

Proceeding Paper

Massive Testing Is Important to Control a SARS-CoV-2 Outbreak †

Daniela Guerreiro ¹, Ana Luísa Costa ¹, Teresa Nascimento ^{2,3} , Ana Clara Ribeiro ² , Luís Proença ² ,
José João Mendes ²  and Helena Barroso ^{2,*} 

¹ Instituto Universitário Egas Moniz (IUEM), 2829-511 Caparica, Portugal; daniela.guerreiro96@gmail.com (D.G.); analuisa.costa315@gmail.com (A.L.C.)

² Centro de Investigação Interdisciplinar Egas Moniz (CiiEM), Instituto Universitário Egas Moniz (IUEM), 2829-511 Caparica, Portugal; tnascimento@egasmoniz.edu.pt (T.N.); acribeiro@egasmoniz.edu.pt (A.C.R.); lproenca@egasmoniz.edu.pt (L.P.); jmendes@egasmoniz.edu.pt (J.J.M.)

³ Unidade de Microbiologia Médica, Global Health and Tropical Medicine (GHTM), Instituto de Higiene e Medicina Tropical/Universidade Nova de Lisboa, 1349-008 Lisbon, Portugal

* Correspondence: mhbarroso@egasmoniz.edu.pt; Tel.: +351-21-294-6725

† Presented at the 5th International Congress of CiiEM—Reducing Inequalities in Health and Society, Online, 16–18 June 2021.

Abstract: At the end of September 2020, an outbreak of SARS-CoV-2 occurred at a university student's residence. A rapid response, with massive testing, using both RT-PCR and antigen rapid testing, helped to control the spread of the virus, showing the importance of tracking the infection. Testing for antibodies one month after the outbreak showed that the permanence of students with no infection in the same building was not a preponderant factor to develop an immune response.

Keywords: SARS-CoV-2; COVID-19; infection; immunological response



Citation: Guerreiro, D.; Costa, A.L.; Nascimento, T.; Ribeiro, A.C.; Proença, L.; Mendes, J.J.; Barroso, H. Massive Testing Is Important to Control a SARS-CoV-2 Outbreak. *Med. Sci. Forum* **2021**, *5*, 38. <https://doi.org/10.3390/msf2021005038>

Academic Editor: Cidália Castro

Published: 22 July 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

On March 2020, the World Health Organization (WHO) communicated that due to its severity and alarming levels of spread, COVID-19 would be characterized as a pandemic [1]. With an increasing number of deaths, several countries have adopted the approach to massively screen the general population combined with contact tracing in an attempt to control the COVID-19 spread [2]. RT-PCR is the current standard for the diagnosis of acute COVID-19 for oral, nasal, or nasopharyngeal samples. However, rapid testing is emerging as the demand to screen large amounts of people in the shortest amount of time possible increases. Serology tests do not directly diagnose the presence of the virus, but the immune system molecules produced by the body as a response to the virus, such as IgM and IgG. These tests could play a major role in the fight against the current pandemic by accurately classifying the individuals who developed an immune response to SARS-CoV-2 [2]. Instituto Universitário Egas Moniz (IUEM) has on its grounds a university students' residence that accommodates young people from various nationalities, where epidemiological surveillance is constant. This work describes how a SAR-CoV-2 outbreak in the residence was controlled and characterizes the antibody response in students who remained confined.

2. Materials and Methods

Antigen rapid test devices (Panbio™ COVID-19), using nasopharyngeal swabs, were used to achieve massive testing of students and staff. During the outbreak, RT-PCR assays (GeneFinder Covid-19 Plus RealAmp Kit) were used to test students who contacted COVID-19 positive cases. Antibody rapid test device kits (Panbio™ IgG/IgM), using fingerstick blood, were used to assess the presence of SARS-CoV-2 antibodies in the residence's population. Informed consent of the participants was obtained.

3. Results and Discussion

In September 2020, all students staying at the residence (165) and employees (22) (cleaning and security staff) were tested with an Ag rapid test device. No SARS-CoV-2 infection was detected. Two weeks after, it was known that one external student who attend a party was infected with SARS-CoV-2. Following this information all students at the residence that attended the party were tested for the presence of SARS-CoV-2 by RT-PCR assay. Four students were detected as positive for the virus. Then, all the remaining residents and staff were tested with an Ag rapid test device. Another three students were detected as positive. No member of staff tested positive. Five days after, two students who tested negative presented some symptoms related to COVID-19. They were retested and were positive. All positive students (9) were allocated to bedrooms situated in a specific area of the residence apart from the rest. All the others stayed in quarantine. During the next 14 days, students who stayed at the residence were not allowed to leave. At the end of the quarantine, all students, except two (the ones that became positive later), tested negative for SARS-CoV-2.

One month later, all students present at the residence and staff (142) were tested for antibodies using a rapid test device. IgG was detected in one member of the staff and in 20 students, 7 of which were students that tested positive during the outbreak and two students who had tested positive back in June and July 2020. Of note, in one student that had been positive in June, IgG was not detected. From the 132 students and staff with no previous known infection (with two or more negative tests), 48 stayed at the residence during quarantine and 84 were at their homes, with IgG-positive rates of 8.3% and 9.4% for both groups, respectively.

The two previously detected cases (June and July) indicated that antibodies can remain active for approximately 5 months, as others have already stated [3], although further studies are needed. Taking this into account, the 12 people that presented IgG and never tested positive could have possibly been infected, albeit asymptomatic, between July and October (not having tested positive in September) and were able to develop immunological responses.

This was a unique situation of an outbreak that arose in a university residence, a contained environment, where it was possible to observe, report, monitor, and verify the evolution of SARS-CoV-2 infection, evidencing that massive and timely testing is important to contain an outbreak. For people who never tested positive and developed an antibody response, no association was found between the place where the quarantine was fulfilled and being IgG detectable, showing that students' cohabitation in the same building was not a preponderant factor for developing an immunological response.

Institutional Review Board Statement: Ethical review and approval were waived for this study, due to the fact that this study was based on laboratory routine results of Covid detection and performed according the demand of national authorities of health in a pandemic context.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Acknowledgments: Authors thank funding by CiiEM, Egas Moniz, Cooperativa de Ensino Superior, CRL.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. General's Opening Remarks at the Media Briefing on COVID-19. 11 March 2020. Available online: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020> (accessed on 22 March 2020).
2. Suhandynata, R.T.; Hoffman, M.A.; Kelner, M.J.; McLawhon, R.W.; Reed, S.L.; Fitzgerald, R.L. Longitudinal Monitoring of SARS-CoV-2 IgM and IgG Seropositivity to Detect COVID-19. *J. Appl. Lab. Med.* **2020**, *5*, 908–920. [CrossRef]
3. Wheatley, A.K.; Juno, J.A.; Wang, J.J.; Selva, K.J.; Reynaldi, A.; Tan, H.X.; Lee, W.S.; Wragg, K.M.; Kelly, H.G.; Esterbauer, R.; et al. Evolution of immune responses to SARS-CoV-2 in mild-moderate COVID-19. *Nat. Commun.* **2021**, *12*, 1162. [CrossRef] [PubMed]