

Components of a Safe and Phased Reopening of Society

Series | COVID-19 & Response Strategy

ISGlobal Institut de Salut Global
Barcelona

“The aim of the present document is to present some of the components of what we might call a “precision public health service”, which will help us to achieve a controlled de-escalation of the containment measures”

[This document is the first in a series of discussion notes that address fundamental questions about COVID-19 crisis and response strategies. The papers have been prepared on the basis of the best scientific information available and can be updated as it evolves.]

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Almost one month after the start of the lockdown and following the extension of the SARS-CoV-2 state of emergency in Spain, the community mitigation measures implemented and the strengthening of the national health system are **proving effective in reducing the number of infections**, hospital admissions and deaths across the country. The mitigation measures will remain in force over the coming weeks in order to achieve the first objective, which is to **limit the spread of the virus and prevent the collapse** of the Spanish health system.

Reopening the economy and getting life back to normal for everyone will require a **gradual and controlled de-escalation** of the confinement measures accompanied by an effective program of epidemiological controls designed to prevent a resurgence of the epidemic. The conversation about how this can be achieved has already begun and what is imperative at this point is to devote some of our energy to devising a plan for the coming months. We have the opportunity and a responsibility to take advantage of the room for manoeuvre that has been gained by the efforts of the public.

The aim of the present document is to present some of the components of what we might call a “precision public health service”, which will help us to achieve a **controlled de-escalation of the containment**

measures. Our main focus is on the **scientific and epidemiological aspects** of the problem, but the analysis necessarily incorporates other elements—**economic, social, public health, communication**—all of which are essential variables in this equation. Some of the tools we are proposing—such as mass screening systems—are not yet available from the health authorities, but we anticipate that they will be in the coming weeks.

We are conscious of the fact that the discussion points in this document do not necessarily give rise to any definitive or unequivocal proposals. We believe, however, that they offer **useful insights** that may help us to answer critical questions about the best strategies to follow. We have taken into account published opinions about the best way to gradually relax the control measures put in place to tackle the coronavirus epidemic¹. As the author of one of those publications aptly says: “The epidemic is evolving rapidly, and our understanding of best responses will evolve as well².”

In the coming weeks, ISGlobal will continue to address some of the fundamental questions in this debate from a scientific perspective in the hope that this will contribute to the difficult and complex task of defining a response strategy ●

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¹ Pisano GB et al. Lessons from Italy's Response to Coronavirus. Harvard Business Review. March 27, 2020; Goettlieb, S. National coronavirus response: A road map to reopening. *American Enterprise Institute*, March 2020.

² Goettlieb, S. National coronavirus response: A road map to reopening. *American Enterprise Institute*, March 2020.

1. Objectives for the Reopening Phase

“In their strategy for the gradual reopening of society and the economy, the authorities have three priority objectives: to protect vulnerable populations, to reactivate the economy and to minimise the collateral damage inflicted by the crisis”

In their strategy for the gradual reopening of society and the economy, the authorities have three priority objectives:

- 1. To protect vulnerable populations** (older adults and people with chronic health conditions) and ensure, by strictly controlling the spread of the virus, that the capacity of the health care system is not overwhelmed by the number of critically ill patients. Control measures will be essential until we reach the minimum level of immunity in the population (herd immunity), effective treatments are available, or we have a vaccine capable of preventing the spread of the virus.
- 2. To gradually reactivate the economy and rebuild employment**, minimizing the decline in GDP and the need to avail of the extraordinary fiscal stimulus made available by the European Union and its member states. This exercise must take into account the particular needs of critical industries as well as the urgent need to revive
- 3. To minimise the collateral damage inflicted by the crisis** on the health, welfare and education of citizens, including:
 - The impact on the physical and mental health of the public caused by stress, loneliness, a lack of physical activity, and the loss of access to greenspace.
 - The impact on the education of children and young people who have already missed part of their academic year, particularly in low-income groups.
 - The increased vulnerability of certain groups, such as elderly people living alone or in care homes, women living in situations of abuse, families living in poverty, undocumented immigrants, and homeless people •

2. Basic Components of the Reopening Strategy

“The quality of the information available at any time is critical for any decision on the next steps”

Any strategy for relaxing confinement measures and a phased return to a new normalcy requires three fundamental elements:

- 1. Case detection and contact tracing**
- 2. An assessment of immunity levels in the community**
- 3. Stratification of the population according to criteria, such as vulnerability and priority for economic recovery**

The quality of the information available at any time is critical for any decision on the next steps that should be taken.

However, the information currently available is suboptimal owing to discrepancies in data collection, processing and availability; this deficiency hinders the decision-making process.

The use of technology will help, but the ethical and legal implications of such tools need to be addressed urgently.

“We are seeking to answer some fundamental questions about the best strategy to follow”

We are seeking to answer some fundamental questions about the best strategy to follow:

- What tools would allow us to more precisely isolate cases of COVID-19, making possible a phased relaxation of the current restrictions?
- How can we determine what percentage of the population has acquired immunity in order to define where, how and when it is possible to relax containment measures?
- What criteria would help us to complete the epidemiological information and proactively identify the population in need of protection? ●

“In addition to social distancing—the most effective preventive measure—another cornerstone of epidemic control is case detection and the isolation of cases and contacts”

“The WHO estimates that the indicator of sufficient testing is when only 1 in 10 tests are positive”

2.1. Case Detection and Contact Tracing

In addition to social distancing—the most effective preventive measure—another cornerstone of epidemic control is case detection and the **isolation of cases and contacts**. Consequently, any effort to end confinement must be accompanied by a **permanent surveillance system** with sufficient capacity to detect as many cases and contacts as possible. This involves the following elements:

A. Tests for detecting cases

WHO Tests capable of detecting the presence of virus in the body (PCR or rapid antigen tests) are used to identify individuals who have an active infection and are therefore contagious. Such testing should prioritise patients with symptoms and their contacts as well as groups who are particularly exposed and/or in contact with vulnerable people (health workers and people working in elder care facilities or high transmission areas).

In addition to these groups, **active case detection** should also be implemented in the community to detect cases with mild or no symptoms, including children, who could also contribute to viral spread. Serological tests are detailed below.

WHERE In addition to hospital-based testing, the capacity to conduct testing in

the community should also be expanded through primary care centres, pharmacies, tents, diagnostic modules, etc.

HOW MANY The WHO estimates that the indicator of sufficient testing is when **only 1 in 10 tests are positive**.

If sufficient testing is not being carried out, any symptomatic person should be considered a possible case; the case should be reported and isolation measures and contact tracing should be carried out in the same way as for confirmed cases.

B. Contact tracing

Contact identification and tracing should be **automated**. The best strategy is to use a **mobile application (app)** that allows the infected person to provide information about their contacts or automatically identifies their contacts using the phone’s geolocation system. The app would also include an option for sending daily messages and information to the infected person during their quarantine.

It is important to ensure widespread use of the app to facilitate contact identification. Such monitoring must provide comprehensive guarantees safeguarding the anonymity and subsequent use of the data collected for epidemiological purposes.

ses. A manual system such as a telephone service (hotline) will be needed to service people who do not use the mobile phone app.

C. Isolation and quarantine of cases and contacts

All cases and contacts should observe a **14-day isolation or quarantine**, in

their own homes when possible. Hotels can also be used to isolate patients with mild to moderate symptoms so that other members of their household are not infected ●

“It is essential to roll out serological testing in the community as soon as possible and on as large a scale as possible”

2.2. Assessing the Immunity of the Population

There is evidence to suggest that once an infected person has recovered they acquire **immunity**³ to future infection (although it is not yet clear how long such immunity may last). If this is the case, it would mean that people who have recovered from the disease could resume normal activities without exposing themselves to reinfection or endangering other people. A recent modelling study estimated that up to 15% of the Spanish population may have been infected, although this figure is associated with a high degree of uncertainty⁴.

It is, therefore, essential to roll out **serological testing** in the community as soon as possible and on as large a scale as possible in order to:

- Establish an effective mechanism for identifying people who have acquired immunity and can return to work and care for the most vulnerable populations. One proposal is the creation of “immunity passports” based on the results of serology tests; the advantages and disadvantages of this option need to be considered.
- Estimate the proportion of the population with immunity in a specific region or group in order to inform and adapt the restriction measures.

WHO It is possible to randomly sample the population in various ways to **facilitate the stratification** described below:

- **Geographical sampling** (e.g. municipalities with more than 30% or more than 5,000 people aged over 60 years);

- **Occupational sampling** (strategic groups or sectors, such as health care workers, law enforcement and defence, transport, education and non-essential industries with a high level of performance or employment);
- **Population-based sampling** (those at highest risk, including adults over 60 years of age and people with chronic conditions who live in densely populated areas or with younger generations; and individuals who have a higher risk of transmitting the disease, including children and young people living in densely populated areas). Serological testing of children would provide very useful data that could inform policies for reopening schools and guide recommendations on contact between children and the older population. Schools themselves could undertake this task and ensure that there is no discrimination among students.

WHERE In addition to hospital-based testing, the capacity to conduct testing in the community should be expanded through primary care centres, diagnostic tents or modules, schools and colleges, among other possible locations. Stratification of the population could help to prioritise regions or groups of particular interest.

HOW MANY The first step in estimating the level of immunity in the population within a given region or population will be to calculate the appropriate sample size. ●

³ Wölfel R et al. Virological assessment of hospitalized patients with COVID19. *Nature*. April 2020. doi.org/10.1038/s41586-020-2196-x; Bao L et al. Reinfection could not occur in SARS-CoV-2 infected rhesus macaques. Preprint. March 2020 doi.org/10.1101/2020.03.13.990226

⁴ Flaxman S et al. Estimating the number of infections and the impact of nonpharmaceutical interventions on COVID-19 in 11 European countries. *Report by Imperial College Response Team*. April 2020.

2.3. Stratification of Populations According to Different Criteria

“We propose stratifying the population according to vulnerability indicators rather than epidemiological indicators (number of cases and seroprevalence), which inevitably reflect the past situation. The aim of this exercise is to formulate a proactive preventive response.”

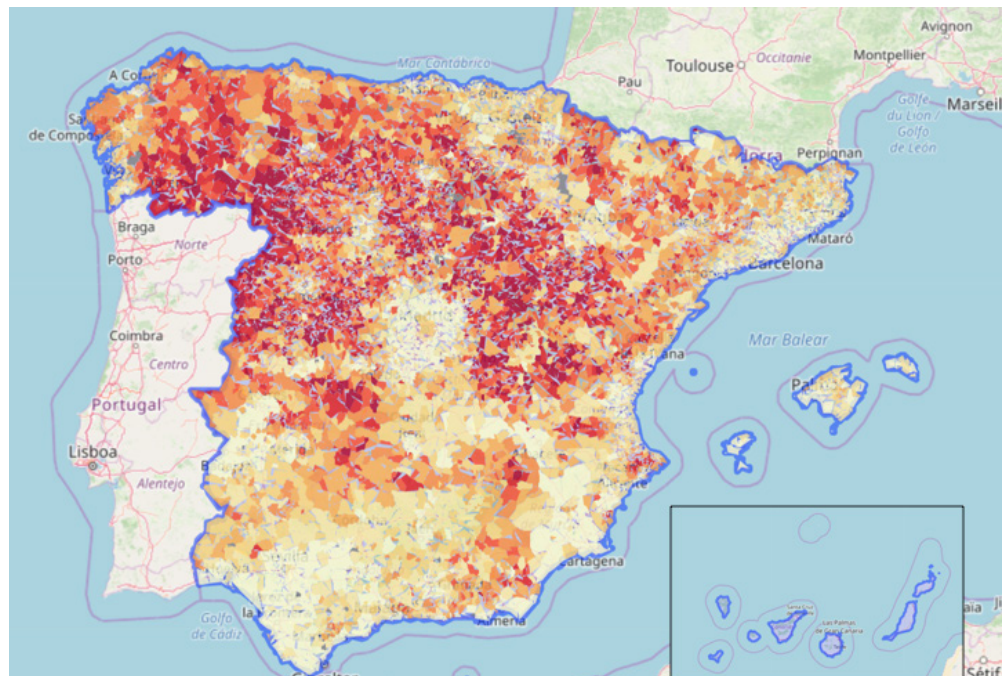
The aim of moving on the next phase in the process is to reduce the human, social and economic cost of the containment measures. To achieve this aim, the strategy should be to limit restrictive measures to geographical areas, groups or individuals at greater risk for severe illness and facilitate a return to active living for groups of higher priority for economic recovery. To this end, we propose stratifying the population according to **vulnerability indicators** rather than epidemiological indicators (number of cases and seroprevalence), which inevitably reflect the past situation. The aim of this exercise

is to formulate a **proactive preventive response**.

Stratification by Geography and Age

There are about 10 million people aged over 60 years in Spain. This statistic allows us to stratify regions and municipalities on the basis of a combination of two criteria:

- Total population over 60 years of age
- Proportion of the population aged over 60 years (using a threshold of 30%, for example). The map below shows the distribution of this population in Spain.



Distribution of the population aged > 60 years in Spain. The data is shown by municipality; the darker the colour the higher the proportion of people aged > 60 (dark red = over 50% of the population).

Other factors to consider in refining this stratification could be:

- **Population density** (rural vs. urban and the possibility of maintaining social distancing)
- **Population mobility** (for example the number of commuters travelling to work in cities)
- **Capacity of the health care system** in the area

such as reported transmission in the area (number of cases or hospitalisations) and percentage of the population with immunity (determined by the number of recovered cases or by serological studies).

The authorities must consider the question of the level at which these measures should be planned and implemented (municipal, district, county or other) ●

These indicators are always complementary to the epidemiological criteria,

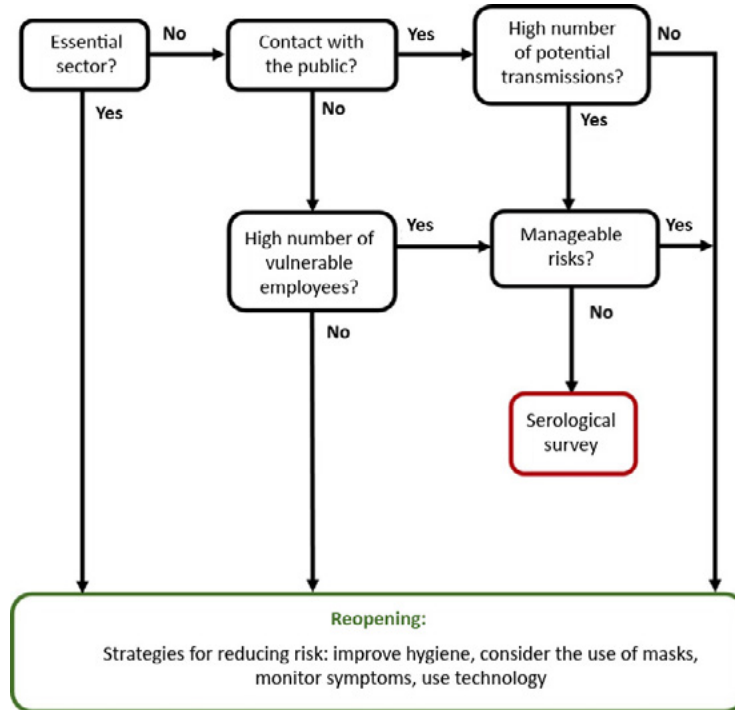
“The practical application of sectoral stratification should take into consideration the following criteria: whether or not the sector is essential; employee risk; risk to the public; whether risk can be managed by adapting working conditions”

Stratification by Sector

The practical application of sectoral stratification should take into consideration the following criteria:

- whether or not the sector is essential;
- employee risk (vulnerable employees);

- risk to the public (employees potentially transmitting the virus);
- whether risk can be managed by adapting working conditions ●



2.4. Other Considerations

Regarding actions taken to reinstate confinement measures

The emergence of **high-risk situations or the resurgence of viral transmission** in specific areas or population groups during the transition towards lifting confinement restrictions may make **selective renewed application of some of the containment measures necessary**. To ensure that this is done in a timely fashion, **we need comprehensive information systems** as well as agile indicators and warning criteria that can promptly detect deviations from expected frequencies (hot spots), both over time and in specific areas.

Regarding the capacity of the health care system to meet the needs of the reopening phase

As the reopening strategies are focussed on preventing and controlling the spread of infection, it is important to ensure that the health care systems in charge of **epidemiological surveillance and analysis** of the data collected have sufficient capacities to carry out this task in addition to their normal functions caring for individuals and the community. Surveillance activities are mainly the responsibility of the **health care systems run by the autonomous communities** and they require significant support in the form of specialised human resources, digital tools and data management.

Conclusion

The SARS-CoV-2 coronavirus pandemic is an event without precedent in the modern age in terms of its magnitude, scope, and repercussions. Scientific, economic, political and social institutions are rapidly adapting to a situation that is putting a dangerous strain on the timelines and principles of research. The authorities are being obliged to take very complex decisions based on partial, uncertain and changing information. Our mission is to **assist and inform** this process with rigorous analysis and research but also with complete **transparency** regarding our degree of certainty.


On that basis, the aim of this report is to raise and try to answer some of the fundamental questions facing our society regarding the best strategy to follow. Over the coming weeks and months, we will con-

tinue to work tirelessly to **increase the evidence available** regarding this epidemic and how best to reduce its direct and collateral consequences. And we will do so in loyal collaboration with other scientific institutions and in the service of the public interest. In that spirit, we welcome any comments or suggestions regarding this document and the proposals it contains ●

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Annex SARS-CoV-2 Seroprevalence Survey in Catalonia: Example for the Design of a Sampling Strategy

The Ministry of Health has announced its intention to carry out a **national seroprevalence survey** in the coming weeks on representative samples from each autonomous community. What could be the added value of carrying out other serological surveys at the local level? The following is **an example based on the case of Catalonia**. The aim of this proposal is to illustrate the use of the tools available and it does not include recommendations on specific ranges or thresholds that could be used to allow containment measures to be relaxed or lifted.

The survey proposed by the Ministry of Health will probably aim to select a representative sample by age group. The

WHO recommendation is to stratify the population into three age groups⁵: 0-18, 19-50, > 50. However, we could also stratify into smaller cohorts to obtain more granular data, for example into 10-year age ranges starting with 0-9 and continuing up to > 80.

Furthermore, other criteria could be used to inform a stratified strategy for reopening society and the economy or the reinstatement of containment measures, for example:

1. GEOGRAPHY

2. SECTOR

3. INDIVIDUAL CHARACTERISTICS

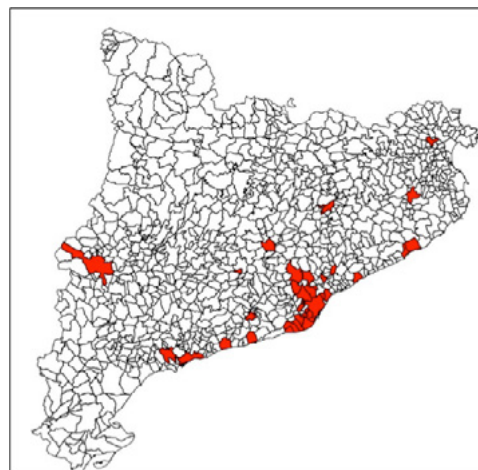
1. GEOGRAPHY

Catalonia has 947 municipalities, with populations ranging from 26 to 1.6 million residents. A strategic sample could be based on some of the following criteria:

- Municipalities where a high proportion of the population is vulnerable to severe disease (e.g. > 60 years). The suggested threshold is 30%.
- Municipalities with a net vulnerable population (> 60 years) in excess of

a certain threshold (e.g. 5,000 inhabitants).

- Municipalities with a high population density (above a certain threshold).
- Municipalities with the highest or lowest levels of confirmed cases, severe cases or deaths.
- Health Departments, depending on the history of their capacity or occupation over the preceding month.
- Areas of importance to the economy or for the flow of people or goods.



60% of Catalans live in 3.6% of the land area.

Decisions based on these criteria can be made on the basis of data currently available using interactive tools such as Tango (<https://datacat.cc/tango/>) or maps representing a combination of the variables described. Alternatively, other criteria could be used, such as the immune status of:

- a) the population most vulnerable to experiencing severe COVID-19;
- b) a population that is mostly asymptomatic or with mild symptoms and yet potential transmitters of the disease ●

⁵ <https://www.who.int/publications-detail/population-based-age-stratified-seroepidemiological-investigation-protocol-for-covid-19-virus-infection>

2. SECTORAL

In the case of a sectoral approach, seroprevalence surveys could focus on populations working in strategic industries or sectors, for example:

- health care sector
- law enforcement and defence forces
- non-essential sectors considered strategic because of their importance to the economy and as employers
- transport
- education

3. INDIVIDUAL

In the case of an approach based on individual characteristics, seroprevalence surveys could focus on two groups:

People at risk of developing severe disease (due to age or an underlying condition):

- People aged over 60 years or with chronic conditions living in homes with three generations or with potentially asymptomatic infected persons.
- People aged over 60 years or with comorbidities living in densely populated areas.

The results of these surveys could inform the risk assessment for both (a) employees and (b) the public and consumers. In the case of the education sector, a high seroprevalence establishing the immunity of an educational community could make possible an early reopening and recovery of the school year using part of the summer months ●

People considered to present the greatest risk of spreading the disease

- Children
- Young people in frequent contact with vulnerable populations.
- Young people who come into contact with a large number of people.

This approach could be complemented with information on symptoms (for example, choosing areas with a high density of symptoms) collected with the app being rolled out in Catalonia ●
