



**OBH ® Segmentation Engine**  
**Cloud Software Service Description**

## OBH Segmentation Engine – Service Description

Segmentation aims to categorise the population according to health status, health care needs and priorities. This approach recognises that groups of people share characteristics that influence the way they interact with health and care services. To optimise health outcomes, service user experience, efficiency and care costs, care delivery systems should respond to the needs of different population segments in different ways. It is therefore essential to understand your population segments in detail.

Segmentation around population characteristics, rather than provider characteristics, can be challenging. Health systems have historically been organised largely around provider characteristics (i.e. clinical specialties like cardiology), rather than population characteristics (i.e. people living with frailty). This is increasingly unsustainable both financially and in terms of improving people's outcomes. Care systems organised around people, rather than providers, offer potentially the only sustainable long-term solution. Accurate population segmentation is key to this.

OBH's Segmentation Engine and Data Model provide an essential, core backbone for population health management data analytics work across different local NHS and local authority organisations, and their health and care partners. OBH's methodology is based on the Bridges to Health segmentation model (Lynn et al 2007).

### Key Features

<b>Data in, data out</b>
The Segmentation Engine can digest primary care data, national SUS data, other national datasets (such as community, mental health, maternity), local acute hospital data, and more. After the data transformation process run by the Engine, it produces a data model that establishes, for each person registered to a GP practice in a given local area, which segments and subsegments they are in, on any given day.
<b>A dynamic, longitudinal model to analyse trends</b>
The output data model allows NHS and care organisations to analyse trends in population movement between population segments, on a daily basis, rather than simply a snapshot. For each person registered to a GP practice in a specific geography (national, regional or local), the model shows which segment and subsegments they are in, every day for the available historical period, and prospectively thereafter.
<b>Condition registers at a snapshot</b>
Taking the output data model (person level, with a daily view for historical years), it is simple to create a snapshot view for any specific day during that period. This is not dissimilar to having a 'live' register for each condition (called 'subsegments' in the Bridges to Health segmentation model), but it covers the entire population. So it also includes a register for people who are currently 'healthy' or generally well. Additional filters can be applied to the latter group to demonstrate who may be currently 'well', but also living with significant risk factors which suggest that they may develop a long-term condition in the near future.
<b>Developed based on evidence</b>
The Segmentation Engine transforms data using clinical codes and logic that are evidence-based, and derived from analysis of international and national best practice, guidelines and standards. OBH have spent over 7 years building and maintaining this database and codebase, having reviewed many hundreds of guidelines and standards, and many thousands of clinical codes over that time.
<b>Local configuration of the segmentation data model</b>

For each local population, OBH runs a local configuration workshop to ensure that the configuration of the segmentation model is tailored for the specific needs of the local population. For example, there are options available to include a range of different subsegments/conditions for each of the Bridges to Health segments.

#### Multiple applications for local analysts and care partners

The resulting Segmentation Data Model for local populations is the backbone to NHS and care organisations' core analytics work. The Data Model has been designed as a dimensional model. This is a standard design approach for a database structure that is optimised for data analytics. It consists of a central periodic snapshot 'Fact Table', connected to multiple 'Dimension' tables. A dimensional model is easy to understand and intuitive for analyst users. Information is grouped into coherent dimensions, making it easier to interpret and read. The model is denormalised to allow for query optimisation. Queries and applications can sit on top of the data model.

### Services

As an initial step and required regardless of the service selected (see below), OBH will deploy the Segmentation Engine. The table below summarises the services which clients can select from, derived from the Segmentation Engine itself. Further details on each of these services are described below:

<b>1. Segmentation Data Model as an output</b>	<p>The models are distributed, typically via SFTP, as flat files which include the SQL for creating each of the tables in the model in SQL Server along with CSV files of the data to populate the tables.</p> <p>The Data Model is a patient-level dimensional data model with daily granularity. It includes a daily view of which segment, or subsegments each person registered to a GP is assigned to on any day. It is processed and updated with new data, and updates provided quarterly. OBH completes the processing and validation and returns the Output Data Model. The Output Data Model can be linked to other datasets at a person-level using the associated individual pseudonym. The Segmentation Engine codebase is maintained and continually optimised and updated- both technically and clinically, incorporating outputs from regular reviews of the latest clinical guidelines and evidence.</p>
<b>2. Segmentation Analytics Dashboard</b>	<p>Derived from OBH's Segmentation Data Model, OBH are able to perform a range of standardised and advanced analytics which summarises a local population's segments and subsegments, in clinical, public health, activity and expenditure terms. This analysis is available through a secure online Platform and is updated on a quarterly basis. Includes HealthSpan™ specialised analytics.</p>
<b>3. Segmentation Analytics Static Report</b>	<p>Derived from OBH's Segmentation Data Model, OBH are able to perform a range of standardised and advanced analytics to provide a comprehensive report (usually in PDF format) which summarises a local population's segments and subsegments, in clinical, public health, activity and expenditure terms. This analysis is typically performed as a one-off or periodic 'deep dive', for example in support of a local JSNA, or Health Needs Assessment. Includes HealthSpan™ Analytics.</p>
<b>4. OBH Outcomes Platform</b>	<p>More information via dedicated G-Cloud 12 offer: "OBH Outcomes Platform".</p>

## **1. OBH Segmentation Data Model**

### **Input Datasets**

The core model is built from combining the following (as an absolute minimum but by no means limited to):

- Secondary SUS datasets; with
- Primary care (General Practice) datasets.

Additional local health and care datasets may be included for additional insight and accuracy. The input data accessed by OBH for processing must already be pseudonymised at source. Depending on the specific purpose required, the data may also be reduced, to only include essential data required for building the model. However, this can also be enabled by OBH as a pre-processing step, if required.

Input Datasets are then transferred to the secure processing environment. This is typically done through SFTP, but alternatives can be arranged where required.

### **Setup and Configuration**

Subject to fulfilling all necessary Information Governance requirements, OBH will work with the required organisation(s) to define the GP Data Specifications to access the relevant data from GP IT systems. The technical details of the data format and delivery will be established and any development for pre-processing the data will be completed.

For each local population, OBH runs a local configuration workshop to ensure that the configuration of the segmentation model is tailored for the needs of the local population. This configuration is used by the data pipeline to create the output data model accordingly.

### **Processing**

Once the input data is in the secure data processing environment, it is processed by OBH to build the Output Data Model.

This processing includes:

- Pre-processing to reduce input data to required fields if necessary;
- Cleaning, transforming and loading the input datasets;
- Checking incoming data including validation against QOF registers, and other publicly available reference benchmarks (eg. national audit data);
- Running the data pipeline to build the Output Data Model below; and
- Validation of output data models to ensure quality and accuracy.

### **Output Data Model**

The data pipeline produces Output Data Models which include:

- Local Segmentation model – patient-level segmentation with daily granularity;
- Local HealthSpan™ model.

## **2. Segmentation Analytics Dashboard**

Derived from OBH's Segmentation Data Model, OBH are able to perform a range of standardised and advanced analytics, accessed via an online Platform, which summarises a local population's segments and subsegments, in clinical, public health, activity and expenditure terms. This is updated quarterly to enable monitoring of trends. The main domains available are set out below:

### **1. Whole Segmentation Model: Analysis of the model as a whole**

This set of analyses looks at how people across the whole segmentation model interact with each other.

Examples of analyses produced are:

- Relative sizes of each population segment
- Number of people in multiple segments
- How the overall number of segments per individual changes over time
- How the proportion of people in each segment differs by socio-demographic factors
- How people move between and within segments dynamically over time

- Number of hospital contacts by individual segment or segment combination, including outpatient appointments, hospital admissions , average length of stay (and total days disrupted by care), and A&E attendances
- Segment-specific analyses of GP contacts

## 2. Generic Segment Profiles: Segment-specific analysis applicable to all segments

There are analyses that can be performed for each segment and shown at monthly and annual snapshots to understand trends.

Some examples of segment-specific analyses include:

- Age of people in each segment at specific timeframes
- Gender and risk factor profiles of each segment
- Number of hospital contacts including outpatient appointments, hospital admissions , average length of stay (and total days disrupted by care), and A&E attendances
- Number of GP contacts (per person)
- Common segment-specific diagnoses and procedures
- Analysis related to segment overlaps and turnover, how people move between segments, and towards to the end of life
- Co-morbidity profiles
- Capitated activity and expenditure associated with each segment

## 3. Specific Segment Profiles: Analysis specific to each segment

For each population segment, there are a number of specific analyses that can be performed that only apply to the specific population segment.

Some specific examples include:

- for people who are in the 'healthy/generally well' segment, the age at which people move to any other 'non-healthy' segment in the given year (i.e. HealthSpan™). This can be analysed in the context of lifespan trends (i.e. HealthSpan:Lifespan™ ratio).
- for people who are in the 'LTC' segment, how multi-morbidity (defined here by the number of LTCs) changes with age
- for people in the 'LTC' segment, numbers of people with single and multiple LTCs
- for people who have died, proportion of people on the palliative care register vs not on the palliative care register
- for people in the 'frailty' segment, numbers of people in each frailty group , and how they change over time and by age

### **Segmentation Analytics Static Report**

Containing the same type of analysis described above for the Segmentation Analytics Dashboard, this takes the form of a comprehensive report (usually in PDF format) which summarises a local population's segments and subsegments, in clinical, public health, activity and expenditure terms. This analysis is typically performed as a one-off or periodic 'deep dive', for example in support of a local JSNA, or Health Needs Assessment. This report helps support areas who need further insights around their populations before deciding on which of OBH's cloud-based offerings better suits their needs. The report's length and complexity will be jointly decided between OBH and the client.

### **OBH Outcomes Platform**

While the OBH Outcomes Platform draws on the power of the OBH Segmentation Engine, it is set out as a separate standalone G-Cloud 12 offer due to its complexity and additional implementation requirements. However, as outlined in the Pricing Document, clients accrue economies of scale/discounts if they purchase a combination of services, including the OBH Outcomes Platform.