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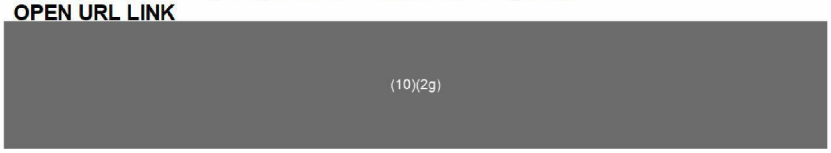
RECORD 1

Lack of COVID-19 transmission on an international flight

Schwartz K.L., Murti M., Finkelstein M., Leis J.A., Fitzgerald-Husek A., Bourns L., Meghani H., Saunders A., Allen V., Yaffe B.

CMAJ (2020) 192:15 (E410). Date of Publication: 14 Apr 2020

OPEN URL LINK



RECORD 2

The rate of underascertainment of novel coronavirus (2019-ncov) infection: Estimation using japanese passengers data on evacuation flights

Nishiura H., Kobayashi T., Yang Y., Hayashi K., Miyama T., Kinoshita R., Linton N.M., Jung S.-M., Yuan B., Suzuki A., Akhmetzhanov A.R.

Journal of Clinical Medicine (2020) 9:2 Article Number: 419. Date of Publication: 1 Feb 2020

From 29 to 31 January 2020, a total of 565 Japanese citizens were evacuated from Wuhan, China on three chartered flights. All passengers were screened upon arrival in Japan for symptoms consistent with novel coronavirus (2019-nCoV) infection and tested for presence of the virus. Assuming that the mean detection window of the virus can be informed by the mean serial interval (estimated at 7.5 days), the ascertainment rate of infection was estimated at 9.2% (95% confidence interval: 5.0, 20.0). This indicates that the incidence of infection in Wuhan can be estimated at 20,767 infected individuals, including those with asymptomatic and mildly symptomatic infections. The infection fatality risk (IFR)—the actual risk of death among all infected individuals—is therefore 0.3% to 0.6%, which may be comparable to Asian influenza pandemic of 1957–1958.

OPEN URL LINK

RECORD 3

What goes on board aircraft? Passengers include Aedes, Anopheles, 2019-nCoV, dengue, Salmonella, Zika, et al

Wilson M.E.

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Travel Medicine and Infectious Disease (2020) 33 Article Number: 101572. Date of Publication: 1 Jan 2020
OPEN URL LINK

RECORD 4
Probable aircraft transmission of Covid-19 in-flight from the Central African Republic to France
Eldin C., Lagier J.-C., Mailhe M., Gautret P.
Travel Medicine and Infectious Disease (2020) 35 Article Number: 101643. Date of Publication: 1 May 2020
OPEN URL LINK

RECORD 5
Potential transmission of SARS-CoV-2 on a flight from Singapore to Hanghzou, China: An epidemiological investigation
Chen J., He H., Cheng W., Liu Y., Sun Z., Chai C., Kong Q., Sun W., Zhang J., Guo S., Shi X., Wang J., Chen E., Chen Z.
Travel Medicine and Infectious Disease (2020) 36 Article Number: 101816. Date of Publication: 1 Jul 2020

Background: Between January 24, 2020 and February 15, 2020, an outbreak of COVID-19 occurred among 335 passengers on a flight from Singapore to Hangzhou in China. This study aimed to investigate the source of the outbreak and assess the risk of transmission of COVID-19 during the flight. Method: Using a standardized questionnaire, we collected information on the travelers' demographic characteristics and illness before, during, and after the flight. We also collected data on factors potentially associated with COVID-19 transmission during the flight. Results: A total of 16 COVID-19 patients were diagnosed among all passengers; the overall attack rate was 4.8%. The attack rate among passengers who had departed from Wuhan was significantly higher than that among those who had departed from other places. One

passenger without an epidemiological history of exposure before boarding developed COVID-19. During the flight, he was seated near four infected passengers from Wuhan for approximately an hour and did not wear his facemask correctly during the flight. Conclusions: COVID-19 transmission may have occurred during the flight. However, the majority of the cases in the flight-associated outbreak could not be attributed to transmission on the flight but were associated with exposure to the virus in Wuhan or to infected members in a single tour group.

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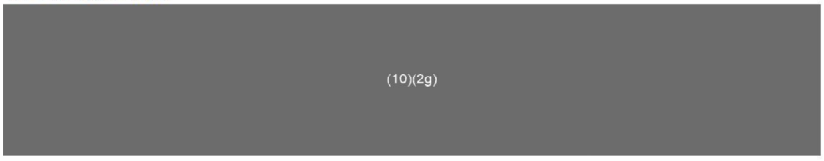

RECORD 6

Risk of severe acute respiratory syndrome-associated coronavirus transmission aboard commercial aircraft

Vogt T.M., Guerra M.A., Flagg E.W., Ksiazek T.G., Lowther S.A., Arguin P.M.
Journal of Travel Medicine (2006) 13:5 (268-272). Date of Publication: September/October 2006

Background. Severe acute respiratory syndrome-associated coronavirus (SARS-CoV) was introduced to the United States through air travel. Although the risk of SARS-CoV transmission within aircraft cabins has been addressed by several studies, the magnitude of the risk remains unclear. Methods. We attempted to contact all persons with working US telephone numbers aboard seven US-bound flights carrying SARS patients. Consenting participants responded to a questionnaire, and a serum sample was collected at least 38 days after the flight and tested for SARS-CoV-associated antibodies. Participants reporting an illness compatible with SARS, with onset during the 2- to 10-day incubation period, were considered suspect cases; positive serology was required for confirmed cases. Results. Among 1,766 passengers and crew, 339 (19%) persons were contacted. Of these, 312 (92%) completed questionnaires, and blood was collected from 127 (37%). Serology was negative for all 127 participants, including three of four who met the clinical case criteria for SARS, and the fourth had a mild illness that lasted only 5 days. Conclusions. Transmission of SARS-associated CoV was not observed, suggesting that the risk of transmission is not amplified aboard aircraft. © 2006 International Society of Travel Medicine.

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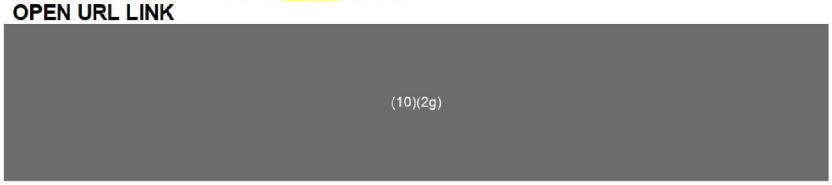

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(10)(2g)

RECORD 7

Detection of SARS-CoV-2 RNA in commercial passenger aircraft and cruise ship wastewater: a surveillance tool for assessing the presence of COVID-19 infected travelers

Ahmed W., Bertsch P.M., Angel N., Bibby K., Bivins A., Dierens L., Edson J., Ehret J., Gyawali P., Hamilton K., Hosegood I., Hugenholtz P., Jiang G., Kitajima M., Sichani H.T., Shi J., Shimko K.M., Simpson S.L., Smith W.J.M., Symonds E.M., Thomas Dsc K.V., Verhagen R., Zaugg J., Mueller J.F.

Journal of travel medicine (2020). Date of Publication: 14 Jul 2020

BACKGROUND: Wastewater-based epidemiology (WBE) for the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can be an important source of information for coronavirus disease 2019 (COVID-19) management during and after the pandemic. Currently, governments and transportation industries around the world are developing strategies to minimise SARS-CoV-2 transmission associated with resuming activity. This study investigated the possible use of SARS-CoV-2 RNA wastewater surveillance from airline and cruise ship sanitation systems and its potential use as a COVID-19 public health management tool. METHODS: Airline and cruise ship wastewater samples (n = 21) were tested for SARS-CoV-2 RNA using two virus concentration methods, adsorption-extraction by electronegative membrane (n = 13) and ultrafiltration by Amicon (n = 8), and five assays using reverse-transcriptase quantitative polymerase chain reaction (RT-qPCR) and RT-droplet digital PCR (RT-ddPCR). Representative amplicons from positive samples were sequenced to confirm assay specificity. RESULTS: SARS-CoV-2 RNA was detected in samples from both aircraft and cruise ship wastewater; however, concentrations were near the assay limit of detection. The analysis of multiple replicate samples and use of multiple RT-qPCR and/or RT-ddPCR assays increased detection sensitivity and minimised false-negative results. Representative amplicons were confirmed for the correct PCR product by sequencing. However, differences in sensitivity were observed among assays and concentration methods. CONCLUSIONS: The study indicates that surveillance of wastewater from large transport vessels with their own sanitation systems has potential as a complementary data source to prioritize clinical testing and contact tracing among disembarking passengers. Importantly, sampling methods and molecular assays must be further optimized to maximize sensitivity. The potential for false negatives by both wastewater testing and clinical swab testing suggests that the two strategies could be employed together to maximize the probability of detecting SARS-CoV-2 infections amongst passengers.

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(10)(2g)

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(10)(2g)

RECORD 8

Absence of in-flight transmission of SARS-CoV-2 likely due to use of face masks on board

Nir-Paz R., Grotto I., Strolov I., Salmon A., Mandelboim M., Mendelson E., Regev-Yochay G.

Journal of travel medicine (2020). Date of Publication: 14 Jul 2020

Using flights was severely affected during the COVID19 pandemic. We describe a 14 hours flight of 11 passengers and 4 crew members in which 2 positive SARS-COV-2 were on board. No new viral acquisitions found in this flight, probably due to the use of masks.

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(10)(2g)

RECORD 9

Mass Air Medical Repatriation of Coronavirus Disease 2019 Patients

Cornelius B., Cornelius A., Crisafi L., Collins C., McCarthy S., Foster C., Shannon H., Bennett R., Brown S., Rodriguez K., Bachini S.

Air Medical Journal (2020) 39:4 (251-256). Date of Publication: 1 Jul 2020

Recent coronavirus disease 2019 (COVID-19) events have presented challenges to health care systems worldwide. Air medical movement of individuals with potential infectious disease poses unique challenges and threats to crews and receiving personnel. The US Department of Health and Human Services air medical evacuation teams of the National Disaster Medical System directly supported 39 flights, moving over 2,000 individuals. Infection control precautions focused on source and engineering controls, personal protective equipment, safe work practices to limit contamination, and containment of the area of potential contamination. Source control to limit transmission distance was used by requiring all passengers to wear masks (surgical masks for persons under investigation and N95 for known positives). Engineering controls used plastic sheeting to segregate and treat patients who developed symptoms while airborne. Crews used Tyvek (Dupont Richmond, VA) suits with booties and a hood, a double layer of gloves, and either a powered air-purifying respirator or an N95 mask with a face shield. For those outside the 6-ft range, an N95 mask and gloves were worn. Safe work practices were used, which included mandatory aircraft surface

decontamination, airflow exchanges, and designated lavatories. Although most patients transported were stable, to the best of our knowledge, this represents the largest repatriation of potentially contagious patients in history without infection of any transporting US Department of Health and Human Services air medical evacuation crews.

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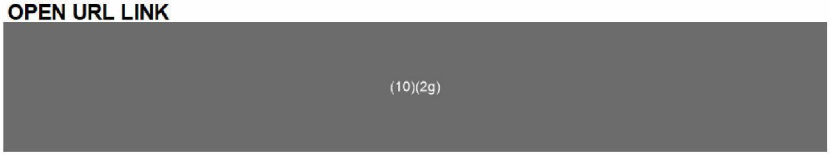

RECORD 10

Looming threat of COVID-19 infection in Africa: act collectively, and fast

Nkengasong J.N., Mankoula W.

The Lancet (2020) 395:10227 (841-842). Date of Publication: 14 Mar 2020

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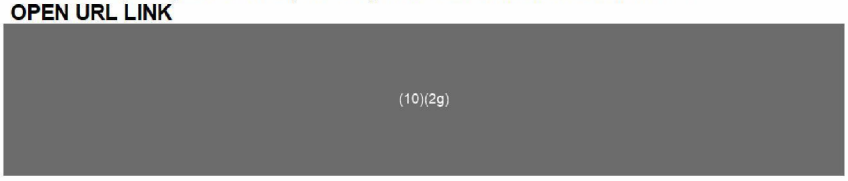

RECORD 11

Passengers' destinations from China: Low risk of Novel Coronavirus (2019-nCoV) transmission into Africa and South America

Haider N., Yavlinsky A., Simons D., Osman A.Y., Ntoumi F., Zumla A., Kock R.

Epidemiology and Infection (2020) Article Number: e41. Date of Publication: 2020

Novel Coronavirus (2019-nCoV [SARS-COV-2]) was detected in humans during the last week of December 2019 at Wuhan city in China, and caused 24 554 cases in 27 countries and territories as of 5 February 2020. The objective of this study was to estimate the risk of transmission of 2019-nCoV through human passenger air flight from four major cities of China (Wuhan, Beijing, Shanghai and Guangzhou) to the passengers' destination countries. We extracted the weekly simulated passengers' end destination data for the period of 1-31 January 2020 from FLIRT, an online air travel dataset that uses information from 800 airlines to show the direct flight and passengers' end destination. We estimated a risk index of 2019-nCoV transmission based on the number of travellers to destination countries, weighted by the number of confirmed cases of the departed city reported by the World Health Organization (WHO). We ranked each country based on the risk index in four quantiles (4th quantile being the highest risk and 1st quantile being the lowest risk). During the period, 388 287 passengers were destined for 1297 airports in 168 countries or territories across the

world. The risk index of 2019-nCoV among the countries had a very high correlation with the WHO-reported confirmed cases (0.97). According to our risk score classification, of the countries that reported at least one Coronavirus-infected pneumonia (COVID-19) case as of 5 February 2020, 24 countries were in the 4th quantile of the risk index, two in the 3rd quantile, one in the 2nd quantile and none in the 1st quantile. Outside China, countries with a higher risk of 2019-nCoV transmission are Thailand, Cambodia, Malaysia, Canada and the USA, all of which reported at least one case. In pan-Europe, UK, France, Russia, Germany and Italy; in North America, USA and Canada; in Oceania, Australia had high risk, all of them reported at least one case. In Africa and South America, the risk of transmission is very low with Ethiopia, South Africa, Egypt, Mauritius and Brazil showing a similar risk of transmission compared to the risk of any of the countries where at least one case is detected. The risk of transmission on 31 January 2020 was very high in neighbouring Asian countries, followed by Europe (UK, France, Russia and Germany), Oceania (Australia) and North America (USA and Canada). Increased public health response including early case recognition, isolation of identified case, contract tracing and targeted airport screening, public awareness and vigilance of health workers will help mitigate the force of further spread to naïve countries.

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RECORD 12

Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy

Jayaweera M., Perera H., Gunawardana B., Manatunge J.

Environmental Research (2020) 188 Article Number: 109819. Date of Publication: 1 Sep 2020

The practice of social distancing and wearing masks has been popular worldwide in combating the contraction of COVID-19. Undeniably, although such practices help control the COVID-19 pandemic to a greater extent, the complete control of virus-laden droplet and aerosol transmission by such practices is poorly understood. This review paper intends to outline the literature concerning the transmission of virus-laden droplets and aerosols in different environmental settings and demonstrates the behavior of droplets and aerosols resulted from a cough-jet of an infected person in various confined spaces. The case studies that have come out in different countries have, with prima facie evidence, manifested that the airborne transmission plays a profound role in contracting susceptible hosts. The infection propensities in confined spaces (airplane, passenger car, and healthcare center) by the transmission of droplets and aerosols

under varying ventilation conditions were discussed. Interestingly, the nosocomial transmission by airborne SARS-CoV-2 virus-laden aerosols in healthcare facilities may be plausible. Hence, clearly defined, science-based administrative, clinical, and physical measures are of paramount importance to eradicate the COVID-19 pandemic from the world.

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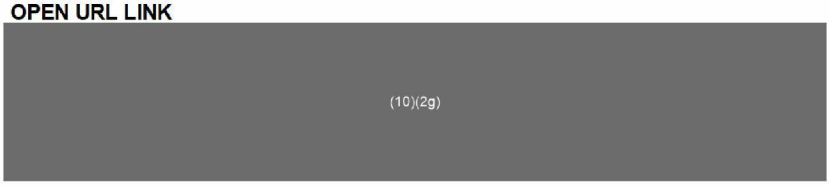

RECORD 13

European Aeromedical Evacuation Transports with SARS-COV 2 positive Patients Innereuropäische Aeromedical-Evacuation-Transporte im Rahmen von COVID-19

Sammito S., Post J., Ritter D.M., Hossfeld B., Erley O.M.

Notarzt (2020). Date of Publication: 2020

Background As part of the humanitarian response to the COVID-19 pandemic, the German Armed Forces provided air transport for patients to Germany from overwhelmed regional hospitals in Italy and France. Thus far, 22 Italian and 2 French citizens have been flown to Germany as part of this effort. The objective of this study is to use a pre-post comparison to analyse changes in vital signs, in particular regarding the ventilation status of the patients, and to draw conclusions for future transports of COVID-19 patients in fixed-wing aircraft. Method Retrospective analysis of transport records as well as other documents (patient movement requests, doctor's referrals, flight times) for 24 COVID-19 patients requiring ventilation. Results 63% of the patients (median age: 59.1 years) had pre-existing medical conditions. They had been ventilated for a median of 10.0 days (Min: 3, Max: 28) and experienced the first symptoms of COVID-19 a median of 17.5 days (Min: 6, Max: 35) before transport. We did not observe a deterioration in vital signs or ventilation status during transport. It was, however, necessary to deepen anaesthesia and administer additional catecholamines during transport. Conclusion The intensive care transport of ventilated COVID-19 patients requires highly qualified personnel and appropriate equipment but can be carried out if properly planned.

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RECORD 14

Transport of COVID-19 and other highly contagious patients by helicopter and fixed-wing air ambulance: a narrative review and experience of the Swiss air rescue Rega

Albrecht R., Knapp J., Theiler L., Eder M., Pietsch U.

Scandinavian journal of trauma, resuscitation and emergency medicine (2020) 28:1 (40). Date of Publication: 14 May 2020

BACKGROUND: The current COVID-19 pandemic highlights the challenges air ambulance services are facing when transporting highly infectious patients for several hours in enclosed spaces. This overview provides an example of a standard operating procedure (SOP) for infection prevention measures in HEMS missions during the COVID-19 pandemic. Furthermore, we describe different methods used by several organizations in Europe and the experience of the Swiss air rescue organization Rega in transporting these patients. Possible benefits of the use of small patient isolation units (PIU) are discussed, including the fact that accompanying medical personnel do not need to wear personal protective equipment (PPE) during the transport but can still maintain full access to the patient. Rega has developed and patented its own PIU. This device allows spontaneously breathing or mechanically ventilated patients to be transported in pressurized jet cabins, small helicopters and ambulance vehicles, without the need to change between transport units. This PIU is unique, as it remains air-tight even when there is a sudden loss of cabin pressure. CONCLUSION: A wide variety of means are being used for the aeromedical transport of infectious patients. These involve isolating either the patient or the medical crew. One benefit of PIUs is that the means of transport can be easily changed without contaminating the surroundings and while still allowing access to the patient.

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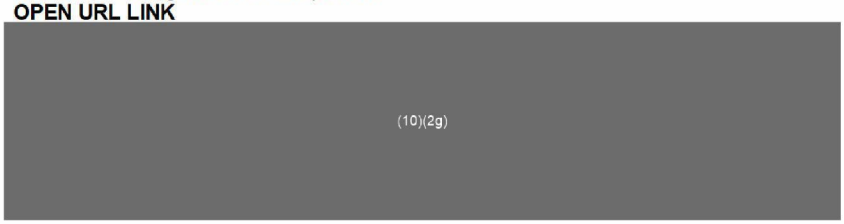

RECORD 15

In-flight transmission cluster of COVID-19: a retrospective case series

Yang N., Shen Y., Shi C., Ma A.H.Y., Zhang X., Jian X., Wang L., Shi J., Wu C., Li G., Fu Y., Wang K., Lu M., Qian G.

Infectious Diseases (2020). Date of Publication: 2020

Background: No data is available about in-flight transmission of SARS-CoV-2. Here, we report an in-flight transmission cluster of COVID-19 and describe the clinical characteristics of these patients. Methods: After a flight, laboratory-confirmed COVID-19

was reported in 12 patients. Ten patients were admitted to the designated hospital. Data was collected from 25th January to 28th February 2020. Clinical information was retrospectively collected. Results: All patients were passengers, and none were flight attendants. The median age was 33 years, and 70% were females. None was admitted to intensive care unit, and no patients died up to 28th February. The median incubation period was 3.0 days and time from onset of illness to hospital admission was 2 days. The most common symptom was fever. Two patients were asymptomatic and had normal chest CT scan during hospital stay. On admission, initial RT-PCR was positive in 9 patients, and initial chest CT was positive in half of the patients. The median lung 'total severity score' of chest CT was 6. 'Crazy-paving' pattern, pleural effusion, and ground-glass nodules were seen. Conclusion: There is potential for COVID-19 transmission in aeroplanes, but the symptoms were mild in our patients. Passengers and attendants must be protected during flights.

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RECORD 16

Travel restrictions and sars-cov-2 transmission: An effective distance approach to estimate impact

Restrictions de voyage et transmission du sars-cov-2: La distance réelle pour mesurer l'impact

Shi S., Tanaka S., Ueno R., Gilmour S., Tanoue Y., Kawashima T., Nomura S., Eguchi A., Miyata H., Yoneoka D.

Bulletin of the World Health Organization (2020) 98:8 (518-529). Date of Publication: 1 Aug 2020

Objective To estimate the effect of airline travel restrictions on the risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) importation. Methods We extracted passenger volume data for the entire global airline network, as well as the dates of the implementation of travel restrictions and the observation of the first case of coronavirus disease (COVID-19) in each country or territory, from publicly available sources. We calculated effective distance between every airport and the city of Wuhan, China. We modelled the risk of SARS-CoV-2 importation by estimating survival probability, expressing median time of importation as a function of effective distance. We calculated the relative change in importation risk under three different hypothetical scenarios that all resulted in different passenger volumes. Findings We identified 28 countries with imported cases of COVID-19 as at 26 February 2020. The arrival time of the virus at these countries ranged from 39 to 80 days since identification of the first case in Wuhan. Our analysis of relative change in risk indicated that strategies of reducing global passenger volume and imposing travel restrictions at a further 10 hub airports would be

equally effective in reducing the risk of importation of SARS-CoV-2; however, this reduction is very limited with a close-to-zero median relative change in risk. Conclusion The hypothetical variations in observed travel restrictions were not sufficient to prevent the global spread of SARS-CoV-2; further research should also consider travel by land and sea. Our study highlights the importance of strengthening local capacities for disease monitoring and control.

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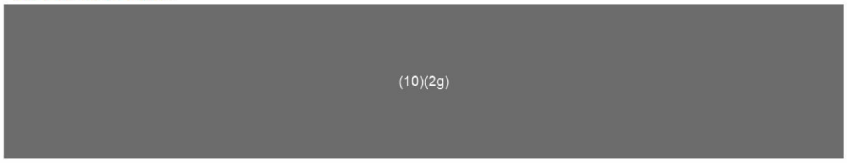

RECORD 17

Feasibility of Lung Point-of-Care Ultrasound for Patients With COVID-19 in Air Medical Transport: Triage of 2 Initially Suspected Cases on Mexico's Front Line

Antúnez-Montes O.Y., Buonsenso D., Paz-Ortega S.O.

Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine (2020). Date of Publication: 5 Aug 2020

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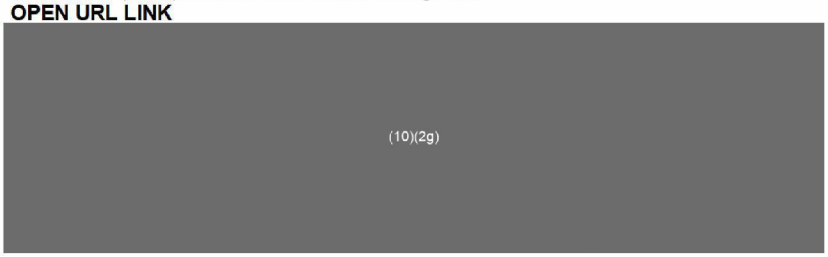

RECORD 18

High prevalence of SARS-CoV-2 infection in repatriation flights to Greece from three European countries

Lytras T., Dellis G., Flountzi A., Hatzianastasiou S., Nikolopoulou G., Tsekou K., Diamantis Z., Stathopoulou G., Togka M., Gerolymatos G., Rigakos G., Sapounas S., Tsiodras S.

Journal of travel medicine (2020) 27:3. Date of Publication: 18 May 2020

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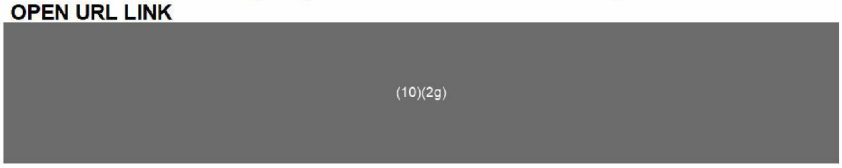

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