. The participants will be remunerated for their time according to the NIHR Involve guidelines.

### Process for obtaining ethical approval

Before the start of this case study, ethical approval will be sought from Newcastle University Faculty of Medical Sciences Research Ethics Committee for the study and materials. It is likely that the study will be deemed low risk.

### 3.2.3 Priority setting exercise design and delivery

Prior to initiating the PSRA exercise, a panel will be established. This panel will participate in an initial meeting to select the most appropriate PSRA method for this case study. Options to consider include Programme Budgeting and Marginal Analysis (PBMA), Advanced Value Framework, Evidence and Value: Impact on Decision-Making (EVIDEM), and Socio-Technical Allocation of Resources (STAR). The precise conduct of the case study will depend on the method chosen by the panel and so it is not possible to provide further detail in this protocol.

The panel will determine the scope of the PSRA exercise and serve as the decision-making body for the final outcomes. Throughout all phases of the panel's work, principles from Participatory Action Research (PAR) will be adopted. The research team will provide ongoing support to the panel members during this process.

The PSRA exercise will take place over a series of meetings conducted over a two-year period.

### 3.2.4 Data collection and analysis

Data collection and analysis for the conduct of the PSRA will depend on the PSRA method chosen and so is not described here. Data collection and analysis relating to the evaluation of case studies will be common across case studies and is described in phase 2 (Evaluation) below.

### ***3.3 Case study 3 – Based in North East of England – Priority setting at the regional level (Integrated Care Boards)***

#### ***3.3.1 Study setting***

The third case study will take place in England. Unlike the study outlined in case study 2 this will take a local approach to priority setting, focusing on decision making that happens within Integrated Care Boards (ICBs). There are 42 ICBs across England, and an ICB is responsible for planning health services for their local population. Whilst decisions are made about what care should be available from NHS England, and budgets for healthcare are made by the government, it is the responsibility of the ICB to commission these services for their local populations. ICBs decide how much of each service to provide, and in the context of dental care this means how much of their budget is allocated to primary dental care (general dental care available from NHS dentists), secondary care (treatments received in hospital) and community dental services (dental care provided to people who would otherwise be unable to access dental services by community dentists).

A PSRA exercise will take place using the context of an ICB in the North-East of England. This case study will assess the feasibility and appropriateness of using formal priority-setting techniques in a meso-setting where decisions need to be made about allocative efficiency given diverse population needs.

#### ***3.3.2 Sample and recruitment***

##### ***Inclusion Criteria***

Members of an ICB will be approached for their participation in the PSRA exercise to form a panel. However, given that the participation in the case study is voluntary not all members may agree to participate. It may be necessary to approach people outside of the ICB to reflect the make-up of the ICB. The ICB to be approached has been chosen as they have an existing link with the University and have expressed interest in the concept of PSRA.

Sampling will therefore be purposive. The sampling criteria will include:

- Local councillors
- Public health officials
- Healthcare workers (including specifically dental professionals)
- Social care workers
- Community representatives
- Academics
- Dental commissioners/policy makers

In order to maintain balance and feasibility, a maximum of two representatives from each outlined group will be recruited.

##### ***Consent and ethics***

Participants will be required to complete a consent form prior to any research activity, and participants would be able to withdraw their consent at any time. Ethical approval will be obtained via Newcastle University.

### 3.3.3 Priority setting exercise design and delivery

The initial stages of the research study will involve assembling a panel as outlined in section 3.3.2. After the panel has been formed, an initial meeting will be held to determine which PSRA method will be used. The options for the PSRA method are outlined in section 1, and include: PBMA, A4R and STAR. Following this, a series of meeting will be held to carry out the PSRA exercise over a 2-year period. The precise conduct of the case study will depend on the method chosen by the panel and so it is not possible to provide further detail in this protocol.

### 3.3.4 Data collection and analysis

Data collection and analysis for the conduct of the PSRA will depend on the PSRA method chosen and consequently is not described here. Data regarding the costs of dental care will be collected from a variety of sources, including the ICB itself, publicly available data from the National Health Service Business Service Authority (NHS BSA). This will be complemented by data requested via Freedom of Information (Fol) requests where necessary to assess the current treatments issued to the population. Data collection and analysis relating to the evaluation of case studies will be common across case studies and is described in phase 2 (Evaluation) below.

## Phase 2: Evaluation

Whilst each case study will be conducted independently given the diversity of settings and difference in aims, there will be a central evaluation strand. This evaluation will be multi-method. Given the diversity of the case studies, the evaluation phase will centre on the process of the respective PSRA exercises, using attributes such as understanding, ease and stakeholder engagement.

Participants in each case study will be issued questionnaires during the PSRA exercises as an opportunity to reflect on the different PSRA processes. These will be based on existing evaluation frameworks by Sibbald et al (2009), Barasa et al (2015) and Gibson, Martin and Singer (2004). These frameworks will inform a questionnaire (which has yet to be developed) which will be issued to all participants across studies at regular intervals. Data from the questionnaires will be pooled across case studies to compile insights about the different PSRA tools used, such as if one was easier to understand, implement, or led to more engagement.

In addition, one to one semi-structured interviews will be undertaken with panel members. An iterative topic guide will initially be developed based around the evaluation frameworks mentioned above and will complement the questionnaire. Interviews will be audio-recorded and transcribed, supplemented by field notes. Analysis will follow the constant comparative method (Glaser 1965).

### Phase 3: Generalising the insights from case studies

Participants from across the PRUDENT consortium as well as selected members of the case studies will be approached to take part in an exercise aimed at assessing the appropriateness of each PRSA technique across Europe, beyond the settings of the case studies. The best practice from each study will be presented and each participant will be invited to critically assess if, and how, the PSRA technique will have worked in their situation. These reflections will feed into the final study output: a report documenting each case study and the relative strengths and disadvantages. This will provide insights and action points to aid cross-country implementation.

## 4. Study outcomes

The aim is that each individual case study will inform resource allocation and policy within the scope and setting of the case study, leading to changes in the provision of oral health services.

Each case study plus overall findings across case studies will be presented at relevant dental and health services/health economics conferences and also written up for academic publication.

Findings across all phases will be drawn together to form a manual with a menu of options to inform policy makers how to conduct their own oral health PSRA exercises in their own contexts. To reflect inter-country differences a menu of possible approaches will be outlined and a practical approach will be taken. The manual will be co-written with policy makers to ensure their needs are met. This will be incorporated into the overall PRUDENT toolkit and sandbox.

## 5. Dissemination

As noted in section 4, academic dissemination will be undertaken through conferences and publications likely to include International Association of Dental Research and Priorities conferences and appropriate dental, health services research and health economics journals. In addition to this academic dissemination, engagement with the following audience will be sought:

- Dental policy makers/commissioners
- Oral health professionals
- Citizens and dental patients

This will be undertaken through a variety of methods including:

- Creation of a policy briefing, available on the PRUDENT website and sent directly to policy contacts
- An infographic or short animation, available on the PRUDENT website, highlighted through social media

- Individual meetings/presentations with key policy makers in each of the case study settings as well as more widely
- Presentation at relevant policy maker events/meetings e.g. Council of European Chief Dental Officers, regional and national policy making bodies
- A webinar for relevant audience groups
- Contribution to the final PRUDENT dissemination event

## 6. Personnel

The overall principal investigator for PRUDENT is Prof Stefan Listl, Radboud University Netherlands. Work package 6 will be undertaken by teams from the School of Dental Sciences at Newcastle University, UK and the Dentistry Department of Radboud University Medical Center (Radboudumc), Netherlands. The personnel involved are as follows:

- Prof Chris Vernazza (overall WP6 lead), Newcastle University
- Mr Jip Janssen (Case study 1 lead), Radboudumc
- Ms Deepti John (Case study 2 lead), Newcastle University
- Ms Katherine Carr (Case study 3 lead), Newcastle University
- Dr Helen Rogers, Newcastle University
- Prof Stefan Listl, Radboudumc

## 7. References

- EATON et al. 2019 Variations in provision & cost of oral care in 11 European countries. *Int Dent J.* ;69:130-140.
- GLASER, B. G. 1965 The constant comparative method of qualitative analysis. *Soc Probl.* 12(4):436-445.
- JEVDJEVIC, M., LISTL, S., BEESON, M., ROVERS, M. & MATSUYAMA, Y. 2021. Forecasting future dental health expenditures: Development of a framework using data from 32 OECD countries. *Community Dent Oral Epidemiol*, 49, 256-266.
- KOSSIONI, A. E. 2012. Is Europe prepared to meet the oral health needs of older people? *Gerodontology*, 29, e1230-40.
- LISTL, S., QUIÑONEZ, C. & VUJICIC, M. 2021. Including oral diseases and conditions in universal health coverage. *Bull World Health Organ*, 99, 407.
- MITTON, C. & DONALDSON, C. 2009. *Priority setting toolkit: guide to the use of economics in healthcare decision making*, John Wiley & Sons.
- NUFFIELD TRUST. 2023. Bold action or slow decay? The state of NHS dentistry and future policy actions <https://www.nuffieldtrust.org.uk/research/bold-action-or-slow-decay-the-state-of-nhs-dentistry-and-future-policy-actions> Accessed: December 5, 2024
- SEIXAS, B. V., DIONNE, F. & MITTON, C. 2021. Practices of decision making in priority setting and resource allocation: a scoping review and narrative synthesis of existing frameworks. *Health Econ Rev*, 11, 2.
- THOMSON, S., CYLUS, J. & EVETOVITS, T. 2019. *Can people afford to pay for health care? New evidence on financial protection in Europe*, World Health Organization. Regional Office for Europe.

VERNAZZA et al. Resource Allocation in a National Dental Service Using Program Budgeting Marginal Analysis. *JDR Clinical & Translational Research*. 2023;8(1):56-65.

WATERMAN et al. Action research: systematic review & guidance. *Health Technol Assess* 2001;5:iii-157.

WATT et al. 2019 Ending the neglect of global oral health: time for radical action. *Lancet*. 394:261-272.

WINKELMANN, J., VAN GINNEKEN, E. & GOMEZ ROSSI, J. 2022. Oral health care in Europe: financing, access and provision. *European Journal of Public Health*, 32, ckac129. 372.