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Implementation plan of Advanced Access for the Ear Nose and Throat department at a public Portuguese Hospital

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Master in Applied Management

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Management

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Abstract

Today's healthcare landscape grapples with the challenge of timely access and operational efficiency. The Ear, Nose, and Throat (ENT) department of the hospital in study faces these and other obstacles, such as high no-show rates and operational inefficiencies.

High no-show rates disrupt patient care and leave resources underused, while low operational efficiency extends lead time and compromised continuity of care. To address these issues, a literature review was conducted, as well as interviews with some professionals of the department in study. A problem-solving methodology was used, in which the situation was diagnosed and then solutions were proposed to solve the problem.

This thesis proposes an adapted Advanced Access implementation in the ENT department. It aims to enhance patient care and operational efficiency. By exploring this subject and implementing Advanced Access, this study contributes insights to elevate patient care and operational effectiveness in healthcare in the department in study.

Keywords: Advance Access; Telemedicine; Appointment scheduling types.

JEL Classification: M10

Resumo

O atual cenário da saúde enfrenta o desafio de fornecer acesso atempado e eficiente a nível operacional. O departamento de Otorrinolaringologia enfrenta esses e outros problemas, como altas taxas de não comparecimento e ineficiência operacional.

As altas taxas de não comparecimento prejudicam o atendimento ao paciente e levam a subutilização de recursos, enquanto a baixa eficiência operacional aumenta o tempo de espera e compromete a continuidade de cuidados. Para abordar essas questões, foi realizada uma revisão da literatura, bem como entrevistas com alguns profissionais do departamento em estudo. Foi utilizada uma metodologia de resolução de problemas, na qual a situação foi diagnosticada e, em seguida, propostas soluções para resolver o problema.

Esta tese propõe uma implementação adaptada de Advance Access no departamento de Otorrinolaringologia. Tem como objetivo melhorar o atendimento ao paciente e a eficiência operacional. O objetivo é melhorar o atendimento ao paciente e a eficiência operacional. Ao explorar este assunto e implementar o Acesso Avançado, este estudo contribui com insights para elevar o atendimento ao paciente e a eficácia operacional em cuidados de saúde no departamento em estudo.

Palavras-Chave: Advance Access; Telemedicina; Tipos de agendamento de consultas.

JEL Classification: M10

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Glossary

AA – Advance Access

ENT – Ear Nose and Throat

HESE – Hospital Espirito Santo de Évora

1. Introduction

In today's dynamic healthcare landscape, timely access to health care and efficiency in providing services is a key issue with no clear answer to resolve it. The Ear, Nose, and Throat (ENT) department, as an integral part of a healthcare institution, plays a critical role in diagnosing and treating various disorders. However, the persistent challenges of high no-show rates and low operational efficiency present significant obstacles in delivering timely care to patients seeking ENT services.

Having high no-show rates has far-reaching implications for both patients and healthcare providers. No-shows disrupt the patient care continuum, hinder optimal resource utilization, and strain the efforts of medical professionals. Concurrently, low operational efficiency within the ENT department can lead to prolonged wait times, compromised patient experiences, and reduced staff morale.

To address these challenges, healthcare administrators and practitioners have explored innovative strategies to enhance patient access and optimize departmental workflows. One such approach is the implementation of Advanced Access, a scheduling model designed to streamline appointment availability and minimize lead time. By adopting guidelines of Advanced Access implementation, the ENT department aims to not only mitigate the impact of no-shows but also improve overall operational efficiency. Recent studies on this subject provide arguments that using the revised pillars of Advance access as general guidelines will provide successful implementation (Breton et al. 2022). With the aid of technology and the growth in popularity for tele-medicine, convenience and improved access can more easily be achieved (Mehrotra et al, 2020).

The objective of this project is to diagnose the situation of this ENT department and propose a possible solution for the problem presented. To do so, an extended literature review about health care access operational models for physician appointments and diagnostic procedures, implementation principles of advanced access scheduling, appointment scheduling types, and telemedicine was carried out. Besides, several interviews were conducted with professionals of the department in study.

Through a problem-solving approach, this study will delve into what can be done to implement an adapted version of the Advanced Access model to cater to the reality and needs of this specialty care department and integrating it into the existing scheduling framework and provide realist recommendations for the ENT department to enhance patient care delivery while optimizing operational efficiency. By doing so, the thesis endeavors to contribute to the improvement of health care service for this department and set an example for others to follow.

This thesis is divided into six parts. First, a Literature Review on the subject of healthcare operational models, Advance Access implementation and adjacent subject required as

appointment scheduling type and tele-medicine. Second, we present the methodology used to achieve the recommended measures. Third, we present the current state of the ENT department and a description of the model in place. Finally, we will have presented the recommended measures to be implemented, KPI's to be considered and the conclusions.

2. Literature Review

2.1. Health care access operational models for physician appointments and diagnostic procedures

Health care operational models are strategies and frameworks that are designed to improve the availability and accessibility of healthcare services to patients.

2.1.1. Traditional access model

As described by Murray and Tantau (2000), in the traditional model of healthcare delivery, the doctor's daily schedule is consistently packed with appointments that are booked weeks or even months in advance. The schedule becomes not just full, but overly saturated. Urgent cases are squeezed in, and doctors frequently find themselves working through lunch breaks, staying late, or falling behind schedule. This approach to managing patient demand results in practices continuously piling on more visits to an already overloaded schedule, straining the capacity of the system and increasing the risks of burnout. It has been proven to lead to an increase of medical error (Tsigaa et al., 2017; Li et al., 2023).

To cope with the overwhelming demand, practices resort to implementing a wide range of restrictive and complex appointment types. For example, specific follow-up appointments for different conditions. This attempt to control demand often leads to high rates of no-shows, further complicating the scheduling process and creating a constant struggle to catch up with the backlog of appointments and maintain pace with patient demand (Murray & Tantau, 2000). This model has several negative consequences. Longer wait times are associated with patient dissatisfaction, poorer individual health outcomes and an increased use of emergency departments and urgent care clinics (Hudec et al., 2010). Moreover, due to the fully packed schedules, the use of urgent care and alternative health care providers for patients seeking immediate attention also increases. However, this reliance on urgent care adds costs and disrupts the doctor-patient relationship, as continuity of care is compromised (Murray & Tantau, 2000).

2.1.2. Carve-out access model

This model is described by having a set percentage of slots for appointments booked in advance (50%), while leaving the rest as "carved-out" slots for urgent same-day cases (Murray & Tantau, 2000).

This model can be seen as a middle ground between the traditional model and the advanced access (AA) model. Although not fully strict, this model gives little room to maneuver when it comes to non-urgent patients, as they now have less slots available for them to access health services (Murray & Tantau, 2000). Also, slots carved-out for urgent patients when not used represent a loss, as resources are underused (Murray & Tantau, 2000).

According to Vidal et al. (2019), although it is a clear improvement to the traditional model, the carved-out model does not reach the same level of benefits of the AA model.

2.1.3. Advance access model

Initially thought out by Murray and Tantau in the early 1990's, AA, also called open access or same day access, is presented as a redefinition of the term access by shifting it from a clinical standpoint to the patient's perspective, as it is "the ability to seek and receive care from the provider of choice at the time the patient chooses." (Murray & Tantau, 2000; p. 45). This system requires healthcare providers to have open schedules with a certain percentage of appointments reserved for same-day (50% to 75%) or next-day booking.

AA is a scheduling system that has gained popularity in healthcare management as a patient-centered approach to improve access to medical care and has been widely researched and proven effective in various healthcare systems (Fournier et al., 2012; Hudec et al., 2010; Rose et al., 2011). This system is designed to reduce wait times, improve patient satisfaction, and optimize the use of healthcare resources. The AA model allows patients to schedule appointments with their healthcare providers on the same day or within a few days of their initial request, rather than having to wait for weeks or months as provided by the standard model where health service availability is set and completely booked in an attempt of.

Several studies have examined the implementation and effectiveness of AA in various healthcare settings. For instance, Murray et al. (2003) evaluated the implementation of AA in a primary care setting and found that this approach resulted in reduced wait times and improved patient satisfaction. Rose et al. (2011) highlighted the positive impacts of AA, including reduced wait times for appointments, decreased rates of missed appointments (no-shows), enhanced patient experiences, and increased satisfaction among healthcare providers. Additional positive effects, such as improved continuity of care, increased availability of appointments, and reduced workload have also been found (Hudec et al., 2010). More specific studies in otolaryngology patients have shown that reducing lead time to under 7 days alone can reduce the no-show rate by over 10% (Cohen et al., 2005, 2007). Similarly, a study by Mjaaland et al. (2011) evaluated the implementation of AA in a mental health setting and found that this approach improved patient outcomes and reduced costs.

However, the implementation of AA may encounter some challenges. For example, a study by Hung et al. (2017) identified several barriers to the implementation of AA, including resistance to change, lack of training and support, and concerns about patient safety. The adoption of the AA model has also raised concerns regarding the patients' responsibility in scheduling their own appointments, as it deviates from the traditional practice of clinics scheduling appointments weeks in advance. In the AA model, patients are tasked with contacting the clinic to secure an appointment within the recommended timeframe (Breton et al., 2020). This shift in responsibility led to worries that vulnerable patients may face difficulties in following up with their healthcare unit, potentially leading to loss of continuity of care. Another study has presented several cases where, although having no negative impact, AA was not able to provide any significant improvement (Degani et al., 2013).

2.1.4. Strengths and Weaknesses of the models

Tables 1, 2 and 3 present a summary of the strengths and weaknesses of the several models described in the previous chapter.

Table 1 – Strength and weaknesses for Traditional Access model

Traditional Access Model	Strengths	Weaknesses
Appointment-Based System	Provides structured scheduling	High lead time for appointments
Limited After-Hours Care	Clear delineation of operating hours	Limited availability outside regular hours
Centralized Care Delivery	Central hub for comprehensive care	Accessibility issues
In-Person Consultations	Face-to-face interaction with providers	Lack of flexibility for virtual consultations

Source: Author

Table 2 – Strength and weaknesses for Carve-out model.

Carve-out model	Strengths	Weaknesses
Halve Appointment-Based, have carve-out	Provides access for urgent cases	Reduces opportunity for non-urgent cases
Provides access for urgent cases	Swifter results of care	Uncertainty of ascendancy
Uncertainty of ascendancy	-	Underutilization of resources

Source: Author

Table 3 – Strength and weaknesses for AA model.

Advanced Access Model	Strengths	Weaknesses
Reduced wait times for appointments	Improved patient satisfaction	Increased demand for same-day appointments
Improved patient satisfaction	Better continuity of care	Care coordination challenges
Better continuity of care	More efficient use of resources	Provider workload and burnout
More efficient use of resources	Better utilization of non-physician workers	Potential underutilization of appointments slots
Implementation	5 AA principles	Limited suitability for specialized care

Source: Author

2.2. Implementation Principles of Advanced Access Scheduling

Originally, Murray and Berwick (2003) presented five principles that Health providers could follow to implement AA in their facilities, as a step-by-step guide. They are:

- Work down the backlog
Add extended hours, temporary providers, and extra appointment slots or telephone consults to add capacity to the current schedule until all scheduled appointments are fulfilled.
- Balance supply and demand
Provide capacity, demand, panel size, and third-next available appointment while maintaining continuity of care. Staff must measure demand prospectively instead of retrospectively by recording patient request data. Measure supply retrospectively and record physician availability and types of services each provider delivers.
- Reduce the number of appointment types.
Eliminate variation in appointment types and simplify the schedule to one or two appointment lengths.
- Develop a contingency plan
Maintain the balance between demand and supply. Plan for provider sick days or seasonal changes, thus limiting unforeseen surges in demand.
- Shape the demand of visits
Match supply to demand by using one visit to cover multiple concerns, maintaining patient–provider continuity (patients will wait to see their usual doctors) and using telephone consults or patient portals to meet patient requests.

Subsequent authors presented these principles with several alterations. For example, Hudec et al. (2010) presents the “Shape the demand of visit principle” as being part of the “Balance supply and demand principle” and replaces it with the new “Interprofessional practice principle”, defining it by increase collaboration between healthcare professionals so that patients can access the most appropriate services as needed. Fournier et al. (2012) removes the “Reduce number of appointments type principle”, presenting instead “Reviewing the appointment system” so it focusses on short-term planning of supply and maintaining availability for urgent cases. Many authors present these principles not as hard set of rules, but principles of a “philosophy” for improving access to health care (Kiran et al., 2015).

More recently, Breton et al. (2022) presented a revised set of principles. In this case, a complete updated definition was given to all principles, two were fused and a new one was added (Table 4). These new principles are presented as open guidelines for concrete measures to implement in health facilities, where either a complete switch to AA is to be undertaken and its full benefits should be expected. Although partial implementation is feasible it needs to be properly thought out and adapted so it can improve access and reach partial benefits from AA, as said by Gaboury (2021), taking account the context of each institution reality is key to improve the chances of any of AA implementations success. In a previous study by Murray (2007) this could already be seen in cases of specialty care where health care was improved even though not all principles were implemented in every case (Fig X).

Table 4 – Relation between the old AA pillar and the revised pillars and their operational definition

Original advanced access model principles	Revised advanced access model principles	New advanced access principles operational definition
Balance supply and demand	Comprehensive planning for needs, supply and recurring variations	Comprehensive planning for the needs and characteristics of registered patients by the clinical team members to provide the number of appointments required. This considers recurring seasonal variations in demand and supply.
Develop contingency plans		
Backlog reduction	Regular adjustment of supply to demand	Regular adjustment of service provision by clinical team members to match and maintain a balance with patients' needs.
Appointment system	Processes of appointment booking and scheduling	The appointment scheduling system must facilitate patient contact with their clinic and provide timely availability of clinical team members according to their patients' needs.
Interprofessional practice	Integration and optimization of collaborative practice	The integration and optimization of a collaborative practice to provide timely health care and services to patients based on their needs and the roles, responsibilities and skills of team members.
---	Communication about advanced access and its functionalities	Information about the principles and functionalities of AA is provided to patients and members of the clinical team and updated when organizational changes occur. This communication incorporates satisfaction of patients and of all clinic members regarding AA.

Source: Breton et al. (2022)

Table 5 – Resume of successful cases at implementing AA in specialty care

Location	Entity	Specialty	Implemented measures	Measured data	Time frame	Results
California, USA	Palo Alto Medical Group	Urology department	<ul style="list-style-type: none"> - Reduced backlog - Reviewed allocation time - Synchronized appointment times <ul style="list-style-type: none"> - Developed service agreements with primary care - Improved graduation of patients back to primary care 	<ul style="list-style-type: none"> - Wait time - Appointment demand - Relative supply - Office lead time 	2 years	<ul style="list-style-type: none"> -Lead time reduced to 5 days or less - Improved physician satisfaction
California, USA	Camino Medical Group	Otolaryngology department	<ul style="list-style-type: none"> - Explicit backlog reduction plan - Service agreements with primary care <ul style="list-style-type: none"> -Standardized rooms - Use of physician's assistant for follow-up and minor procedures - Prepare in advance for visits 	<ul style="list-style-type: none"> - Wait time - Appointment demand - Relative supply - Office lead time 	18 months	<ul style="list-style-type: none"> -Lead time reduced to 5 days or less - Improved physician satisfaction
California, USA	Santa Clara Valley Medical Center	Eye Care service department	<ul style="list-style-type: none"> -Reduced backlog -Synchronized appointment times -Increased number of clinics by identifying additional space -Expanded diabetes mellitus screening clinic because patients with diabetes were seen less efficiently in the general eye clinic -Opened one clinic just for new patients 	<ul style="list-style-type: none"> - Wait time - Appointment demand - Relative supply - Office lead time 	2 years	<ul style="list-style-type: none"> -Lead time reduced to 5 days or less - Improved physician satisfaction - Reduced staffing cost
Wisconsin, USA	Marshfield Clinic	Pain management practice	<ul style="list-style-type: none"> - Complete all work that arrives prior to 15:30 each day. - Reduced backlog by adding more appointments temporarily - Standardized appointment slots <ul style="list-style-type: none"> - Review future schedule daily - Synchronized appointment times <ul style="list-style-type: none"> - Improved continuity - Revised referral process - Post-vacation contingency plan - Revised provider schedule by adding slots when necessary and eliminating hidden time - Standardized examination rooms and process 	<ul style="list-style-type: none"> - Wait time - Appointment demand - Relative supply - Office lead time 	18 months	<ul style="list-style-type: none"> -Lead time reduced to 5 days or less - Reduction of 35% follow-up appointment cycle time. - Eliminated costly overtime - Improved staff satisfaction

Source: (Murray 2007)

2.3. Appointment scheduling types

There are several types of scheduling types, which are presented below.

- Time-Specified Scheduling

Time-specific scheduling involves setting appointments at specific times. Most clinics use this method in order to reduce patients' uncertainty waiting time for the appointment (Chung, 2002). The allotted time for appointments typically varies based on the purpose of the visit. New patient appointments and complete physicals usually require more time compared to urgent visits for established patients. However, a potential concern with this scheduling method is the possibility of patients not showing up, leading to gaps in the schedule (Chung, 2002).

- Wave Scheduling

In this method, the practice schedules three or four patients for every thirty-minute interval. The practitioner then attends each patient in the order of their arrival. This creates a wave-like pattern where there is always a patient waiting to be seen (Chung, 2002). This scheduling method is particularly suitable for doctors with many patients to accommodate. It allows for some flexibility, as occasionally ill patients may be seen before those with routine appointments. However, it is essential to be mindful that this approach might lead to certain patients becoming frustrated if they realize that someone else has taken their appointment slot. To ensure patient satisfaction, clear and timely communication is crucial. It is important to message and inform patients about any potential delays or changes in the schedule to manage their expectations effectively (Chung, 2002).

- Double-Booking

This scheduling method involves booking two patients for the same appointment slot. It can be beneficial in various scenarios. For instance, if a patient is undergoing an extended diagnostic procedure, the doctor may attend to another patient during that time. Additionally, when the schedule permits only 15-minute time slots, the doctor might double-book one slot per hour, allowing them to see five patients per hour instead of the usual four (Beltrami et al., 2022). Unfortunately, patients frequently experience frustration upon realizing that someone else has been scheduled in the same time slot, as this can overload doctors and nurses, resulting in less time available for each patient (Beltrami et al., 2022).

- **Modified Wave Scheduling**

This scheduling method allocates patients to the first half of every hour, and in some cases, double-booking may occur, while the second half remains unassigned, serving as a buffer for special circumstances. This approach allows practices to accommodate visits that may extend beyond their allotted time or reserve slots for patients who walk in without an appointment (Chung, 2002). This method is most suitable for medical groups facing unpredictable visit lengths or practices frequently receiving walk-in patients without prior appointments. However, it is important to acknowledge that there might be periods of downtime during the second half hour if no patients arrive (Chung, 2002)

- **Clustering Scheduling**

Clustering is an alternative scheduling method in which practices group patients with similar complaints together. This approach aids doctors in maintaining the right frame of mind as they progress through their day (Kaplan et al., 1995). As an illustration, patients visiting for general wellness checkups could be grouped together, followed by the doctor's focus on seeing patients with mental health concerns. Lastly, the day might conclude with appointments for injuries and illnesses. While this method might not be suitable for patients with busy schedules, it can be advantageous for doctors who prefer extended periods of focus within a specific frame of mind (Kaplan et al., 1995).

2.4. Telemedicine

Telemedicine is defined as the practice of medicine via a remote electronic interface (Mechanic et al.,2022).

In recent years, there has been a rapid increase in the use of telemedicine technologies, which allow healthcare providers to remotely diagnose, monitor, and treat patients. The COVID-19 pandemic has accelerated the adoption of telemedicine, as it enables healthcare professionals to provide essential care while reducing the risk of infection transmission. According to a recent survey, telemedicine utilization increased by 38% globally during the pandemic, with some countries experiencing a surge of over 100% in telemedicine usage (Mehrota et al., 2020).

2.4.1. Tele-appointments

Tele-appointment is a patient-to-doctor appointment via remote electronic interface (Mechanic et al.,2022).

Telemedicine appointments have the potential to improve access to care, particularly for patients who live in remote or underserved areas, who have limited mobility or transportation options, or who face other barriers to access traditional healthcare services (Bashshur et al., 2014). Moreover, telemedicine can improve patient outcomes by providing more timely interventions, reducing hospital readmissions, and enabling more effective chronic disease management (Nesbitt et al., 2013). Recently, during the Covid pandemic, tele-appointments were widely used at a national level with great success (O'Neill et al., 2022).

Another big advantage of online appointments is the reduction in the no-show rate, especially for cases of patients that require frequent visits or have some type of chronic disease (Adepoju et al., 2022). High no-show rate has been a prominent problem in most of the world for years now (Campbell et al., 2015).

Tele appointments for Otolaryngology have been shown to be well received by patients, even in pediatric scenarios (McCoy et al., 2021). Other authors argue that most publications in this subject are in fact just proof of concept, requiring further research (Singh et al., 2021). In many cases, tele-appointment can provide all that is needed compared with a face-to-face appointment (Rametta et al., 2020).

However, telemedicine also presents several challenges, such as the need for robust and secure telecommunication networks, reliable technology infrastructure, and patient privacy and consent concerns (Bashshur et al., 2020; Morrison et al., 2021). Additionally, telemedicine requires healthcare providers to develop new skills and workflows, as well as to adapt to new care models that may differ significantly from traditional in-person care (Kruse et al., 2017).

2.4.2. Tele triage

Tele triage is the moment a telemedicine facilitator (i.e., medical assistant, nurse, etc.) conducts preliminary assessment via remote electronic interface (Mechanic et al., 2022).

Tele triage has been shown to reduce unnecessary visits to the hospital, improved clinical outcome while increasing satisfaction rates (Farzandipour et al., 2023). Several case studies have shown the effectiveness of tele-triage even in patients with complex conditions such as head and neck cancer (Hardman et al., 2022), or mouth cancer (Almubarak et al., 2022).

One big challenge is that both low and high urgency cases may present the same level of difficulty to handle, phone triage nurses experience a constant tension between gatekeeping and service providing where professional judgment, available guidelines, system constraints, and interactions with patients have an impact on their decision on classifying the urgency for each patient, specially is health cases where a strict protocol can't be followed (Bent et al., 2021).

3. Methodology

A problem-solving methodology was used, in which the situation was diagnosed and then solutions were proposed to solve the problem.

Having the objective of utilizing AA principles for implementing service improvement at the ENT department of HESE.

For this literature review, a search for scientific articles was carried on Pubmed, ScienceDirect, Springer and Google Scholar on the subject of “advance access”, from which 15 were included for this study. Complementary search was made on the subjects of “telemedicine” and others for a better context on the implementation of AA. No special criteria of selection were taken for this study other than having a clear relation with the subjects of this study. A mixture of open access and paid articles with no publication period limitation were used, although a preference for more recent studies was taken.

An initial in person interview with hospital personnel, physicians, audiologists and administrative workers was conducted to describe the current state of HESE and its ENT department.

A list of possible measures to be implemented, based on the AA principles and literature review, was drafted, then reviewed with the ENT physicians. From this draft a finalized list of measures to be taken was presented with some guidelines on how to implement them.

4. ENT department Hospital Espírito Santo de Évora

Through in person interviews with staff, a correct description and context was drafted and posteriorly reviewed with ENT physicians.

4.1. Hospital Espírito Santo de Évora

Hospital Espírito Santo de Évora (HESE) is part of the Portuguese National Health System (NHS), and by constitutional law must guarantee access to health care to every patient in need of it within viability of its resources (Law no. 56/79). In the year 2022, a total of 1,143,281 medical appointments in both general and specialty medicine were provided in this Hospital (Transparencia SNS). It is considered a central Hospital for the region of Alentejo, providing health service to an area of 31,551 km² and their 704,533 inhabitants (Censos 2021). In some cases, for example Ear, Nose and Throat (ENT) care, is the only provider within the NHS in Alentejo region.

As part of the NHS, a non-urgent transportation service must be provided to patients, within certain requirements, so they are able to get to their appointments (Decree no.142-B/2012, of 15 May). In 2022, for the Alentejo region alone, a total of 43,463 transportation services were provided to 8,185 different patients, costing 1,500,925.33€ to NHS (Transparencia SNS). (Silva et al., 2020)

4.2. ENT Department

Currently, to get access to an appointment at the ENT department, a patient must first get a referral from a General Practitioner or from the Urgent Care service. With this referral patients can then request an appointment with HESE administrative service, both in person or by phone.

When requesting an appointment, a priority level (high priority, moderate priority or low priority) is given to the patient. This priority level can be set by a general practitioner in a prior appointment and can be reviewed for subsequent contacts. If no clinical justification is presented, low priority is given by default. When requesting an appointment, patients are added to a waiting list and later contacted to actually schedule their appointment after confirming physician's availability. Patients are contacted to schedule their appointment for a future week/month, by phone if scheduling within 15 days or by letter if over 15 days. The scheduling type method used is Time-Specified Scheduling. Patients have the possibility to contact HESE's administrative workers to re-schedule their appointment or request specific physicians. Each appointment is booked with the intent of respecting the maximum waiting time defined by law (Table 6).

Table 6 – Maximum lead time for a 1st appointment and surgery according to patient priority level

	1 st appointment	Surgery
High priority + High priority oncology	15 days	15 days
Medium priority oncology	30 days	45 days
Medium priority + low priority oncology	30 days	60days
Low priority	150 days	180 days

Source: Decree no. 153/2017, of 4 May

Daily schedule is divided into 15 minutes slots where a patient can be booked to several slots according to the needs of their appointment. The service schedule for appointments goes from Monday to Friday, from 8:30 a.m. to 6:30 and the booking is made according to each health service provider’s availability. Tuesday and Thursday are reserved for urgent care, where the day is booked with high priority patients and patients originated from HESE urgent care service that are squeezed in whenever possible. Mondays, Wednesdays, and Fridays are considered normal service days, where patients with all priorities can be booked.

This availability varies within this schedule as the normal weekly hours worked is 35. It is also within this schedule that surgery takes place for physicians, reducing the normal availability for consultations.

The surgery block is managed outside of the ENT department, where availability is provided independently from the physician appointments and many times with little to no lead time. Surgery is always prioritized to already booked appointments as free slots in the surgery block are scarce and patients that need surgery usually benefit greatly from having them performed earlier. When this happens, the booked appointments are re-scheduled for a later date.

The ENT team is comprised of 6 physicians, 2 nurses, 2 audiologists and a team of undifferentiated hospital administrative workers in both front office and back office. Of the 6 physicians, 2 are in-house physicians with a complete schedule in the HESE and the other 4 are outsourced physicians providing service at HESE from twice a week to once a month. Each physician specializes in one of the 5 specializations provided at this hospital (Otorhinolaryngology, Children's Deafness, Voice Pathology, Otorhinolaryngology Oncology, Otoneurology). Nurses provide support in physician appointments and Audiologist provide appointments in diagnostic procedures from a total of 10 different diagnostic procedures where some have a different time length (Table 7).

Table 7 - Diagnostic procedures provided by Audiologists at HESE

Auxiliary Diagnostic and Therapeutic Means (ADTM)	Duration (minutes)	Requires Preparation	Requires Doctor presence	Can immediately generate the report
Pure-tone Audiometry up to 5y/old	30	No	No	Yes
Pure-tone Audiometry	30	No	No	Yes
Auxiliary Diagnostic and Therapeutic Means (ADTM)	Duration (minutes)	Requires Preparation	Requires Doctor presence	Can immediately generate the report
Speech Audiometry	15	No	No	Yes
Hearing Gain Optimization	30	No	No	Yes
Acuphenometry	30	No	No	Yes
Tympanogram	15	No	No	Yes
Research of Acoustic Reflex	15	No	No	Yes
Electronystagmography (ENG)	90		No	Yes
Videonystagmography (VNG) -prep	60	Yes	Yes	Yes
Computerized Dynamic Posturography – prep	30	Yes	No	Yes
Auditory Evoked Potentials – prep	45	Yes	No	Yes

Source: Author

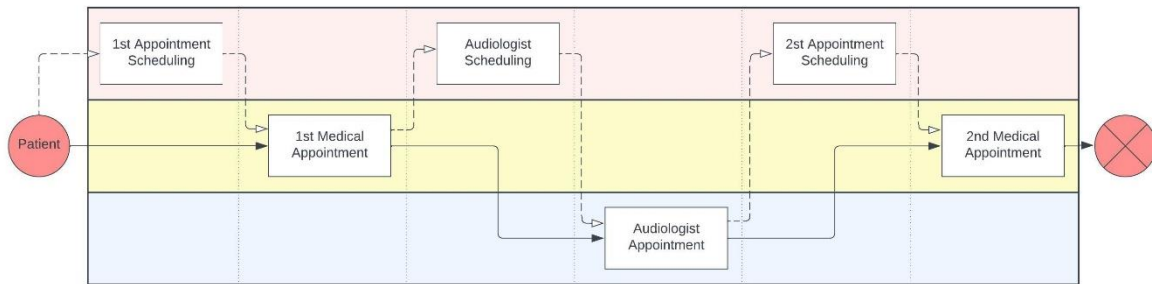
No-show rates are high, commonly reaching 30% of the daily booking, resulting in common situations where physicians have time to attend patients without a scheduled appointment or in some cases without any activity for several slots at a time. The main factor for this is the long lead times for an appointment and re-scheduling, which previous studies have shown to be common cause for no-show (Marbough et al., 2020; Kaplan et al., 2013). Dissatisfaction is low but predominant in the previously mentioned cases of re-scheduling.

Telemedicine has been explored recently during the Covid pandemic, mainly through voice tele-appointments, but no longer in use since restrictions were lifted.

4.3. Current operational model description for the ENT department at HESE

When new appointment vacancies are available, a patient is contacted by the administrative team to schedule an appointment, commonly weeks to months in advance, where most patients will follow a similar path (Figure X).

Figure 1 – Visual representation of the standard path for ENT patients



Source: Author

In the day of the first appointment, the patient must check-in at the front desk when he arrives at the hospital, then he is given guidance on how to get to the waiting area near the doctor's office at the ENT department. During the appointment, the physician questions the patient and concludes that to properly diagnose the patient a complementary audiometry diagnostic procedure must be done. With a prescription for a diagnostic procedure the patient can request an audiometry appointment for that effect. Again, the patient waits for a vacancy so his appointment can be scheduled.

In the day of the audiometry appointment the patient must again check-in and proceed to the waiting area in the ENT department. After the appointment, a diagnostic report is created which is sent to the patient by mail several days after the appointment. Only when the patient is in possession of this report, he can request a second physician appointment for his diagnosis to be finalized.

On the day of the second physician appointment, the patient must again check-in, wait in the ENT waiting area and when attended the physician analyzes the report generated in the next room weeks before and decide how to proceed with this patient case.

Currently is not possible to increase the medical team, both for physicians and audiologists. Budget for implementing any kind of innovation is limited and, in any case, taking advantage of what is already available at the hospital will increase the possibility of it to be approved and implemented.

5. Recommendations to be implemented based on Advanced Access

For the recommended measures to implement we present them in two waves, where in the first wave can be achieved with low to nonmonetary investment while the second wave might require a bigger investment in both time and monetary effort. Each recommended measure is related to one or more AA principles (Table 8).

Table 8 - List of measures to be implemented and the AA principles they relate to

Implementing Measures	Objective	Principle
1st wave		
Phone attendance confirmation system	Reduce no show rate.	Regular adjustment of supply to demand / Comprehensive planning for needs, supply and recurring variations
Simple tele-triage	Reduce unnecessary appointments. Reduce lead time.	Integration and optimization of collaborative practice/ Regular adjustment of supply to demand / Comprehensive planning for needs, supply and recurring variations
AA communication plan	Communicate functionality and goals of AA	Communication about advanced access and its functionalities
Communication line with urgent care and general practitioner	Improve continuity of care. Reduce workload.	Integration and optimization of collaborative practice
Seasonal Contingency plan	Reduce workload.	Comprehensive planning for needs, supply and recurring variations
Modified Wave scheduling	Improve flexibility	Processes of appointment booking and scheduling
Same day diagnostic procedure and physician follow up	Improve continuity of care.	Regular adjustment of supply to demand /
2nd wave		
Nurse tele-triage	Reduce unnecessary appointments. Reduce lead time. Improve continuity of care.	Integration and optimization of collaborative practice/ Regular adjustment of supply to demand / Comprehensive planning for needs, supply and recurring variations
Tele-appointments	Improve continuity of care.	Regular adjustment of supply to demand / Comprehensive planning for needs, supply and recurring variations
Contingency plan for unexpected surgery block opening	Improve continuity of care. Reduce patient dissatisfaction. Reduce no show rate.	Comprehensive planning for needs, supply and recurring variations

Source: Author

For the first wave we recommend the following measures to be implemented.

- **Phone attendance confirmation system**
By introducing phone attendance confirmations, the ENT department can significantly decrease no-show rates. This proactive approach ensures patients are prepared for their appointments, resulting in reduced idle slots, optimized resources, and overall improved healthcare service. This moment contact can be also used for further questioning the patient on his case.
- **Simple tele-screening**
By assessing patients remotely, healthcare professionals can determine the urgency and required care of a situation, channeling simple cases to a quicker line of service. An administrative worker or nurse can review the medical report for the general physician that referred the patient to the ENT department, this way patients can be divided by the possibility, or not, to go directly for a diagnostic procedure or if it requires more information before deciding. This can optimize resources and reduce lead time. This can be done by creating a simple questionnaire to identify if it's possible to send the patient directly to a diagnostic procedure. This questionnaire should be created by the ENT physicians and can be tested at the beginning of regular appointments. All necessary cases reports should be reviewed and approved by a physician before proceeding in this direction.
- **AA communication plan**
This can be made into a standard and simple communication document, where at the time of contacting the patient prior to an appointment he can be informed about AA, how it operates and how it can speed up his health service. This can also be used to communicate within the hospital for possible collaborative practices.
- **Communication line with urgent care and general practitioner**
The creation of a direct communication line to an administrative worker at the ENT department could enable the forwarding of patients from the urgencies when open slots are available for the day.
- **Seasonal Contingency plan**
For this is required an understanding of the seasonality of certain conditions/pathologies. For example, in winter, cases of Otis increase and so an increase of patients with

complaints of ear pain and discomfort looking for an appointment without a previous request could be expected.

- Modified Wave scheduling

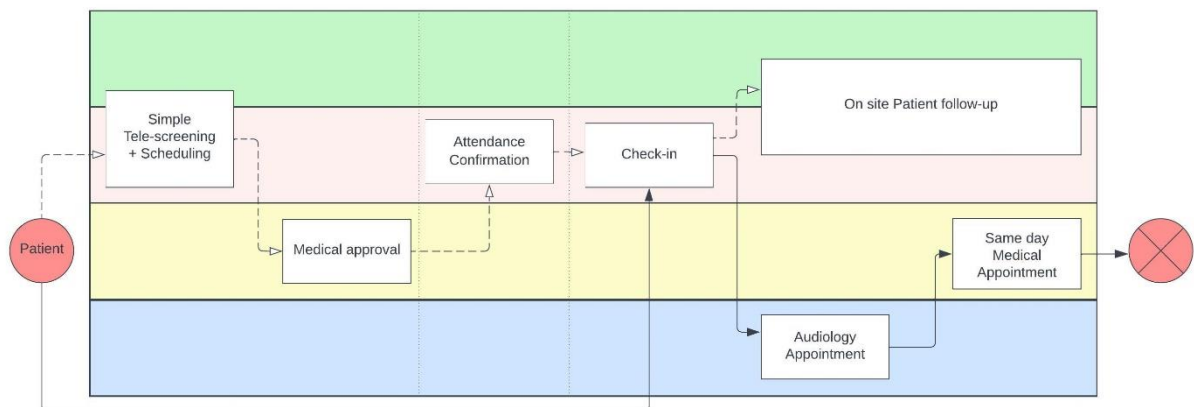
This type of scheduling should be preferred as it provides a great amount of flexibility to adjust the number of slots for booking in advance and open access whenever is needed.

- Same day diagnostic procedure and physician appointment

This will allow patients to have the possibility to be seen by both the Audiologist and physician on the same day, receiving the final diagnoses and possibly treatment on the same day they visit the hospital. This can be easily applied to patients that went through the tele-screening.

With the first wave of measures implemented we now have the possibility of streamlining some patients. An example could be of a patient going through tele-screening where a possible hearing loss was identified, with that he can be directly appointed to an Audiologist for a hearing exam saving time from a first physician appointment that would have the same outcome (Figure 2).

Figure 2 - Visual representation of possible patient path with wave one implemented.



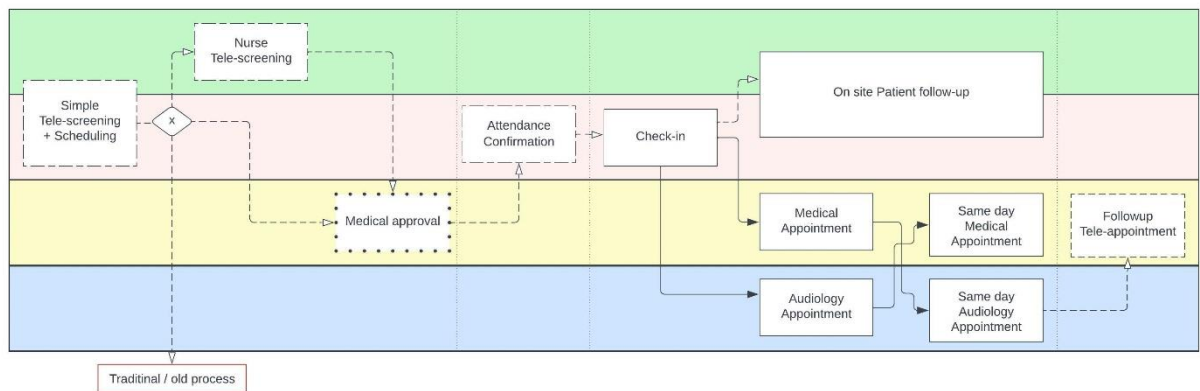
Source: Author

For the second wave we recommend the following measures to be implemented.

- Tele-appointments
Although it's simple to have a video call with a patient, appropriate software provides the needed security and privacy as well as some kind of support service.
- Nurse tele-triage
Although a similar procedure to the simple tele-triage, this nurse tele-triage has the goal to look for more complex cases where a simple questionnaire through a voice call does not suffice. Video call will be required to visualize and possibly capture image for adding the diagnosis. All necessary cases should be reviewed and approved by a physician.
- Contingency plan for unexpected surgery block opening
This contingency plan should take advantage of the two previous measures by providing the possibility of patients to be seen on another date through a tele-appointment or allow them to be seen by a nurse face to face and have them triaged.

With the second wave implemented we now have not only more possibilities to streamline patients but also alternative routes when this is not possible as form of contingency options (Figure 3).

Figure 3 - Visual representation of possible patient path with wave two implemented.



Source: Author

6. KPI's

The most effective way to measure progress is through the evolution of measurements, and for this case KPI's and the answers they should give us are:

- No-show rates

With a model more flexible and catered to the patient, should be expected that the no-show rate to decrease. This can also be aided by contingency plans.

- Average lead time

Having better management of patients and an established way to streamline them with tele-screening and same day appointments, the average lead time should see a reduction.

- Satisfaction levels.

In this case satisfaction levels should improve, not only by reduced lead time, but also due to the reduction of unpleasant situations like canceled appointments due to unexpected openings at the surgical block thanks to the contingency plans.

- Patients attended vs physician appointments.

This new KPI can give us information regarding the effectiveness of reducing unnecessary appointments. When comparing the relation between these two numbers we should expect it to increase as we are able to take care of more patients without increasing needed appointments. This can also give us an insight if we are being more cost effective with our staff, as the reduced direct interaction with physicians will be passed to other staff (nurses and administrative workers).

7. Conclusions

The Traditional access model for health care service is showing its limitations, as the same time society gets older the pressure it puts on entities like the NHS grows. A new model where flexibility is a strong part of its core can alleviate this situation.

The central objective of this project is to diagnose the situation of the ENT department in study and propose a possible solution for the presented problem. After an extended literature review and several interviews with the professionals of this department, it was concluded that the best solution to solve the problems of high no show rates and operational inefficiency was an Advanced Access implementation plan specifically tailored to the ENT department's unique needs. This proposal encompassed ten measures divided into two phases. By delineating these measures, this thesis aimed to provide a roadmap for healthcare administrators and practitioners to enhance patient care delivery while improving the operational efficiency within the ENT department. With huge constraints on budget, creativity had to be used on creating the recommended measures.

While the proposed measures hold promise, it is essential to acknowledge the limitations of this study. One notable constraint is the lack of in-field feedback from patients. Incorporating patient perspectives and experiences into the implementation process is vital to ensure that the changes resonate with the individuals we aim to serve. Future research and implementation efforts should prioritize gathering patient feedback to refine and fine-tune the Advanced Access model continually. Another point not addressed was the possibility to also streamlining patients for pre-surgery procedures like x-rays and blood testing as this was out of the ENT department.

In conclusion, the challenges faced by the ENT department in this hospital, characterized by high no-show rates and low operational efficiency, have been addressed through the lens of implementing the recommended. This thesis embarked on a journey to explore these issues, employing a problem-solving methodology to identify practical solutions.

Nonetheless, this thesis represents a crucial step toward transforming the ENT department into a more efficient and patient-centric healthcare unit. By addressing high no-show rates and low operational efficiency through an operational approach, it lays the foundation for positive change. As healthcare systems evolve, the lessons learned in this study can serve as a reference for health departments with similar characteristics seeking to optimize their operational model, ultimately contributing to enhanced patient care and a more efficient healthcare delivery.

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