

VISION DOCUMENT

HOW HEALTHCARE SYSTEMS CAN LEVERAGE DIGITAL TO MITIGATE THE RISK OF COLLAPSE

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AGENDA

0. INTRODUCTION
1. ONLINE SELF-SERVICE FOR CITIZENS
2. MONITORING OF EPIDEMIOLOGIC EVOLUTION AND TRACKING OF HIGH-RISK CASES
3. SUPPORT TO HEALTHCARE PROFESSIONALS
4. CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE



INTRODUCTION

SCOPE

PURPOSE OF THIS DOCUMENT

- The purpose of this document is to alert key decision makers for the **potential of digital** to overcome the **challenge of the escalating need for medical assistance and monitoring** of potential patients, as well as support for healthcare professionals.
- Therefore, it does not aim at designing a functional or technical solution in itself.

CONTEXT OF THE DOCUMENT

- Karma Network's **motivation** was to **contribute with knowledge within its area of expertise**⁽¹⁾, following the identification of a unique opportunity to leverage digital in the mitigation of a dramatic crisis.

DISCLAIMER

- Karma Network **is not fully aware on the current processes and intricacies of the portuguese healthcare system nor of the medical protocols in place**, rather being a specialist in digital approaches. As such, perspectives included in the present document are fully outside-in, therefore possibly lacking some adjustment to reality.

ABOUT KARMA NETWORK

- Karma Network is a **strategy and digital execution consulting firm**, whose mission is **to help organizations and society capture the full potential of digital, at scale.**

(1) The base content for the preparation of the present document had its origin in a brainstorming exercise during a Karma Network offsite.

EXECUTIVE SUMMARY

THIS DOCUMENT PROPOSES SEVERAL INITIATIVES, DIVIDED INTO FOUR COURSES OF ACTION, THAT CAN BE EASY AND FAST TO IMPLEMENT, LEVERAGING DIGITAL TO SCALE HEALTHCARE SYSTEMS' RESPONSE CAPACITY THROUGH ONLINE CHANNELS:

1. ONLINE SELF-SERVICE FOR CITIZENS

- Online self-service for citizens (and/or healthcare professionals), by transferring and adapting the phone protocol to digital, using it as the primary triage process with virtually unlimited capacity.

2. EPIDEMIOLOGIC MONITORING AT SCALE

- Monitoring of the epidemiologic evolution and tracking of critical cases, looking to monitor IT in a centralized manner and at scale: suspected cases, high-risk cases, in-need for hospitalisation cases, etc.

3. SUPPORT TO HEALTHCARE PROFESSIONALS

- Support to healthcare professionals (capacitation, protocol updates, task coordination).

4. CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE

- Creation of a war room that leverages upon a multidisciplinary team to support decision making, adjustments and the deployment of new initiatives in an agile manner and centralizes access to information in an integrated way.

OBJECTIVES OF PROPOSED INITIATIVES



SAVING LIVES

- Enabling a real triage effect, allowing for an earlier identification of critical cases, thus enabling earlier assistance.
- Improving systems' support capacity in a significant manner.
- Amplifying capacity to oversight and control incidences.



IMPROVING HEALTHCARE SYSTEMS' USER EXPERIENCE

- Reducing service waiting times.
- Minimizing anxiety resulting from lack of information and difficult access to the system - namely the screening process.
- Minimizing feelings of "system failure".



IMPROVING SYSTEMS' EFFECTIVENESS AND EFFICIENCY

- Using technology to reduce the need for human resources (scarce and valuable) in non-priority activities.
- Generating more impact while using less resources.

ADVANTAGES OF A DIGITAL APPROACH TO THE OVERLOAD CHALLENGE IN HEALTHCARE SYSTEMS SERVICE AND SUPPORT

SCALABILITY IN INTERACTION

Ability to unlimitedly scale up the interaction with citizens, in a bidirectional manner.

IMMEDIATE CONSOLIDATION OF LEARNINGS AND PROTOCOL UPDATES

Allowing to adjust and update contact interfaces with users almost immediately.

CENTRALIZED AND DEEP MONITORING

Centralization of all contact, triage and case monitoring data in real-time and with the ability of being filtered, structured and detailed within seconds.



FAST IMPLEMENTATION

Ability to activate new initiatives or adjustments within hours or a few days (depending on the level of complexity), with minimum costs.

SIMPLICITY AND INTERACTIVITY IN COMMUNICATING COMPLEX INFORMATION

Relevant information can be infinitely expanded, comprising citizens and healthcare professionals need for information and making access and understanding of that information easier.

AUTOMATED COMMUNICATION FLOWS

The use of automated question and answer solutions enables the filtering of cases needing human intervention or pre-programmed communication.



ONLINE SELF-SERVICE FOR CITIZENS

COURSE OF ACTION 1: ONLINE SELF-SERVICE FOR CITIZENS

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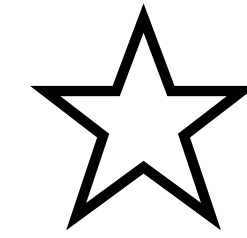
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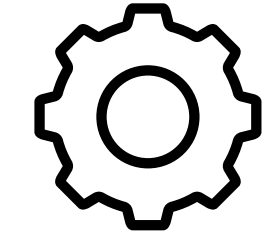


ONLINE SELF-SERVICE APPROACH HAS FOUR KEY COMPONENTS



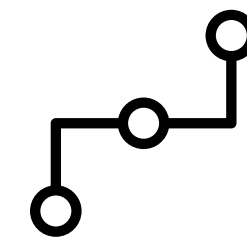
MAKING ONLINE THE PRIMARY CHANNEL

Adapting online channel to work as the frontline contact point with citizens, at scale.



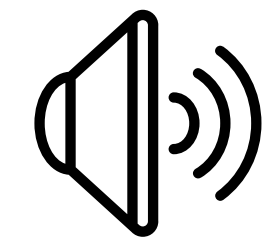
ENSURING ONLINE RESPONSE CAPACITY

Supplying online channels with technical infrastructure that ensures response to demand peaks.



DEFLECTING PHONE CALLS CURRENTLY FLOODING THE HOTLINE

Technically strengthening hotlines and creating mechanisms that allow to automatically inform, filter and deflect contacts to online channels.



PROACTIVELY COMMUNICATING WITH CITIZENS

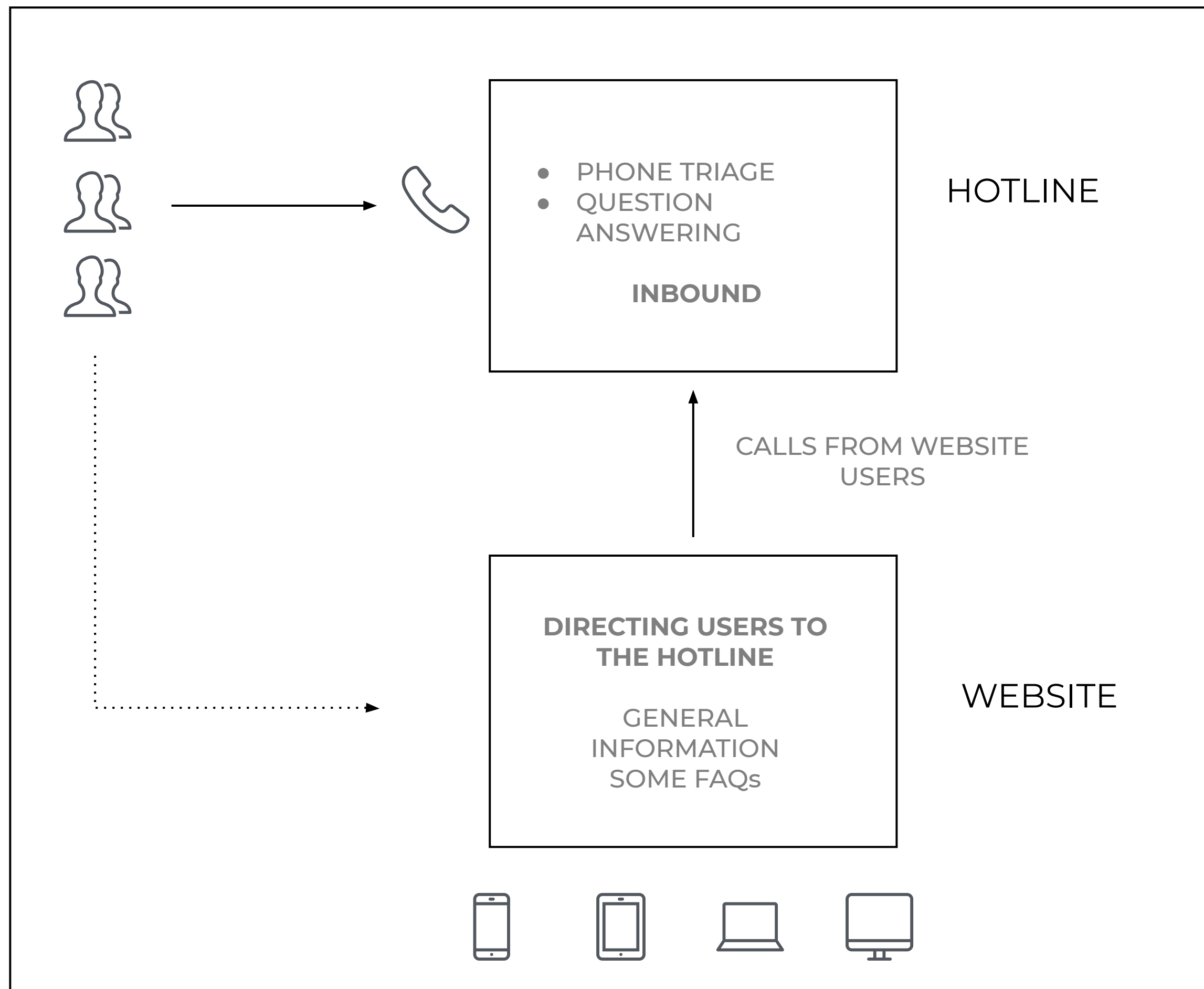
Communicating online as the primary channel, rather than the hotline⁽¹⁾.

(1) Preserving the phone channel, for those who do not have access to the internet and for emergency cases.

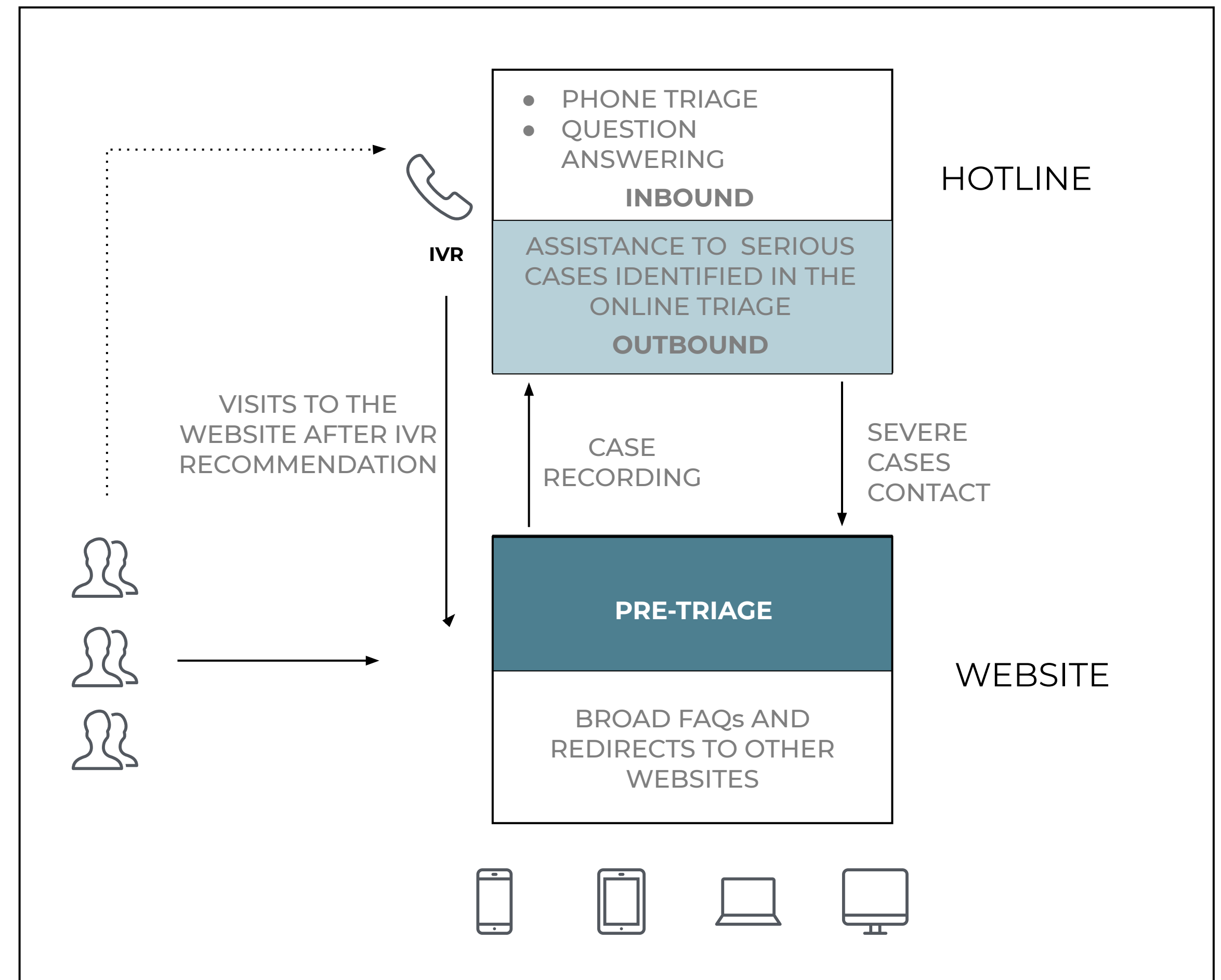
VISION: MAKING ONLINE THE PRIMARY CHANNEL

- Prioritization of system effort according to severity
- Deployment of a real triage
- Leverage of the unlimited scale of online

CURRENT SCENARIO



DESIRABLE SCENARIO



MAKING ONLINE THE PRIMARY CHANNEL. HOW?

4 KEY ACTIVITIES

OPTIMIZING ONLINE CONTENT

- Developing relevant content that effectively informs citizens.
- Harmonizing information and frequently asked questions across websites.
- Alternatively, sending people to a single website condensing frequently asked questions and relevant information.
- Organizing frequently asked questions by topic and by relevance (most read, most asked, most asked in the call centre, etc.).
- Improving information sorting and user interface (eg. using expandable formats).

DEVELOPING AN ONLINE TRIAGE PROCESS

- Adapting phone triage protocols to online, through specialized platforms.
- Using a SAAS⁽¹⁾ market tool, with fast implementation, new generation UI/UX⁽²⁾ and high response capacity.
- Directing users to other websites if their information needs falls outside the scope of case triage.
- Questionnaire with logic trees according to the users' answers.
- Collection of contact data.
- Possible dispatch of automatic messages after completion of questionnaire (according to answers, or not).
- Forwarding of critical cases to the outbound team.

CREATING A SUPPORT FOR CASE RECORDING

- Recording of completed forms (including contact information) in databases.
- Data processing automation, for a simplified visualization of cases.
- Creating unique IDs per case, associated to risk scores.
- Defining and incorporating automatic contact workflows via message or robot call, depending on the score and call centre availability.
- Migrating cases identified as having a critical score after contact with healthcare professionals, to a database of cases to be monitored.
- Integrated and real-time view of the triage flow.

CREATING AN OUTBOUND OPERATION

- Converting part of the inbound team into outbound, to contact with online flagged cases.
- Effective resource management to ensure that cases that were identified as critical online, face a waiting time below average.

(1) Software as a service.

(2) User Interface/User Experience

SEVERAL WEBSITES WITH DIFFERENT CONTENT CAN MAKE CONSULTING INFORMATION DIFFICULT
POP-UPS CAN BE USED TO REDIRECT CITIZENS TO ONE SINGLE WEBSITE THAT CONDENSES ALL RELEVANT INFORMATION

ILLUSTRATIVE CASE OF THE PORTUGUESE NATIONAL HEALTHCARE SERVICE: THERE ARE SEVERAL WEBSITES WITH DISPERSE INFORMATION

<https://www.sns24.gov.pt/>



<https://covid19estamoson.gov.pt/>



<https://covid19.min-saude.pt/>



IT IS IMPORTANT TO OPTIMIZE CONTENT MADE AVAILABLE ONLINE

INFORMATION MADE AVAILABLE ONLINE SHOULD BE PROPERLY DEVELOPED

ILLUSTRATIVE CASE OF THE PORTUGUESE NATIONAL HEALTHCARE SERVICE: INFORMATION MADE AVAILABLE IN THE WEBSITE APPEARS NOT TO BE DEVELOPED ENOUGH AND, IN THE CONTEXT OF COVID-19, IT REDIRECTS USERS TO THE HOTLINE

<https://www.sns24.gov.pt/>

Alertas
Mantenha-se informado, proteja-se.
Conte com o nosso apoio.

COVID - 19
CORONAVÍRUS

Novo coronavírus
COVID-19: Saiba como se pode prevenir e o que deve fazer no caso de ter sintomas.

Ver todos os alertas >

Prevenção

- [Lave frequentemente as mãos](#) com água e sabão ou use solução à base de álcool
- Quando espirrar ou tossir tape o nariz e a boca com o braço
- Use lenços de papel descartáveis e de utilização única
- Se regressou de uma área afetada, evite o contacto próximo com outras pessoas

Esteve perto de alguém com **COVID-19** e **NÃO** tem sintomas?

Se **NÃO** tem [febre](#), [tosse](#) ou [dificuldade em respirar](#) deve:

1. Evitar estar próximo de pessoas durante 14 dias
2. Medir a temperatura 2 vezes por dia

Esteve perto de alguém com **COVID-19** e **TEM** sintomas?

Se **TEM** [febre](#), [tosse](#) ou [dificuldade em respirar](#) deve:

1. Ligar para o SNS 24 – [808 24 24 24](#) e seguir as orientações dadas
2. Evitar estar próximo de pessoas

IT IS IMPORTANT TO OPTIMIZE CONTENT MADE AVAILABLE ONLINE

INFORMATION AVAILABLE ONLINE SHOULD BE RELEVANT

ILLUSTRATIVE CASE OF THE PORTUGUESE NATIONAL HEALTHCARE SERVICE: WHEN SEARCHING FOR CORONAVIRUS OR COVID-19 IN THE WEBSITE, RESULTS APPEAR TO LACK RELEVANCE

Resultados de pesquisa por: coronavirus

Encontrámos 110 resultados

Serviços

Utilizar a aplicação MySNS Carteira

Novo coronavírus. Quais as medições que posso registar? Pode registar a medição de: Passos*; Glicémia. *Para o sistema operativo ...

Marcar consultas

COVID-19 Faça aqui a pré-avaliação dos sintomas provocados pelo novo coronavírus COVID-19 e saiba o que deve fazer · Início Serviços Marcar consultas ...

Pedir comprovativo de contacto com o SNS 24

COVID-19 Faça aqui a pré-avaliação dos sintomas provocados pelo novo coronavírus COVID-19 e saiba o que deve fazer · Início Serviços Pedir comprovativo ...

[Ver mais Serviços](#)

Resultados de pesquisa por: covid19

Encontrámos 217 resultados

Serviços

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Consultar comprovativo de pagamento das taxas moderadoras ...

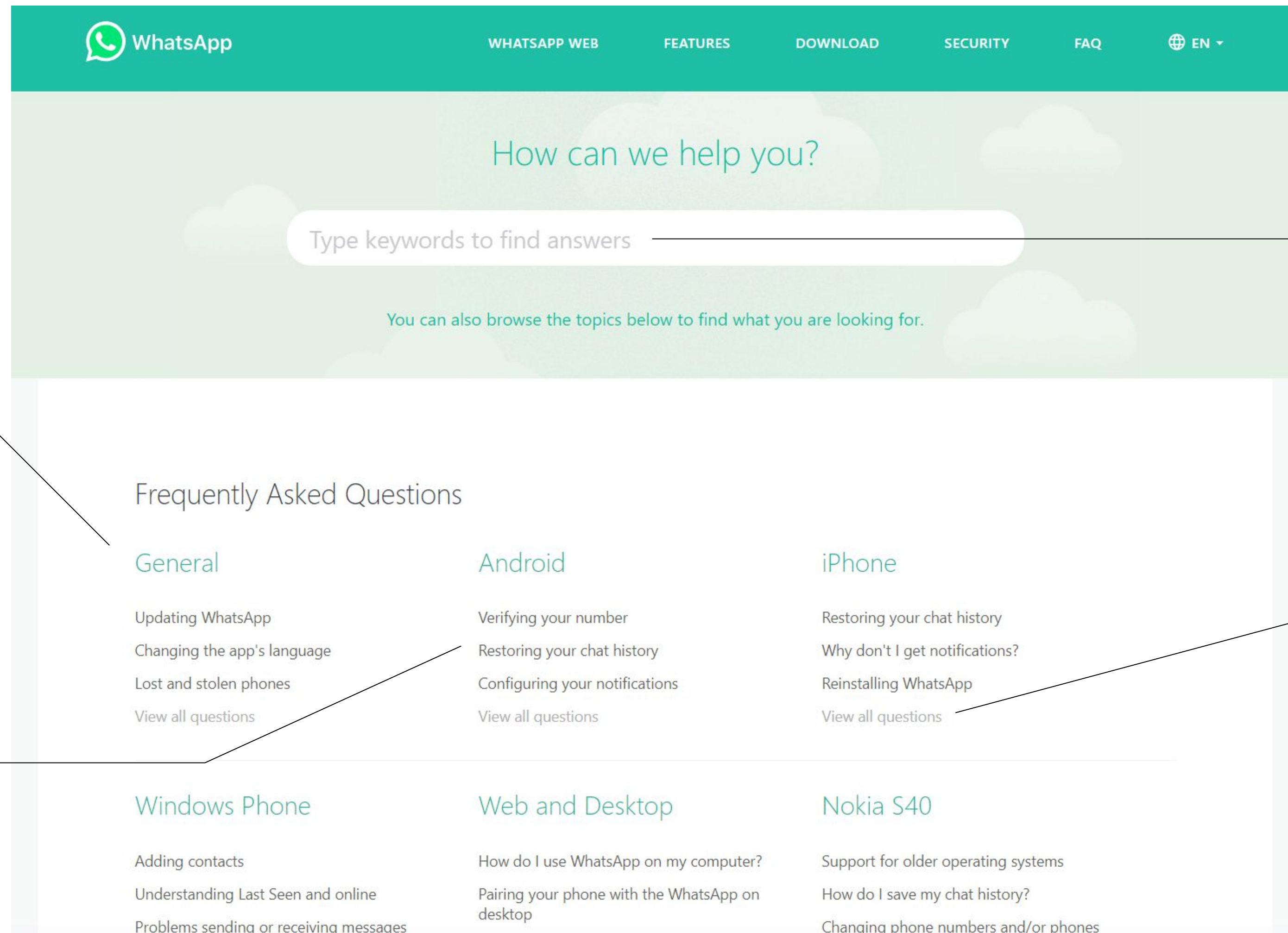
20 Dez 2019 ... AVISO. COVID-19 Se esteve próximo de alguém com COVID-19 e NÃO tem febre, tosse ou dificuldade em respirar saiba aqui o que deve fazer.

[Ver mais Serviços](#)

FREQUENTLY ASKED QUESTIONS SHOULD BE SORTED BY TOPIC AND BY RELEVANCE AND SHOULD BE SEARCHABLE

A FLUID ORGANIZATION ALLOWS TO EFFECTIVELY SATISFY THE USER'S NEEDS

ILLUSTRATION OF WELL SORTED FREQUENTLY ASKED QUESTIONS (WHATSAPP WEBSITE)



Categorization of questions in a highly visual manner.

Easy keyword search

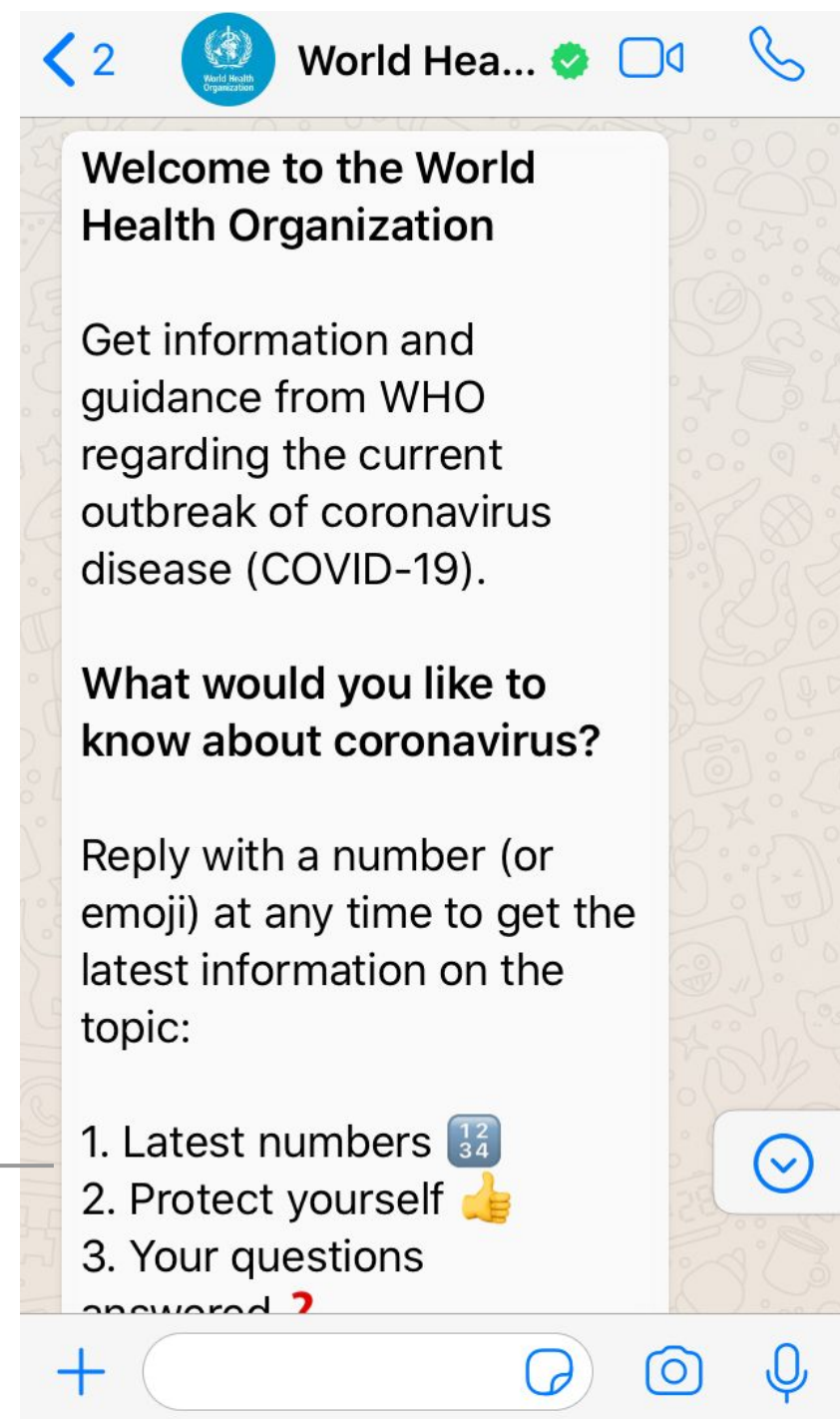
Questions displayed by relevance

Refrains from immediately showing all questions, in order to present a broader view of different information topics available.

WORLD HEALTH ORGANIZATION HAS RECENTLY RELEASED A DIRECT COMMUNICATION CHANNEL VIA WHATSAPP WITH A SIMPLE, FLUID AND VERY ACCESSIBLE LANGUAGE

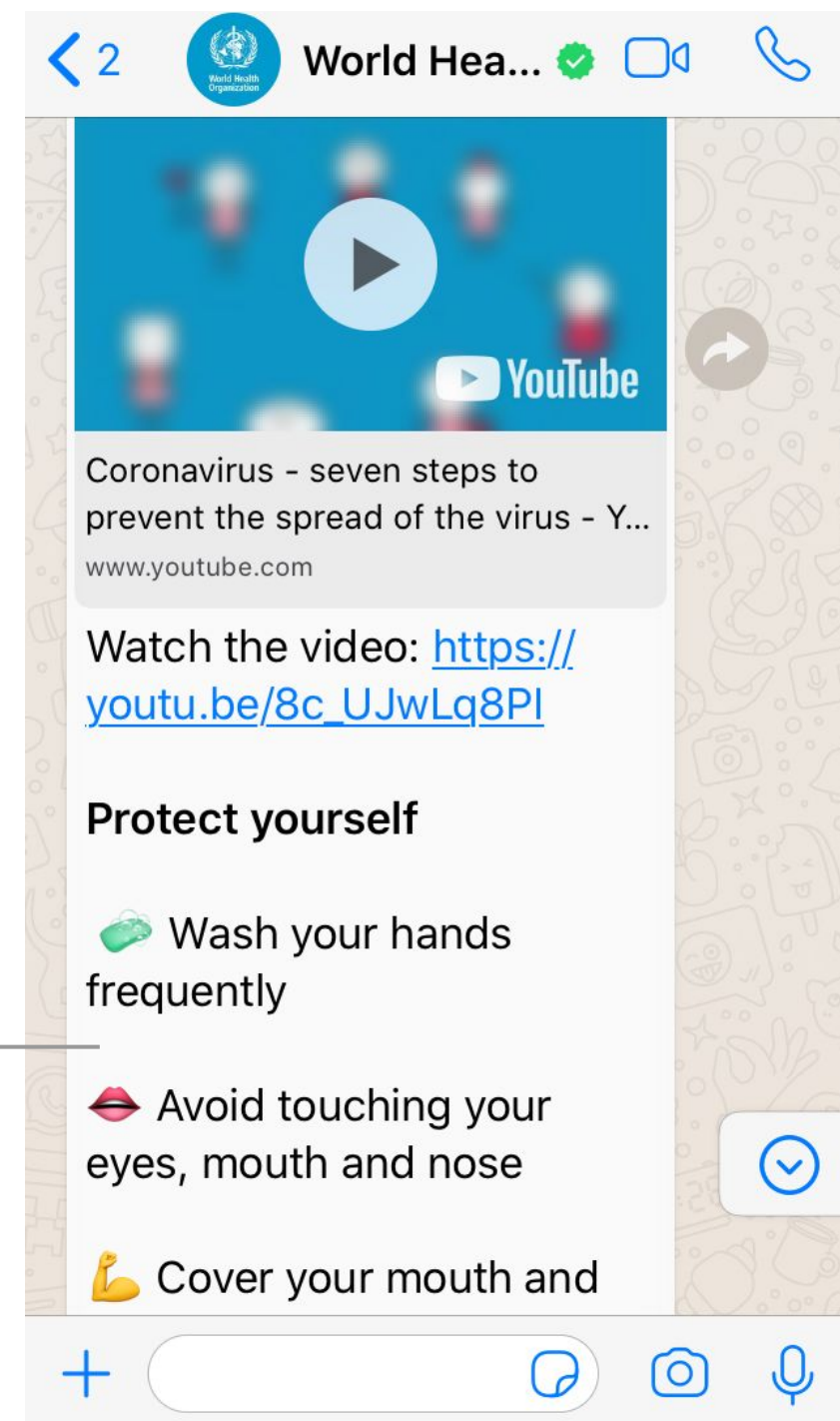
ILLUSTRATION OF THE WORLD HEALTH ORGANIZATION WHATSAPP CHANNEL WITH INTERACTIVE FREQUENTLY ASKED QUESTIONS

WELCOME MESSAGE



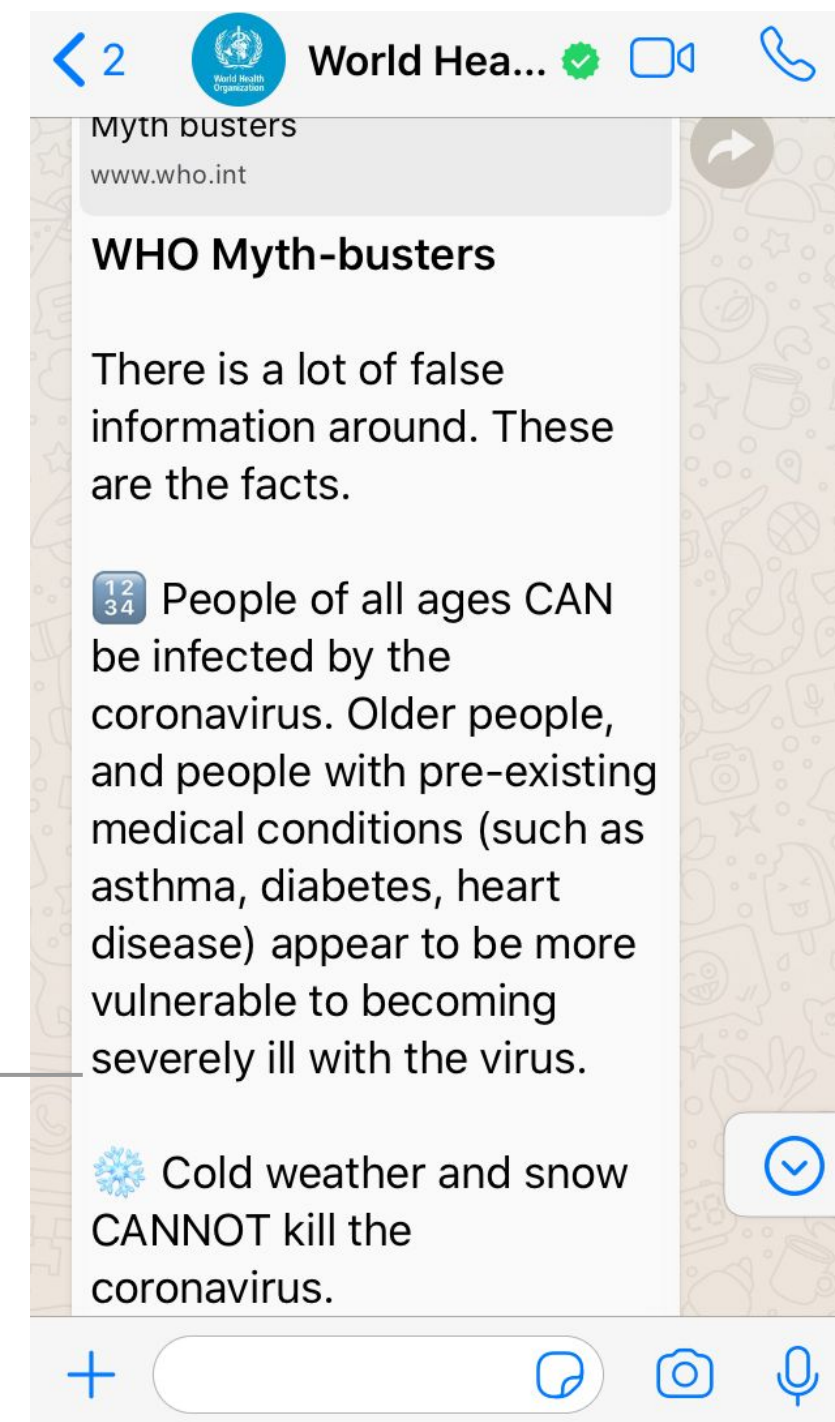
Interactive presentation of Frequently Asked Questions, available in four different languages

2. PROTECT YOURSELF



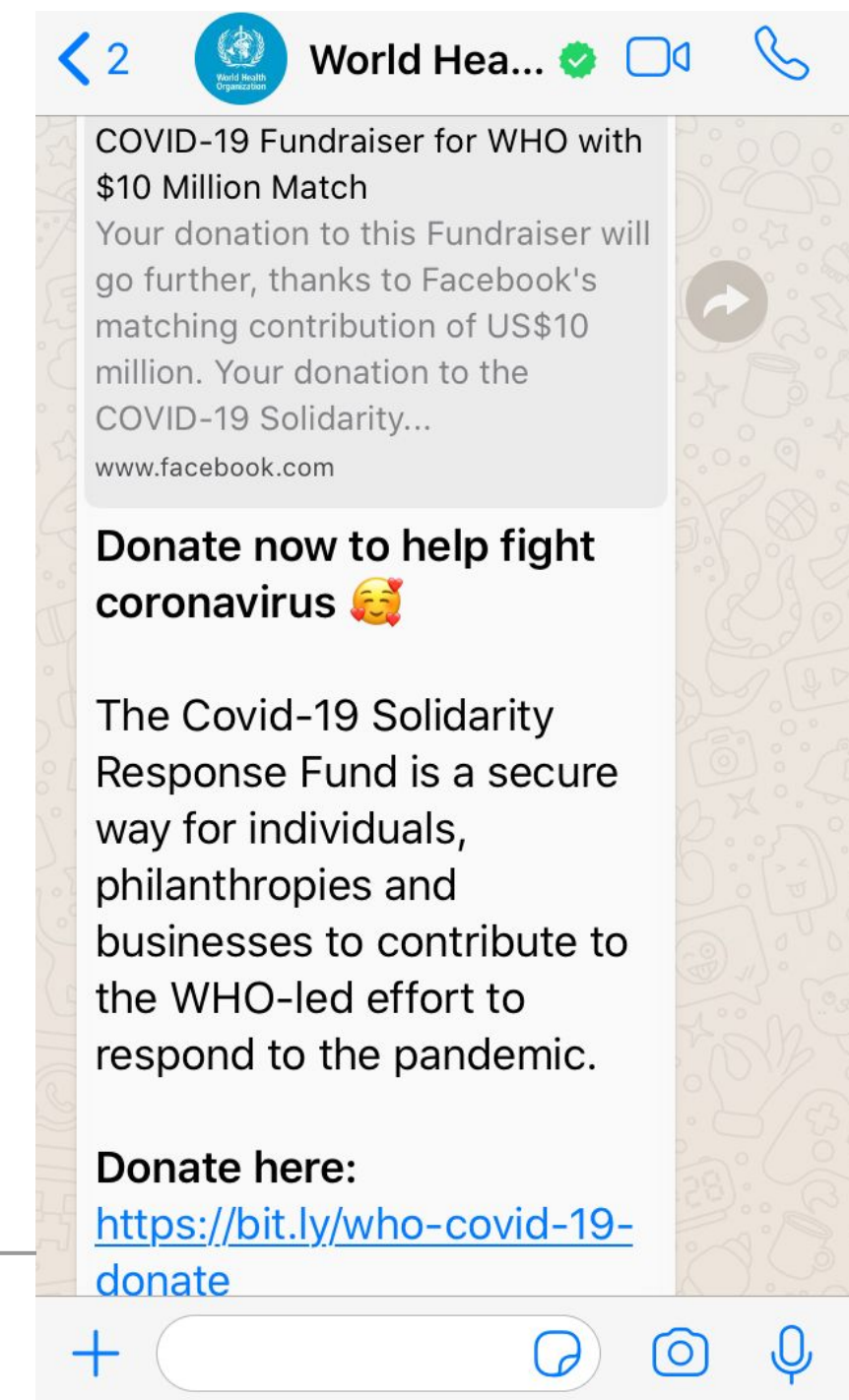
Use of different formats (text, emojis, video) to facilitate reading.

4. MYTHBUSTERS



Complex information presented in a simple and concise way.

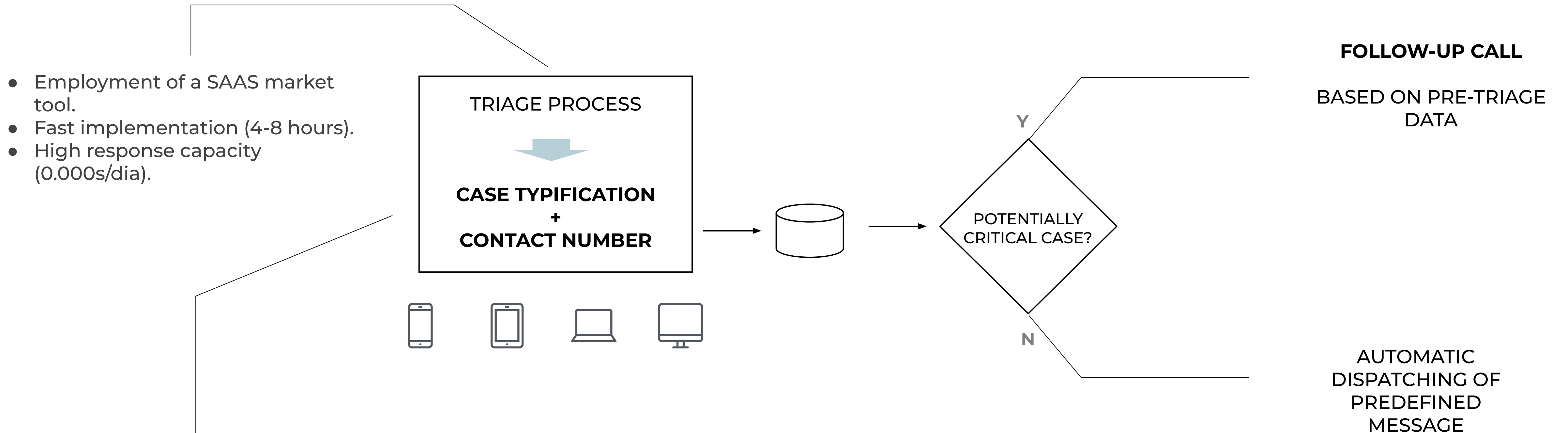
8. DONATIONS



Redirecting users to websites that satisfy their information needs.

THE ONLINE TRIAGE PROCESS AIMS AT CREATING A SYSTEM FOR “PATIENT RELATIONSHIP MANAGEMENT”, THAT ALLOWS FOR AN EFFECTIVE CONTACT MANAGEMENT WITH THE CITIZENS, AT SCALE BASED ON SAAS MARKET TOOLS - QUICK TO IMPLEMENT

ILLUSTRATION OF POTENTIAL ONLINE TRIAGE PROCESS



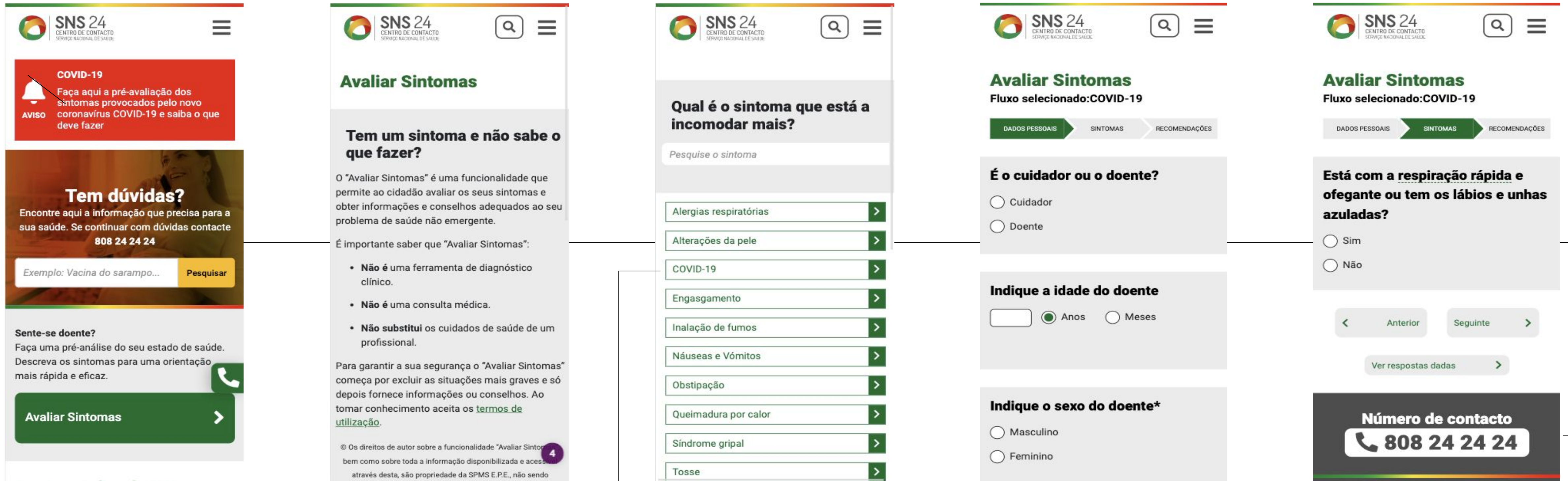
- Employment of a SAAS market tool.
- Fast implementation (4-8 hours).
- High response capacity (0.000s/dia).

- Structured questionnaire, with logic tree according to responses, with adaptation/enrichment of current protocol.
- **Collection of contact number.**
- Presentation of a message at the end of the questionnaire.
- Automated response (according to the answers provided, or not).

ILLUSTRATIVE CASE OF PORTUGUESE NATIONAL HEALTHCARE SERVICE: CURRENT SYMPTOMS EVALUATION SYSTEM INVARIABLY ENDS IN A RECOMMENDATION TO CALL THE HOTLINE

IT APPEARS TO LACK EFFECTIVE TRIAGE CAPACITY AND IT DOES NOT COLLECT CITIZENS' CONTACTS

PORTUGUESE SYMPTOMS EVALUATION PROCESS FOR COVID RECOMMENDS USERS TO CALL THE HOTLINE, EVEN IF THEY TURN OUT TO BE LIGHT CASES



The current symptoms evaluation tool places Covid-19 as a symptom to begin with, conditioning the remaining question flow, hindering the triage process.

Users who select the Covid-19 flow are directed to the hotline, before any assessment of the case seriousness.

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The screenshots illustrate the user journey through the SNS 24 COVID-19 symptoms evaluation system. The process starts with the 'Avaliar Sintomas' (Evaluate Symptoms) section, where users are asked to select a flow (COVID-19). The questionnaire consists of three main steps: 'DADOS PESSOAIS' (Personal Data), 'SINTOMAS' (Symptoms), and 'RECOMENDAÇÕES' (Recommendations). The 'SINTOMAS' section includes questions about symptoms in the last 3 days, travel in the last 2 weeks, and contact with suspected or confirmed COVID-19 cases. The 'RECOMENDAÇÕES' section provides advice based on the user's answers, such as 'Ligue SNS 24 - 808 24 24 24' (Call SNS 24 - 808 24 24 24). A dark grey box with the same number is also present at the bottom of the questionnaire screens.

Hotline number is present along the questionnaire, encouraging the use of the phone channel.

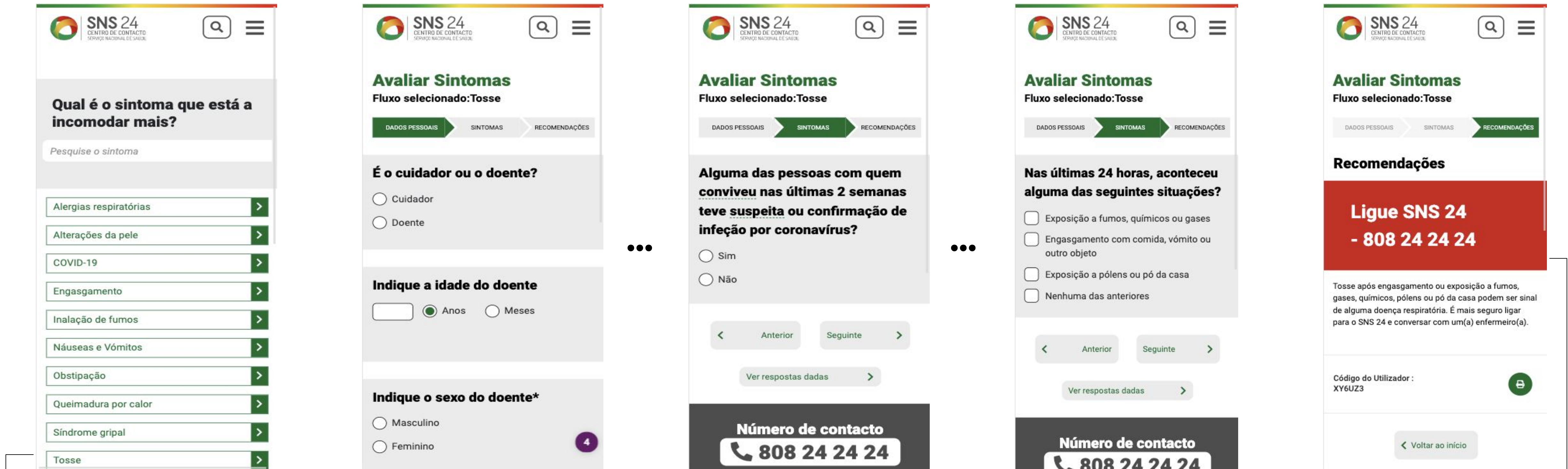
The lack of contact collection makes it impossible to contact users back in the future.

Despite showing a result that aims at reassuring the users, it rather directs them to a hotline with waiting times, potentially increasing frustration with the system.

ILLUSTRATIVE CASE OF PORTUGUESE NATIONAL HEALTHCARE SERVICE: CURRENT SYMPTOMS EVALUATION SYSTEM INVARIABLY ENDS IN A RECOMMENDATION TO CALL THE HOTLINE

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USERS WHO PRESENT **COUGH** AS A SYMPTOM ARE ALSO RECOMMENDED TO CALL THE HOTLINE
(EVEN IF CAUSED BY DUST OR POLLEN)

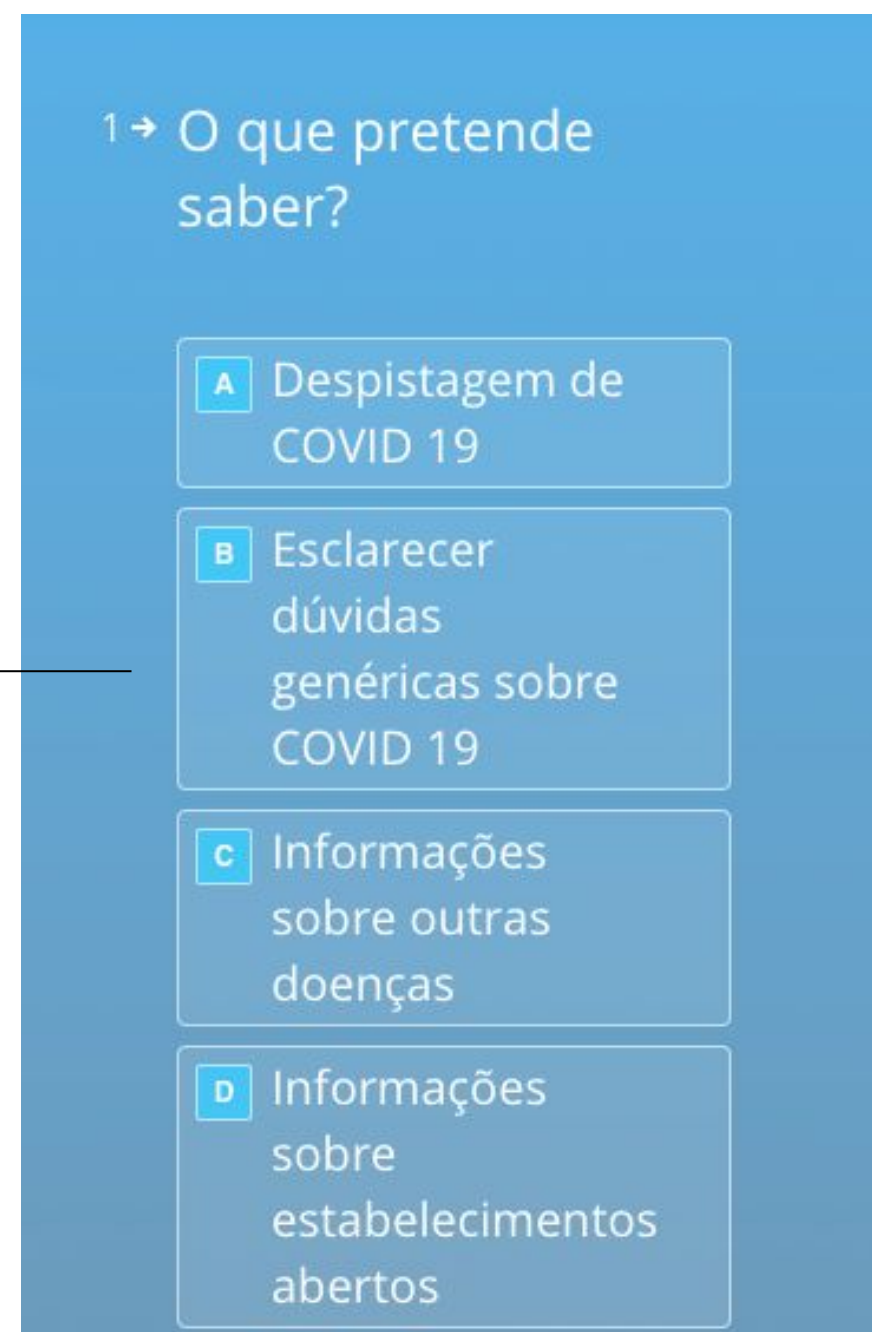


Users who present symptoms that might be associated to Covid-19, even if light, are currently being directed towards the hotline, increasing the number of calls.

THERE ARE SAAS⁽¹⁾ MARKET TOOLS THAT EFFECTIVELY ENABLE THE IMPLEMENTATION OF QUESTIONNAIRES AND THE SEAMLESS INTEGRATION WITH DATABASES

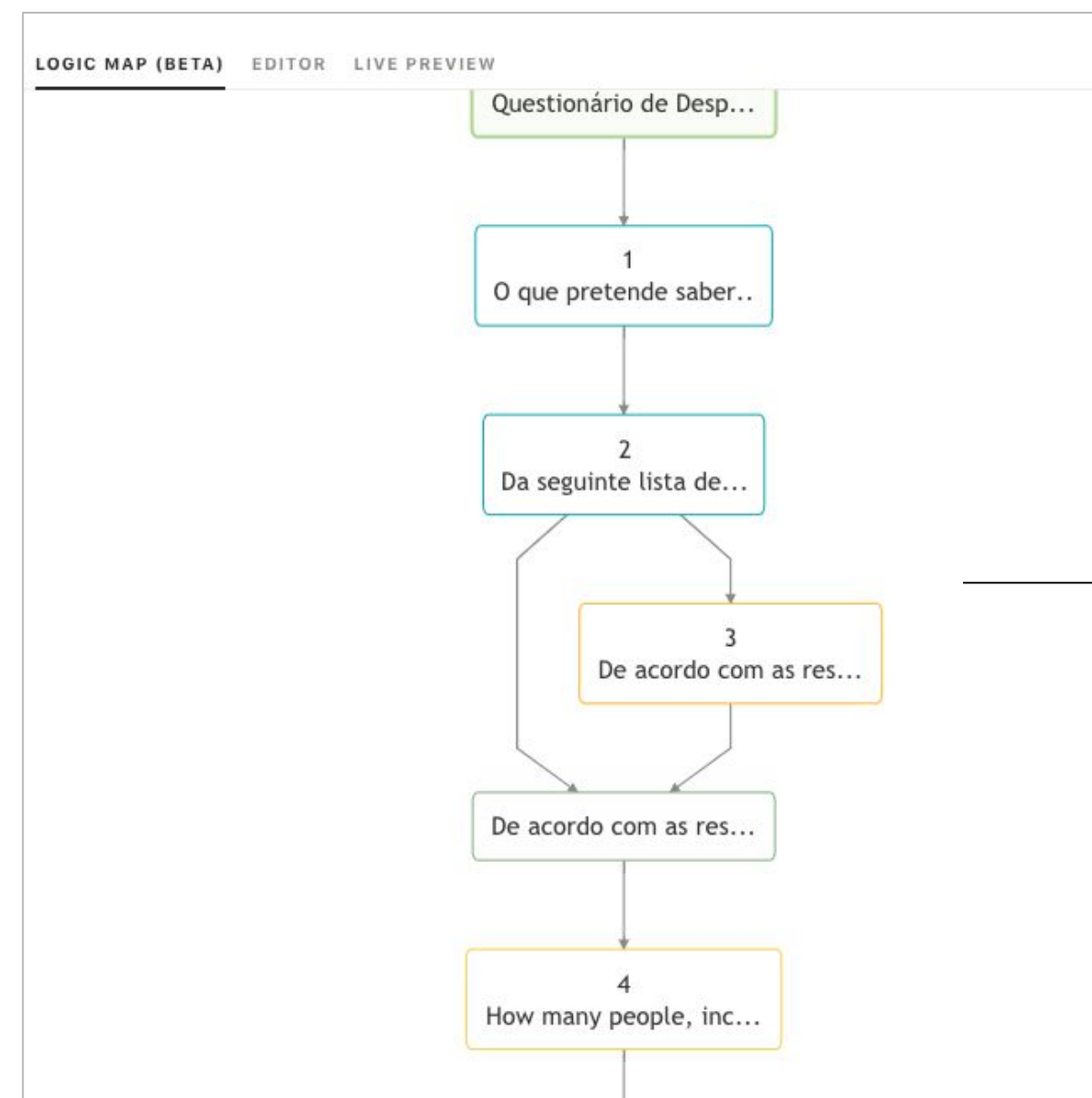
EXAMPLE TYPEFORM

EXAMPLE OF AN INITIAL QUALIFYING QUESTION



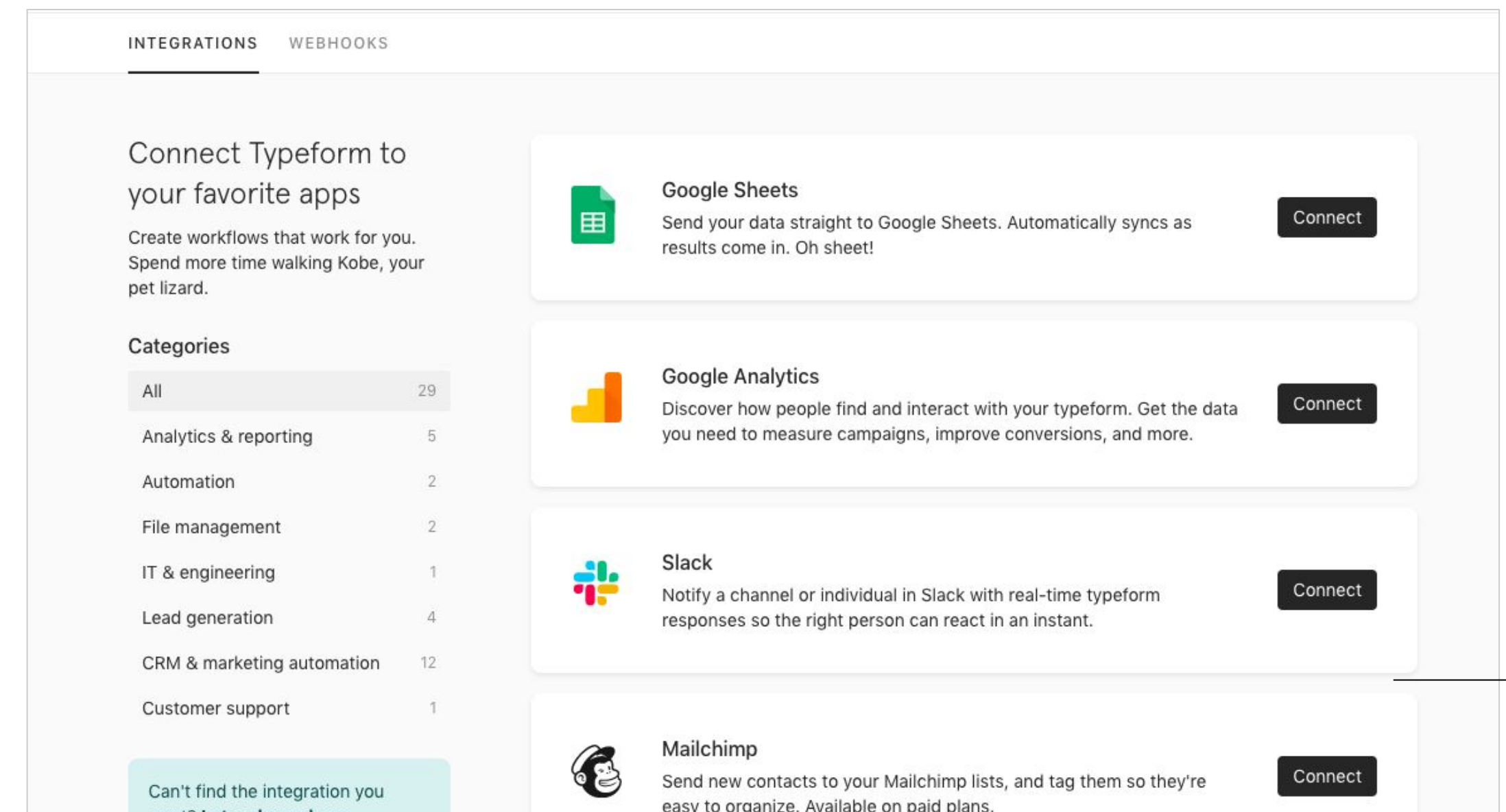
Mobile-first interface, presenting one question at a time, to facilitate reading and interaction.

EXAMPLE OF LOGIC TREES BETWEEN QUESTIONS



Qualifying questions that lead to different follow-up questions, depending on the answer.

EXAMPLE OF AUTOMATIC INTEGRATIONS WITH OTHER PLATFORMS



Ability to integrate with other databases and with direct communication platforms (eg. email) to guarantee an automatic reply, after completion of questionnaire.

(1) Software as a service.

ONLINE TRIAGE PROCESS CAN BE QUICKLY SET UP WITHIN STANDARD PLATFORMS WHICH HAVE BASE INTELLIGENCE AND THE ABILITY TO SCALE FOR LARGE TRAFFIC VOLUMES

EXAMPLE OF A QUICKLY BUILT QUESTIONNAIRE WORKFLOW SUPPORTED USING TYPEFORM⁽¹⁾

The workflow consists of the following steps:

- Start:** A screen with the SNS 24 logo and a "Start" button. Text: "Este é um processo de avaliação online para medir o seu grau de risco. Por favor seja honesto(a) nas respostas".
- 1 of 5 answered:** Question: "1 → Qual o seu nome e apelido?". Input field: "Escreva aqui a sua".
- 1 of 5 answered:** Question: "2 → Qual o seu número de telefone? *". Text: "Pedimos esta informação pra poder contactá-lo caso seja necessário". Input: Portugal flag, "912 345 678".
- 2 of 5 answered:** Question: "3 → Apresenta alguns destes sintomas?". Multiple choice options: A Tosse seca, B Febre alta, C Dificuldade em respirar (falta de ar), D Cefaleia, E Dores musculares, F Fraqueza generalizada, G Espirros frequentes, H Suores frios.
- 3 of 5 answered:** Question: "4 → Em que data teve os primeiros sintomas?". Input field: "MM/DD/YYYY".
- 3 of 5 answered:** Question: "5 → Esteve com alguém que possa estar contaminado?". Radio buttons: "Y Yes", "N No".
- Final Screen:** SNS 24 logo. Text: "De acordo com as respostas fornecidas, a probabilidade de estar contaminado é baixa, pelo que de momento, recomendamos que siga todas as indicações fornecidas no link: <http://covid19.pt> de modo a prevenir o contágio e auxiliar os profissionais de saúde no controlo e gestão de todos os casos."

(1) Online questionnaire development tool.

THE USER SELF-TRIAGE SYSTEM ENABLES HEALTHCARE PROFESSIONALS TO IDENTIFY SEVERE CASES AND CONTACT THEM VIA OUTBOUND

THROUGH A DATABASE TO SUPPORT DATA RECORDING

EXAMPLE OF A TABLE WITH TRIAGE QUESTIONNAIRE DATA⁽¹⁾

Name	Temperature	Age	Cough	Muscle Pain	Respiratory Diff	Contact with infected case	Diarrhea	Zip Code		Phone number
Xavier Peres	37.3	23	N	N	N	Y	Y	4930-503	MODERATE	351935965681
Telmo Melo	38.4	61	Y	N	N	Y	Y	4510-501	SERIOUS	351936688978
Ivo Sousa	38.5	50	N	Y	Y	N	Y	2640	SERIOUS	351934080035
Emanuel Peres	38.8	53	Y	N	Y	N	Y	4705 -081	SERIOUS	351933209417
Bernardo Montenegro	36.8	75	Y	Y	N	Y	N	1100	MODERATE	351930457372
Tiburcio Passos	36.1	39	N	N	N	N	N	4400	OK	351933172966
David Luz	37.3	79	Y	Y	Y	N	Y	4490 212	SERIOUS	351936547898
Virgílio Melo	38.5	27	Y	Y	N	N	Y	1250	SERIOUS	351931816096
Jaime Vieira	37.9	46	N	N	N	Y	Y	4830	MODERATE	351933286916
Otávio Pinho	36.7	39	N	N	N	Y	Y	1100	MODERATE	351932461035
Lívia de Lima	38.4	29	Y	Y	Y	Y	Y	1495	SERIOUS	351937336347
Filipa Roque	37.1	77	N	Y	Y	N	N	3025-063	MODERATE	351930287866
Teresa Faria	36.3	66	N	N	Y	Y	Y	9545	MODERATE	351935449862
Vitória Castro	37.4	68	N	N	Y	Y	N	2620-310	MODERATE	351936675206
Jaqueline Águas	37.5	42	Y	N	Y	N	N	4800	MODERATE	351934077441
Lucília Santos	37.5	61	Y	N	N	Y	Y	3830	SERIOUS	351937925690
Leonor Mendez	36.7	39	N	Y	Y	N	Y	2280	MODERATE	351934412046
Renata Nunes	38.5	56	N	N	Y	Y	Y	1050	SERIOUS	351931424495
Luana Dias	39.0	62	Y	N	Y	N	Y	2110	SERIOUS	351939264779
Débora Baptista	37.8	42	N	N	Y	N	Y	3725 110	MODERATE	351936292194

- Data automatically collected by the platform.
- Enables analysis by region, age, symptoms, etc.
- Allows to immediately identify the problematic cases for follow-up.

Makes it possible to design an algorithm to send text messages with typified content according to risk score

Allows to export/integrate serious cases data with the CTI (Computer Telephony Integration) for outbound contact.

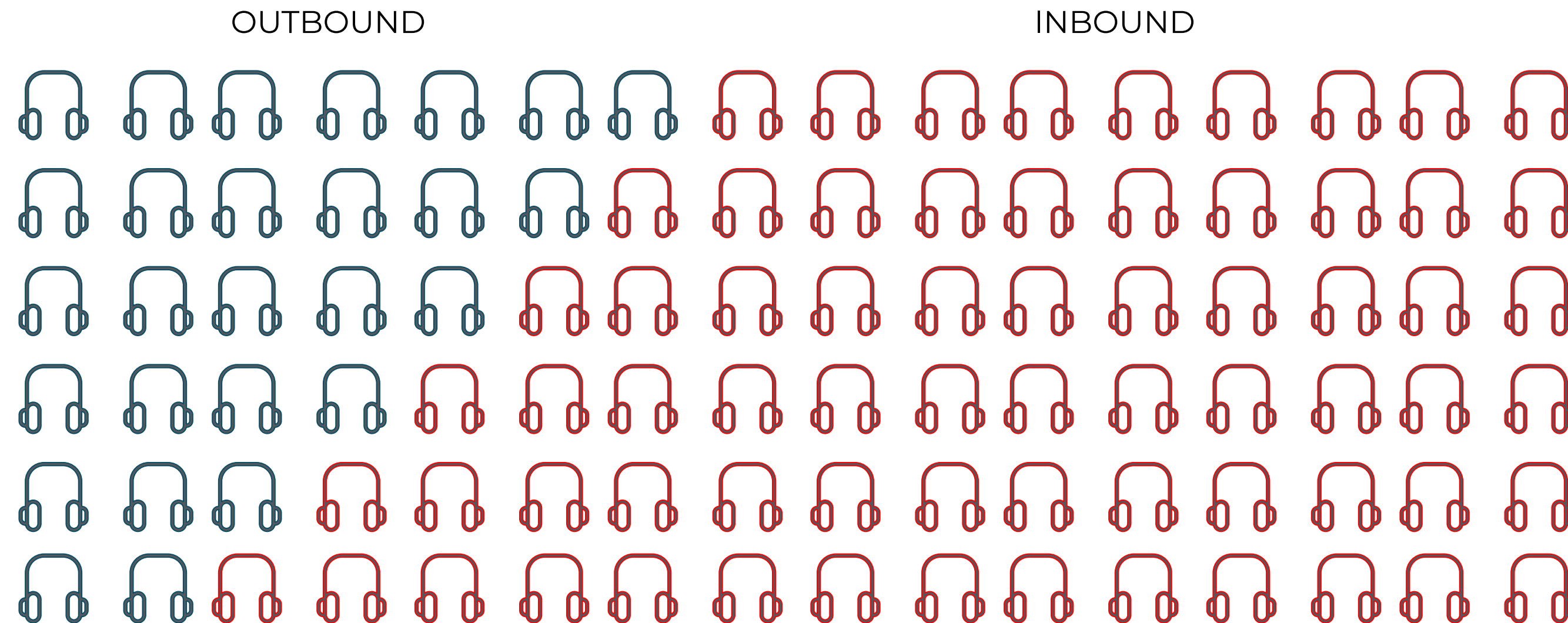
(1) These data can be lodged in a cloud database (eg. Google BigQuery), with direct integration with the triage questionnaire tool. This kind of system can be set up within hours and has a virtually unlimited capacity, thus being efficient in terms of costs.

SETTING UP AN OUTBOUND OPERATION TO SUPPORT THE MOST SEVERE CASES ALLOWS FOR THE OPTIMIZATION OF CALL CENTRE EFFECTIVENESS

MANAGING ALLOCATION BETWEEN INBOUND AND OUTBOUND ACCORDING TO THE MOST RELEVANT CASES

IMPLEMENTATION OF AN INBOUND/OUTBOUND OPERATION

- Guaranteed allocation of resources to the most critical cases.
- Gradual allocation of resources to the outbound operation, depending on the number of critical cases registered online.



- Continuous measurement of online triage impact on the total volume of phone calls, waiting time and percentage of relevant contacts.

- Improved use of call-centre resources, using balancing of resources between outbound and inbound operation, making the most of all available capacity.
- Flexible management of resources, based on online cases' level of severity vs average waiting time in the inbound operation.

- An outbound operation keeping the current script does not require additional personnel qualification.
- The CTI (computer telephony integration) system should be able to incorporate the outbound operation and the import/integration of serious cases, with reduced adjustments.

SEVERAL OPTIMIZATIONS SHOULD BE PUT IN PLACE TO ENSURE ONLINE RESPONSE CAPACITY FOCUSING ON FAST AND EASY TO IMPLEMENT MEASURES

ACTIVATE SCALABLE ARCHITECTURE

- Based on high capacity and scalability platforms (Azure, AWS, Google cloud, etc.) vs on-premise.
- Activating auto-scaling features of cloud based solutions, to ensure systems scale according to needs.
- Immediate revision of contract conditions with suppliers (contracted capacity and SLAs).

USE CONTENT DISTRIBUTION NETWORKS (CDN)

- CDNs servers host content (in cache), making it available “as mirrors” of websites, across different distribution points.
- When content is requested, users access it by connecting themselves to the closest CDN server, instead of waiting for the request to reach the origin directly, resulting in a significant improvement of performance and availability.

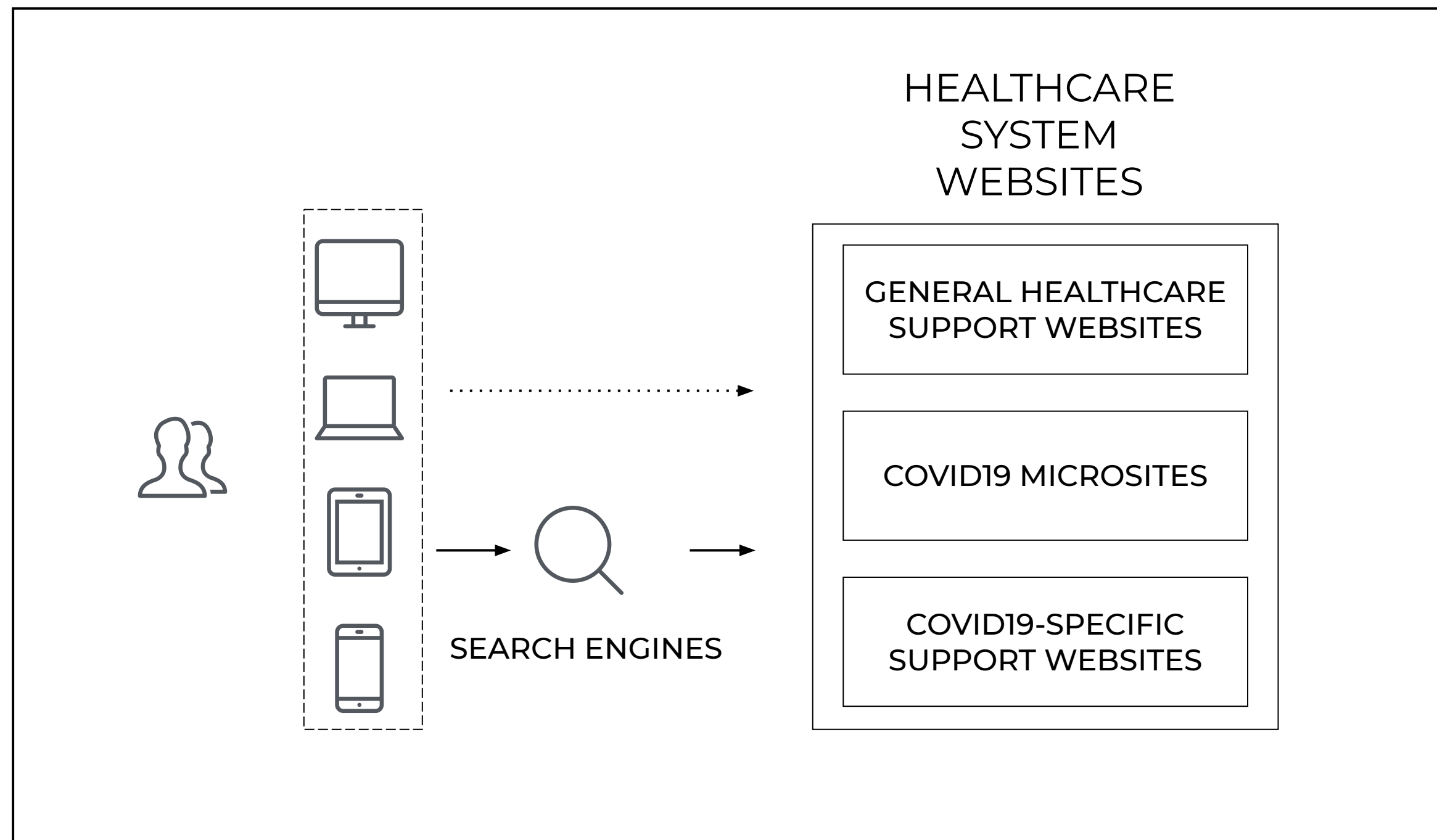
LEVERAGE GOOGLE’S CACHE CAPACITY THROUGH AMP TECHNOLOGY

- The use of critical pages in AMP (accelerated mobile pages) technology has two important benefits:
 - It makes pages lighter in mobile accesses, reducing conveyed information, with a significant impact on improving performance.
 - It makes Google host these pages in its cache, when accessed from a search engine - reducing servers’ load and making them available immediately (<1 sec)
- The implementation of AMP pages can be relatively quick (2-3 days for simple pages).

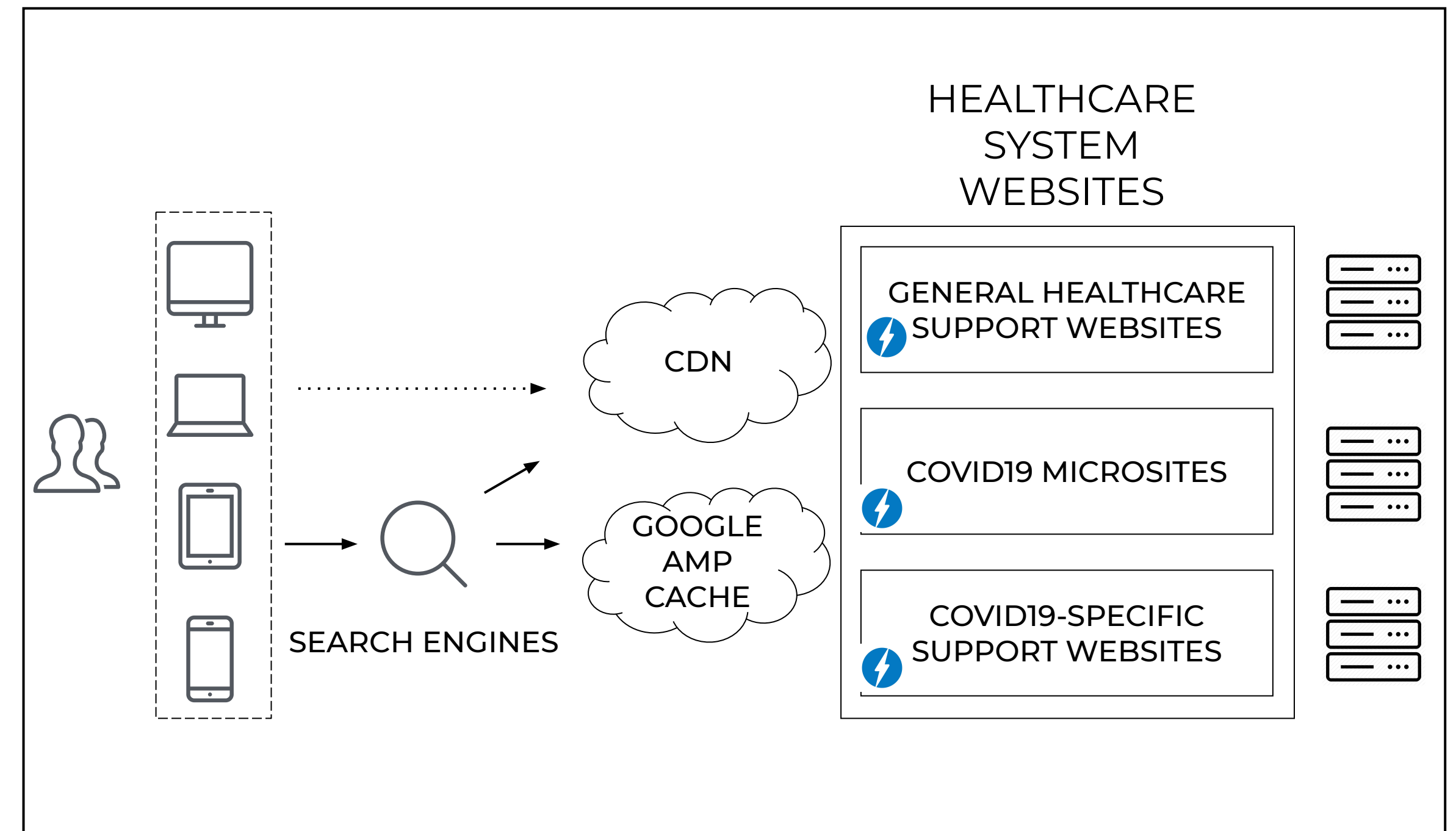
OPTIMIZATIONS TO BE IMPLEMENTED IN ORDER TO GUARANTEE ONLINE RESPONSE CAPACITY

HIGH-LEVEL ARCHITECTURE DIAGRAM OF THE ONLINE INFORMATION SYSTEM

ILLUSTRATIVE STANDARD SCENARIO



DESIRABLE SCENARIO



DEFLECTING PHONE CALLS THAT ARE CURRENTLY OVERLOADING HOTLINES AND LEVERAGING AUTOMATION COMPONENTS OF PHONE CHANNEL

ENCOURAGING THE USE OF ONLINE AS PRIMARY CHANNEL	INCREASING TECHNICAL CAPACITY OF THE CALL CENTRE	LEVERAGING WAITING MESSAGES	EMPLOYING IVR FUNCTIONALITIES
<ul style="list-style-type: none"> • In public communications, the website should be mentioned as the primary channel instead of the phone line⁽¹⁾. • In the website, avoid encouragement of phone contact, rather pointing in the direction of “Frequently Asked Questions” and to the online triage. 	<ul style="list-style-type: none"> • Avoiding “busy” signal in phone calls. • Picking up calls by leveraging waiting messages. • Recording numbers associated to missed calls to be recovered through outbound contacts. 	<ul style="list-style-type: none"> • Suggesting the use of website at first, encouraging abandonment of phone channel in favour of those who do not have access to the internet or that might be more severe cases. • Other possibilities to consider: <ul style="list-style-type: none"> ○ Communicating expected waiting times. ○ Using messages to play a recording of the behaviors to adopt. ○ Asking for a phone number for a later contact, at a time of less pressure (with a possible dispatch of automatic messages) 	<ul style="list-style-type: none"> • Testing the possibility of using an IVR (Interactive Voice Response) system for a simple triage process (eg: whether or not a case is related to coronavirus; seriousness level). • Testing the possibility of using an IVR system to do the screening for Covid-19, similar to the online platform, collecting a phone number for a later contact of cases likely to be more severe, leveraging dispatch of automatic messages.

(1) Online channel must be prepared in terms of technical capacity, content and triage process.

COMMUNICATING PROACTIVELY WITH CITIZENS, REDIRECTING THEM TOWARDS THE ONLINE CHANNEL

THROUGH ONLINE COMMUNICATION CHANNELS

In healthcare systems' websites:

- Encouraging the online triage process (via links and pop-ups redirecting users to the right pages).
- Replacing information containing incentives for calling the hotline by information containing incentives to do the online triage.

In other online channels (organic and, if needed, paid)

- In social media
- In search engines
- In video channels

THROUGH PUBLIC COMMUNICATIONS

Referring the online channel as the primary one in:

- Press conferences
- Press releases and communications to the media
- Interviews
- Public figures' statements on TV

BY SMS/EMAILS

- Dispatching SMS to citizens, communicating preventive information and the link to the website, which should be the primary channel.
- This should be done gradually and while monitoring response capacity.

ALL WEBSITES SHOULD ENCOURAGE THE USE OF ONLINE CHANNEL TO FREE PHONE CHANNEL CURRENTLY THERE IS AN EXPLICIT INCENTIVE TO DRIVE CALLS TO THE HOTLINE

ILLUSTRATIVE CASE OF THE PORTUGUESE NATIONAL HEALTHCARE SERVICE: HEALTH AUTHORITY WEBSITE HOMEPAGE ENCOURAGING CALLS TO THE HOTLINE



2

**MONITORING OF EPIDEMIOLOGIC
EVOLUTION AND TRACKING OF
HIGH-RISK CASES**

COURSE OF ACTION 2: EPIDEMIOLOGIC MONITORING AT SCALE

1. ONLINE SELF-SERVICE FOR CITIZENS

- Online self-service for citizens (and/or healthcare professionals), by transferring and adapting the phone protocol to digital, using it as the primary triage process with virtually unlimited capacity.

2. EPIDEMIOLOGIC MONITORING AT SCALE

- Monitoring of the epidemiologic evolution and tracking of critical cases, looking to monitor IT in a centralized manner and at scale: suspected cases, high-risk cases, in-need for hospitalisation cases, etc.

3. SUPPORT TO HEALTHCARE PROFESSIONALS

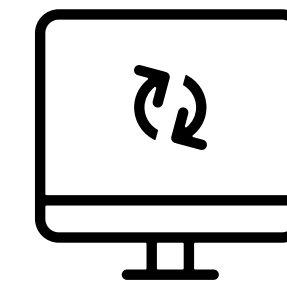
- Support to healthcare professionals (capacitation, protocol updates, task coordination).

4. CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE

- Creation of a war room that leverages upon a multidisciplinary team to support decision making, adjustments and the deployment of new initiatives in an agile manner and centralizes access to information in an integrated way.

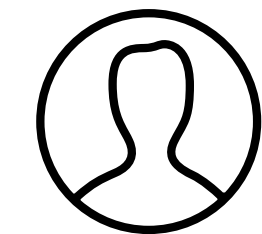


MONITORING OF EPIDEMIOLOGIC EVOLUTION AND TRACKING OF RISK CASES THROUGH INFORMATION PROVIDED BY PATIENTS COMPRISES 2 MACRO ACTIVITIES



AGILE CREATION OF A TRACKING PORTAL

Where patients under watch can update their health status without having to be actively contacted by the healthcare professionals.



UPDATE OF DATA BY THE PATIENTS THEMSELVES 1-2 TIMES A DAY

Centrally managing data within a unique repository fed by the patients themselves, allowing for an easy and timely identification of cases requiring special attention or immediate intervention.

ADVANTAGES OF PATIENTS UPDATING HEALTH STATUS BY THEMSELVES, VIA ONLINE CHANNELS

UNLIMITED SCALABILITY

Ability to unlimitedly scale interaction and monitoring, based on status updates done by patients on their own.

MORE EFFECTIVE MONITORING

Greater detail in follow-up questions
More frequent updates.

CAPACITY TO TRACK CASES ACCORDING TO CERTAIN CRITERIA

Severity
Evolution
Family support
Geography

ONLINE UPDATING OF DATA BY PATIENTS

REAL TRIAGE CAPACITY

With total and centralized visibility, it is possible to appoint which cases have higher priority and define where to allocate more efforts.

AGGREGATED DATA AND AUTOMATICALLY CENTRALIZED INFORMATION

Allowing for a more effective decision making about execution, according to cases and available means.

RESOURCE SAVING

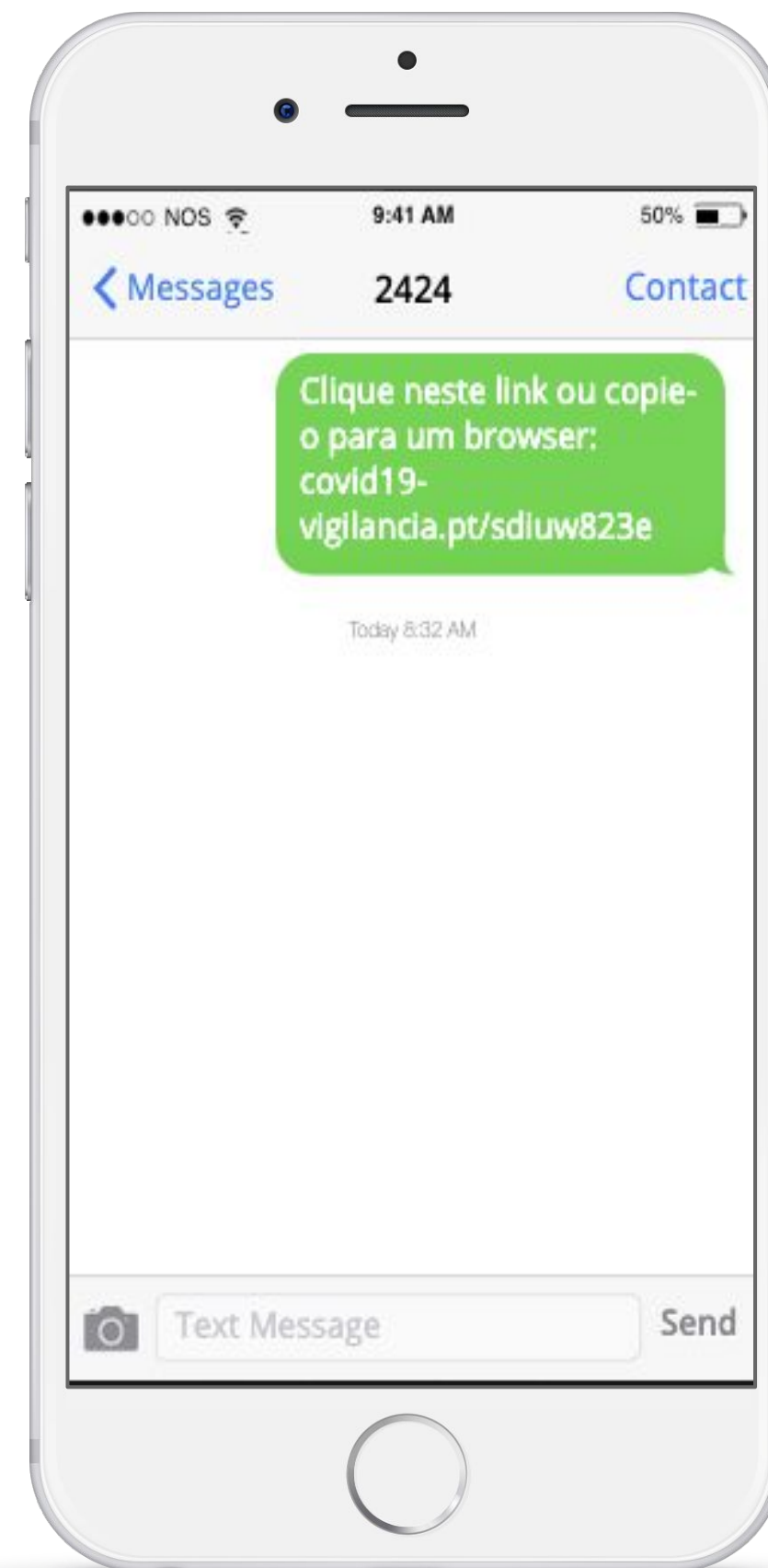
Efficiency in the allocation of healthcare professionals, by removing waiting time, calls time and information registering.

ILLUSTRATION OF STATUS UPDATES BY PATIENTS PROCESS

PHONE NUMBER AS AN IDENTIFIER



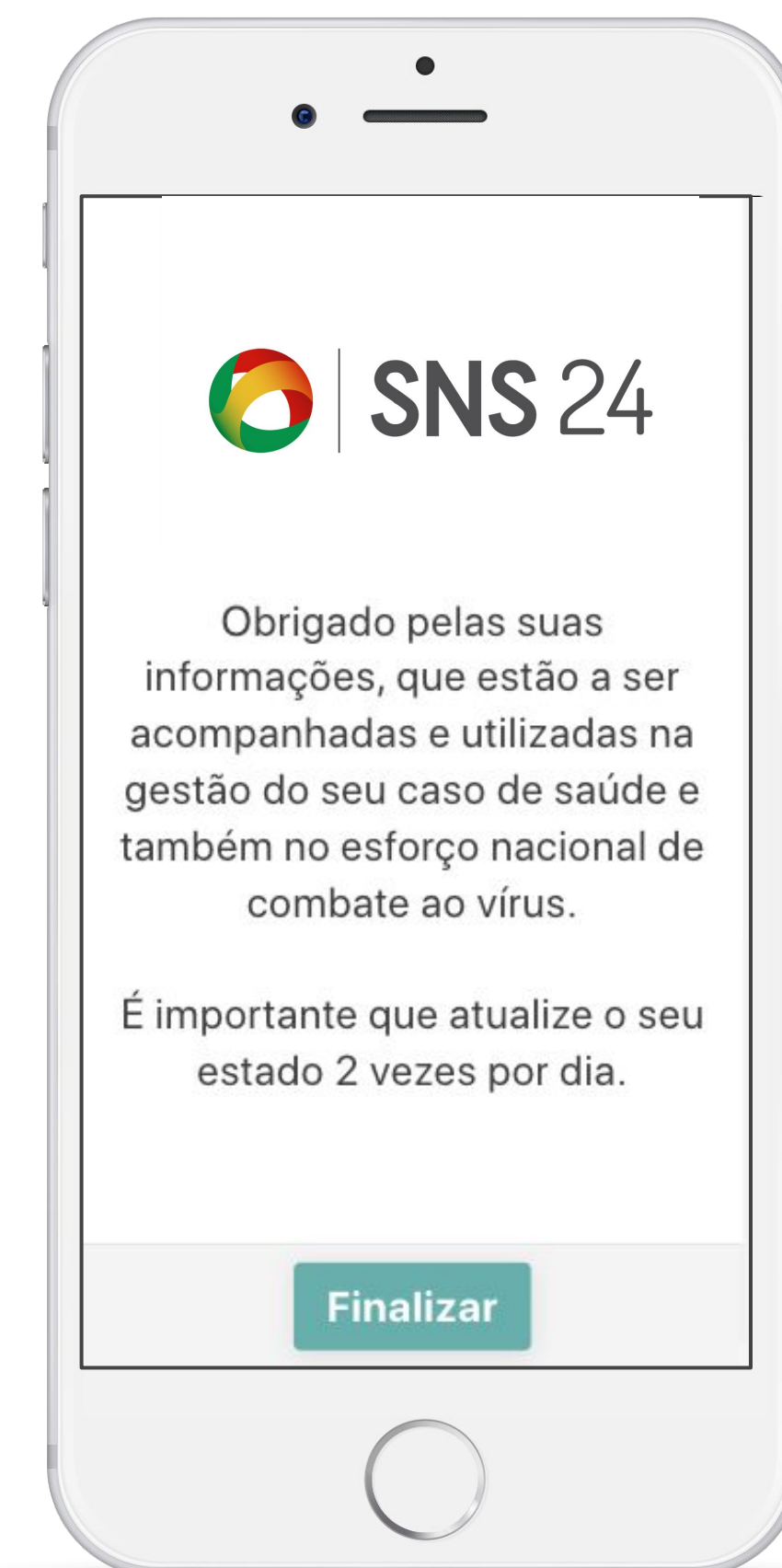
AUTHENTICATION VIA LINK SENT BY SMS



HEALTH DATA UPDATE (EXHAUSTIVE)



CONFIRMATION MESSAGE



UNDER-WATCH PATIENTS UPDATE THEIR OWN STATUS ON A DAILY BASIS

RESPONSES FEED THE DATABASE, ENABLING A QUICK VISUALIZATION OF CASE EVOLUTION

A SYSTEM BASED ON SELF-UPDATING OF PATIENTS ALLOWS HEALTHCARE PROFESSIONALS TO IDENTIFY MOST SEVERE CASES AND DEFINE ACTIONS

More exhaustive status updates, since they would no longer depend on healthcare professionals availability

Nome	IDADE	Ultima actualização	Nr. Telefone	Estado clínico	Evolução	T°	Tosse	Dores musculares	Dif respiratórias	Contacto c/ infectado	Diarreia	COD POSTAL
Xavier Peres	47	3/16/2020	351935965681	GRAVE	POSITIVA	36.3	S	N	S	S	S	4930-503
Telmo Melo	67	3/16/2020	351936688978	GRAVE	POSITIVA	38.7	N	S	S	N	S	4510-501
Ivo Sousa	60	3/16/2020	351934080035	ASSINTOMATICO	NEGATIVA	36.5	N	N	N	N	S	2640
Emanuel Peres	30	3/15/2020	351933209417	GRAVE	ESTAVEL	38.7	N	S	S	S	S	4705 -081
Bernardo Montenegro	64	3/16/2020	351930457372	MODERADO	POSITIVA	37.9	N	N	S	N	S	1100
Tiburcio Passos	59	3/16/2020	351933172966	GRAVE	POSITIVA	38.4	S	N	S	S	N	4400
David Luz	41	3/16/2020	351936547898	ASSINTOMATICO	NEGATIVA	36.4	N	S	N	N	N	4490 212
Virgílio Melo	25	3/16/2020	351931816096	MODERADO	NEGATIVA	37.1	S	N	S	N	N	1250
Jaime Vieira	37	3/15/2020	351933286916	MODERADO	NEGATIVA	37.8	N	N	N	S	N	4830
Otávio Pinho	70	3/16/2020	351932461035	ASSINTOMATICO	NEGATIVA	36.6	N	S	N	N	N	1100
Lívia de Lima	38	3/16/2020	351937336347	MODERADO	NEGATIVA	38.0	N	N	S	N	N	1495
Filipa Roque	78	3/16/2020	351930287866	MODERADO	POSITIVA	37.2	N	S	S	S	N	3025-063
Teresa Faria	34	3/15/2020	351935449862	GRAVE	ESTAVEL	38.2	S	S	S	N	S	9545
Vitória Castro	25	3/16/2020	351936675206	MODERADO	NEGATIVA	37.2	S	N	S	N	N	2620-310
Jaqueline Águas	72	3/16/2020	351934077441	MODERADO	POSITIVA	37.4	N	S	N	S	S	4800
Lucília Santos	48	3/16/2020	351937925690	MODERADO	POSITIVA	36.3	S	S	N	N	S	3830
Leonor Mendez	64	3/16/2020	351934412046	MODERADO	NEGATIVA	37.3	N	S	N	N	S	2280
Renata Nunes	50	3/16/2020	351931424495	MODERADO	POSITIVA	36.4	N	S	S	S	N	1050
Luana Dias	50	3/16/2020	351939264779	MODERADO	POSITIVA	38.3	N	S	N	S	N	2110
Débora Baptista	64	3/16/2020	351936292194	MODERADO	NEGATIVA	37.2	S	N	N	S	N	3725 110

Ability to contact patients who didn't complete their updates.

Triage by severity and evolution

Automatic classification of the evolution according to response updates.

Analysis of evolution status by geography and definition of actions according to locally available resources.

3

**SUPPORT TO HEALTHCARE
PROFESSIONALS**

COURSE OF ACTION 3: SUPPORT TO HEALTHCARE PROFESSIONALS

1. ONLINE SELF-SERVICE FOR CITIZENS

- Online self-service for citizens (and/or healthcare professionals), by transferring and adapting the phone protocol to digital, using it as the primary triage process with virtually unlimited capacity.

2. EPIDEMIOLOGIC MONITORING AT SCALE

- Monitoring of the epidemiologic evolution and tracking of critical cases, looking to monitor IT in a centralized manner and at scale: suspected cases, high-risk cases, in-need for hospitalisation cases, etc.

3. SUPPORT TO HEALTHCARE PROFESSIONALS

- Support to healthcare professionals (capacitation, protocol updates, task coordination).

4. CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE

- Creation of a war room that leverages upon a multidisciplinary team to support decision making, adjustments and the deployment of new initiatives in an agile manner and centralizes access to information in an integrated way.

CAPACITATION AND DISSEMINATION OF INFORMATION TO HEALTHCARE PROFESSIONALS PRESENTS A NUMBER OF CHALLENGES THAT MAY BE OVERCOME BY NEW TECHNOLOGIES

CHALLENGES

- **Dissemination** of information **at scale**, leveraging digital channels' reach and automation capacity
- Assurance that **information** is **trustworthy, detailed** and **up-to-date**, using digital for collection and treatment
- Allowing **information** to be **rich**: using **images** and **videos** instead of text when possible
- Enabling controlled **sharing** of **experiences among healthcare professionals** (nationally and internationally), in order to increase effectiveness of approaches
- Ensuring **ease of onboarding and use** by healthcare professionals in the communication channels to be used

MULTIPLE DIGITAL PLATFORMS CAN BE LEVERAGED TO MAKE INFORMATION EFFECTIVELY REACH HEALTHCARE PROFESSIONALS

LEVERAGING UNIVERSALLY USED COMMUNICATION PLATFORMS OR NEW GENERATION KNOWLEDGE MANAGEMENT PLATFORMS

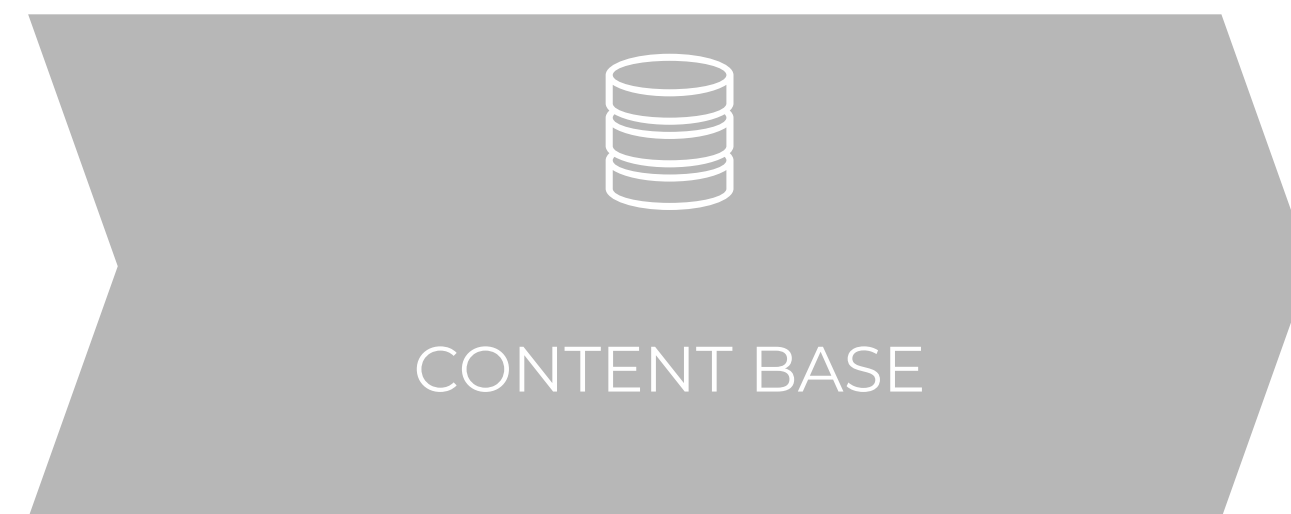
MULTIPLE COMMUNICATION PLATFORMS CAN BE USED TOGETHER AND LEVERAGING UNIVERSALLY USED PLATFORMS



MULTIPLE DIGITAL PLATFORMS CAN BE LEVERAGED TO MAKE INFORMATION EFFECTIVELY REACH HEALTHCARE PROFESSIONALS

LEVERAGING UNIVERSALLY USED COMMUNICATION PLATFORMS

CREATION OF A CONTENT REPOSITORY TO SHARE RELEVANT INFORMATION WITHIN THE MEDICAL COMMUNITY (DEPENDING ON AVAILABLE CONTACTS)



- WHO REPORTS
- INTERNATIONAL TREATMENTS STUDIES
- EUROPEAN/WORLDWIDE GUIDELINES ABOUT TECHNICAL MATERIAL
- OPERATIONAL/HOSPITAL INTERNAL LOGISTICS UPDATES
- ...



- TEXT
- IMAGE
- INFOGRAPHIC
- VIDEOS
- ...



- SMS/ WHATSAPP
- EMAIL
- YOUTUBE (PRIVATE LINKS)
- FACEBOOK GROUPS

4

**CREATION OF A WAR ROOM TO ENABLE
AN AGILE AND EFFECTIVE RESPONSE**

COURSE OF ACTION 4: CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE

1. ONLINE SELF-SERVICE FOR CITIZENS

- Online self-service for citizens (and/or healthcare professionals), by transferring and adapting the phone protocol to digital, using it as the primary triage process with virtually unlimited capacity.

2. EPIDEMIOLOGIC MONITORING AT SCALE

- Monitoring of the epidemiologic evolution and tracking of critical cases, looking to monitor IT in a centralized manner and at scale: suspected cases, high-risk cases, in-need for hospitalisation cases, etc.

3. SUPPORT TO HEALTHCARE PROFESSIONALS

- Support to healthcare professionals (capacitation, protocol updates, task coordination).

4. CREATION OF A WAR ROOM TO ENABLE AN AGILE AND EFFECTIVE RESPONSE

- Creation of a war room that leverages upon a multidisciplinary team to support decision making, adjustments and the deployment of new initiatives in an agile manner and centralizes access to information in an integrated way.

CREATING A WAR ROOM IS KEY FOR MANAGING COMMUNICATION WITH CITIZENS, PATIENTS AND FOR SUPPORTING DECISION MAKING IN HEALTHCARE

WAR ROOM: A ROOM, IN A HEADQUARTERS, THAT HAS ACCESS TO TECHNICAL [AND HUMAN] RESOURCES TO COLLECT INFORMATION, PLAN STRATEGIES AND RUN ACTIVITIES

[TYPICALLY IN A MILITARY CONTEXT, IN WAR SCENARIOS]

MULTIDISCIPLINARY AND MULTI PLATFORM TEAM

Responsible team should include several specialists from the areas whose activities have to be coordinated.

PHYSICAL CONCENTRATION

The whole team shares the same physical space, communication is immediate, transparent, fluid and supported by visual resources (activities boards, dashboards, etc.)

CLEAR LEADERSHIP

War room hierarchy and leadership should be clearly defined, so that processes are collective in ideation, but effective in definition and execution phases.

FAST APPROVAL CHANNELS/HIGH LEVEL OF AUTONOMY

The level of autonomy should be high or there should be access to fast approval channels, so that approval is not a barrier to timely execution.

ACCESS TO DATA AND VISUALIZATION ABILITY

War Room team should have access to different data sources from different contact points, Google searches, social networks, and should analyse them in an integrated (and visual) fashion, in order to support decision making.

TECHNICAL CAPACITY TO DEVELOP AND PROTOTYPE

Within the War Room, resident execution capacity should be ensured, in order to allow for agile and prompt execution cycles.

DIRECT ACCESS TO THE VARIOUS DIGITAL PLATFORMS/ASSETS

War Room team should have access to the various platforms, so that they can be changed and adjusted when needed.

“The greatest error is not to move, the greatest error is to be paralyzed by the fear of failure.”

Dr. Michael J. Ryan, WHO

USEFUL LINKS

- <https://azure.microsoft.com/en-us/features/autoscale/>
- <https://amp.dev/>
- <https://developers.google.com/amp>
- <https://www.typeform.com/>
- <https://www.whatsapp.com/business>
- <https://www.e-goi.com/pt/>
- <https://www.facebook.com/help/1629740080681586>
- <https://support.google.com/youtube/answer/157177?co=GENIE.Platform%3DDesktop&hl=en>
- <https://www.cloudflare.com/learning/cdn/what-is-a-cdn/>
- <https://www.talkdesk.com/blog/what-is-an-ivr-and-6-benefits-of-using-one/>
- <https://products.office.com/en-us/yammer/yammer-overview>
- <https://www.atlassian.com/software/confluence>

KARMA