Environmental issues on covid-19 medical waste: review from policy perspective

R A Nugroho1*, A W Kumar1, A T Kartinawanty2, S G Prakoso1,2, K Setyowati1 and R Suryawati1

1 Public Administration Department, Faculty of Social and Political Sciences, Universitas Sebelas Maret, Jl Ir Sutami 36 A, Surakarta, Indonesia
2 Faculty of Dentistry, Kebangkitan Nasional No.101, Surakarta, Indonesia
3 Institute of Political Science, National Sun Yat Sen University, No. 70 號, Lianhai Road, Gushan District, Kaohsiung City, Taiwan

Corresponding author: rino.nugroho@staff.uns.ac.id

Abstract. The Covid-19 pandemic brings two sides to the environment. On one side, it reduces air pollution due to travel and work limitations but on the other hand, medical waste increases. This contradictory situation on the environment has been studied by research all around the world. This study is trying to map the concern of experts on environmental issues during Covid-19. This paper conducts a systematic literature review from prominent databases to portray the environmental issues that emerged during the Covid-19 Pandemic from a policy perspective. Unique keywords that combine environment, covid-19, and policy filtered the literature available in the research database. No less than 152 literature were collected and extracted using PRISMA approach. The result indicates very limited policy issued by the government to protect the environment for the post-covid era.

1. Introduction
The Covid-19 pandemic has surged the world during the past two years. Life adjustments have changed the world's facets in the last two years. Covid-19 Pandemic is an outbreak that causes severe acute respiratory syndrome [1, 2] and systemic disorders [3]. The virus is contagious and transmitted either directly and indirectly [4]. Covid-19 has increased infections and mortality, putting pressure on public health, economic sectors [5], and the environment [6]. The World Health Organization (WHO) has declared several preventive strategies to reduce disease spread and infection rates, including patient isolation, masks, and gloves, social distancing, preserving hygiene behavior and prohibiting a crowd of people. Several countries have established a lockdown policy in response to this problem. Besides that policy, governments worldwide also oblige their citizens to wear masks, clean their hands, and avoid crowds. These policies have been effective in reducing the virus spread. Interestingly the policy had an impact on the environment.

In April 2021, the air quality in China and India has improved due to the decrease of air pollution as one of the side effects of the government's lockdown policy to break the chain of covid-19 infection [7, 8]. Prior studies compared the air quality before and after the lockdown policy was considered. The result indicated that the concentrations of air pollution (PM2.5, PM10, SO2, NO2, and CO) were all decreasing significantly [6, 8, 9]. This reveals a positive air quality impact from the pandemic Covid-19 in China and India, which is the positive side of the impact of Covid-19 on the environment.
During the pandemics, people are obliged to wear Personal Protection Equipment (PPE) for their activities [12] to control the spread of the Covid-19 virus [13]. Disposable masks and gloves are the PPE which most frequently used [14]. This equipment has negative consequences on the environment [10, 13, 15]. In the long run, the high demand for PPE that increased drastically due to virus spread prevention [16, 17] will aggravate waste [18]. Most medical mask leftovers will not be appropriately treated through landfills or incinerators [16]. According to a prior study, medical masks are categorized into B3 waste requiring a special treatment [19]. Medical mask also increasing microplastics pollution [20] and threat environment sustainability. Another leftovers, such as vials, syringes, needles, expired vaccines and single-use plastic package also increasing medical waste after the vaccination [21]. Based on those descriptions the presence of medical waste has threatened the environment sustainability.

Government plays an important role in balancing the covid-19 spread prevention and protecting the environment. This study aims to portray the policy and politics of the environmental sustainability issues during the pandemic. Such insight will help policymakers in reshaping their actions to combat the virus and managing environmental sustainability. A systematic literature review approach was used to collect the government action around the world that has been successful in recent times. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach was used to do the review.

2. Methods
This paper uses a systematic literature review to portray literature in the research database. Scopus database was used as the reference due to its ability and precision in literature filtering. As one of the gold standards for conducting a literature review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach was used. The researcher utilized Covidence software to provide easiness and consistent review. The data was collected in 2021, with unique keywords combination between environment, policy, politics, and covid-19. The terms of policy and politics were used as the keywords to get sufficient information about government action in balancing covid-19 prevention and environmental sustainability.

3. Result and discussion
3.1. Data collection

| Table 1. Keywords used and results of Scopus datamining |
|-------------------------------|-----------------|-----------------|
| Keyword                        | Result | References |
| Pollution & Covid-19 & “Public policy” | 7      | [5, 17, 22–26] |
| Pollution & Covid-19 & “Government”   | 8      | [9, 13, 22, 27–32] |
| Pollution & Covid-19 & “Politics”    | 3      | [33–35] |
| Pollution & Covid-19 & “Regulation”  | 4      | [9, 32, 36–38] |
| Environment & Covid-19 & “Public Policy” | 5      | [26, 39–44] |
| Environmental Issues & Covid-19 & “Government” | 49    | [1, 12, 16, 27, 28, 31, 32, 39, 42, 43, 45–90] |
| Environment Issues & Covid-19 & “Politics” | 7      | [91–96] |
| Environment Issues & Covid-19 & “Regulation” | 8      | [9, 32, 100–108, 36, 39, 51, 55, 70, 97–99] |
| Medical waste & Covid 19 and “Public policy” | 2      | [109, 110] |
| Medical waste and Covid 19 and “Government” | 10     | [2, 11, 14, 15, 111–127] |
| Medical waste and Covid 19 and “Politics” | 11     | [6, 7, 10, 128–134] |
| Medical waste and Covid 19 and “Regulation” | 12     | [2–4, 18–21, 135–143, 111-112, 119, 121, 122, 124, 127, 133] |
| Total                          | 142    |                |

The authors collected studies indexed in Scopus databases on August 3-6th, 2021. The following search strategy was Environmental Issue AND Covid-19; and Pollution AND Covid-19. The additional search strategy is put another keyword about the main topic area such as "Public policy", "Government", "Politics", and "Regulation". For the easiness of access, this study limits the literature search with open
access criteria. This searching also focused on journal articles with more complete results than any other forms of publications. As policy and politics were more related to social science, the social fields were also used to filter the result. Lastly, the review only focused on the article that is written in English compared to other languages. Based on twelve search iterations with different keywords, 170 literature were collected, and 142 were relevant to the issue. The complete use of keywords, the results, and references are depicted in Table 1.

3.2. Data analysis and discussion
PRISMA has four steps: (1) import references and checks the duplicates, (2) screen the studies based on the abstract reading, (3) full text studies, reading the full article to decide whether the study will be included or excluded, and (4) evaluate and classify the full paper. The 170 results from the Scopus database were inserted to Covidence software. Among the 170, 28 of them were duplicates, so they were removed. After reading the abstract 105 studies were deemed to be irrelevant to the topics discussed. In the full paper review, 31 studies were excluded from the next phase due to four reasons: (1) not discussing policy on environmental issues, (2) not discussing the environmental issue, (3) cannot be accessed. Finally, 6 studies were evaluated and classified based on the theme discussed in the paper. The complete result of the PRISMA procedure on each step is presented in Figure 1.

The six studies included in the final step discuss the various issues around the policy of the environment. Five studies out of six urge the importance of government policy in protecting the environment based on the lockdown policy during the Covid-19 restriction. In Egypt, the positive impact on lockdown policy, i.e., pollution decrease, will not be sustained without the government's stricter law [6]. The other studies urge the importance of partnership between government, business [24], and NGO [13] to reshape the policy [17] and take further action in handling the Covid-19 pollution and educating people's awareness toward it. From China's experience, future policymakers must balance sustainable urban development and appropriate human activities based on the pandemic handling experience [9]. One study discusses Italy's government policy in developing a permanent bike lane to facilitate its citizens in urban transport during the pandemics [62]. This policy utilizes the covid-19 travel restriction by pushing citizens to use bicycles instead of other means of transportation. By issuing this policy, the government tries to push the lockdown, positive impact to be more sustainable after the pandemic ends by developing green infrastructure.

![Figure 1. PRISMA result based on Covidence software [144](image)](image)
4. Conclusion
The Covid-19 pandemic brings many changes to daily life. Based on prior studies, the pandemic also affects the environment both in negative and positive ways. How can government capitalize on the positive impact on the environment and reduce the negative impact? This study captures government policy that has been taken during 2020-2021 to maintain the environmental sustainability. No less than 142 literature were reviewed using the PRISMA approach, and only 6 were related to policy in environmental issues. This result indicates that very limited studies have been conducted focusing on the policy aspects of environmental sustainability in post-pandemic settings. This study suggests further research to explore the policy and practice of government action during the covid-19 pandemic to preserve environmental sustainability.

Acknowledgment
Authors acknowledge the PNBP UNS Research Grant for funding the research and publication in 2021.

References
[1] Singhal S 2021 Open Public Health J. 14 140–144
[2] Na J Y, Noh S J, Choi M S and Park J-P 2020 J. Korean Med. Sci. 35 e302
[3] Anindyajati G 2021 Front. Psychiatry 12 634585
[4] Purnama S G and Susanna D 2020 Kesenmas 15 6–13
[5] Coccia M 2020 Sustain. 12 22 1–12
[6] Mostafa M K Gamal G and Wafiq A 2021 J. Environ. Manage. 277 111496
[7] Cooke S J et al. 2021 Conserv. Physiol. 9 coab009
[8] Mendez-espinosa J F, Rojas N Y, Vargas J, Pachón J E, Belalcazar L C and Ramírez O 2020 Sci. Total Environ. 749 141621
[9] Bai Y, Zhou Y, Alatalo J M and Hughes A C 2020 Sustain. 12 1–12
[10] Rume T and Islam S M D 2020 Hellyon 6 e04965
[11] Alghamdi H A 2021 Saudi J. Biol. Sci. 28 4082–4088
[12] Dzisi E K J and Dei O A 2020 Transp. Res. Interdiscip. Perspect. 7 100191
[13] Arimiyaw A W, Abass K and Morgan A K 2021 Sustain. Sci. Pract. Policy 17 82–85
[14] Islam S M D-U, Safiq M B, Bodrud-Doza M and Mamun M A 2020 P Front. Public Heal. 8 592345
[15] Poursadeqiyan M, Bazrafshan E and Arefi M F 2020 J. Educ. Health Promot. 9 250
[16] Wang Z, Guy C, Ng K T W and An C 2021 Sustain. 13 7034
[17] Schofield J, Praet E, Townsend K A and Vince J 2021 Antiquity 95 435–449
[18] Baker N et al. 2020 Front. Public Heal. 8
[19] Rozana et al. 2021 IOP Conf. Ser.: Earth Environ. Sci. 802 012036
[20] Shen M et al. 2021 Sci. Total Environ. 790 148130
[21] Jiang P, Fan Y, Van Bokhara A and Wang X 2021 COVID-19 pandemics Stage II – Energy and environmental impacts of vaccination
[22] Coelho, Junior F A, Marques-Quinteiro P and Faiad C 2021 Investig. Geogr. 104
[23] Kim H, Kang K and Kim T 2020 Sustain. 12 21 p. 1–19
[24] Fenwick M, McCahery J A and Vermeulen E P M 2021 Eur. Bus. Organ. Law Rev. 22 125–145
[25] Mach L J 2021 Societies 11 3
[26] Monroy-Torres R et al., 2021 Sustain. 13 13
[27] Bartle J R Lutte R K and Leuenberger D Z 2021 Sustain. 13 7
[28] Mukherjee M et al., 2020 Prog. Disaster Sci. 7
[29] Moyo T Kibangou A and Musakwa W 2020 24th ISPRS Congress - Technical Commission IV on Spatial Information Science 43 137–142
[30] Rodriguez-Pose A and Burlina C 2021 J. Reg. Sci. 61 728–752
[31] Caldevilla-Dominguez D Barrientos-Báez A and Padilla-Castillo G 2021 Sustain. 13, 6.
[32] Kim C 2021 Build. Environ. 204 13
[33] Samani P, Garcia-Velásquez C, Fleury P, Van Der Meer Y, Kiran E and Bölükbaşı A 2021 *Glob. Sustain.* 23 78–85

[34] Mevorach T, Cohen J and Apter A, 2021 K *Int. J. Environ. Res. Public Health* 18 1–13

[35] Breman J 2020 T *Indian J. Labour Econ.* 63 901–919

[36] Prunet P, Lezeaux O, Camy-Peyret C and Thevenon H 2020 *City Environ. Interact.* 8

[37] Caraka R E 2021 *Sustain.* 13 11

[38] Abliakimova E and Jianjun W 2020 *Lex Portus* 6 7–34

[39] Díaz J B, Vinagre T and Nicolas-Sans R 2021 *Sustain.* 13 11

[40] Gutiérrez L R, De Vicente, Oliva M A and Romero-Ania A 2021 *Sustain.* 13 9

[41] Mayen, Huerta C and Utomo A 2021 *Heal. Place* 70

[42] Halonen J I, Erhola M, Furman E, Hahtaleta T, Jousilahti P, Barouki R, Bergman Å, Billo NE, Fuller R, Haines A, Kogevinas M, Kolossa-Gehring M, Krauze K, Lanki T, Vicente J L, Messerli P, Nieuwenhuijzen M, Palomini R, Peters A, Posch K H, Timonen P, Vermeulen R, Virtanen SM, Bousquet J and Antó J M 2020 T *Lancet Planet. Heal.* 4 503–505

[43] Charlebois S, Bowdrige E, Lemieux J-L, Somogyi S and Music J 2021 *Foods* 10 5

[44] Badillo-Rivera E, Esteves A J F, Alata-López F E, Virú-Vásquez P H and Acuña S M M 2021 *Investig. Geogr.* 104

[45] Buhusayen B, Seet P-S and Coetzer A 2020 *Sustain.* 12 1–24

[46] Sakamoto M, Sasaki D, Ono Y, Makino Y, Kodama E N and Poppe K 2020 *Prog. Disaster Sci.* 8 20–25

[47] Zepeda R 2021 *Norteamerica* 16 1–31

[48] Choi H, Chung S-Y and Ko J 2021 *Sustain.* 13 10

[49] Jia W and Lu F 2021 *Glob. Media China* 6 8–23

[50] Sudiarno A 2021 *Int. J. Public Heal. Sci.* 10 68–76

[51] Harantová V, Hájnik A and Kalašová A 2020 *Sustain.* 12 17

[52] Hong J, McArthur D and Raturi V 2020 *Sustain.* 12 1–16

[53] Morgan A K, Awafó B A and Quarany T 212 *Sustain. Sci. Pract. Policy* 17 77–81

[54] Yemelyanov O et al., 2020 *Sustain.* 12 859–864

[55] Wessler J and Purnhagen K 2020 *EuroChoices* 19 49–52

[56] Navayongsathan A, Trimetsoontorn J, Rungruang P and Janthongpan S 2020 *Acta Logist.* 7 245–251

[57] Al Khamaiseh O S 2021 *J. Educ. Soc. Res.* 11 20–38

[58] Al-Youbi A O, Al-Hayani A, Rizwan A and Choudhry H 2020 *Sustain.* 12 17

[59] Butola L K 2021 *Indian J. Forensic Med. Toxicol.* 15 422–426

[60] Babu M V, Arumugam M K and Debnath D J 2021 *Adv. Med. Educ. Pract.* 12 579–585

[61] Drummond P 2021 *Sustain.* 13 1–24

[62] Barbarossa L 2020 *Sustain.* 13 17

[63] Zapata-cantu L and González F 2021 *Sustain.* 13 7

[64] Álvarez-Martínez M T and Mainar-Causapé A J 2021 *Sustain.* 13 1–14

[65] Cole R J 2020 *Sustain.* 12 1–25

[66] Ashford N A, Hall R P, Arango-Quiroga J, Metaxas K A and Showalter A L 2020 *Sustain.* 12 13

[67] Atkinson-Clement C and Pigalle E 2021 *Humanit. Soc. Sci. Commun.* 8 1

[68] Dlamini N, Maharaj P and Dunn S 2021 *Perspect. Educ.* 39 106–121

[69] Sikka G, Yenneti K and Singh R B 2021 *Geogr. Environ. Sustain.* 14 6–8

[70] Hsu W-C J, Lo H-W and Yang C-C 2021 *Sustain.* 13 1–19

[71] Stanier I and Nunan J 2021 *Polic. Soc.* 31 512–529

[72] Aristovnik A, Keržič D, Ravšelj D, Tomaževič N and Umek L 2020 *Sustain.* 12 1–34

[73] Fernández M A E, Alonso S L N, Jorge-Vázquez J and Forradellas R F R 2021 C *Sustain.* 13 8

[74] Koe W-L, Mahphoth M H, Alias N E, Krishnan R and Arham A F 2021 *J. Educ. Soc. Res.* 11 162–169

[75] Green M 2021 *Big Data Soc.* 8 1
[76] Ponkratov V, Kuznetsov N, Bashkirova N, Volkova M, Alimova M, Ivleva M, Vatutina L and Elyakova I 2020 *J. Open Innov. Technol. Mark. Complex.* 6 3
[77] Alonso-Garcia M, Garrido-Letrán T M and Sánchez-Alzola A 2021 *Sustain.* 13 11
[78] Doğan E and Genç H D 2021 *Nonprofit Policy Forum* 12 127–146
[79] Lee P, Hunter W C and Chung N 2020 *Sustain.* 12 10
[80] Roseboom T 2020 *BMJ Nutr. Prev. Heal.* 3 416–418
[81] Carvajal-Miranda C, Mañas-Viniegra L and Liang L 2020 *O Soc. Sci.* 9 10
[82] Mulenga E M and Marbán J M, 2020 *Eurasia J. Math. Sci. Technol. Educ.* 16 9
[83] Rameez A, Fowsar M A M and Lumna N 2020 *J. Educ. Soc. Res.* 10 341–349
[84] Attwell K, Harper T, Rizzi M, Taylor J, Casigliani V, Quattrone F and Lopalco P 2021 *Policy Sci.* 15 1–19
[85] Ticlău T, Hintea C and Andrianu B 2020 *Transylvanian Rev. Adm. Sci.* 167–182
[86] Lundgren M, Klamberg M, Sundström K and Dahlqvist J 2020 *Nord. J. Hum. Rights* 38 305–318
[87] Rachmawati R, Choirunnisa U, Pambagyo Z A, Syarafina Y A and Ghiffari R A 2021 *Sustain.* 13 12
[88] Crowley F, Daly H, Doran J, Ryan G and Caulfield B 2021 *Transp. Policy* 106 185–195
[89] Isaacs A, Squires C G and Hawkes C 2021 *Int. J. Qual. Methods* 20
[90] Sanders K B 2020 *Church. Commun. Cult.* 5 356–377
[91] Gibson S-J 2021 *Music Educ. Res.* 23 151–166
[92] Ruisch B C, Moore C, Granados, Samayoa J, Boggs S, Ladanyi J and Fazio R 2021 *Polit. Psychol.*
[93] Foster R and Feldman M 2021 *J. Contemp. Eur. Res.* 17 116–127
[94] Lehmen A, 2020 *Brazilian J. Int. Law* 17 85–99
[95] Kuo R Zhang A Shaw V and Wang C 2020 *Soc. Media Soc.* 6 4
[96] Hinkel R U 2020 *Interiority* 3 121–144
[97] Katuistime L 2021 *Economies* 9 2
[98] Mulholland M and O’Toole C 2021 *Irish Educ. Stud.* 40 329–340
[99] Chernysh Y and Roubik H 2020 *Sustain.* 12 1–18
[100] Roberts J S 2021 *J. Microbiol. Biol. Educ.* 22 2
[101] Cho J, Ahn B, Hong K and Cheong I 2020 *J. Int. Logist. Trade* 18 137–147
[102] Comai S 2020 13th GeoInformation for Disaster Management Conference 54 29–36
[103] Kooij D T A M 2020 *Work. Aging Retire.* 6 233–237
[104] Alonso-Montoloi C, Serra-Coch G, Isalgue A and Coch H 2021 *Sustain.* 13 1–20
[105] Atici G and Gursoy G, 2020 *J. Gov. Regul.* 13 132–143
[106] Shooshtarian S, Maqsood T, Wong P S P, Benzakour L, Cereghetti S, Moullec G, Kurth S, Roos P, Benzakour L, Cereghetti S, Moullec G, Scott K and Sánchez R 2021 *Sustain.* 12 1–20
[107] Juvet T M, Corbaz-Kurth S, Roos P, Benzaikour L, Cereghetti S, Mouilleg F, Suard T, Vieux L, Wozniak H, Pralong J A and Weissbrodt R 2021 *Saf. Sci.* 139.
[108] Cheshmezangi A 2021 10 166–175
[109] Kashyap S Ramaprasad A and Bidare Sastry N 2020 *Int. J. Health Plann. Manage.* 35 1277–1278
[110] Nash D B, Angelo M, Nash E J, Gleason J L and Meyer B A 2020 *Popul. Health Manag.* 23 378–385
[111] Siddesh S E, Gowda D M, Jain R, Gulati A, Patil G S, Anudeep TC, Jeyaraman N, Muthu S and Jeyaraman M 2021 *Stem Cell Investig.* 8 579–585
[112] Rowan N J and Moral R A 2021 *Sci. Total Environ.* 772
[113] Goswami M Goswami P J Nautiyal S and Prakash S 2021 *Heliyon* 7 3
[114] Parashar R 2020 *Int. J. Res. Pharm. Sci.* 11 1755–1761
[115] Ortiz, M R, Grijalva M J, Turell M J, Waters W F, Montalvo A C, Mathias D, Sharma V, Renoy C F, Suits P, Thomas S J and Leon R 2020 *Am. J. Trop. Med. Hyg.* 103 838–840
[116] Liu Z 2021 *Int. J. Environ. Res. Public Health* 18 10
[117] Mahendradhata Y 2021 *Front. Public Heal.* 9
[118] Pawar S D, Kode S S, Keng S S, Tare D S, Abraham P and Ogoina D 2020 *Indian J. Med. Microbiol.* 38 243–251
[119] Araújo A, Machado Vaz F, Duarte M, Rocha C and Rosendo E 2020 *Acta Med. Port.* **33** 13
[120] Inglis T J J 2020 *J. Med. Microbiol.* **69** 653–656
[121] Imperiale M J and Casadevall A 2020 *MBio* **11** 1–4
[122] Rajbhandari B, Phuyal N, Shrestha B and Thapa M 2020 *J. Nepal Med. Assoc.* **58** 125–133
[123] Nowakowski P, Kuśnierz S, Sosna P, Mauer J and Maj D 2020 *Resources* **9** 1–11
[124] Hanney S R, Kanya L, Pokhrel S, Jones T H and Boaz A 2020 *Heal. Res. Policy Syst.* **18** 1
[125] Airaksinen M 2021 *Pharm. Pract. (Granada).* **19** 1–10
[126] Dakhode S 2021 *Indian J. Forensic Med. Toxicol.* **15** 464–471
[127] Liu L, Wu G, Feng Q and Chen Y 2021 5th International Conference on Advances in Energy, Environment and Chemical Science, AEECS 2021 **245**
[128] Yeo S 2021 *Int. J. Commun.* **15** 1617–1636
[129] Chen F, Lou J, Hu J, Chen H, Long R and Li W 2021 S *Sci. Total Environ.* **787**
[130] Sen S, Nash D B, Angelo M, Nash E J, Gleason J L and Meyer B A 2020 *World Dev.* **135** 378–385
[131] Barr J, Doroshow D B and Montgomery S P 2020 *J. Trauma Acute Care Surg.* **89** 95–96
[132] Kataki S, Chatterjee S, Vairale M G, Sharma S and Dwivedi S K 2021 *Resour. Conserv. Recycl.* **164**
[133] Yu H, Sun X, Solvang W D and Zhao X 2020 *Int. J. Environ. Res. Public Health* **17** 5
[134] Hantoko D 2021 *J. Environ. Manage.* **286** 454–460
[135] Reshetnikov V 2021 *Int. J. Environ. Res. Public Health* **18** 11
[136] Mihai F-C, 2020 *Int. J. Environ. Res. Public Health* **17** 1–18
[137] Rahayu P, Rohajawati S, Fairus S, Saragih H and Akbar H 2021 2nd International Conference on Science and Technology, ICoST 2020 **1844** 1
[138] Kim S M, Park S G, Jee Y K and Song I H 2020 P *Med. Educ. Online* **25** 1
[139] Bizzoca M E, Campisi G and Muzio L L 2020 *Int. J. Environ. Res. Public Health* **17**, 11.
[140] Tsai W-T 2021 *Waste Manag. Res.* **39** 27–33
[141] Gruszczeka J and Filip R 2020 *Ann. Agric. Environ. Med.* **27** 171–174
[142] Ding J, Fu H, Liu Y, Gao J, Li Z, Zhao X, Zheng J, Sun W, Ni H, Ma X, Feng J, Wu A, Liu J, Wang Y, Geng P, Chen Y 2020 *Eur. Radiol.* **30** 3603–3608
[143] Corrêa H L and Corrêa D G 2020 *Front. Mater.* **7**
[144] Veritas Health Innovation 2018 *Covidence systematic review software* Melbourne, Australia covidence.org https://support.covidence.org/help/how-can-i-cite-covidence