Material and methods

SARS-CoV-2 reverse transcription polymerase chain reaction (RT-PCR). RT-PCR for SARS-CoV-2 was performed using the Allplex 2019-nCoV assay (Cat. No. RP10243X; Seegene Inc., South Korea) according to the manufacturer's instructions. The Allplex 2019-nCoV assay simultaneously detects the envelope (E), RNA-dependent RNA polymerase (RdRp) and nucleocapsid (N) genes. SARS-CoV-2 RT-PCR was performed on nucleic acid purified from nasopharyngeal (NP), oropharyngeal (OP), saliva, sputum, cheek cell and nasal epithelial cell specimens. NP, OP and cheek cell specimens were collected using eNAT flocked swabs following standard procedures while nasal epithelial cells were collected using a brush. Saliva and sputum samples were collected in specimen collectors following standard procedure. All RT-PCR assays were performed on a Bio-Rad CFX96 Dx real-time PCR detection system (Bio-Rad Laboratories, USA) with the CFX Manager Dx 3.1 software (Bio-Rad Laboratories, USA), and results were analysed with Seegene Viewer software (version 3.0, Seegene Inc., South Korea) following the manufacturer's instructions. For all Seegene analyses, samples were classified as positive if at least one gene was detected with a Ct value <40. All SARS-CoV-2 RT-PCR tests were performed at least in triplicate using independently extracted RNA.

Nucleic acid extraction. Nucleic acid extraction was performed with the following methods: (*i*) the MicroLab Nimbus (Hamilton Inc., USA) automated extraction system; (*ii*) the SEEPREP32 (Seegene Inc., South Korea) semi-automated extraction system; and (*iii*) manual extraction with Quick-RNA Viral extraction kit (Cat. No. R1035; Zymo Research, USA) according to the manufacturers' protocol.

Respiratory panel RT-PCR. RT-PCR for four different respiratory panels was performed using Allplex Respiratory Panel 1, 2, 3, and 4 assays (Cat. Nos RP9801X, RP9802X, RP9601X and RP9803X, respectively; Seegene Inc., South Korea) according to the manufacturer's instructions. Respiratory panel 1 detects influenza A and subtypes H1, H3, and H1pdm09; influenza B, and respiratory syncytial virus and its subtypes A and B. Respiratory panel 2 detects human adenovirus, metapneumovirus, enterovirus, and parainfluenza virus 1, 2, 3 and 4. Respiratory panel 3 detects human bocavirus 1, 2, 3 and 4, rhinovirus A, B, and C, and coronaviruses NL63 and OC43. Finally, respiratory panel 4 detects *Chlamydophila pneumoniae, Mycoplasma pneumoniae, Streptococcus pneumoniae, Legionella pneumophila, Bordetella pertussis, Bordetella parapertussis*, and *Haemophilus influenzae.* All respiratory panel RT-PCRs were performed on RNA purified from NP swabs that tested positive for SARS-CoV-2 for the case study subject. Results were analysed with Seegene Viewer software (version 3.0; Seegene Inc., South Korea).

SARS-CoV-2 genotyping. Genotyping for SARS-CoV-2 was performed using the Allplex SARS-CoV-2 Master Assay (Cat. No. RP10243X, Seegene Inc., South Korea) followed by the

Allplex SARS-CoV-2 Variant I Assay (Cat. No. RV10286X; Seegene Inc., South Korea), according to the manufacturer's instructions. The Allplex SARS-CoV-2 Master Assay simultaneously detects the E, RdRp, N and spike (S) genes and the HV69/70 del, Y144del, E484K, N501Y, and P681H variants of S. The assay is capable of S variants screening but does not differentiate individual mutations. To identify individual mutations, the Allplex SARS-CoV-2 Variant I Assay was used, which simultaneously detects the RdRp gene and differentiates between HV69/70 del, E484K, and N501Y variants of S. For the SARS-CoV-2 Master Assay, RT-PCR was performed on NP specimens that tested positive for SARS-CoV-2. For the SARS-CoV-2 Variant I Assay, RT-PCR was performed on the NP samples that tested positive for S-gene variants with the SARS-CoV-2 Master Assay. Results were analysed with the Seegene SARS-CoV-2 Viewer according to manufacturer's instructions. All Genotyping RT-PCR tests were performed at least in duplicate.

SARS-CoV-2 rapid antigen test. SARS-CoV-2 rapid testing was performed using the Panbio COVID-19 nasopharyngeal antigen rapid test device (Ref. No.: 41FK10, Abbott Laboratories, USA) following manufacturer's instructions on NP swabs.

SARS-CoV-2 sequencing. Sequencing was performed according to the Artic tiling protocol v3 created by Josh Quick (nCoV-2019 sequencing protocol v3 (LoCost) protocols.io: https://protocols.io/view/ncov-2019-sequencing-protocol-v3-locost-bh42j8ye; 2020), derived from the Tyson *et al.*, protocol (Tyson JR, James P, Stoddart D, et al. Improvements to the ARTIC multiplex PCR method for SARS-CoV-2 genome sequencing using nanopore. BioRxiv Prepr Serv Biol 2020 (epub 4 September 2020). https://doi.org/10.1101/2020.09.04.283077).

Haematology. The full blood count and differential count was performed using a DxH 500 Hematology Analyser (Beckman Coulter Inc., USA) following the manufacturer's instructions.