Public health leadership in the COVID-19 era: how does it fit? A scoping review

Tommaso Osti,[1] Angelica Valz Gris,[1] Valerio Flavio Corona,[1] Leonardo Villani [iD] ,[1] Floriana D'Ambrosio,[1] Marta Lomazzi,[2,3] Carlo Favaretti,[4] Fidelia Cascini,[1] Maria Rosaria Gualano [iD] ,[4,5] Walter Ricciardi[1,4]

ABSTRACT
The COVID-19 pandemic has put a lot of pressure on all the world's health systems and public health leaders who have often found themselves unprepared to handle an emergency of this magnitude. This study aims to bring together published evidence on the qualities required to leaders to deal with a public health issue like the COVID-19 pandemic. This scoping literature review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist. A search of relevant articles was performed in the PubMed, Scopus and Web of Science databases. A total of 2499 records were screened, and 45 articles were included, from which 93 characteristics of effective leadership were extrapolated and grouped into 6 clusters. The qualities most frequently reported in the articles were human traits and emotional intelligence (46.7%) and communication skills such as transparency and reliability (48.9%). Responsiveness and preparedness (40%), management skills (33.3%) and team working (35.6%) are considered by a significant percentage of the articles as necessary for the construction of rapid and effective measures in response to the emergency. A considerable proportion of articles also highlighted the need for leaders capable of making evidence-based decisions and driving innovation (31.1%). Although identifying leaders who possess all the skills described in this study appears complex, determining the key characteristics of effective public health leadership in a crisis, such as the COVID-19 pandemic, is useful not only in selecting future leaders but also in implementing training and education programmes for the public health workforce.

INTRODUCTION
The COVID-19 pandemic represents a major public health issue with a huge health, social and economic impact worldwide.[1–3] After more than 3 years from the beginning of the pandemic, hundreds of millions confirmed cases and more than 6 million deaths have been reported worldwide.[4]

Indeed, the pandemic has undoubtedly generated enormous pressure on health systems, not only in terms of the scientific and logistical challenge of countering a new virus, but also in terms of allocation of resources and frequent disruption of essential services.[5] This situation has created new barriers between the general population and the demand for healthcare, resulting in an intensification of health inequalities.[2 6] Despite the lessons learnt from previous infectious diseases outbreaks,[7]

the COVID-19 pandemic demonstrated the lack of preparedness of healthcare systems, with significant implications for population health, economic growth of countries, social cohesion of communities and stability of governments and democracies.[8] Moreover, shortage of investment in sectors such as healthcare, education and research has contributed to miscommunication, growing distrust in institutions and science, challenging public health decision-makers in implementing necessary measures to tackle the pandemic.[9 10] Addressing these challenges requires strong evidence-driven public health leadership to coordinate an integrated policy response that can reduce the impact of the crisis and provide effective responses to increase resilience of health systems.[11] In this context, keeping in mind Roger Gill's quote 'There is no one correct definition of leadership, or any one set of personal qualities or competencies that characterize leaders',[12] leadership is traditionally conceptualised through theoretical models that consider competence, behaviours and values. However, public health issues are complex, involve almost every sector of management and have consequences for every aspect of people's lives, requiring public health leaders to engage multiple stakeholders in activities that are public and open to broad scrutiny and public debate.[13] Models of health leadership need to consider the complexity of healthcare organisations, the intersectionality of challenges, and the need to involve and empower the population to give sustainability to the actions and the policies adopted. During the COVID-19 emergency, people who had to manage the pandemic both at a macro (political, governmental and institutional) and micro level (eg, in a hospital and local healthcare settings) faced several challenges, such as the limited or constantly changing nature of information, the need for rapid and problem-oriented responses, and fear and mistrust of the population.[14] Therefore, leaders are required to direct, guide and establish the most appropriate strategies to make a difference between success and failure in the management of potentially catastrophic situations at all levels.

In this context, the aim of this review is to summarise evidence on the main leadership's characteristics reported during the COVID-19 pandemic. Identifying capacities, values and traits of leaders can help institutions and educators to build programmes that ensure a workforce capable of strengthening the resilience and preparedness of healthcare systems and leading public health to address possible future threats.[15]
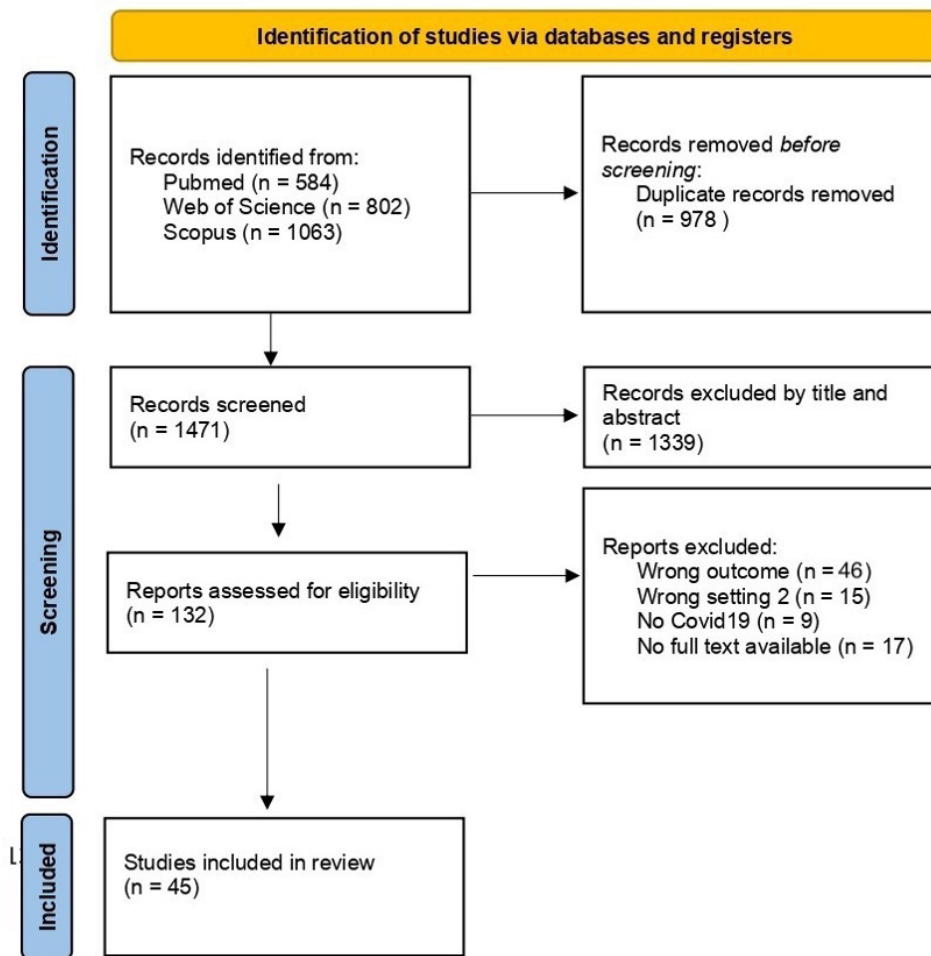
Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

METHODS
Search strategy

This scoping review of the literature was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.[16] A search of relevant articles was performed in the PubMed, Scopus and Web of Science databases using a query related to leadership skills and characteristics during the COVID-19 pandemic (online supplemental figure 1). The search was performed from January 2020 to February 2022. The resulting records were entered on the web application Rayyan-Intelligent Systematic Review,[17] to be subsequently screened according to the inclusion/exclusion criteria. After the removal of duplicates, the selection of articles was made by reading titles and abstracts, and then full texts.

Inclusion/exclusion criteria

Eligible articles were any type of publication that outlined one or more characteristics of public health leadership during the COVID-19 pandemic, such as communication abilities, soft skills, ethics and values, management skills, training and work experience. We included articles concerning local healthcare settings, specifically hospital directorate and medical and nursing management of wards, or public health management at a national or international level. We considered articles published between the beginning of the healthcare emergency in January 2020 and February 2022. We considered only articles written in English or Italian. We excluded all articles that did not explicitly

address the COVID-19 pandemic or with a different setting (eg, veterinarian, schools, enterprise). Moreover, we excluded articles that did not identify any leadership characteristics, intended as communication abilities, soft skills, ethics and values, management skills, training and work experience (wrong outcome).

Selection process and data extraction

Each record was assessed by title and abstract by two independent reviewers (VFC and FD'A). Any disagreement between reviewers, whether necessary, was discussed and solved with a third reviewer (TO).

The full-text assessment was performed in the same manner, thereby identifying the final list of eligible articles. Data extraction was performed by two reviewers (TO and AVG), and every disagreement was resolved by discussion with a third reviewer (LV). The data from the eligible studies were extracted in a predefined Excel sheet, defined by the following columns regarding information extracted from the studies: authors' name, publication year, study country, study design, type of publication, study setting and main findings. Three reviewers (TO, AVG, LV) analysed and clustered elements that emerged from the analysis by using an iterative process rooted in grounded theory to compare and develop emergent themes.[18] Thus, characteristics emerged as relevant and the number of times each characteristic was discussed was clustered in six macro groups: human traits, behaviour and emotional intelligence; management skills and decision-making; team working, collaboration

Table 1 General characteristics of the included studies

First author and year	Type of publication	Geographical area	Setting—type of professionalism
Abdi,[36] 2022	Opinion piece	Generic	Healthcare directorate
Aboramadan,[23] 2021	Cross-sectional study	Palestine	Healthcare directorate
Azar,[53] 2021	Commentary	Generic	Nurse
Bavel,[39] 2020	Narrative review	Generic	Public health management
Bourgeault,[60] 2020	Commentary	Generic	Public health management
Burkle,[56] 2020	Narrative review	World	Public health management
Crayne,[32] 2021	Commentary	Generic	Public health management
Czabanowska,[35] 2021	Report	Global study	Public health management
Dirani,[59] 2020	Commentary	Generic	Public health management
Finset,[31] 2020	Editorial	USA	Public health management
Forster,[63] 2021	Ecological study	World	Public health management
Freudenberg,[29] 2022	Opinion piece	Generic	Physician
Gao,[55] 2021	Narrative review	China	Public health management
Harrington,[54] 2021	Opinion piece	Generic	Nurse
Hartney,[22] 2021	Qualitative study	Canada	Healthcare directorate
Hauck,[26] 2021	Cross-sectional study	USA	Healthcare directorate
Hertelendy,[34] 2021	Commentary	USA	Healthcare directorate
Hølge-Hazelton,[51] 2021	Qualitative study	Denmark	Nurse
Hølge-Hazelton,[51] 2021	Cross-sectional study	Denmark	Healthcare directorate
Iserson,[58] 2020	Editorial	USA	Public health management
Jain,[52] 2020	Commentary	USA	Public health management
Jaworska,[40] 2021	Qualitative study	Germany	Public health management
Kapucu,[45] 2021	Commentary	USA	Public health management
Latemore,[30] 2020	Opinion piece	Generic	Public health management
Laur,[50] 2021	Case study	Canada	Healthcare directorate
MacKay,[61] 2021	Systematic review	Generic	Public health management
Sevy Majers,[62] 2020	Case study	USA	Nurse
Mayer,[49] 2021	Commentary	USA	Public health management
McGuire,[20] 2020	Qualitative study	New Zealand	Public health management
Editors of the *NEJM*,[48] 2020	Editorial	USA	Public health management
Raderstorf,[27] 2020	Editorial	Generic	Healthcare directorate
Rigby,[25] 2021	Ecological study	World	Healthcare directorate
Sanders,[28] 2021	Commentary	USA	Physician
Santra,[19] 2021	Qualitative study	India	Physician
Sazzad,[47] 2021	Systematic review	Asia	Public health management
Scott,[44] 2021	Opinion piece	Generic	Public health management
Seijts,[24] 2021	Cross-sectional study	Canada	Public health management
Sriharan,[38] 2021	Systematic review	Generic	Public health management
Strudsholm,[42] 2021	Cross-sectional study	Canada	Public health management
Taylor,[37] 2020	Commentary	USA	Physician
Wagstaff,[21] 2020	Qualitative study	Chile	Public health management
Wicker,[33] 2021	Opinion piece	Generic	Public health management
Wymer,[46] 2021	Narrative review	USA	Nurse
Xu,[57] 2021	Cross-sectional study	China	Public health management
Yule,[43] 2020	Opinion piece	USA	Physician

NEJM, New England Journal of Medicine.

and empowerment; responsiveness and preparedness; communication skills and stakeholder engagement; evidence-based approach and innovation. Finally, the entire research team discussed the clustering results to identify and resolve any disagreements.

RESULTS
The overall research in the three databases yielded a total of 2449 articles. After duplicates removal, 1471 articles were screened based on the title and abstract. In total, 132 full-text articles were selected. Following the inclusion and exclusion criteria, the screening resulted in the final inclusion of 45 articles. Details about the study selection process are shown in figure 1. Of these, 7 were literature reviews (15.6%), 16 were research articles (35.6%) and 22 were classified as 'other' (48.8%), including editorials, commentaries, opinion pieces and reports.

Data were recruited from a variety of countries, with the USA being the most represented, although about 30% of the articles are not placed in any specific geographical setting but produce general considerations.

Table 2 Number of articles reporting leadership characteristics by categories

Characteristics		Research articles	Others	Reviews	Total studies*	Percentage
Positive	Human traits, behaviour and emotional intelligence	8	11	2	21	46.7
	Management skills and decision-making	5	7	3	15	33.3
	Team working, collaboration and empowerment	8	6	2	16	35.6
	Responsiveness and preparedness	10	5	3	18	40.0
	Communication skills and stakeholder engagement	7	13	2	22	48.9
	Evidence-based approach and innovation	5	7	2	14	31.1
Negative	Management skills and decision-making	0	2	0	2	4.0
	Team working, collaboration and empowerment	0	1	1	2	4.0
	Evidence-based approach and innovation	0	1	0	1	2.0

*A single study may contain elements that can be traced to more than one single group.

More than 57.8% of the articles (n=26) addressed public health management setting, at national or government level, while 19 (42.2%) hospital setting, involving physicians (11.1%), nurses (11.1%), healthcare directorate and management (20%) (table 1).

Leadership characteristics and clustering

We identified 93 characteristics (a characteristic can be expressed several times in different studies, for a total of 170 citations) that we clustered into six main groups: human traits, behaviour and emotional intelligence; management skills and decision-making; team working, collaboration and empowerment; responsiveness and preparedness; communication skills and stakeholder engagement; evidence-based approach and innovation.

Among the groups, in three cases (management skills and decision-making; team working, collaboration and empowerment; evidence-based approach and innovation), we found both positive and negative aspects related to the leaders' characteristics. The groups identified are shown in table 2, while table 3 specifically reports the nomenclature and the frequency of each item found.

Characteristics attributable to the first group, 'human traits, behaviour and emotional intelligence', were identified in 21 articles (46.7%), 8 of which were research articles,[19–26] 11 opinion pieces[27–37] and 2 reviews.[38 39] In particular, empathy and 'honesty and truthfulness in relationships' were the two most cited characteristics (six and three times, respectively), followed by compassion, emotional intelligence and psychological safety, attention to psychological well-being, emotional effectiveness, equity and values, sense-making and sense-giving (all cited two times). Other characteristics emerged only once from the analysis (table 3).

In group 2, 'management skill and decision-making', we identified 15 articles (33.3%) containing features from this domain: 5 research articles,[19 21 40–42] 7 opinion pieces[29 33 35 36 43–45] and 3 reviews.[38 46 47] Elements that have emerged most frequently are decision-making (eight times), organisation and planning (both three times), adherence to rules, influencing policies, prepare (twice each). Moreover, in this group, three characteristics emerged as negatively associated with public health leadership: 'inconsistent policy position', 'management at federal level' and 'unpredictable behaviour'.[48 49]

Sixteen articles (35.6%) were related to group 3, 'team working, collaboration and empowerment', of which eight research articles,[19 20 22 24 26 42 50 51] six opinion pieces[34 36 37 52–54] and two reviews.[38 55] Notable characteristics are collaboration, which emerged predominantly five times, accountability, empowerment and team building (three times each), and shared

decision-making/leadership (twice). Lack of coordination was underlined once as a negative aspect,[49] while autocratic leadership was still presented as a deductive factor.[56]

Eighteen studies (40%) were included in group 4, 'responsiveness and 'preparedness' (10 research articles,[19–21 24 40–42 50 51 57] 5 opinion pieces[32 34 35 44 51] and 3 reviews[38 46 47]). 'Adapt according to the situation' was the most cited characteristic (seven times), followed by resilience (four times), act fast, creating strategies, 'integrative and systematic thinking skills' (three times), and pragmatism (twice).

The characteristics of the fifth group, 'communication skills and stakeholder engagement', were reported in 7 research articles,[19–22 24 42] 13 opinion pieces[27 29–31 35–37 43 45 52 58–60] and 2 reviews[38 61] (48.9%). About this topic, elements that emerged with greater frequency are clear communication, (10 times), transparency (6 times), advocacy, risk and crisis communication (2 times each).

Finally, group 6, 'evidence-based approach and communication' aspects have been found in 14 articles (31.1%), of which 5 research articles,[19 20 25 62 63] 7 opinion pieces[27 32 35 36 44 53 60] and 2 reviews.[46 47] 'Evidence-based decision-making' (six times) and technological skills (two times) are the most represented characteristics. Finally, one opinion piece[48] highlighted 'mistrust of science' as a negative feature.

Finally, we found a different distribution of the characteristics according to the healthcare setting and type of professionalism (table 4). In particular, characteristics related to communication and team working, human traits and management capabilities were reported in articles dealing with medical professionalism, while no articles focused on the importance of the evidence-based approach. The importance of team working was reported also in articles dealing with nursing professionalism, as well as evidence-based approaches. In the articles dealing with the healthcare directorate, we found many leadership characteristics, such as human traits, preparedness and communicative elements. Finally, in the public health management setting, we mainly found leadership characteristics such as communication, team working and those related to human traits.

DISCUSSION

In this scoping review we summarised the main leadership's characteristics that emerged during the COVID-19 pandemic, addressing both governmental and international as well as local settings. In detail, we identified six macro groups referring to several aspects of leadership that are reported as fundamental in order to be a good leader, capable of managing a public health emergency. Elements emerged from this analysis outline a varied profile, ranging in different characteristics and capacity areas.

Table 3 Aspects of leadership mentioned in articles by categories

Leadership characteristics

Human traits, behaviour and emotional intelligence		Management skills and decision-making		Team working, collaboration and empowerment		Responsiveness and preparedness		Communication skills and stakeholder engagement		Evidence-based approach and innovation	
Empathy	6	Decision-making	8	Collaboration	5	Adapt according to the situation	7	Clear communication	10	Evidence-based decision-making	6
Honesty and truthfulness in relationships	3	Organisation	3	Accountability	3	Resilience	4	Transparency	6	Technological skills	2
Compassion	2	Planning	3	Empowerment	3	Act fast	3	Advocacy	2	Avoidance of dogmatism	1
Emotional intelligence and psychological safety	2	Adherence to rules	2	Team building	3	Creating strategies	3	Risk communication	2	Digital access to information	1
Attention to psychological well-being	2	Influencing policies	2	Shared decision-making/leadership	2	Integrative and systematic thinking skills	3	Crisis communication	2	Epidemiology approach	1
Emotional effectiveness	2	Prepare	2	Autocratic leadership*	1	Pragmatism	2	Consistency	1	Guiding ideation	1
Equity and values	2	Analytical reasoning	1	Authoritarian leadership	1	Acknowledging uncertainty	1	Credibility	1	High educational level	1
Sense-making and sense-giving	2	Claiming power	1	Building and maintaining trust	1	Agility	1	Dissemination of information	1	Innovative drive	1
Aspiration	1	Control	1	Capacity building	1	Critical thinking skills	1	Flexible and open communication	1	Learning orientation	1
Calm and optimism	1	Disciplined action	1	Creating a group with diversity of skills	1	Provide direction	1	Frequency	1	Locus of causations	1
Charisma	1	Forward thinking	1	Creating a high-performance team	1	Rapid skills acquisition	1	Give meaning to citizens	1	Mistrust of science*	1
Compassionate leadership	1	Inconsistent policy position*	1	Focus on workers	1	Time frame orientation	1	Interdisciplinarity	1	Understanding organisation linkages	1
Concern for emotional stress	1	Management at federal level*	1	Inclusiveness in decision-making process	1			Networking	1		
Courage	1	Situation awareness	1	Inspire	1			Specificity	1		
Humanity	1	Unpredictable behaviour*	1	Lack of coordination*	1			Team communication	1		
Integrity and credibility	1			Make collaborators feel valuable	1			Trustworthiness	1		
Listening	1										
Physical presence	1										
Psychological stability	1										
Servant leadership	1										
Use of emotions	1										
Visibility	1										
Total and related citation frequency†	22 (35)		15 (29)		16 (27)		12 (28)		16 (33)		12 (18)

*Items underline a negative aspect.

†We found 93 (22+15+16+12+16+12) characteristics that are cited a total of 170 times, as the same may be reported in different studies.

Table 4 Distribution of leadership characteristics according to the healthcare setting and type of professionalism

Characteristics*	Healthcare setting and type of professionalism			
	Nurse	Physician	Healthcare directorate	Public health management
Human traits, behaviour and emotional intelligence	1 (20%)	3 (60%)	5 (63%)	11 (44%)
Management skills and decision-making	2 (40%)	3 (60%)	3 (38%)	9 (36%)
Team working, collaboration and empowerment	3 (60%)	4 (80%)	3 (38%)	8 (32%)
Responsiveness and preparedness	2 (40%)	2 (40%)	5 (63%)	9 (36%)
Communication skills and stakeholder engagement	0 (0%)	4 (80%)	4 (50%)	13 (52%)
Evidence-based approach and innovation	3 (60%)	0 (0%)	3 (38%)	9 (36%)
Total	5	5	8	25
*A single article can mention more characteristics.				

Human traits, behaviour and emotional intelligence emerged as really necessary to create and transmit trust and confidence, both at an institutional level (and therefore to citizens) and in the work team. In particular, empathy, compassion, attention to well-being and honesty are reaffirmed as key characteristics for ensuring credibility and trust,[64–66] allowing the implementation of actions and measures, specifically during the pandemic, without causing doubt, perplexity and, in extreme cases, anger from the population. These points are closely linked to communication skills. Our study, in fact, shows that clear communication and transparency are the most cited characteristics in the description of the communication skills of a good leader during the pandemic. Indeed, the ability to communicate information in a clear, empathetic and evidence-based manner is critical to enable people to understand and accept measures being taken.[67 68] The same could be highlighted at a micro level, like for example in hospital setting, where clear and transparent communication within the team and towards patients is fundamental for effective project development and goals' achievement.[69 70] A clear example of wrong communication and misinformation is about the COVID-19 vaccine campaign, where, based on assumptions and not on data, the administration of the AstraZeneca vaccine was stopped claiming associations between vaccination and increased risk of death.[71] The suspension of this vaccine generated great panic among citizens, increasing doubts, fear and vaccine hesitancy,[72] causing a slowdown of the campaign.

Similarly, the lack of transparency and objective communication of risk by several political leaders all over the world led to underestimation of the risk and made it impossible to control the spread of the infection in many countries, resulting in a high number of cases and deaths.[73–75]

Second, the results report as characteristics of a good leader, 'management skill and decision-making', closely related to 'team working, collaboration and empowerment'. Another important theme is related to 'responsiveness and preparedness', with reference to the ability to plan and predict events in order to optimise resources available. Extending this vision to an international level, the definition of a clear chain of command and the centralisation of some decisions are a necessary prerogative for the correct management of an emergency.[76] This is consistent with the vision of the dynamics that regulate the events during a pandemic as attributable to a system that we can define as 'complex adaptive',[77–79] so it requires not only careful planning[14] but also a considerable adaptability and resilience.

Leaders, by definition, never work alone, so it is essential that he or she is supported by a loyal and responsive working group, creating a constructive synergy. Of course, to achieve this type of relationship, it is important for leaders to provide inputs aimed at conveying a sense of empowerment to the group, promoting team-building dynamics that shift the structure of some decisions on a more shared level.[80]

Finally, another important aspect emerged from our study is the focal role of 'evidence-based decision-making' acquired during the COVID-19 pandemic. A leader's activity in public health cannot be done without a robust system of scientific evidence to support decisions. This both to implement decisions that will positively impact the course of events and to fully justify the direction taken in a public health perspective.[81 82]

Regarding the distribution of leadership characteristics according to different settings, we noted a homogeneous distribution of qualities in specific settings. Indeed, both of the health directorate in local health authorities and hospitals and the public health management are representations, at macro and meso levels, of organisational and health planning settings, in which the leader is called to deal with multidisciplinary and varied inputs,[83] thus requiring all the different categories highlighted by our study. Therefore, in these specific contexts, the clusters we have identified constitute paramount cross-cutting and key elements in the identification of the figure of a leader. Indeed, these are settings that can be traced to the complex system model, and as such require a systemic and inclusive approach of multiple elements,[84] such as the one proposed in this work. Indeed, leaders operating in these areas should have a profile that reflects the multiplicity of challenges they face. This element suggests the importance of a cross-fertilisation of skills and capabilities between healthcare workers, including clinicians, surgeons, nurses and public health professionals. Thus, creating joint training programmes, taking into account the various characteristics we have identified, would improve professional capabilities and knowledge, fostering collaboration within complex systems at different levels.

Strengths and limitations
As far as we know, this is the first scoping review investigating characteristics of leadership during COVID-19 and succeeds in providing a comprehensive set of all the main qualities of a public health leader described in the literature. However, it is necessary to highlight the structural limits of some of the studies included in the analysis, as they lacked a standardised methodology in the process of identification and evaluation in terms of the characteristics and qualities regarding leadership in public health. Furthermore, in the search for articles, only articles in English and Italian were selected, which may have resulted in the omission of literature from some geographical areas. Given the limited number of studies in the literature aimed at measuring the effectiveness of a leader's competencies in various contexts and the possible variables of interest, it is advisable to increase

research aimed at finding methods to measure how leadership competencies actually influence the impact of public health measures and consequently the well-being of the population.

CONCLUSIONS

The pandemic has highlighted the need for leaders highly prepared to manage public health emergency contexts. Of course, identifying a leader who possesses all the qualities we highlighted in our study could appear difficult or even impossible; however, for this reason, it is necessary and more urgent than ever to continue and increase investment in the preparation of those in charge of guiding people across difficult situations like the one we are experiencing with the COVID-19 pandemic. In this context, the training of professionals and leaders is a paramount action to address the challenges of the future in public health. In the area of communication, it would be appropriate to integrate training programmes specifically targeting communication skills into health professionals' and decision-makers' curricula at different organisational levels. We cannot assume that a single communication style fits all settings and situations in which a leader operates; however, by taking advantage of the available evidence,[85] it is possible to identify the most appropriate educational tool for the development of effective communication skills. Similarly, the other elements that emerged from our study, such as adherence to an evidence-based approach in decision-making processes, emotional intelligence and team working abilities, should be included in the training programmes, in order to prepare leaders who interface with public health issues.

The development of research in the field of public health leadership can, starting from the characteristics we have identified, make use of quantitative and qualitative methods to investigate with increasing rigour the weight these attributes have in the management of critical public health issues. In this sense, future studies that can analyse more thoroughly the specific role in health crises of elements related to human traits, team working and communication skills are desirable, possibly proposing objective evaluations of how these factors have weighed in the management of the COVID-19 pandemic in different global settings. It would also be useful to investigate further the gaps in the literature referring to the lack of articles highlighting the importance of the evidence-based approach in a physicians' leadership setting and the crucial role of communication in nursing.

Finally, it is necessary to dwell on technological and digital skills, particularly related to the information sector and social media, as those deeply affecting the dynamics underlying the social response to health policies aimed at responding to a pandemic situation.[86] The importance, today, in knowing how to use digital and information technology tools for the benefit of shared health is, in our view, critical in defining the characteristics that compete for a public health leader.

Thus, the value of our research lies in providing a comprehensive view of the attributes to look for in the figures we place at the top of our decision-making systems, promoting the value of leadership research and training to ensure we are prepared for future public health emergencies and emerging challenges affecting public health interventions.

ORCID iDs
Leonardo Villani http://orcid.org/0000-0001-9375-8731
Maria Rosaria Gualano http://orcid.org/0000-0001-7357-2892

REFERENCES

1. WHO. The impact of COVID-19 on global health goals, Available: https://www.who.int/news-room/spotlight/the-impact-of-covid-19-on-global-health-goals [Accessed 24 Apr 2022].
2. Nicola M, Alsafi Z, Sohrabi C, *et al*. The socio-economic implications of the Coronavirus pandemic (COVID-19): A review. *Int J Surg* 2020;78:185–93.
3. Mofijur M, Fattah IMR, Alam MA, *et al*. Impact of COVID-19 on the social, economic, environmental and energy domains: lessons learnt from a global pandemic. *Sustain Prod Consum* 2021;26:343–59.
4. WHO. COVID-19 Detailed Surveillance Data Dashboard, . 2022Available: https://covid19.who.int [Accessed 24 Apr 2022].
5. WHO. Third round of the global pulse survey on continuity of essential health services during the COVID-19 pandemic interim report; 2022Feb7. Geneva
6. WHO. Building health systems resilience for universal health coverage and health security during the COVID-19 pandemic and beyond. Geneva; 2021.
7. Cascini F, Hoxhaj I, Zaçe D, *et al*. How health systems approached respiratory viral Pandemics over time: a systematic review. *BMJ Glob Health* 2020;5:e003677.

8 OECD. Adaptive health financing: budgetary and health system responses to combat COVID-19. *OECD Journal on Budgeting* 2021;21.

9 OCED. Transparency, communication and trust: the role of public communication in responding to the wave of Disinformation about the new Coronavirus; 2020.

10 Moreira L. Health literacy for people-centred care; 2018.

11 Damiani G, Specchia ML, Ricciardi W. *Manuale di Programmazione e Organizzazione Sanitaria*4th ed. Naples, Italy: Idelson Gnocchi, 2021.

12 Gill R. Theory and practice of leadership. 2011.

13 Koh HK, Jacobson M. Fostering public health leadership. *J Public Health (Oxf)* 2009;31:199–201.

14 Aristei L, D'Ambrosio F, Villani L, *et al*. Public health regulations and policies dealing with preparedness and emergency management: the experience of the COVID-19 pandemic in Italy. *Int J Environ Res Public Health* 2022;19:1091.

15 Carlton EL, Holsinger JW, Riddell MC, *et al*. Full-range public health leadership, part 2: qualitative analysis and synthesis. *Front Public Health* 2015;3:174.

16 Tricco AC, Lillie E, Zarin W, *et al*. PRISMA extension for Scoping reviews (PRISMA-SCR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.

17 Ouzzani M, Hammady H, Fedorowicz Z, *et al*. Rayyan—a web and mobile App for systematic reviews. *Syst Rev* 2016;5:210.

18 Strauss A, Corbin J. Grounded theory in practice. Thousand Oaks, CA, 1997.

19 Santra S, Alat P. Adaptive leadership of doctors during COVID-19. *LHS* 2022;35:246–66.

20 McGuire D, Cunningham JEA, Reynolds K, *et al*. Beating the virus: an examination of the crisis communication approach taken by New Zealand Prime Minister Jacinda Ardern during the COVID-19 pandemic. *Human Resource Development International* 2020;23:361–79.

21 Wagstaff MF, Salvaj E, Villanueva S. Champions in the time of COVID-19: tracing paths to recovery in Ibero-America. *MRJIAM* 2020;18:379–99.

22 Hartney E, Melis E, Taylor D, *et al*. Leading through the first wave of COVID: a Canadian action research study. *LHS* 2022;35:30–45.

23 Aboramadan M, Dahleez KA. The impact of perceived servant leadership traits and safety climate on task performance and risk-taking behavior in times of crisis. *LHS* 2022;35:210–27.

24 Seijts GH, de Clercy C, Mohan G. Trust as a mediator of the relationship between character and perceptions of leader effectiveness during the COVID-19 crisis. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement* 2021;53:358–64.

25 Rigby MJ, Zdunek K, Pecoraro F, *et al*. When COVID-19 first struck: analysis of the influence of structural characteristics of countries - Technocracy is strengthened by open democracy. *PLoS One* 2021;16:e0257757.

26 Hauck KD, Hochman KA, Pochapin MB, *et al*. The COVID-19 army: experiences from the deployment of non-Hospitalist physician volunteers during the COVID-19 pandemic. *Disaster Med Public Health Prep* 2021:1–5.

27 Raderstorf T, Barr TL, Ackerman M, *et al*. A guide to empowering frontline nurses and Healthcare Clinicians through Evidence-Based innovation leadership during COVID-19 and beyond. *Worldviews Evid Based Nurs* 2020;17:254–7.

28 Sanders J, Balcom C. Clinical leadership during the COVID-19 pandemic: reflections and lessons learned. *Healthc Manage Forum* 2021;34:316–9.

29 Freudenberg LS, Pomykala KL, Herrmann K. COVID-19 pandemic: what have we learned and what to expect in the future? *Semin Nucl Med* 2022;52:86–9.

30 Latemore G. COVID and the common good. *Philos Manag* 2021;20:257–69.

31 Finset A, Bosworth H, Butow P, *et al*. Effective health communication - a key factor in fighting the COVID-19 pandemic. *Patient Educ Couns* 2020;103:873–6.

32 Crayne MP, Medeiros KE. Making sense of crisis: Charismatic, ideological, and pragmatic leadership in response to COVID-19. *Am Psychol* 2021;76:462–74.

33 Wicker C. Competency-Based approach to developing leaders for crises. *New Horizons in Adult Education and Human Resource Development* 2021;33:52–9. 10.1002/nha3.20315 Available: https://onlinelibrary.wiley.com/toc/19394225/33/2

34 Hertelendy AJ, Goniewicz K, Khorram-Manesh A. Preparing emergency and disaster medicine physicians to lead future responses: crisis leadership a core competency. *The American Journal of Emergency Medicine* 2021;47:309–10.

35 Czabanowska K, Kuhlmann E. Public health Competences through the lens of the COVID-19 pandemic: what matters for health workforce preparedness for global health emergencies. *Int J Health Plann Manage* 2021;36:14–9.

36 Abdi Z, Lega F, Ebeid N, *et al*. Role of hospital leadership in combating the COVID-19 pandemic. *Health Serv Manage Res* 2022;35:2–6.

37 Taylor DC, Andolsek KM. What's important: physician leadership. *Journal of Bone and Joint Surgery* 2020;102:1219–20.

38 Sriharan A, Hertelendy AJ, Banaszak-Holl J, *et al*. Public health and health sector crisis leadership during Pandemics: A review of the medical and business literature. *Med Care Res Rev* 2022;79:475–86.

39 Bavel JJV, Baicker K, Boggio PS, *et al*. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav* 2020;4:460–71.

40 Jaworska S. Competence and Collectivity: the discourse of Angela Merkel's media communications during the first wave of the pandemic. *Discourse, Context & Media* 2021;42:100506.

41 Hølge-Hazelton B, Kjerholt M, Rosted E, *et al*. Health professional frontline leaders' experiences during the COVID-19 pandemic: A cross-sectional study. *J Healthc Leadersh* 2021;13:7–18.

42 Strudsholm T, Vollman AR. Public health leadership: Competencies to guide practice. *Healthc Manage Forum* 2021;34:340–5.

43 Yule S, Smink DS. Nontechnical skill countermeasures for pandemic response. *Ann Surg* 2020;272:e213–5.

44 Scott M, Bove LA. Nursing leadership role development: preparing to lead through ethical conundrums. *J Contin Educ Nurs* 2021;52:8–10.

45 Kapucu N, Moynihan D. Trump's (Mis)Management of the COVID-19 pandemic in the US. *Policy Studies* 2021;42:592–610.

46 Wymer JA, Stucky CH, De Jong MJ. Nursing leadership and COVID-19. *Nurse Leader* 2021;19:483–8.

47 Sazzad F, Rajan VP, Demircioglu MA. The role of leadership in public sector innovation: A systematic review and meta-analysis of the management of COVID-19 in Asian countries. *Front Public Health* 2021;9:743748.

48 The Editors. Dying in a leadership vacuum. *N Engl J Med* 2020;383:1479–80.

49 Mayer KR. The random walk Presidency. *Pres Stud Q* 2021;51:71–95.

50 Laur CV, Agarwal P, Mukerji G, *et al*. Correction: building health services in a rapidly changing landscape: lessons in adaptive leadership and pivots in a COVID-19 remote monitoring program. *J Med Internet Res* 2021;23:e31044.

51 Hølge-Hazelton B, Kjerholt M, Rosted E, *et al*. Improving person-centred leadership: A qualitative study of ward managers' experiences during the COVID-19 crisis. *Risk Manag Healthc Policy* 2021;14:1401–11.

52 Jain SH, Lucey C, Crosson FJ. The enduring importance of trust in the leadership of health care organizations. *JAMA* 2020;324:2363–4.

53 Azar KMJ. The evolving role of nurse leadership in the fight for health equity. *Nurse Lead* 2021;19:571–5.

54 Harrington A. Understanding effective nurse leadership styles during the COVID-19 pandemic. *Nurs Stand* 2021;36:45–50.

55 Gao J, Zhang P. "China's public health policies in response to COVID-19: from an "authoritarian" perspective". *Front Public Health* 2021;9:756677.

56 Burkle FM. Declining public health protections within autocratic regimes: impact on global public health security, infectious disease outbreaks, epidemics, and Pandemics. *Prehosp Disaster Med* 2020;35:237–46.

57 Xu J, Mao J-Y, Zhang Y. Bad time to be humble! when and why leaders should not be humble. *LODJ* 2022;43:14–24.

58 Iserson KV. Healthcare ethics during a pandemic. *West J Emerg Med* 2020;21:477–83.

59 Dirani KM, Abadi M, Alizadeh A, *et al*. Leadership Competencies and the essential role of human resource development in times of crisis: a response to COVID-19 pandemic. *Human Resource Development International* 2020;23:380–94.

60 Bourgeault IL, Maier CB, Dieleman M, *et al*. The COVID-19 pandemic presents an opportunity to develop more sustainable health workforces. *Hum Resour Health* 2020;18:83.

61 MacKay M, Colangeli T, Thaivalappil A, *et al*. A review and analysis of the literature on public health emergency communication practices. *J Community Health* 2022;47:150–62.

62 Sevy Majers J, Warshawsky N. Evidence-based decision-making for nurse leaders. *Nurse Lead* 2020;18:471–5.

63 Forster T, Heinzel M. Reacting, fast and slow: how world leaders shaped government responses to the COVID-19 pandemic. *J Eur Public Policy* 2021;28:1299–320.

64 Huikko-Tarvainen S. Elements of perceived good physician leadership and their relation to leadership theory. *LHS* 2022;35:14–29.

65 Archer J, Stevenson L, Coulter A, *et al*. Connecting patient experience, leadership, and the importance of involvement, information, and empathy in the care process. *Healthc Manage Forum* 2018;31:252–5.

66 Harrel E, Berland L, Jacobson J, *et al*. Compassionate leadership: essential for the future of tropical medicine and global health. *Am J Trop Med Hyg* 2021;105:1450–2.

67 Tetteh HA. A leader's guide to crisis communication: lessons from Ebola for COVID-19. *Mil Med* 2020;185:e1371–5.

68 Oxman AD, Glenton C, Flottorp S, *et al*. Development of a checklist for people communicating evidence-based information about the effects of Healthcare interventions: a mixed methods study. *BMJ Open* 2020;10:e036348.

69 Brown A. Communication and leadership in Healthcare quality governance. *J Health Organ Manag* 2020;34:144–61.

70 Braaf S, Ameratunga S, Nunn A, *et al*. Patient-identified information and communication needs in the context of major trauma. *BMC Health Serv Res* 2018;18:163.

71 Mahase E. Covid-19: WHO says Rollout of Astrazeneca vaccine should continue, as Europe divides over safety. *BMJ* 2021;372:728.

72 Wise J. Covid-19: how Astrazeneca lost the vaccine PR war. *BMJ* 2021;373:921.

73 Diderichsen F. How did Sweden fail the pandemic *Int J Health Serv* 2021;51:417–22.

74 Yamey G, Gonsalves G. Donald Trump: a political determinant of COVID-19. *BMJ* 2020;369:m1643.

75 Fonseca EM da, Nattrass N, Lazaro LLB, *et al*. Political discourse, Denialism and leadership failure in Brazil's response to COVID-19. *Global Public Health* 2021;16:1251–66.

76 Ricciardi W, Tarricone R. The evolution of the Italian national health service. *The Lancet* 2021;398:2193–206.

77 Holland John H. *Complex Adaptive Systems*. Daedalus, 1992.

78 Gell-Mann M. Complex adaptive systems;

79 Anderson RA, Issel LM, McDaniel RR. Nursing homes as complex adaptive systems. *Nursing Research* 2003;52:12–21.

80 Salas-Vallina A, Ferrer-Franco A, Herrera J. Fostering the Healthcare workforce during the COVID -19 pandemic: shared leadership, social capital, and contagion among health professionals. *Int J Health Plann Manage* 2020;35:1606–10.

81 Brownson RC. *Evidence-Based Public Health*3rd ed. New York: Oxford University Press, 2011.

82 Brownson RC, Fielding JE, Maylahn CM. *Evidence-based Decision Making to Improve Public Health Practice*. Public Health Services and Systems Research,

83 Figueroa CA, Harrison R, Chauhan A, *et al*. Priorities and challenges for health leadership and workforce management globally: a rapid review. *BMC Health Serv Res* 2019;19:239.

84 Belrhiti Z, Nebot Giralt A, Marchal B. Complex leadership in Healthcare: A Scoping review. *Int J Health Policy Manag* 2018;7:1073–84.

85 Bachmann C, Pettit J, Rosenbaum M. Developing communication curricula in Healthcare education: an evidence-based guide. *Patient Educ Couns* 2022;105:2320–7.

86 Cascini F, Pantovic A, Al-Ajlouni YA, *et al*. Social media and attitudes towards a COVID-19 vaccination: A systematic review of the literature. *EClinicalMedicine* 2022;48:101454.