HAUTE AUTORITÉ DE SANTÉ

REPORT

COVID-19 vaccination strategy

Anticipation of possible vaccination scenarios and preliminary guidelines for target populations

Validated by the HAS Board on 23 July 2020

Contents

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Introduction

In accordance with its framework document, and in response to the referral by the Director General for Health on 13 July, the HAS has initiated an upstream study of the SARS-CoV-2 vaccination strategy which could be recommended in France when vaccines are made available.

With a view to guiding public decision-making, the HAS has anticipated a number of vaccination strategies that can be envisaged in France based on possible developments in virus circulation in France when the vaccines arrive, and on the characteristics of the candidate vaccines developed, and in particular, their ability either to protect against infection or to reduce the severity of the disease, their safety profile, as well as on the number of doses that will gradually be made available. The HAS is now issuing preliminary guidelines on the groups deemed to take priority for vaccination based on these scenarios.

Once they have been shown to be safe and effective, these vaccines will represent the best tool for preventing and combatting the pandemic, alongside essential control measures.

At this stage, the HAS would like to point out that drafting a vaccination policy against COVID-19 requires the definition of public health objectives to be achieved in the specific context of a pandemic of uncertain outcome due to the circulation of an emerging virus, in which knowledge on the transmission and pathogenicity of Sars-CoV-2 is being updated at a rapid pace.

Vaccination against COVID-19 involves multiple public health objectives:

- Individual prevention consisting of reducing the risk of contracting the disease and/or of limiting its impact, in particular severe forms, in respect of an individual or a group of individuals: this involves vaccinating specific population groups such as vulnerable individuals at an increased risk of severe forms or those in close contact with them;
- Collective prevention to slow the spread of the virus among the population and impact the epidemic process, with a view to limiting the impacts of sustained circulation of the virus and achieving herd immunity, either on a national or local level, or within localised outbreaks;
- Prevention to maintain the country's vital functional needs in the pandemic emergency context and to reduce the risk of contracting the disease and/or limit its impacts among workers at a greater risk of more frequently contracting and spreading the infection;

In order to meet the public health objectives, the HAS shall eventually draft guidelines on the vaccination strategy that shall frame the use of vaccines form their arrival, and on vaccination rollout procedures, specifying in particular:

- For the vaccination strategy: target populations (age, high-risk populations, elderly, those in contact with vulnerable individuals, etc.), vaccination schedules and the cost-effectiveness ratio of the strategy. It may also rank different vaccines in relation to one another, where applicable according to any differences between platforms (efficacy, administration schedule, dosage form, storage) and according to their supply capacity in terms of doses;
- For vaccination rollout procedures: identification of the healthcare professionals authorised to administer vaccine and the follow-up procedure in respect of vaccinated subjects.

Moreover, the parallel development of candidate vaccines shall require sequential assessments on a vaccine-by-vaccine basis subject to marketing authorisation approval time-frames and the indications selected by the registration authorities.

> **Note: this document was drafted based on the knowledge available at the time of its drafting; it is therefore subject to change according to new data.**

Purpose of the document

This document defines various vaccination strategies that can be envisaged in France once vaccines have been granted an MA (including in a conditional context), or have received a temporary authorisation for use (ATU), and provides preliminary guidelines on the groups deemed to take priority for vaccination. .

These guidelines are based on the current knowledge, which is subject to change, in respect of:

- Transmission of SARS-CoV-2 infection
- Changes in epidemiological circumstances in France
- And the candidate vaccines under development, for which only very preliminary efficacy and safety data are available to date.

In a context of fast-tracked clinical development of candidate vaccines and the need to plan their gradual delivery, it is necessary to conceptualise the various scenarios that can be envisaged which still involve many uncertainties at this stage.

Method

Considering the limited data and current uncertainties, the HAS has adopted a theoretical approach conceptualising a number of scenarios with a view to establishing the reference framework that will eventually be used to define the vaccination strategy.

The scenarios are based on four potential epidemic circumstances depending on the level of viral circulation (high viral circulation/high localised viral circulation/low background viral circulation/zero viral circulation). For each of the epidemic circumstances considered, the various objectives of the vaccination strategy are defined along with the potential target populations and the expected characteristics of the vaccines.

The matrix compiled shall be updated as knowledge is acquired and as the review of the literature currently underway progresses, and shall help consolidate and model the scenarios.

The impact of these different strategies shall effectively be assessed within the scope of epidemiological models with a view to determining the most effective strategies (alone or in combination) or even those that are most cost-effective and best suited to the targeted objectives (controlling the epidemic or reducing the risk of severe forms). These models shall represent a key reference for decision-making should it prove to be necessary to prioritise among the target populations due to the potentially sequential availability of vaccine doses and initially limited quantities.

The HAS has already received guidance from a work group consisting of the members of the Technical Vaccination Committee in concert with and supported by teams from ANSM and Santé publique France.

The HAS has furthermore taken into consideration:

- The preliminary reports already published by some countries to set out the priority groups eligible for vaccination (ECDC for the European Commission[1], ACIP in the United States[2], JCVI in the United Kingdom[3], Superior Health Council in Belgium[4]).
- While all of these reports stress that it is still very early in terms of the data and that many uncertainties remain as to how knowledge on COVID-19 as a disease will evolve and the characteristics of the various candidate vaccines under development, they recommend, at this stage of the process, to prioritise the vaccination of healthcare workers and key workers, as well as individuals at an increased risk of developing a severe form of the disease due to their age or the presence of comorbidities.

[1] Blue print for an EU vaccination plan for COVID 19 _ European Commission

[2] ACIP Meeting June 24, 2020. COVID-19 vaccine prioritization considerations; Work Group considerations and next steps.

[3] Joint Committee on Vaccination and Immunisation: interim advice on priority groups for COVID-19 vaccination - Independent report - Published 18 June 2020 https://www.gov.uk/government/publications/priority-groups-for-coronaviruscovid-19-vaccination-advice-from-the-jcvi/interim-advice-on-priority-groups-for-covid-19-vaccination

[4] Conseil supérieur de la santé. Stratégie de vaccination contre le Covid-19 en Belgique. https://www.health.belgium.be/fr/avis-9597-strategie-de-vaccination-covid-19#anchor-37490

- The French National Council for Public Health[5] report defining the groups at an increased risk of developing a severe form of COVID-19.

  The retained groups are those aged over 65 years, subjects with certain comorbidities: previous history of cardiovascular disease, poorly controlled diabetes or involving complications, chronic respiratory disease prone to decompensation during viral infection; chronic kidney failure treated with dialysis; progressive cancer undergoing treatment (excluding hormone therapy), as well as by analogy with other respiratory diseases: third trimester of pregnancy, congenital or acquired immunodepression, class B cirrhosis, obesity with body mass index > 30 kg/m2, previous history of splenectomy or homozygous sickle-cell anaemia.

- A first report on the Sars-CoV-2 vaccination strategy in France drafted by the experts belonging to the CARE group, the COVID-19 Scientific Committee and the COVID-19 Vaccine Committee at the Prime Minister's request[6].

  In this report, a number of priority groups for COVID-19 vaccination are identified. The following groups are deemed to be "top priority": groups at risk of occupational exposure, with a "*very high priority*" for

  "*healthcare workers with the greatest exposure due to their occupation/job and workers in contact with the most vulnerable individuals*"; "*individuals at an increased risk due to their age or their health status and in particular individuals aged 65 years and over*" (subject to the availability of an effective vaccine in the elderly), "*individuals aged under 65 years suffering from chronic disease, or obesity"; "individuals in positions of extreme insecurity".*

  Other groups are deemed to be "*of secondary priority*": *"populations of overseas departments and regions in the event of intensive care bed shortages (and not belonging to previously prioritised groups)"*, and *"individuals living in institutions at an increased risk of transmission (prisons, institutions for the disabled, psychiatric institutions)"*, *"key workers (for example, police officers, firefighters, active military, etc.)"*

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Vaccination scenario matrix

The various vaccination scenarios considered are dependent on a number of key factors, in particular:

- The characteristics of the epidemic at the time of arrival of the vaccine(s) and modelling-based predictions of the future epidemiology of the epidemic;
- Current knowledge on SARS-CoV-2 infection: risk factors of the disease and primary contamination modes, identification of subjects at an increased risk of severe forms;
- The characteristics of the vaccine(s), particularly of the type of response triggered and the impact on carriage and therefore transmission of the virus, their benefit-risk balance and their mode of administration;

[5] 5 Haut conseil de la santé publique. Update dated 20 April 2020 of the review of individuals at an increased risk of severe forms of Covid-19 and the specific control measures for these groups. Paris: HCSP; 2020. https://www.hcsp.fr/explore.cgi/avisrapportsdomaine?clefr=807

[6] SARS-CoV-2 VACCINES - A VACCINATION STRATEGY; Report by CARE – COVID-19 Scientific Committee – COVID-19 Vaccine Committee dated 9 JULY 2020 https://solidarites-sante.gouv.fr/IMG/pdf/avis_vaccins_9_juillet_2020_-_care_-_conseil_scientifique_-_comite_vaccin.pdf

- The gradual availability of vaccine doses;
- The existence of alternatives, particularly curative treatments or other preventative treatments.

At this stage of our knowledge, the different scenarios envisaged are presented in matrix form based primarily on the level of spread of SARS-CoV-2 at the time of the possible availability of the vaccines:

- Scenario 1: circumstances with high viral circulation
- Scenario 2: circumstances with high localised viral circulation in some localities (local zone to be defined)
- Scenario 3: circumstances with low background viral circulation: limited clusters
- Scenario 4: no indicator of viral circulation

For each of the scenarios associated with viral circulation, the 3 objectives of a COVID-19 vaccination strategy are then set out, namely:

1. reducing morbimortality associated with COVID-19: expected impact on deaths, severe forms, hospital admissions particularly in intensive care;
2. reducing the spread of the epidemic: expected impact of vaccination on infections;
3. maintaining the country's vital functional needs: expected impact of vaccination on infections among key workers for the community. Finally, based on these objectives, the groups to be targeted and the minimum characteristics that future vaccines should have to meet these objectives are determined, along with a preliminary estimation of the number of vaccine doses required, which shall require fine-tuning (see overview of scenarios in Tables 1 to 4).

Transmission parameters and risk factors for severe forms affect the determination of the priority groups for vaccination and possible vaccination procedures.

Some parameters are starting to become clear such as:

- the main mode of transmission of the virus via droplets (airborne and hand-borne) and the very likely role of aerosol transmission;
- the median incubation period of 5 days (up to 14 days);
- the infectious period of 2 days before the onset of symptoms; during symptoms and at most up to 14 days after the onset of the first signs (no culturable virus in specimens after this date[7]). In asymptomatic subjects, no later than 7 days after the positive sample;

Others are worth specifying and updating with a view to better estimating and quantifying:

- the level of risk of exposure according to the main contamination settings/modes based on the literature and the data obtained from contact tracing conducted in France;
- the level of risk of severe forms according to the various risk factors identified (age, comorbidities, socio-economic factors, ethnicity) based on the review of the literature and French monitoring data.

[7] https://www.nature.com/articles/s41586-020-2196-x
https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa638/5842165
https://jcm.asm.org/content/jcm/early/2020/06/08/JCM.01068-20.full.pdf

The question of the level of immunity of the population at the time of delivery of the vaccines and of the vaccination of previously infected and tested subjects should also be taken into account (possible exclusion, precautions for use, etc.)

The vaccine characteristics which are as yet not sufficiently known are also key in determining the vaccination strategy, in particular:

- the rate at which protective immunity is induced and the period of protection,
- the type of protection provided against infection, against the disease, against severe forms
- the efficacy in the various populations studied and in particular populations at an increased risk of severe COVID-19 infections
- the authorisation indications granted (authorised indications and populations)
- the safety profile among the various populations studied;
- the number of doses required to obtain protection;
- the vaccine dosage form (single- or multi-dose) and storage conditions.

The strategies envisaged, drafted based on the data and knowledge currently available, are described below and detailed in Tables 1 to 4.

1.1. Description of Scenarios 1 and 2

Scenarios 1 and 2 consider circumstances with high short-term viral circulation and essentially differ due to the geographic component: scenario 1 is envisaged on a national scale; scenario 2 on a local scale (for which the definition of the locality has yet to be defined).

In the context of scenarios 1 and 2, the objectives identified may be as follows:

1) Reducing morbimortality associated with COVID-19:

- a first means consists of targeting the **population at an increased risk of severe forms** (age, comorbidities).

  In this case, the vaccine(s) to be used are those which have been shown to be effective in preventing the disease or reducing severe forms, and to be safe among these groups.

  Should such a strategy be adopted, the target population identified as being at an increased risk of severe forms is at this stage estimated at approximately 23 million (+ 8 million obese individuals - see Appendix 1). Due to a vaccination schedule that will very likely have one or two doses (prime-boost), the number of doses required would then be approximately 46 million. However, these figures are very preliminary and need to be fine-tuned. Considering a sequential and gradual delivery of the vaccine doses,

prioritisation among those at the highest risk should be anticipated once the first vaccines arrive.

To protect these groups, **the vaccination of frontline healthcare workers** and medical-social sector workers is deemed critical in that they contribute to the spread of the epidemic and the transmission of the virus to vulnerable groups. This strategy would also help protect these workers directly from the risk of contamination while they are working despite personal protective measures, and from the possible complications liable to ensue.

The healthcare worker population is estimated at approximately 1.8 million, and that of medical-social sector workers at approximately 1 million (see Appendix 1). These estimations are preliminary at this stage and shall need to be fine-tuned.

- a second means consists of targeting **those in close contact with vulnerable individuals** (young and with no comorbidities), and more specifically high-risk individuals who may not be eligible for vaccination due to an unknown or unfavourable benefit-risk ratio.

  In this case, the vaccine(s) to be used are those which have been shown to be effective in reducing infection and transmission, and to be safe in young subjects.

  Should such a strategy be adopted, it will be necessary to assess the feasibility of calculating those in close contact with vulnerable individuals.

2) Reducing the spread of the COVID-19 epidemic:

- a first means consists of targeting the entire **population liable to be infected** studied in clinical trials with a view to having an impact on the reservoir.

  In this case, the vaccine(s) to be used are those which have been shown to be effective in reducing infection and transmission, and to be safe in this population. It would be essential to determine a vaccination uptake target to achieve herd immunity based on epidemiological models.

  Should such a strategy be adopted, the vaccine requirement is extremely high. Indeed, in 2020, the adult population is estimated at approximately 53 million (INSEE 2020 data).

  A second means consists of targeting **individuals who are more likely to be contaminated.**

  Based on current knowledge, this applies to groups living in communities or living in conditions conducive to overcrowding (e.g. hospital, care home, prisons, collective accommodation) and groups frequenting settings conducive to multiple contacts (e.g. workplaces, enclosed places and public transport, etc.). In this case, the vaccines to be used are those which have been shown to be effective in reducing infection and transmission of infection. Should such a strategy be adopted, the dose availability is lower than that used to cover the adult population, but has yet to be calculated as things stand. According to an initial estimation of these target populations, approximately 65,300 incarcerated individuals, and 585,560 people residing in care homes would

particularly need to be taken into account (see Appendix 1). However, these figures are preliminary and need to be fine-tuned.

3) Maintaining the vital functional needs of the country (scenario 1) or the locality (scenario 2)

- This would involve targeting workers who help keep the healthcare and social, security, defence, energy, agri-food, education, and banking sectors running, or indeed from other sectors to be defined within the national territory or a limited locality.

  In order to fine-tune this population, more data on contamination modes and on seroprevalence are needed.

  In this case, the vaccine(s) to be used are those which have been shown to be effective in reducing infection and transmission, and to be safe.

  According to an initial estimation which needs to be developed further, the target population within the healthcare and medical-social sectors would be calculated at approximately 1.8 million and 1 million, respectively, (see Appendix 1), and must be defined for other sectors. The quantity of vaccine needed has yet to be determined accurately, also accounting for the organisation of the various sectors concerned (e.g. education, agri-food, energy, etc.), and the proportion of activities suitable for remote working.

1.2. Description of Scenario 3

Scenario 3 considers circumstances with low background viral circulation (limited clusters). This scenario would be aimed at:

1) reducing the spread of the COVID-19 epidemic within and beyond the cluster independently of risk factors in respect of contamination and severe forms and would envisage **ring vaccination of contacts of COVID-19 cases** (1st degree, 2nd degree) or in locations and communities in which cases occur (barrier vaccination).

   In this case, the vaccine must be capable of inducing rapid protection from the first dose, and preferentially of impacting carriage of the virus.

   Should such a strategy be adopted, the quantity of vaccine required has yet to be established based on the number and extent of the outbreaks.
2) maintaining vital functional needs in respect of the settings and communities in which outbreaks occur.

1.3. Description of Scenario 4

Scenario 4 considers circumstances with no indicator of viral circulation when the vaccines are made available

9. The need for vaccination shall be dependent on the characteristics of the vaccines and particularly on the period of protection provided by the vaccines, and the protection provided against other coronaviruses or variants, and on factors associated with projections in respect of the epidemic (existence of seasonal trends; mutation potential of the virus in the more or less long term, status of the epidemic in other countries).

Preliminary guidelines

At this stage, the definition of the vaccination strategy to be adopted at the time of the arrival of future candidate vaccines, among the four scenarios envisaged, cannot be determined given the current uncertainties mentioned above, and shall depend on:

1) developments in the epidemic in the French population at the time that the vaccines are made available and its impacts on health.
2) the characteristics and benefit-risk ratio of the vaccines at the time that they are made available, and particularly on:
   - immunogenicity according to the different age-groups and high-risk groups;
   - vaccine efficacy according to the different age-groups and high-risk groups;
   - the effect of the vaccine on contamination and transmission of infection
   - the safety of the vaccines in the different age-groups and high-risk groups; 3)

sequential availability of vaccine doses.

The HAS guidelines shall prioritise the most appropriate vaccination strategies (alone or in combination) to meet the public health objectives defined in view of the status of each of these items.

They shall also consider the expected acceptability of vaccination, and of the different vaccines where applicable, in the different groups, as well as equitable access to vaccination among groups particularly in the case of groups in positions of insecurity.

The vaccination policy shall thus be subject to change as knowledge is updated and vaccine doses are made available.

At this stage, the HAS is of the view that, in all scenarios envisaged, **frontline healthcare and medical-social sector workers shall represent the essential priority targets for vaccination** meeting objectives in respect of individual and collective prevention, and maintaining the country's essential activities during epidemic periods.

Moreover, **individuals at an increased risk of severe forms** who pay the heaviest price in terms of hospital admission and death (individuals aged over 65 and those with a comorbidity) **shall also be targeted as a priority by vaccination** once a positive benefit-risk balance of vaccination has been established.

These guidelines shall be reviewed as knowledge is updated as previously evoked.

Scenario 1: Circumstances with high viral circulation on a national scale

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability – requirements
Reducing morbimortality associated with COVID-19 (hospital admissions, intensive care, deaths and secondary complications)	– Individuals at increased risk of severe forms – Healthcare and support workers (accommodation, social services, etc.)	Proven efficacy of the vaccine in these individuals in reducing infection or severe forms among these groups Safety	Estimation of approximately 23 million (+ 8 million obese individuals) (see Appendix 1: preliminary calculations – risk of double counting) Approximately 1.8 million healthcare workers and 1 million medical-social workers (see Appendix 1: preliminary calculations) Number of doses according to vaccination schedule => population X number of doses required If quantity is less than estimated requirements: need for prioritisation according to the identification of the groups at the greatest risk

	– Individual in close contact with individuals at increased risk (young and with no comorbidities)	Proven efficacy of the vaccine among young subjects and efficacy on transmission Safety particularly in the event of unfavourable benefit-risk balance of	Estimation of those in close contact: to be completed Number of doses according to vaccination schedule => population X number of doses required

Objectives targeted by the strategy	**Target populations**	**Vaccine prerequisites**	**Vaccine availability – requirements**
		vaccine for some individuals at increased risk	If quantity is less than estimated requirements: need for prioritisation
Reducing the COVID-19 epidemic: contaminations	– The entire population liable to be infected and studied in clinical trials (at this stage limited to the adult population) Possible exclusion of unstudied populations	Proven efficacy in reducing infection and transmission among these groups Safety To be defined: vaccination uptake target to achieve herd immunity (model)	The estimation of the population aged 18 and over according to INSEE 2020 data is 53 million. Very large quantity

	– Groups most likely to be contaminated: groups living in communities or living in conditions conducive to overcrowding (hospital, care home, prisons, collective accommodation) and groups frequenting settings conducive to multiple contacts (e.g. workplaces, enclosed places and	Proven efficacy in reducing infection and transmission Safety	Estimation of groups at increased risk of infection: to be completed If quantity is less than estimated requirements: Need for prioritisation
Objectives targeted by the strategy	**Target populations**	**Vaccine prerequisites**	**Vaccine availability – requirements**
	public transport, prisons, etc.)		

Maintaining the country's vital functional needs	– Key workers and essential services: • healthcare and social • security, • defence, • energy, • agri-food, • education, • banking, • others (to be completed)	Proven efficacy on symptomatic forms Proven efficacy on infection and transmission Safety	Estimation of groups affected: to be completed (some preliminary calculation data in Appendix 1) If quantity is less than estimated requirements: need for prioritisation according to frontline workers or prioritisation of essential services

Scenario 2: Circumstances with high localised viral circulation in some localities (local zone to be defined)

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability
Reducing morbimortality associated with COVID-19 (hospital admissions, intensive care, deaths and secondary complications)	– Individuals at increased risk of severe forms – Healthcare and support workers (accommodation, social services)	Proven efficacy of the vaccine in these individuals in reducing infection or severe forms among these groups Safety	Estimation limited to the locality/localities concerned If quantity is less than estimated requirements: need for prioritisation according to the identification of the groups at the greatest risk

	– Individuals in close contact with vulnerable individuals (young and with no comorbidities)	Proven efficacy of the vaccine among young subjects and efficacy on transmission Safety Particularly in the event of unfavourable benefit-risk balance of vaccine for some individuals at increased risk	Estimation limited to the locality/localities If quantity is less than estimated requirements: Need for prioritisation
Reducing the COVID-19 epidemic: contaminations	-The entire population liable to be infected aged over 18 years and studied in clinical trials	Proven efficacy in reducing infection and transmission among these groups Safety	Estimation limited to the locality/localities concerned

Objectives targeted by the strategy	**Target populations**	**Vaccine prerequisites**	**Vaccine availability**
	Possible exclusion of unstudied populations	To be defined: vaccination uptake target to achieve herd immunity (model)	

	– Group liable to be contaminated more frequently: groups living in communities or living in conditions conducive to overcrowding (hospital, care home, prisons, collective accommodation) and groups frequenting settings conducive to multiple contacts (hospital, care home, settings conducive to contact (workplaces, enclosed settings and public transport, prisons, etc.).	Proven efficacy in reducing infection and transmission Safety	Estimation limited to the locality/localities concerned If quantity is less than estimated requirements: need for prioritisation
Maintaining the locality's vital functional needs	– Key workers and essential services:	Proven efficacy on symptomatic forms	Estimation of groups concerned: to be completed (Some preliminary calculation data in Appendix 1)
Objectives targeted by the strategy	**Target populations**	**Vaccine prerequisites**	**Vaccine availability**

	• healthcare and social • security, • defence • energy, • agri-food • education • banking • others (to be completed)	Proven efficacy on infection and transmission Safety	If quantity is less than estimated requirements: need for prioritisation according to frontline workers or prioritisation of essential services

Scenario 3: circumstances with low background viral circulation: limited clusters

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability
Reducing the spread of the COVID-19 epidemic beyond the outbreak	Cluster(s): ring vaccination of contacts of COVID-19 cases (1st degree, 2nd degree) or in locations and communities where cases occur (barrier vaccination).	Proven efficacy based on ring vaccination Proven rapidity of immune response at the first dose	Estimation limited to the number(s) of clusters and to the locations and communities concerned
Maintaining vital functional needs	Key workers and essential services in respect of the locations and communities where outbreaks occur: • healthcare and social • security, • defence • energy, • agri-food • education? • banking • others (to be completed)	Proven efficacy based on ring vaccination Proven rapidity of immune response at the first dose	Estimation limited to the number(s) of clusters and to the locations and communities concerned

Scenario 4: no indicator of viral circulation

In this scenario, the benefit of vaccination shall be assessed based on factors linked with projections of resurgence of the epidemic or projections in respect of seasonal trends

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability - requirements
Reducing morbimortality associated with COVID-19 (hospital admissions, intensive care, deaths and secondary complications)	– Individuals at increased risk of severe forms – Healthcare and support workers (accommodation, social services, etc.)	B/R of vaccinating in the absence of viral circulation period of protection provided by vaccines, efficacy of vaccination according to the viral variants based on virus mutation potential in the more or less long term resulting in a possible decrease in vaccination efficacy	Estimation of approximately 23 million (+ 8 million obese individuals) (see Appendix 1: preliminary calculations – risk of double counting) Approximately 1.8 million healthcare workers and 1 million medical-social workers (see Appendix 1: preliminary calculations) Number of doses according to vaccination schedule => population X number of doses required If quantity is less than estimated requirements: need for prioritisation according to the identification of the RF with the greatest risk
	– Individual in close contact with vulnerable individuals (young and with no comorbidities)	B/R of vaccinating in the absence of viral circulation	Estimation of those in close contact: to be completed Number of doses according to vaccination schedule => population X number of doses required

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability - requirements
		Period of protection provided by vaccines, Efficacy against other coronaviruses liable to emerge Efficacy of vaccination according to the viral variants based on virus mutation potential in the more or less long term resulting in a possible decrease in vaccination efficacy	If quantity is less than estimated requirements: need for prioritisation
Reducing the COVID-19 epidemic: infections	– The entire population liable to be infected and studied in clinical trials Possible exclusion of unstudied populations	B/R of vaccinating in the absence of viral circulation Period of protection provided by vaccines, Efficacy against other coronaviruses liable to emerge	The estimation of the population aged 18 and over according to INSEE 2020 data is 53 million people. Very large quantity

Objectives targeted by the strategy	Target populations	Vaccine prerequisites	Vaccine availability - requirements
		Efficacy of vaccination according to the viral variants based on virus mutation potential in the more or less long term resulting in a possible decrease in vaccination efficacy	
	– Groups most likely to be contaminated: groups living in communities or living in conditions conducive to overcrowding (hospital, care home, prisons, collective accommodation) and groups frequenting settings conducive to contacts (workplaces, enclosed places and public transport, prisons, etc.).	B/R of vaccinating in the absence of viral circulation Period of protection provided by vaccines, Efficacy against other coronaviruses liable to emerge Efficacy of vaccination according to the viral variants based on virus mutation potential in the more or less long term resulting in a possible decrease in vaccination efficacy	Estimation of groups at increased risk of infection: to be completed If quantity is less than estimated requirements: need for prioritisation

Maintaining the country's vital functional needs	– Key workers and essential services: • healthcare and social	B/R of vaccinating in the absence of viral circulation	Estimation of groups affected: to be completed (some preliminary calculation data in Appendix 1)
Objectives targeted by the strategy	**Target populations**	**Vaccine prerequisites**	**Vaccine availability - requirements**
	• security, • defence • energy, • agri-food • education? • banking • others (to be completed)	Period of protection provided by vaccines, Efficacy against other coronaviruses liable to emerge Efficacy of vaccination according to the viral variants based on virus mutation potential in the more or less long term resulting in a possible decrease in vaccination efficacy	If quantity is less than estimated requirements: need for prioritisation according to frontline workers or prioritisation of essential services

Appendix 1: Status as at 10 June 2020 - Initial estimations of those at increased risk of severe forms of COVID-19 and of exposure

Method for counting those at increased risk of severe forms of COVID-19:

The estimations presented in Table 1 are based on a report from the French national health data system (SNDS) produced by Santé publique France (France as a whole- extrapolated from all schemes). They count the populations aged 65 years and over with or without vulnerability criteria (at least one) and those under 65 with vulnerability criteria (based on the risk factors defined by the HCSP and identifiable in the data available). These figures are probably overestimated as they have been established, in an initial approximation, on broader criteria than those defined by the HCSP, not taking disease stages or complications into consideration. Therefore, it is a broad and rough estimation.

The vulnerability criteria identified based on conditions identifiable from treatments (prescribed and purchased), long-term illnesses, hospital admissions – "top-ranking CNAM pathologies", are as follows: cardiovascular disease, chronic respiratory disease, cancer, terminal kidney failure, liver disease, HIV, Diabetes, Hypertension, women in third trimester of pregnancy. **Moreover, they do not include obese subjects.**

Besides those at increased risk of severe forms of COVID-19, other population groups also need to be considered such as those at increased risk of occupational exposure (healthcare workers, support workers, etc.) or living in communities (incarcerated persons, etc.) and key workers or essential services (penitentiary administration staff, departmental fire and emergency services or active members of the National police force, Gendarmerie Nationale, Civil Protection, and Military, etc.). Based on the initial estimations presented in Table 2, they could also represent a significant proportion of the population to be vaccinated, as almost 1.8 million healthcare workers and 1 million social-medial facility workers, for example, could be concerned. Essential services have yet to be defined.

> **Important point: these initial calculation data involve a double-counting risk, with vulnerable groups in particular; therefore, these are rough estimations at this stage which need to be fine-tuned and consolidated.**

Initial estimations of potential target populations:

Table 1: Initial estimations of individuals at increased risk of severe forms of COVID

SpF SNDS report	<65 years with at least one vulnerability criterion	≥65 years with at least one vulnerability criterion	≥65 years with no vulnerability criteria
Total France as a whole	9.8 million	9.6 million	3.4 million

Source: SNDS report produced by Santé Publique France

Furthermore, the obese population in France is estimated, according to the French Ministry of Health at over 8 million people8 (17% of the population) (potential double-counting risk with groups with diabetes and high blood pressure).

– Healthcare workers

According to the report by CARE – COVID-19 Scientific Committee – COVID-19 Vaccine Committee9, almost 1,800,000 people are concerned:

- doctors (independent and hospital): 230,000
- dentists: 40,000
- pharmacists: 75,000
- midwives: 22,000
- students: 100,000
- nurses: 700,000
- healthcare assistants: 400,000
- others (physiotherapists, radiographers, psychomotor therapists): 200,000 • laboratory staff: 20,000

Table 2: Initial estimations of individuals at increased of occupational exposure or living in communities and key workers or essential services

Social and medical-social organisation and service staff (minimum estimation)	1,074,437 million
Incarcerated individuals	65,300
Care home residents	585,560 (but already counted among those aged over 65)
Key workers, essential services:	
Penitentiary administration staff	41,000
Departmental fire and emergency services	260,900
Active members of the National police force, Gendarmerie Nationale, Civil Protection and Military	608,000
Other key sectors and essential services to be specified	To be calculated

Sources: DREES data for healthcare workers, INSEE data and French Interior Ministry data

[8] https://solidarites-sante.gouv.fr/systeme-de-sante-et-medico-social/strategie-nationale-de-sante/priorite-prevention-rester-enbonne-sante-tout-au-long-de-sa-vie-11031/priorite-prevention-les-mesures-phares-detaillees/article/obesite-prevention-et-prise-encharge

[9] https://solidarites-sante.gouv.fr/IMG/pdf/avis_vaccins_9_juillet_2020_-_care_-_conseil_scientifique_-_comite_vaccin.pdf

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