Experts’ request to the Spanish Government: move Spain towards complete lockdown

We would like to express our concern about the limited capacity of actions taken by the Spanish Government to successfully control the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak and end the exponential growth phase of new cases. The measures taken so far, consisting primarily of partial restriction mobility, are in the right direction, although some researchers have warned about the pressure placed on the building blocks of the health system.1

Given that the actual extent of an epidemic can only be assessed retrospectively, governments and policy makers are forced to make decisions on the basis of mathematical models of other diseases and previous experiences by other countries taking different actions.2 In Spain, various models simulating the spread of infection and using different assumptions converge in a landscape of a high number of new cases within the next few weeks. Simulations have been done using the URV and UNIZAR models to predict the progression of the number of patients who will require admission into hospital intensive care units because of coronavirus disease 2019 (COVID-19) in three scenarios (appendix): scenario 1, no mobility restrictions; scenario 2, partial restriction of mobility (ie, movement to the workplace allowed for 30% of people); and scenario 3, complete restriction of mobility (ie, no workplace mobility allowed except for essential services).

The model suggests that the actions taken to date, consistent with scenario 2, will be insufficient to prevent hospitals and intensive care units from being overwhelmed over the coming weeks. The foreseen collapse of the health system, along with the age distribution of the Spanish population (ie, 18% of people aged ≥65 years), suggests a potentially high mortality rate associated with COVID-19 in the country. According to our models, the current state is associated with a very high risk of saturation of our health system, which is expected to last from March 26 to April 24, 2020 (appendix). Therefore, we urge the Spanish Government to implement, as swiftly as possible, more drastic measures to minimise the impact of the pandemic on the Spanish population.

As a reference framework (to be adjusted, if applicable), we suggest the following measures. Establish regional categories according to the number of cases per 100 000 population and implement a package of multiple interventions that fit each category (appendix). For example, type A areas (≥100 cases per 10⁵ inhabitants in the past 7 days) implement a complete shutdown of the region and citizen lockdown, except for essential services (eg, hospitals, health care, and research centres) for a minimum period of 15–21 days. This category includes, as of March 26, 2020, the Autonomous Communities of La Rioja (166 cases per 10⁵ inhabitants), Madrid (155), Navarra (142), Basque Country (124), Castilla-La Mancha (127), Catalonia (115), and Castilla y León (109).

Type B areas (<100 cases per 10⁵ inhabitants), which include all areas that are not considered type A, apply partial confinement (30% of work activity and 25% of internal movement allowed) and close monitoring of the growth rate of new infections. If the number of cases in a type B area increases sharply, it becomes a type A area. All non-essential inter-regional land, sea, and air transport must be totally interrupted for at least 15 days.

To implement combined non-pharmacological interventions for several weeks, including complete restriction of movement, work interruption, and social distancing, banning all travel and all non-basic economic activities, together with the intensified use of diagnostic tests in suspected cases has proven to yield good results.3 Also, there is an urgent need to establish a purchasing and supply channel for personal protective equipment, which is currently insufficient for health personnel who are highly exposed to and prone to contagion. The recent finding on the spreading capacity of SARS-CoV-2 by contamination of eyelashes and hair reinforces this need.4

The proposed suppression policies will not mean the end of COVID-19 in Spain in the initial 3–4 weeks; therefore, the development of strategies to sustain the gains is critical. A key lesson from the Asian experience is the need to create a robust surveillance system capable of collecting and reporting epidemiological data down to the individual or household level.1 There are two pillars for the development of such a system: (1) the development and implementation of a universal mobile application for self-reporting of suspected COVID-19 symptoms as well as apps to support contact tracing efforts (eg, TraceTogether mobile app; Singapore); and (2) increased diagnostic capacity to test all individuals with symptoms for early isolation. The identification of an increase in the number of cases in an area would trigger quick remedial measures like the implementation of early and targeted suppression actions.

Importantly, we beg the Spanish Government to facilitate the access of the scientific community to outbreak data, thus providing artificial intelligence support in simulation and modelling, and to create core support groups that coordinate a comprehensive, objective, and transparent scientific response.

We declare no competing interests.

*Oriol Mitjà, Àlex Arenas, Xavier Rodó, Aurelio Tobias, Joe Brew, José M Benlloch on behalf of 62 signatories†

mitja@flsida.org

†Signatories are listed in the appendix. JB is an independent data analyst.

Hospital Universitari Germans Trias i Pujol, 08916 Badalona, Spain (OM); Universitat Rovira i Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global Virgili, Tarragona, Spain (AA); ICREA and Climate & Health Program, Barcelona Institute for Global
Racism and discrimination in COVID-19 responses

Outbreaks create fear, and fear is a key ingredient for racism and xenophobia to thrive. The coronavirus disease 2019 (COVID-19) pandemic has uncovered social and political fractures within communities, with racialised and discriminatory responses to fear, disproportionately affecting marginalised groups.

Throughout history, infectious diseases have been associated with othering.1 Following the spread of COVID-19 from Wuhan, China, discrimination towards Chinese people has increased. This includes individual acts of microaggression or violence, to collective forms, for example Chinese people being barred from economic systems that surround it. Epidemics is inseparable from broader social and economic systems. Health protection relies not only on a well functioning health system with universal coverage, but also on social inclusion, justice, and solidarity. In the absence of these factors, inequalities are magnified and scapegoating persists, with discrimination remaining long after. Division and fear of others will lead to worse outcomes for all.

We declare no competing interests.

*Delan Devakumar, Geordan Shannon, Sunil S Bhopal, Ibrahim Abubakar
d.devakumar@ucl.ac.uk

Institute for Global Health, UCL, London WC1N 1EH, UK (DD, GS, IA); and Northumbria Healthcare NHS Foundation Trust, London, UK (SSB)

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Supplementary appendix

This appendix formed part of the original submission. We post it as supplied by the authors.

This online publication has been corrected. The corrected version first appeared at thelancet.com on March 30, 2020.

Supplement to: Mitjà O, Arenas A, Rodó X, et al. Experts’ request to the Spanish Government: move Spain towards complete lockdown. Lancet 2020; published online March 26. http://dx.doi.org/10.1016/S0140-6736(20)30753-4.
Supplementary Appendix
This appendix has been provided by the authors to give readers additional information about their correspondence.
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Supplementary material – Figures

Figure 1 – Progression of the number of patients who will require hospitalization in intensive care units (3 scenarios)

Credit – Clara Granell
Figure 2. A) Accumulative number of cases by Autonomous Community since start of the epidemic.

Figure 2. B) Number of cases (7 most recent days) adjusted by population: polygons

Credit – Joe Brew
Supplementary material – Mathematical model

The simulation was conducted using the last version of a family of discrete-time epidemiological models, specifically tailored to describe the transmission dynamics of SARS-COV-2, the etiological agent of COVID-19. The model aims to estimate the risk rate for each Spanish municipality, considering the following parameters: (1) the transmission dynamics of SARS-COV-2, (2) the usual movement patterns of the Spanish population, and (3) the demographics of the Spanish population.

Transmission dynamics
Virus transmission was described using a compartmental model that groups the population according to the infection status into the following categories:

- **Susceptible**: individuals without COVID-19, but still at risk.
- **Exposed**: infected individuals within the incubation phase and no transmission capacity.
- **Asymptomatic**: infected individuals without clinically relevant symptoms but transmission capacity.
- **Infected**: individuals with symptoms that are likely to be attributed to COVID-19.
- **Hospitalized**: infected individuals who have been identified and admitted to a hospital, thus blocking the transmission capacity.
- **Recovered**: individuals who have been infected but cannot transmit the disease because they have either died or recovered and developed immunity.

Movement patterns of the Spanish population
Transitions between the infection states drive the probabilities of transmission, recovery, etc., obtained from COVID-19 studies published to date. Regarding movements, we have included data from the National Institute of Statistics (NIS) on travel to the workplace between and within towns. The NIS record includes all movements between Spanish municipalities greater than 100 inhabitants and reporting more than 10 trips. The inclusion of individual movements into the model is essential to understand how the virus spreads across the country and allows simulating the outcome of movement restrictions both globally and locally.

Spanish demographics
The Spanish population has been divided into three age groups:

- Young (from 0 to 25 years old).
- Adult (from 26 to 65 years old).
- Older (more than 65 years old).

The rationale for age grouping has been based on the recent evidence on COVID-19 that shows a different effect of the infection in each age group. In our model, the following differences between age groups have been considered:

- Young and older are less likely to move across the territory than adults.
- Young are more likely to experience an asymptomatic disease (or with mild symptoms) and are, therefore, more challenging to identify.
- Older people are more likely to require hospitalization than young and adults.

Limitations

- The model does not predict or consider international inputs of infected individuals.
- The model has been based on epidemiologic parameters reported to date; however, these parameters may change in the near future.
- The model assumes the movement data reported by the NIE, which may vary in case of mobility restrictions.

Strengths

- The model allows modifying the epidemiologic parameters as new reports come up.
• The model allows for investigating the influence of the asymptomatic period and associated infectivity.
• Based on the current parameters, we can build risk maps of new cases and foresee infection spread by asymptomatic subjects.
• General mobility restrictions can be quickly introduced into the model to yield new predictions with these assumptions. This feature is of particular interest for policymakers and health authorities, which will be able to explore the foreseen impact of the previewed restrictions on infection spread.

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## Supplementary material – Full list of signatories

| Surname, Name       | Institution                                                                 | Position                          |
|---------------------|------------------------------------------------------------------------------|-----------------------------------|
| Arenas, Alex        | Cátedra Ciencia y Humanismo, Universitat Rovira i Virgili, Tarragona         | Director                          |
| Ares, Saúl          | Department of Systems Biology, Centro Nacional de Biotecnología - CSIC, Madrid| Científico Titular                |
| Benlloch, José María| I3M, Universitat Politecnica Valencia - CSIC, Valencia                      | Director                          |
| Bruña Romero, Óscar | Departamento de Microbiologia, Inmunologia y Parasitologia, Universidad Federal de Santa Catarina, Florianópolis (Brasil) | Associate Professor               |
| Brew, Joe           | Data Brew LLC, Barcelona                                                    | Data Scientist                     |
| Buceta, Javier      | Bioengineering Department, Chemical and Biomolecular Engineering Department, Lehigh University, Pennsylvania (USA) | Associate Professor               |
| Calle, Malu         | Research Group in Bioinformatics and Medical Statistics, Facultat de Medicina i Facultat de Ciències de la Salut i Benestar, Universitat de Vic – Universitat Central de Catalunya, Vic | Professor                         |
| Casabona, Jordi     | CEEISCAT, CIBERESP-UAB, Barcelona                                            | Director                          |
| Casals, Martí       | Facultat de Medicina i Facultat de Ciències de la Salut i Benestar a la Universitat de Vic – Universitat Central de Catalunya, Vic | Professor                         |
| Caylà, Joan         | Fundació de la Unitat d'Investigació en Tuberculosi de Barcelona, Barcelona | Professor                         |
| Chaccour, Carlos    | Institut de Salut Global de Barcelona, Barcelona                            | Assistant Research Professor       |
| Clotet, Bonaventura | Instituto Investigación Germans Trias i Pujol, Barcelona                    | Director                          |
| Cuesta, José A.     | Universidad Carlos III, Madrid                                               | Professor                         |
| de León, Manuel     | Instituto de Ciencias Matemáticas - CSIC y Real Academia de Ciencias, Madrid | Professor                         |
| Domingo Solans, Esteban | Centro de Biología Molecular Severo Ochoa - CSIC, Madrid                  | Professor                         |
| Figueras, Antonio   | Instituto de Investigaciones Marinas - CSIC, Madrid                          | Research Professor                |
| Gallego Cámara, Beatriz | Centro Nacional de Biotecnologia - CSIC, Madrid                      | Post-doctoral researcher          |
| García-Aymerich, Judith | Non-comunicable disease department, Institut de Salut Global de Barcelona, Barcelona | Research Professor, Head of department |
| García López, José Luis | I2SysBio, Institute for Integrative Systems Biology | Professor and Co-director       |
| Name                          | Affiliation                                                                 | Position                        |
|-------------------------------|-----------------------------------------------------------------------------|---------------------------------|
| Gasset, Maria                 | Instituto Química-Física Rocasolano - CSIC, Madrid                          | Associate Professor             |
| Gómez Melis, Guadalupe        | GRBIO: Research Group in Biostatistics and Bioinformatics, Departament d’Estadistica i Investigació Operativa, Universitat Politècnica de Catalunya, Barcelona | Professor of Statistics         |
| Gómez Rodríguez, Carmen       | Centro Nacional de Biotecnologia - CSIC, Madrid                             | Research Scientist              |
| Gómez-Gardeñes, Jesús         | Universidad de Zaragoza, Zaragoza                                          | Professor                       |
| Gómez, Sergio                 | Universitat Rovira i Virgili, Tarragona                                     | Professor                       |
| Granell, Clara                | Universidad de Zaragoza, Zaragoza                                          | Post-doctoral researcher        |
| Guillén, Francisco             | de Medicina Preventiva y Salud Pública, Facultad de Ciencias de la Salud, Universidad Pública de Navarra, Navarra | Professor                       |
| Gutiérrez Alvarez, Francisco J.| Department of Molecular and Cell Biology, Centro Nacional de Biotecnología, Madrid | Post-doctoral researcher        |
| Hueso-Gil, Ángeles            | Centro Nacional de Biotecnologia - CSIC, Madrid                             | Post-doctoral researcher        |
| Jarrillo-Herrero, Pablo        | Massachusetts Institute of Technology, Boston, Massachusetts (USA)          | Cecil and Ida Green Professor of Physics |
| López, Leonardo Rafael        | Institut de Salut Global de Barcelona, Barcelona                           | Post-doctoral researcher        |
| Lowe, Rachel                  | London School of Hygiene & Tropical Medicine, London (UK)                   | Associate Professor             |
| Lozano, Andrés                | Neurosurgery Department, University of Toronto, Toronto (Canada)            | Professor, Head of department   |
| Maiques, Ana                  | Neuroelecrtics, Massachusetts (USA)                                         | Research Scientist              |
| Manrubia, Susanna             | Centro Nacional de Biotecnologia - CSIC, Madrid                             | Associate Professor             |
| Martín Buldú, Javier          | Centro de Tecnologia Biomédica & URJC, Madrid                               | Principal Investigator          |
| Martín-Benito, Jaime          | Centro Nacional de Biotecnologia - CSIC, Madrid                             | Principal Investigator          |
| Martínez González, Miguel Ángel| Universidad de Navarra & Harvard School of Public Health, Harvard University, Massachusetts (USA) | Professor                      |
| Martínez Sánchez, José Maria  | Grupo de Evaluación de Determinantes de la Salud y Políticas Sanitaria, Universitat Internacional de Catalunya, Barcelona | Professor                      |
| Matamalas, Joan T.            | Harvard Medical School, Boston, Massachusetts (USA)                         | Research Associate              |
| Mitjà, Oriol                  | Instituto Investigación Germans Trias i Pujol                              | Associate Professor, ERC researcher |
| Morales, Maria                | Departamento de Medicina Preventiva y Salud Pública, Universitat de València| Professor                      |
| Moreno del Alamo, María       | Centro Nacional de Biotecnologia - CSIC, Madrid                             | Post-doctoral researcher        |
| Pascual-Leone, Álvaro          | Center for Memory Health, Hebrew Senior Life, Boston, Massachusetts (USA)    | Senior scientist                |
| Name                  | Affiliation                                                                 | Position                      |
|-----------------------|------------------------------------------------------------------------------|-------------------------------|
| Pereda, María         | Departamento Ingeniería de Organización, Administración de empresas y Estadística, Universidad Politécnica de Madrid | Assistant Professor           |
| Pérez Losada, Jesús   | Instituto de Biología Molecular y Celular del Cáncer – CSIC, Salamanca       | Científico titular            |
| Puig Reixac, Maria Teresa | Hospital de la Santa Creu i Sant Pau, Universitat Autònoma de Barcelona, Barcelona. | Professor                    |
| Real, Jordi           | Unidad Bioestadística, USR Barcelona DAP-CAT, Barcelona                      | Research Scientist            |
| Risco Ortiz, Cristina | Laboratorio de Estructura Celular, Centro Nacional de Biotecnología - CSIC, Madrid | Director                     |
| Rodó, Xavier          | Programa, Clima y Salud, Institut de Salut Global de Barcelona, Barcelona    | Professor, Head of department, ICREA researcher |
| Ruffini, Giulio       | Starlab, Massachusetts (USA)                                                 | Research Scientist            |
| Sardanyés, Josep      | Centre de Recerca Matemàtica, Barcelona                                       | Research Scientist            |
| Sanchez, Alvar        | Applied Physics Department, Universitat Autonoma de Barcelona, Barcelona     | Professor                    |
| Sánchez Villegas, Almudena | Departamento de Ciencias Clínicas, Universidad de as Palmas de Gran Canaria, Las Palmas de Gran Canarias | Professor                    |
| Solé, Ricard          | Complex Systems Lab - Universitat Pompeu Fabra, Barcelona                     | ICREA Research Professor      |
| Soriano-Paños, David  | Universidad de Zaragoza, Zaragoza                                            | Post-doctoral researcher      |
| Sunyer, Jordi          | Programa, Infancia y Medio Ambiente, Institut de Salut Global de Barcelona, Barcelona | Professor, Head of department |
| Tobías, Aurelio       | Instituto de Diagnóstico Ambiental y Estudios del Agua - CSIC, Barcelona     | Associate Professor           |
| Toledo, Estefania     | Centro de Investigación Biomédica en Red-Fisiopatología de la Obesidad y Nutrición, Universidad de Navarra, Navarra | Professor                    |
| Valls, Joan           | Estadística y Metodología de la Investigación, Institut de Recerca Biomèdica de Lleida, Lleida | Research Scientist           |
| Valverde, Sergi       | Institut de Biología Evolutiva, Universidad Pompeu Fabra - CSIC, Barcelona   | Tenured Scientist             |
| Villà-Freixa, Jordi   | Departamento de Ciencias Básicas, Universitat Internacional de Catalunya, Barcelona | Vice-dean, Research          |
| Vioque, Jesús         | Departamento Medicina Preventiva y Salud Pública, Universidad Miguel Hernandez, Alicante | Professor                    |