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FAST TRACK TO INNOVATION PROCUREMENT

# PREPLEX

HOSPITAL UNIVERSITARIO DEL SURESTE

# PREPLEX

## PITCH

An algorithm to automate the balancing of supply-demand and optimize the management of resources in the outpatient department of a hospital.

## ORGANISATION DESCRIPTION

The 'Hospital Universitario del Sureste', is a public hospital within the Autonomous Community of Madrid in Spain that provides primary and secondary care for around 200.000 people. Its sphere of influence covers both big towns and small rural areas. The whole region has suffered a massive increase in population in recent years (the projected number was around 170.000 by 2025 when the hospital was built) so the resources are always strained.

The Hospital Information System (HIS) currently used is *Selene*, a solution developed by CompuGroup Medical. Everything related to management of supply and demand in the outpatient department is stored within this system, so only one data source is needed for the purpose of solving the challenge.

Our organization has a strong data engineering department with direct access to the system's database and sound knowledge of the data models so access to the information should not be a problem.

## CHALLENGE DESCRIPTION

As in many other healthcare organizations around Europe, the demand in our outpatient department is structured around a system of waiting lists implemented using slots to help manage the available resources. This is how it works:

- The hospital has **resources** (like ultrasound scanners).
- Each resource has a **schedule** composed of **slots**.
- Every slot is <u>predefined</u> to accommodate only certain **healthcare services** (like abdominal echography) and **priorities** (urgent, preferential and normal).
- Physicians make **service requests** for an available slot against the resources.
- Each **service request** includes parameters like the requested **healthcare service**, priority and **indication date**.

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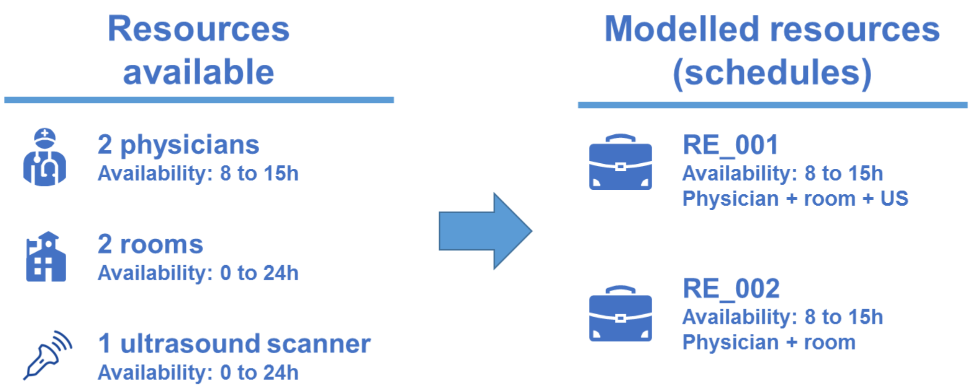
- Once the service request has been processed, an **appointment** is created occupying a slot.

All these **concepts** are further explained in Annex 1.

It is very important to stress that these schedules and slots are predefined for a certain period of time before any appointment is even admitted. The reason behind this is that we are not talking about a pure first-come, first-served basis. We want to segment patients into different waiting lists, each with different waiting times as not every healthcare service and priority require the same response times.

Taking into account all the previous points this is the current workflow:

1. **Definition of the healthcare offer**
    a. Assessing the current resources and its availability.
        i. Who: Chief Medical Officer for each medical specialty.
        ii. When: Yearly or more.
        iii. What it is: Defining the minimum set of composed resources that can be used for the outpatient department in the next year. For instance: if the specialty has two full-time physicians and one medical room every day, they have the equivalent of one composed **resource** in order to admit appointments, which is the combination of the room and one physician. In practice: He or she is defining the **schedule**.




    b. Assessing the current healthcare services that can be provided.
        i. Who: Chief Medical Officer for each medical specialty.
        ii. When: Yearly or more.
        iii. What it is: For every composed resource, define which **healthcare services** will be available for next year based on a predefined

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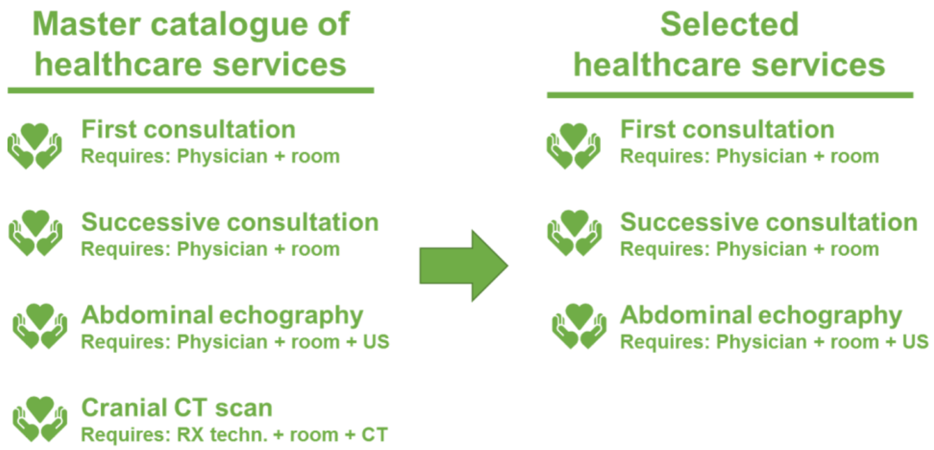
catalogue. For instance, in order to provide abdominal echography a physician-room-ultrasound scanner combo is required whether a physician-room combo can provide a first or successive standard medical consultation.




c. Deciding the balance of healthcare services for every resource based on expected demand.
    i. Who: Chief Medical Officer for each medical specialty.
    ii. When: Yearly or more.
    iii. What it is: For every composed resource, determine how many slots within its schedule are dedicated to which healthcare service. In practice, he or she is defining which **slots** compose the schedule. It is very important to state that, until now, this balance definition is based solely on the experience and knowledge of the Chief Medical Officer and what he/she expects for the following year. In many cases, the allocation of slots is completely static and the balance selected for one year is automatically extended to the next one.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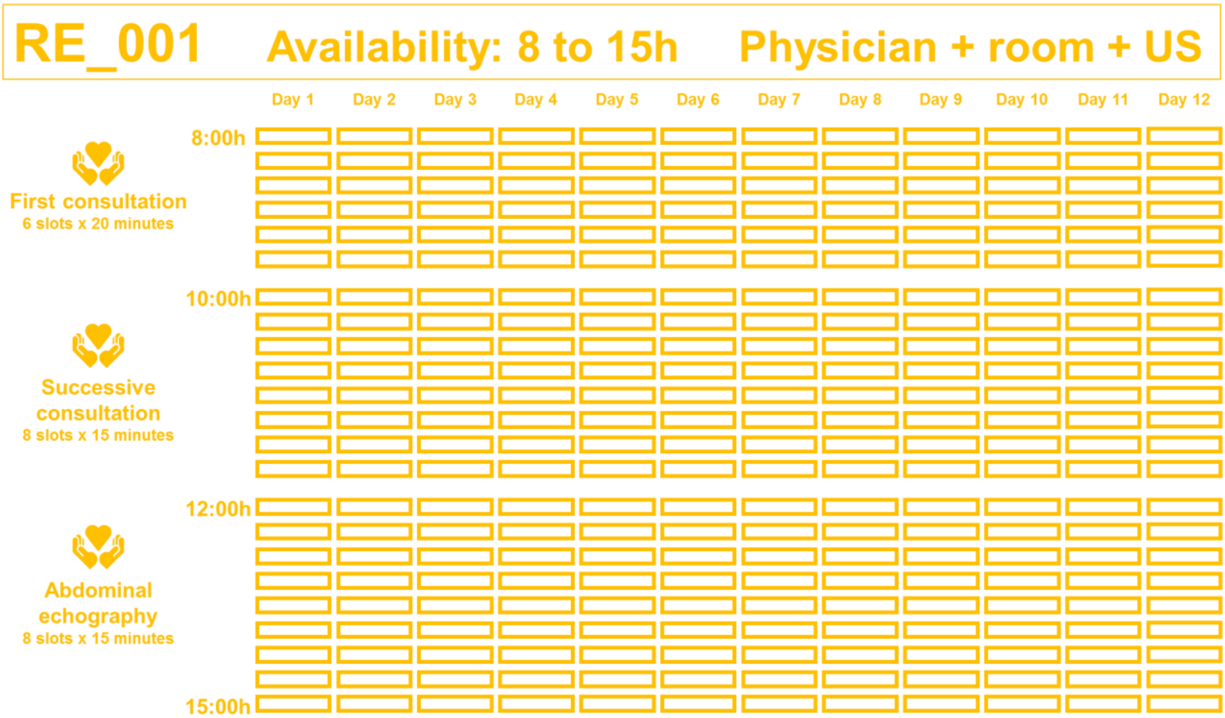
d. Creating the logical schedules in the Hospital Information System
   i. Who: Administrative personnel.
   ii. When: As soon as the schedules with slot allocation are available.
   iii. What it is: Once defined, the schedules are introduced in the system and the creation of appointments can begin. Graphically, a typical (though very simplified) schedule would look like this:




2. **Demand and creation of appointments**
   a. Requesting a medical service for a patient
      i. Who: Healthcare personnel.
      ii. When: Whenever a patient needs it.
      iii. What it is: Even though any physician or nurse can create directly an appointment, the usual procedure defines that they should make a request for it and provide the desired date, healthcare service and priority. All these requests end up in a working list, from which the administrative lists can prioritize the creation of the appointments based on the aforementioned parameters. These are two typical requests, observe that one request can include one or more services that should be treated as a package.

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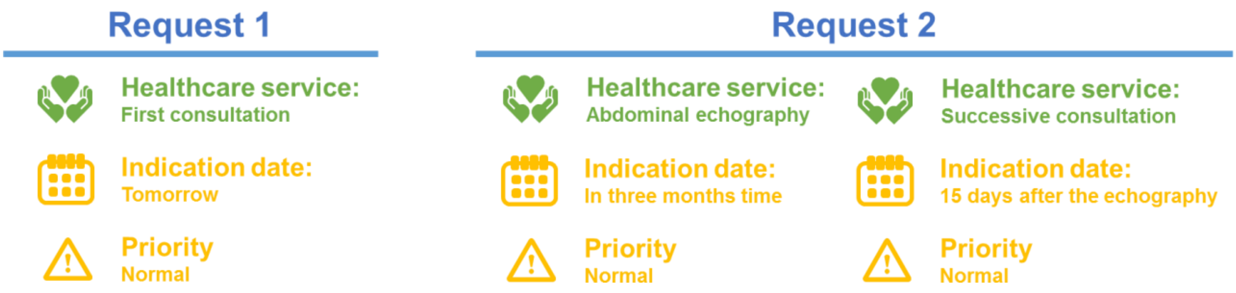


b. Creating an appointment
   i. Who: Administrative personnel.
   ii. When: As soon as there are schedules created for the resources needed.
   iii. What it is: Depending on the parameters, creating the appointments can be trivial (For instance in the previous example for request 1: It is only a matter of finding the earliest available slot for the healthcare service, a thing that the HIS can provide automatically) or require more intervention (For request 2, an appointment for successive consultation can only be created in the earliest available slot if there is enough room for appointing the echography 15 days prior. If that’s not the case another slot has to be found).

In order to correctly perform the key is that the estimation of expected demand done in point 1.c. is as accurate as possible. If so, almost every slot will be full when its day comes and the demand will be evenly distributed: A healthy schedule should look like this:

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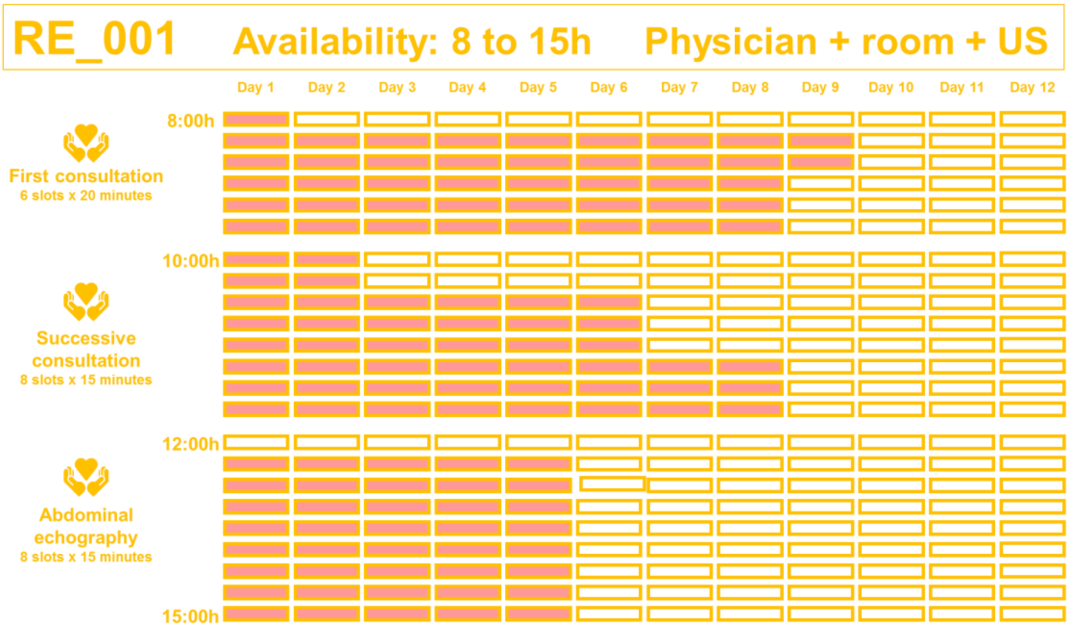
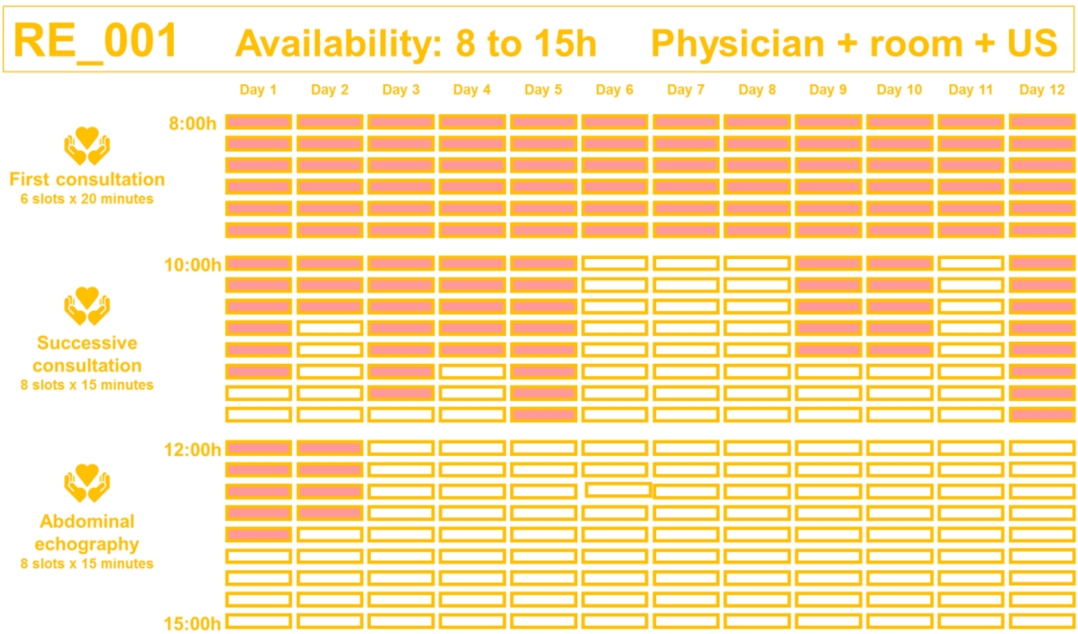



There is a small number of slots not occupied in the short term (in order to accommodate urgent requests), you can get an appointment in a reasonable amount of days and the waiting time is more or less evenly distributed between services.

With the exact same number of appointments but a different demand you can get a schedule that look like this:

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There are healthcare services with no slots available or which waiting list is way too long, and there are many slots in the short term for certain services empty (which most probably will not be occupied and hence go to waste) and the distribution is not even.

The ultimate problem we are facing is the inefficiencies that arise because supply and demand are not adjusted so resources run well below 100% productivity. There are two main reasons for that:

- Poor planning of the schedules due to its definition based on experience and not real data.
- Poor flexibility due to the time frame used to define the schedules (yearly at best). We know that demand fluctuates during the year as it is highly stational. We would like to define schedules one year ahead but segmented into four three-month periods that can adjust to the mentioned stational particularities.

We are sure that an algorithm can solve the two main issues that are causing the bottleneck that prevents the solution of the problem:

- **Determining what is the predicted amount of patients that will require medical services in the following months (point 1.a):** For the purpose of accomplishing such a task we have vast amounts of data of past requests and appointments. The solution that addresses our challenge should implement a way to predict future demand based on historical data.
- **Providing a proposed optimal schedule for the resources taking into account the previously calculated estimated demand (point 1.c)** and the resources available.

## CHALLENGE MAIN OBJECTIVES

The main objective is to optimize the scheduling system used in the outpatient department so better efficiency can be reached. Specifically, we are asking for the design of an algorithm or support tool that provides the best allocation of slots whatever the demand based on a series of constraints (which are basically the availability of resources). As said before this can be done in two phases:

1. Predict the future demand using historical data.
2. Propose schedules for the resources using predicted demand and constraints.

It is important to note that the solution only should be able to simulate ´real world´ scenarios, to consume and produce the input and output data. We are not looking for an operational solution that is expected to replace any current system. The possibility to re-run

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the simulation cheaply and frequently will allow us to have greater flexibility, as defining the schedules manually is a cumbersome and time-consuming task.

# SOLUTION FUNCTIONAL REQUIREMENTS

## Compulsory functional requirements

1. The solution will provide a model (not a productive system) that shall ingest historical data from past appointments in order to calculate the estimated demand in the future, segmented at least using the following parameters:
    a. Healthcare service.
    b. Priority.
    c. Indication date.
2. The solution has to be able to learn and validate ´success´ using historical data. In order to do so, the solution has to model all components (appointments, resources, constraints, and services) and then consume the data from the historic sample.
3. The solution shall implement a way to import the current clinical resources. Every clinical resource should be defined by;
    a. Type of resource: Personnel, equipment, facility or other.
    b. Availability (Using a calendar).
4. The solution shall implement a way to define which healthcare services require which resources in order to correctly calculate the optimal slot allocation.
5. The solution shall implement a procedure for introducing constraints on the resources so certain situations are invalidated while trying to seek an optimal schedule.
6. After processing all of the above the solution will provide a weekly schedule for each resource specifying a series of slots (once again with a determined Healthcare service and priority) in which the appointments will take place. The final user doesn't have to understand the rules behind this calculation, it can follow a black-box approach.

## Desirable functional requirements

1. The solution could implement a system in which the users could request changes in the Result based on unpredicted events that affect the resource availability, such as maintenance, illness, etc. These requests should be evaluated by a user with a higher role, who could accept or refuse the change.
2. The system could implement a predictive module that, taking into account all the appointments requested that are not yet scheduled, could simulate the final state in which the system would end up after scheduling them using the Result.

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3. The system could implement an early warning system that, using data from the current occupation of the system, would trigger alarms in certain situations (Such as the absence of slots available for certain resources).
4. The system could take into account no-shows to the appointments so certain resources could be overbooked to prevent this situation.

## PILOT SCOPE

The pilot will be set up using a reduced set of medical specialties as proof of concept. Our proposal is to involve Dermatology (as it is a specialty with relatively few interactions), Otolaryngology (which adds time constraints based on its surgical activity) and Radiology (in order to test the case when two Healthcare services are linked together).

### Type and number of targeted end-users

| End-user type | Role | Number |
|---|---|---|
| **Head of Medical Specialty** | To provide specific requirements related to the scheduling system and to validate results (Clinical section) | **1 person (For each medical specialty)** |
| **Head of Admission and Clinical Documentation** | To provide specific requirements related to the scheduling system and to validate results. (Operative section) | **1 person** |
| **Admission Committee** | To provide functional and technological advice. | **4 persons** |

TABLE 1: TARGETED END-USER DURING PILOT PHASE

### Language

End-users will be primarily Spanish native speakers but this situation will not pose a significant restriction since most of the interactions with them would be performed through the challenger team. The solution interface needs to be implemented in Spanish for the pilot phase with the possibility of switching between English and Spanish in case of a large-scale deployment.

## PILOT SET-UP CONDITIONS

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## Ethical, legal or regulatory

For the purpose of correctly assessing the demand (and hence predicting the optimal supply) historical data of past appointments are needed. While setting up the pilot, the challenger team will perform this task prior to extracting the data so any piece of information used during the pilot will not contain any patient data whatsoever. The challenger team will extract, anonymize and provide real data to the supplier for training and testing the model. As there are two data engineers in the challenger team, any adaptation or modification of the data extraction and transformation process will be performed by the team itself. No further data integration tasks are expected to be performed by the solver team.
In any case, the solver team will have to comply with GDPR regulations in all tasks that relate to data extracted from the hospital servers.

## Technological

As mentioned in the previous section, legal aspects while accessing data can be one of the key barriers in order to set up the project. Moreover, even though all the information is concentrated in one single information system (Selene, as stated before), it is scattered along several dozen tables within the system database with hard-to-understand constraints and relations between them.

So, in order to ensure the success of the project, the challenger team has set up a separate database which will be the only data source needed for the project. This database will contain a very simplified model of the most important tables but, at the same time will hold all the information needed for covering the scope of the project. Furthermore, it is completely detached from any personal data so legal risks are therefore reduced.

## Data access and modelling

All the data will be extracted from the Challenger existing IT systems, processed, anonymized and provided to the Solver in the aforementioned database. For reference here it is the architecture:

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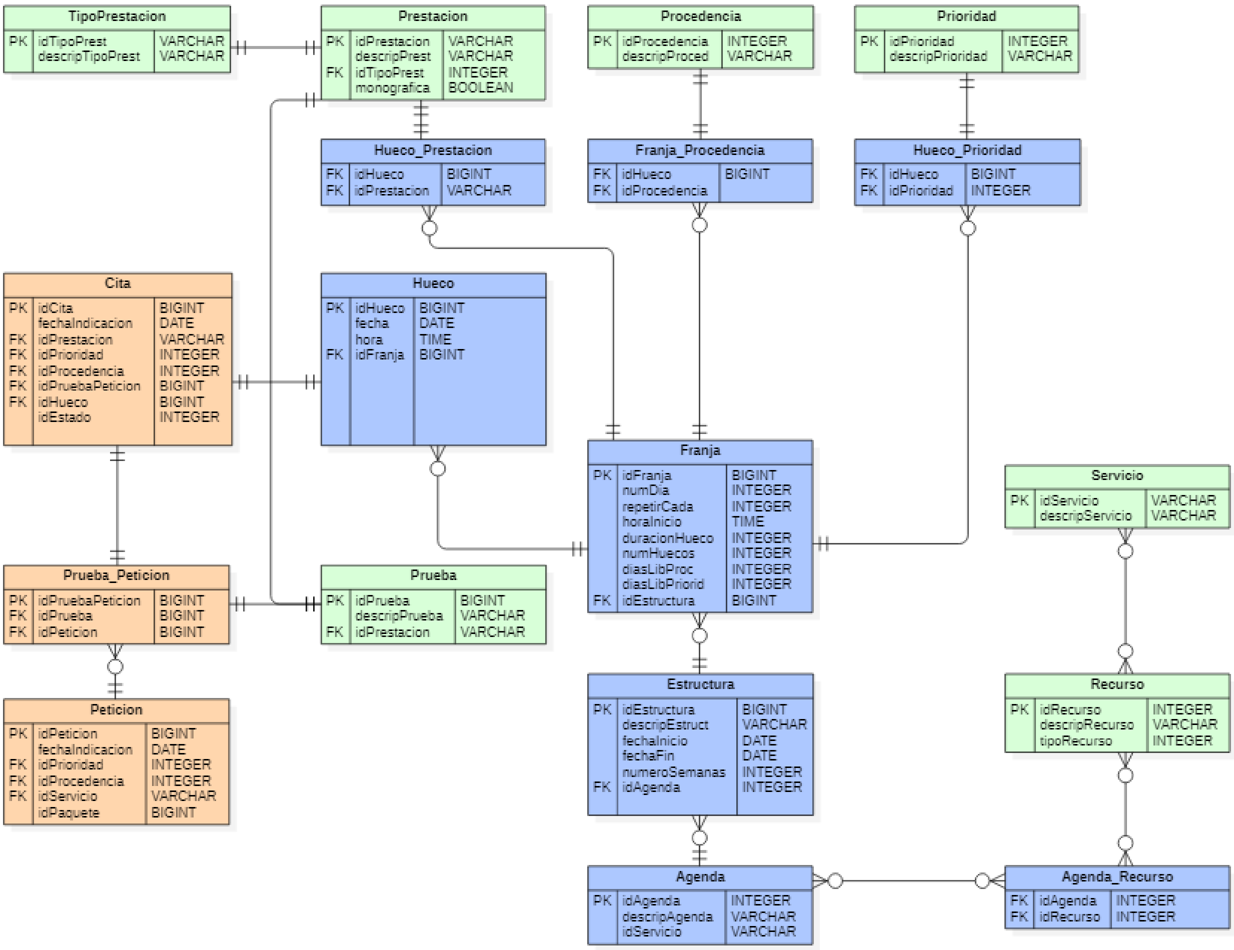


For a more detailed version of it, see Annex 2.

The solver will have access to a database with this exact data model. It will be populated with the requests, appointments and schedules of the past 10 years. For the sake of simplicity, only the last two years will be used with the purpose of predicting the actual demand. The rest of the data will be used for validation tasks. Not only performed appointments will be provided but also cancelled ones with the reason of the cancelation. This will allow the solver to take into consideration down times due to illness, equipment malfunctions, etc.

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## EXPECTED IMPACTS AND KPIS

The main performance indicators that we use to monitor how well adjusted the supply and the demand are and hence how 'good' are the schedules defined (all segmented by healthcare service and priority) are:

- **Schedule occupation index:** What percentage of the slots is occupied in seven days, fifteen days, one month and three months time: It provides information about the accumulated demand. Even though it fluctuates depending on the medical specialty and time of the year, in 2023 this KPI sits at 71,52%, 70,64%, 71,42% and 56,1% (seven days, fifteen days, one month and three months). We can see that we are not getting more occupation rates on closer dates once we pass the one month milestone. That means that we are saving more slots than necessary to accommodate urgent demand and hence some of them are left unused in the end.
- **First slot available and first five slots available:** It provides insight into the availability of a given service and priority. Both the first free slot and the first five free slots are obtained, since there may be empty slots for cancelled appointments, so knowing only the date on which the first slot is empty, may not show the real availability. In this way we can verify from which date there are free slots for a given service and priority. This indicator is especially useful for the more critical ones (urgent and oncological care).
- **Average lost slots per week in the last three months:** It provides information about possible over-supply or an excess of slots reserved for urgent care. A percentage of the slots are blocked for priority cases and are released a certain time before the date (variable depending on the service). It is important to reach a balance to ensure a sufficient number of slots to meet these more urgent cases, but to avoid that eventually, due to lower demand, they remain empty.
- **Average time spent on the waiting list and its distribution**: The average time patients wait for their appointment date and the distribution of the waiting list, although it is an indirect measure, allows us to know the input/output ratio. In this case, the total number of patients on the waiting list is not as important as trying to ensure that the highest percentage of them are waiting for a short period of time. (see Annex 2 for more detail)

An overall indicator that can be used to evaluate the performance of the whole system and compare the before-after situation is the number of successful appointments per resource.

With the purpose of measuring the success of the project's implementation and having a clear before-after analysis, we plan to compare the 'human' allocation of slots against the automatic one. For example, for Otolaryngology (the medical specialty defined in the pilot) this was the manual distribution of healthcare services defined for the year 2022. We can

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compare this static allocation with the actual demand which can be further segmented by trimester:

| Healtcare service | Estimated demand for 2022 (Manual) | Actual demand for 2022 | | | |
|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 |
| First consultation | 25,4% | 32,5% | 36,5% | 35,6% | 32,8% |
| First consultation (preferential) | 5,9% | 12,9% | 11,8% | 10,6% | 10,8% |
| Successive consultation | 35,5% | 35,2% | 35,8% | 31,2% | 35,9% |
| Successive consultation (preferential) | 10,1% | 11,5% | 13,2% | 8,6% | 13,7% |
| Telephonic consultation | 15,4% | 7,0% | 9,0% | 3,6% | 6,5% |
| Auditory evoked potentials | 3,0% | 0,7% | 1,1% | 0,6% | 0,7% |
| Vestibular Rehabilitation | 2,4% | 0,0% | 0,8% | 0,9% | 0,7% |
| Videonistagmography | 2,4% | 0,2% | 0,8% | 0,4% | 0,5% |

Using this data, we can measure the deviation of the human prediction:

| Healtcare service | Deviation in percentage | | | |
|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 |
| First consultation | +27,7% | +43,5% | +39,8% | +28,8% |
| First consultation (preferential) | +117,9% | +99,5% | +79,1% | +83,0% |
| Successive consultation | -0,8% | +0,8% | -12,2% | +1,2% |
| Successive consultation (preferential) | +14,2% | +30,9% | -14,8% | +36,3% |
| Telephonic consultation | -54,4% | -41,3% | -76,5% | -57,7% |
| Auditory evoked potentials | -77,6% | -63,1% | -78,9% | -77,6% |
| Vestibular Rehabilitation | -100,0% | -67,1% | -62,1% | -72,0% |
| Videonistagmography | -90,1% | -65,4% | -85,2% | -77,0% |

Once the algorithm starts to deliver results, we can measure its success by comparing its deviation from the actual demand with the deviation from the human prediction to compare whether the algorithm is able to obtain a more realistic distribution than the human. We can also calculate the total days on the waiting list that the solution can save in a given period of time, thus measuring its true impact on patients.

## BUSINESS OPPORTUNITY

The business opportunity presented is certainly groundbreaking. In the healthcare industry, developments have mainly focused on the analysis and processing of clinical data, with significant progress in this area. However, when it comes to solutions related to management data, there is a notable gap. This is where our project stands out, being a pioneer in this field, which makes it a good opportunity to fill an unexplored space and provide a valuable solution.

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In order to achieve a successful solution, it is imperative to have a thorough understanding of the various domains covered by the project. This encompasses a deep knowledge of the actual processes that take place in a hospital environment, the ability to access and manage hospital data, a solid competency in information technology processes, and a strong project management background. In this sense, our organisation brings a solid and well-founded knowledge of the internal operation of hospitals, while you companies contribute with their experience in technical areas and project management. This combination places us in an optimal position to establish a strong collaboration, which allows us to form a highly competent team and, ultimately, to ensure the successful development of this project.

## Market size

Internally, the solution could be extended to around 20 medical specialties which share the same need. The direct users would encompass each of the 20 physicians that manage each one of them plus around 10 people that work in the Admission department. Around 150 other physicians would be indirect users as, even though they don't participate in defining the scheduling systems, they use them every day in the outpatient department. The potential beneficiaries would include every single patient in the area of influence of the hospital (Around 200.000 people).
In an archetypical Spanish Hospital, around 50 to 60% of the direct costs are allocated to personnel and a physician is assigned to outpatient duty 70% of his or her working time (That number varies greatly between medical specialties but it is a good average). Being able to optimize physicians' time as a resource could have a tremendous economic impact. With the aforementioned gross numbers, a 5% improvement could represent up to €1.4 million a year in cost-savings for a hospital our size.

Nothing prevents the future solution from being adopted in many other hospitals. Extending the solution to other hospitals in the Community of Madrid would be very simple and would only require some adaptation, which would increase the number of potential users to 3 million. In the rest of the hospitals in Spain it could be implemented simply by developing their specific regional adaptor to ingest the data, since the daily operations of the outpatient department are basically the same.

In Europe we find countries with different healthcare models. Those with the Beveridge model could implement the solution in their centers with just a few adaptations, which would bring the number of potential users to more than 96 million. For those countries that follow the Bismarck model, the project can also be implemented, although it would require more adaptation work.


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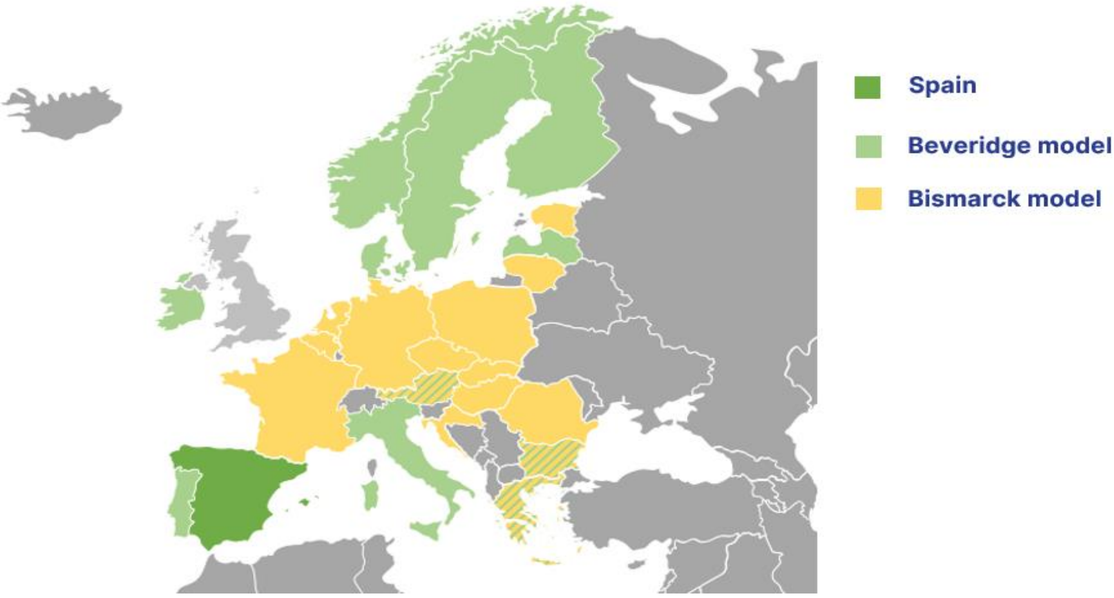


The implications of this problem reach all levels of society.

- For the general population, the increased delay for receiving assistance means poorer service and greater dissatisfaction. The health status of the population will tend to decay also.
- The government, on the other hand, has to progressively deescalate the allocation of budget that was made during the pandemic time. This means that no increase in resources is expected in the next couple of years. To make things worse, the low number of health workers available also means that we have to make every resource count.
- For the professionals, the administrative workload of designing and maintaining the planning systems is well beyond their capabilities. The more administrative tasks they have to perform, the less time they have left for patients which increases the possibility of burnout syndrome.

If this whole system could be optimized, not only we could improve the delivery of healthcare services but also we could extend their coverage, as we would be able to do more with the same resources.

## Adoption plans

The organization is fully committed to the programme as it sees an excellent opportunity to address a long-time existing unmet need. A professional has been appointed as Head of Innovation to ease any difficulty that arises during the process. There is a commitment from management to buy the solution once it is developed and specific resources have been reserved to do so (€15.000 for the acquisition of the solution).

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# ANNEX 1: DEFINITIONS

**Healthcare service:** medical assistance provided to a patient and aimed at preserving or restoring his/her health. It can be either diagnostic or therapeutic, e.g., an abdominal echography, a medical consultation, and a CT scan.

**Healthcare resource:** a stock or supply of staff, equipment, facilities, and other assets that can be drawn on by a healthcare organization in order to provide one or more healthcare services. Following the previous example an ultrasound scanner (US) can perform abdominal (but also other kinds) echographies. Conversely, in order to provide an abdominal echography, the US, a nurse or doctor, and a room are required.

**Slot**: a predefined amount of time required in order to successfully deliver a healthcare service by a resource. A slot is defined within the Hospital Information System (HIS) along with its aforementioned amount of time and healthcare service and a determined priority (see next). For example, an abdominal echography slot requires 20 minutes.

**Priority**: A parameter set while creating a slot that defines the urgency of treating a patient. There are three types of priorities: urgent, preferential, and normal. Only urgent service requests (see next) can be appointed on urgent slots while requests with any given priority can be appointed in a normal slot.

**Schedule**: A set of slots that defines the availability of a resource. For instance, a US can have a weekly schedule in which every day from 8:00 to 15:00 performs scanners of abdominal echography (20 minutes per slot so 21 slots a day) The first two slots per day are dedicated to urgent patients. From 15:00 to 20:00 it performs gynecological echographies (30 minutes per slot so 10 slots a day). Once a slot is assigned to a schedule it is given start and end times. For instance, in the previous scenario, the second slot for each day starts at 8:20 and ends at 8:40.

**Healthcare service request:** a petition for booking a patient in a slot. It also must define a date from which the appointment has to be created (immediately or sometime in the future if it corresponds to a check-up), a priority, and a healthcare service.

**Appointment**: a slot, once a healthcare service request has been allocated to it with its corresponding patient, healthcare service, priority, duration, and start and end times.

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**Indication date:** The aforementioned date from which the appointment has to take place and defined during the healthcare service request.
**Waiting time:** Time spent by the patient waiting for an appointment and calculated as the days gone by between the appointment date and the indication date of its corresponding request.

**Waiting list:** Set of appointments whose patients are waiting and any given time. Waiting lists originate from a situation in which there are not enough slots available for scheduling appointments for a determined service, priority, and indication date.

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# ANNEX 2: CURRENT WAITING LIST

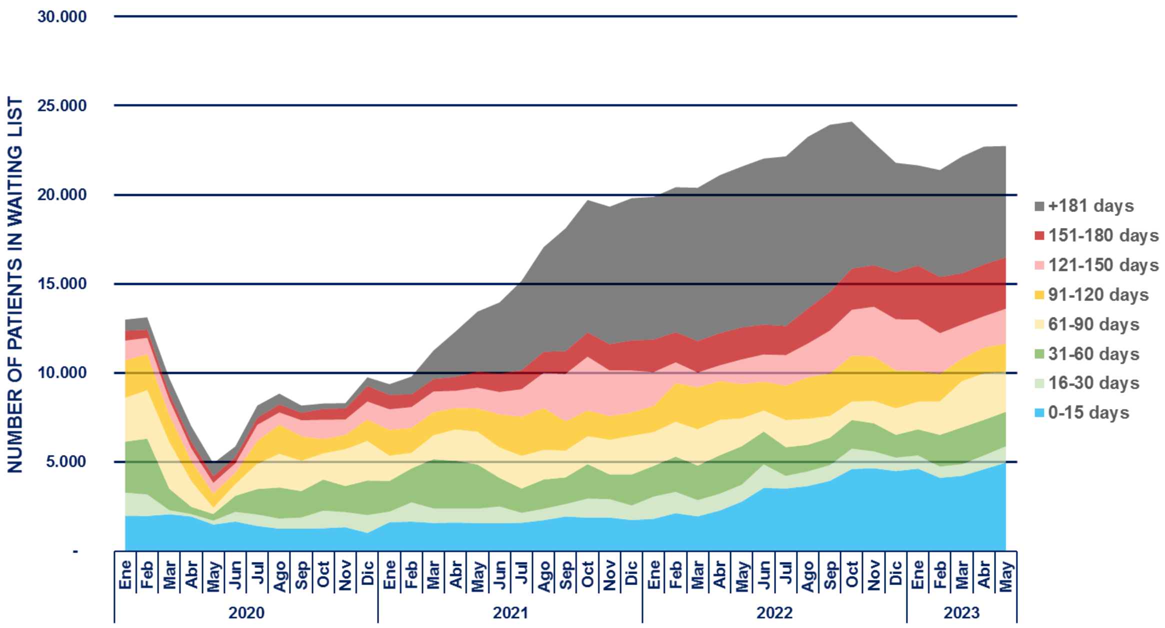


FIGURE 1: EVOLUTION OF WAITING LIST (FIRST REFERRAL AFTER GP VISIT) WITH TIME SPENT WAITING

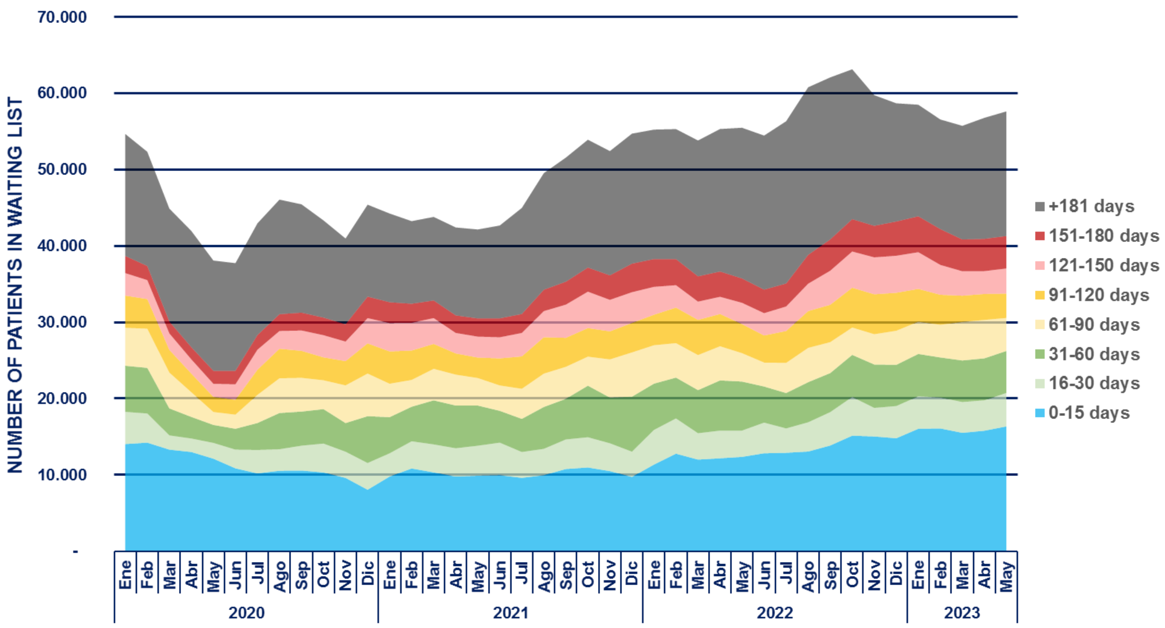


FIGURE 2: EVOLUTION OF WAITING LIST (TOTAL) WITH TIME SPENT WAITING

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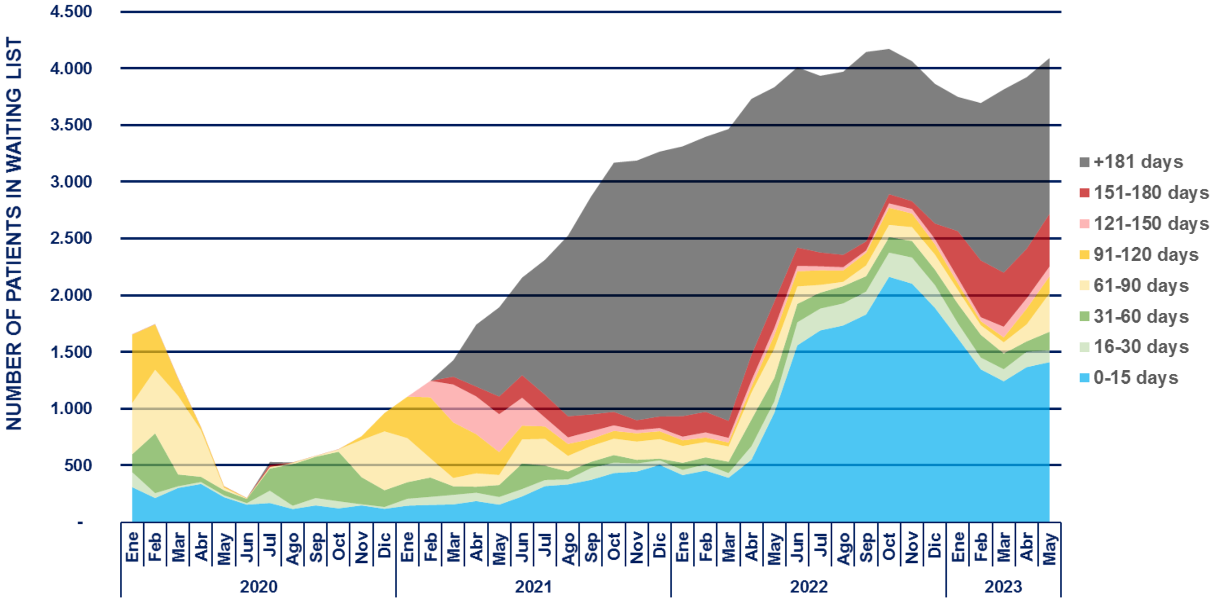


FIGURE 3: EVOLUTION OF WAITING LIST (DERMATOLOGY, USED IN PILOT) WITH TIME SPENT WAITING

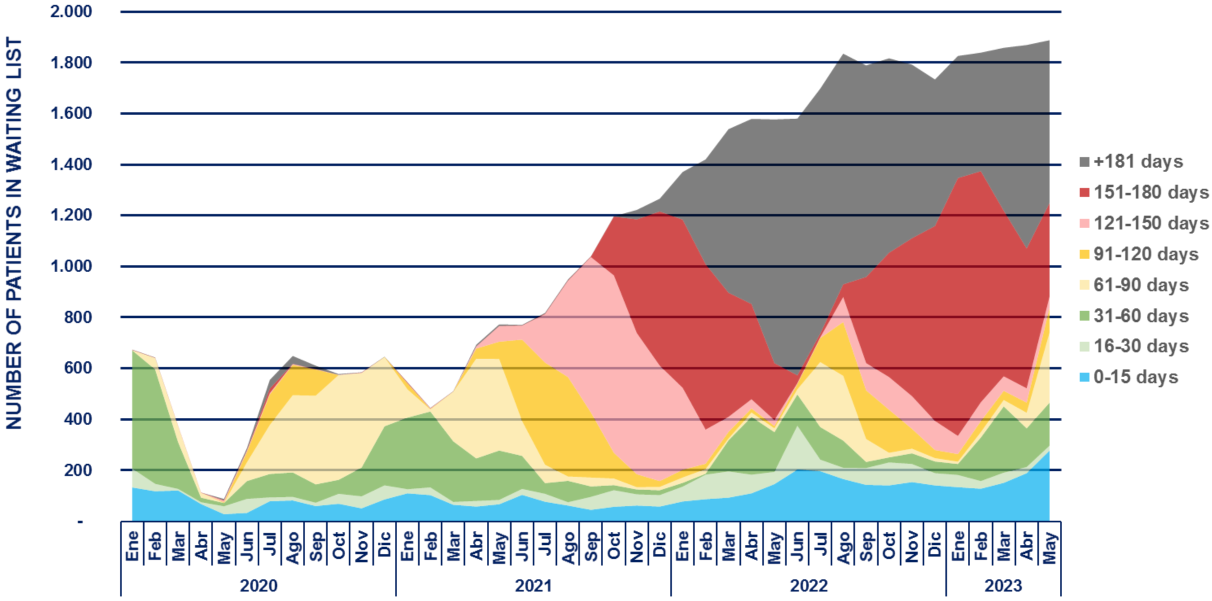


FIGURE 4: EVOLUTION OF WAITING LIST (OTORRINOLARINGOLOGY, USED IN PILOT) WITH TIME SPENT WAITING

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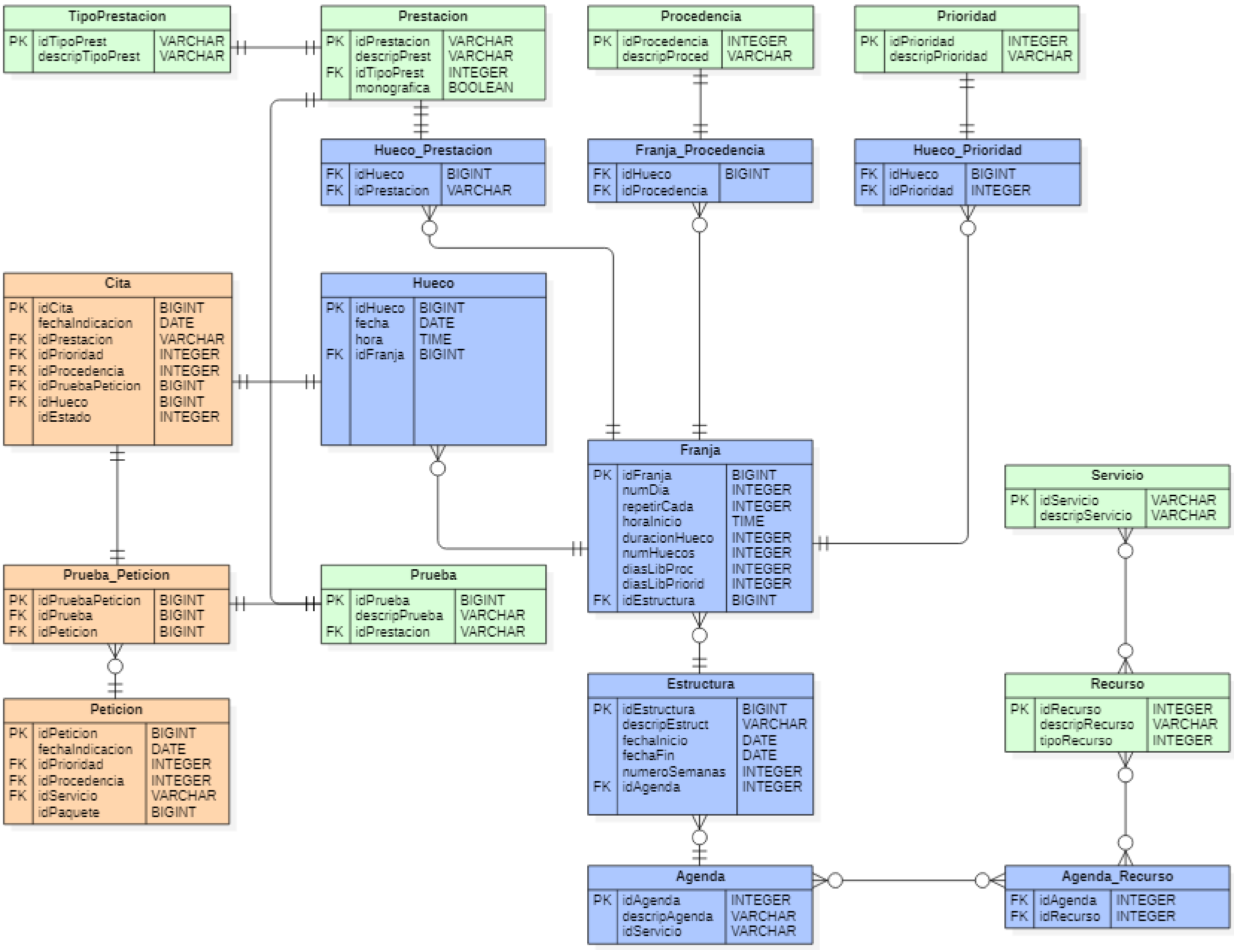
# ANNEX 3: DATA MODEL




**Green section: Master tables**

Master tables hold basic information of the system so it can work properly:

- Servicio: Medical specialties that provide services within the hospital.
- Recurso: Resources associated with one or more medical specialties.
  - tipoRecurso: defines its type (1=personnel, 2=facility, 3= equipment)
- Prioridad: Priority of the request/appointment/slot of a healthcare service. (0=urgent, 1=preferential, 2= normal)
- Procedencia: Define who asks for an appointment. Some slots are reserved for some requesters. For the purpose of this project, there are only two; Primary care and secondary care.
- Prestacion: Healthcare service.

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- TipoPrestacion: Type of healthcare service. While abdominal echography and gynaecological ecography are two separate services, they have the same type (Ultrasound scan).
- Prueba: It is kept in the model for the sake of compatibility for all aspects, it can be treated as a synonym to healthcare service.

**Orange section: Demand**

This section contains everything related to what the medical staff requests. It will contain information about the last two years (Approximately 800.000 appointments). Using information from this section alone, required supply can be calculated.

- Petición: Contains the actual request for one or more ‘Prueba’ (Healthcare services).
  - fechaIndicacion: The indication date for the appointment.
  - idPaquete: Contains information about if the request is part of a package that must be treated as a whole (When two or more healthcare services are requested at the same time).
- Cita: Appointment created from a request or by its own. It has a relation with a specific slot that determines its date and time.
  - idEstado: Contains information about the appointment state (1=visit registered, 2= no show, 3= cancelled).

**Blue section: Supply**

This section contains how the supply of services is currently scheduled. It is provided for two main reasons: Firstly, the proposed schedules should be provided by the algorithm using this schema. Secondly the data it contains serve as a way to validate the results of the algorithm against the current situation.

- Agenda: The schedule that aggregates the working list of several related resources.
- Estructura: Structure, It represents a time window in which appointments are admitted. The distribution of different slots (Franja) within it is fixed. If it must be changed, another Estructura must be created.
- Franja: Distribution. It represents the specific distribution of slots within the schedule. It has one or more predetermined healthcare services, priorities and requesters assigned.
  - numDia: Represents which day within the schedule the Distribution starts. numDia = 1 represents the first Monday.
  - repetirCada: Represents the periodicity. A Distribution with numDia = 1 and repetirCada = 7 means that it is defined for every Monday for as long as the Structure is defined.
  - horaInicio: Time defined for the specific Distribution to start.
  - duracion: Duration in minutes.
  - numHuecos: Number of identical slots that the specific Distribution contains.

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- diasLibPriorid: Defines the number of days prior to the actual slot day in which any priority can be allocated is the slot is empty. For example: For a Distribution with priority 'Preferential' and diasLibProced = 7. Only Preferential appointments can be allocated except in one case: Its slots are empty and there are only 7 days left to fill them until their expected appointment takes place.
- diasLibProced: Same case, only with requester instead of priority.

- Hueco: Slot. The actual place where the appointments are allocated. Slots are automatically created empty once a Schedule and its distributions are set in place and are filled by appointments.

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