Commentary

Integral management of COVID-19 in Madrid: Turning things around during the second wave.

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A R T I C L E   I N F O

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The decentralized system governing health policy decisions in Spain has led to heterogeneous measures implemented to face the second wave of COVID-19 in Spain, which makes them difficult to compare and may explain diverse outcomes. On the other hand, the single-command measure adopted by the central government, after more than 20 years of transfers in health granted to regional governments, generated some confusion and uncertainty during the first months of the pandemic, when epidemiological rather than medical criteria prevailed[1,2]. Despite the political complexities that make up the country, its vulnerability (we have the oldest population in Europe), sociodemographic profile and mobility [2,3], and knowing that the main source of income depends on the services sector, Spain has recovered many of the deficiencies detected in the first wave. As an example of these renewed efforts in terms of structure and function, the Community of Madrid (CM) has generated social and tax policies to compensate affected people. Despite having suffered in the region along with the rest of the country a deep decline in the Gross Domestic Product (GDP), this marker showed an increase of a 25.5% in the third quarter of the year, given that the regional GDP reached in this period 17.3%, as compared with -18.0% during the previous trimester. This growth in the months of July, August and September allows the CM to reduce the rate of year-on-year decline to 8.1% [4].

In order to gauge the impact of different preventive health strategies and design better policies that reduce the health risks associated with COVID-19, the European Community has requested regional reports of adequate frequency and quality [5]. The Health Council of the CM, through the General Directorate of Public Health, generates a daily update of new cases, divided by age, sex, districts, hospitalizations, and deaths, openly on the health website of the Regional Government in Madrid [6].

Entering testing aspects, the molecular diagnostic capacity in the Hospitals Microbiology laboratories in Madrid has tripled since June. This was associated with the pioneering implementation of antigenic tests, contacts surveillance and voluntary screenings, what balanced the limitation of diagnostic resources by improving the transmission control. The introduction of rapid antigen tests could increase the diagnostic capacity of COVID-19 in the CM, both when targeting symptomatic and asymptomatic individuals. From week 41 to the end of 2020, half of the more than 100,000 SARS-CoV-2 diagnostic tests done per week in suspected cases were antigen rapid tests. This strategy, implemented in hospitals and primary care settings [7], allowed more than doubling the diagnostic capacity of COVID-19 cases, and achieving the benchmark recommended by the WHO of ten negative tests to one positive, ratio previously found in around four tests done per case (Fig. 1). Counting of antigen rapid tests alone, the diagnostic capacity in screening of asymptomatic subjects achieved the ratio of 250 tests per one COVID-19 case detected, with nearly 620.000 tests done in a targeted basic health area (BHA) with an approximated population of 2 million people. These results prove that the acceptability and simplicity of point-of-care SARS-CoV-2 diagnosis overcome limitations in test sensitivity, particularly seen in asymptomatic subjects, and make antigen tests a valuable tool to monitor and control the COVID-19 pandemic.

The updated information also allowed the generation of selective perimeter confinements by BHAs. BHA corresponds to delimited areas of health care that take into account the maximum distances of

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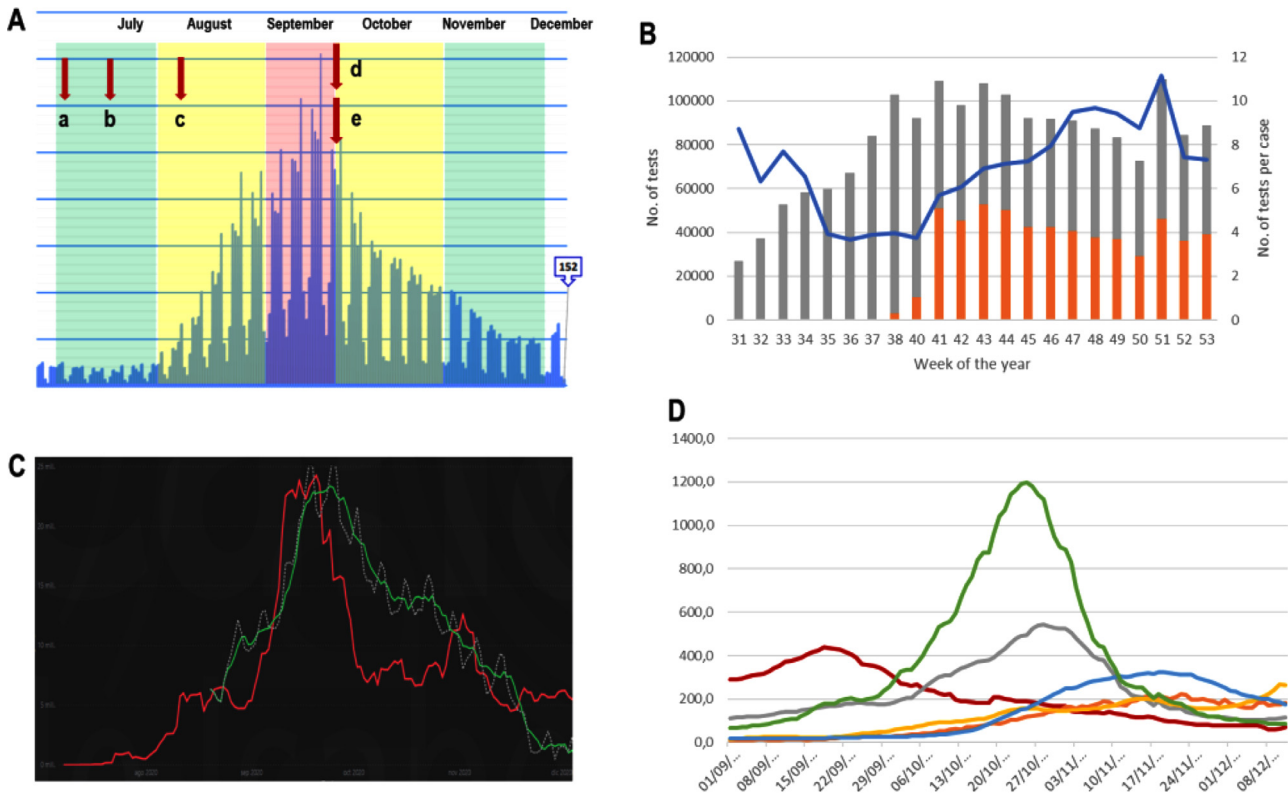E-mail address: franciscojavier.candel@salud.madrid.org (F.J. Candel).

Fig. 1. Summary of measures implemented during the second wave in Community of Madrid and comparison with other European capitals.

A. Correlation between incidence density and measures implemented for control transmission over the months and during the second wave (to December14[th]): a: SARS-COV-2 PCR in sewage water, b: Seroprevalence studies, c: Increase of diagnostic molecular capacity, d: Antigenic tests, e: Perimetral confinement. **B**. SARS-CoV-2 Test per week in the community of Madrid (orange bar: Antigen tests, grey bar: PCR, Blue line: total diagnostic capacity). **C**. Correlation between SARS-COV-2 PCR in sewage water and the average of hospital admissions (red line: μg/L per 100,000 inhabitants, green line: average of hospital admissions in 7 days. White discontinuous line: average of hospital admissions in 5 days). **D**. Comparison of incidence density between European capitals. green line: Bruseles; grey line: París; blue line: Rome, orange line: Berlín, yellow line: London, red line: Community of Madrid. (https://www.mscbs.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov/situacionActual.htm; https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Fallzahlen.html; https://geodes.santepubliquefrance.fr/#c=indicator&i=sp_ti_tp_7j.tx_pe_gliss&s=2020-10-11-2020-10-17&selcodgeo=11&t=a01&view=map1;https://coronavirus-staging.data.gov.uk/details/cases?areaType=region&areaName=London; https://github.com/pcm-dpc/COVID-19; https://epistat.wiv-isp.be/covid/).

the population groups furthest from the health services, the normal time to invest in their journey using ordinary means, the degree of concentration or dispersion of the population, the epidemiological characteristics of the area, and the health facilities and resources of the area. The CM has 286 BHAS with a median of 21875 inhabitants (IQR 11083) per area. From September 21 until the end of 2020 (apart from the specific measures established for the Christmas holidays), 89 BHAS corresponding to 32 municipalities in the CM were intervened in, with approximately 1,949,960 residents. This type of confinement, by districts or small municipalities, only in those areas with the highest incidence density, minimize the social and economic impact of the closure of commercial activity and safeguarding a minimum income in many households [8]. This type of restrictions, mostly applied to the neighborhood, has also generated in citizens a greater culture in the development of barrier measures (masks, gels, social distance) and a commitment towards deconfinement greater than that of a global restriction, which does not grant greater mobility to areas with less density of incidence.

Knowing the proportion of the infected population is essential to develop public health strategies. The last report for the national ENE-COVID seroprevalence survey [9] has shown that in the CM nearly one of each five people is already infected. This figure, the highest in Spain, speaks of the titanic effort done in the region to dismount the second pandemic peak. The seroprevalence studies in vulnerable or exposed people (residents in social-health centers, people with disabilities, public order forces, prison officials, etc.) as a complement to the national study [10], have allowed us to understand the traceability of infections and its modulating factors (cohabitation,

transportation, gathering, labor, etc.). For example, more than 55,000 workers and residents of the 419 social-health centers of the CM have been tested, to group these centers in traffic light of risk by their serostatus. New health policies have been generated in a consensual manner with other regional government departments; among others these were the sectorization of personnel, timing of opening and visit schedules, the cadence of the screening of workers, trace of the contagion flows in outbreaks among residents, etc.

Multidisciplinary advisory support through experts from scientific societies related to the three dimensions of COVID-19 (epidemiologic, diagnostic and care) who released protocols and recommendations has offered security to the regional government for decision-making. In the same way, flexibility has been experienced, generating alternative health structures and circuits to guarantee the quality of care in times of increased demand, including a greater availability of personnel dedicated to surveillance, increasing the capacities of public health and the health care system.

As a complement to test/confinement data analysis, since April 2020, Canal de Isabel II launched an intensive sewage water testing initiative to monitor the presence and evolution of SARS-CoV-2 in the Madrid region, as an ecological indicator for early surveillance in the face of behavioral changes in the ecosystem. Following a successful test in a single municipality, to stablish the maximal distance of 2.5 km between the sampling points and population density of Madrid, 289 wells were required to represent the whole population. Every week, all the sampling points were sampled, PCR against SARS-CoV-2 was carried out in two different laboratories. Corrections were established by parallel

analysis of parameters that could alter the results, such as temperature, chemical oxygen demand, chloride levels or electrical conductivity. Points with atypical or discordant results were re-sampled. Mathematical models for predicts 48-72 hours in advance the changes in the incidence density in a district or municipality of the CM, and its linearly correlated with the hospitalization rate in each area were generated (Fig. 1).

There is still a pandemic, incidence could change, and this virus has come to stay. New modulators of incidence will happen, related to coinfections (influenza, syncytial respiratory and other viruses), vaccination, therapeutic models, and prevention and control strategies. We have all learned. The price is still high, but in the sooner or later the curves will bend. Spain is considered a country with high health indicators, considering its socio-demographic index [3]. However, like many European countries, it may have been overburdened by the pandemic and CM has witnessed this.

Conflict of Interest

FJC, JSR and **PB** work part-time as advisors to the Ministry of Public Health in the Community of Madrid. **JC** is assistant to the Vice-counselor of public health in the Community of Madrid. **AZ** is the Vice-counselor of Public Health in the Community of Madrid. **FJMP** is the Director of Social and Health Coordination in the Community of Madrid.

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