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MONOGRAPH

It's "Classical Advice!" Why Medical Education Should Go Beyond Science

Monica Consolandi[1] · **Sara Agnelli**[2]

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Abstract
This article is a reflection on a new (but ancient) definition of medicine, which considers doctors and patients alike from their complex human experiences. It explores the doctor-patient relationship as well as the practice of medicine itself through an historical lens, by examining some of the scholarship of Galen of Pergamum, the ancient Greek doctor and philosopher of the second century CE. The intention is not to give a new, definite answer, but to use an example from the past to look at the matter from a different, perhaps unusual, perspective.

Keywords Medical humanities · Galen · COVID-19 pandemic · Medical curriculum · Ancient Roman tradition · One health

Preface

The outbreak of SARS-CoV-2 virus not only created a medical crisis of global dimension, but it has also raised a host of complex problems where it became clear that scientific knowledge alone was not enough. The biology of the virus and its paths of contagion took doctors and health workers far beyond biomedicine into realms of cultural practice, history, religion, and ideology. As COVID-19 still remains a major public health concern [1], medicine has been calling upon different kinds of knowledge from the humanities and the arts, which have been offering novel approaches to vexing problems such as misinformation, racism, and xenophobia [2]. The humanities' vital part in the pandemic response, through their immediate, translational, front-line work, has shown once again how the "science of medicine" can be integrated with the "art of medicine."

This paper is addressed to anyone interested in the question: what makes a good health professional? Our intention is not to give a new, definite answer, but to use an example from the past to look at the issue from a different, perhaps unusual, perspective. It is our hope that through the present work, medical educators and faculty, students, physicians, and leaders in academic medicine will see the *Art* (*of medicine*) differently[1].

Introduction

This study is the outcome of a multidisciplinary dialogue (historical, linguistic, and philosophical), which started from "the doctor-patient relationship" and expanded to the practice of medicine itself, broadly considered in its own definition. In accordance with the current scholarship[2],

Monica Consolandi and Sara Agnelli contributed equally to this article.

First author: Monica Consolandi

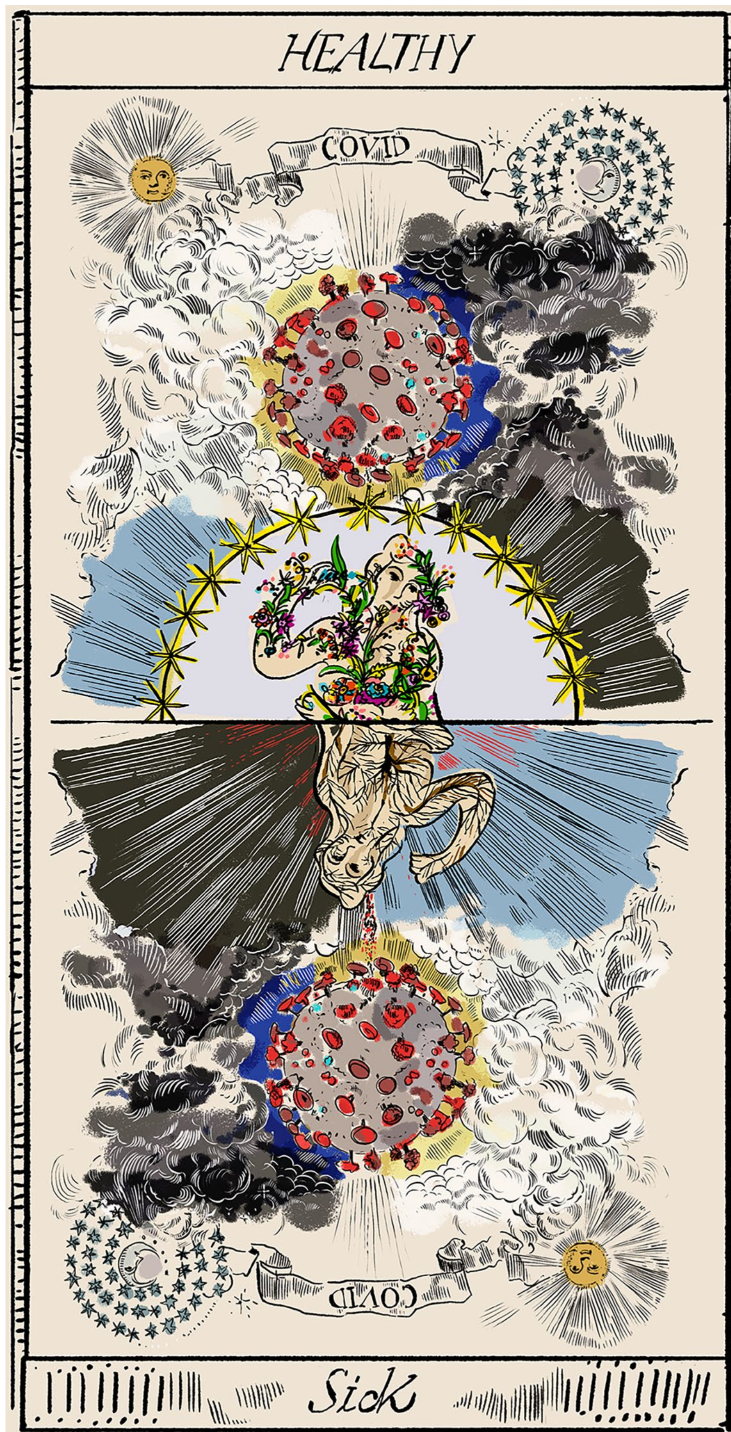
✉ Sara Agnelli
saraclassics@ufl.edu

[1] Center for Digital Health and Well Being, Fondazione Bruno Kessler, Povo, Trento, Italy

[2] One Health Center of Excellence for Research and Training, and Center for the Humanities and Public Sphere, University of Florida, Gainesville, FL, USA

[1] The Art echoes Hippocrates' little treatise called Περὶ τέχνης (*De arte*, "On the Art of Medicine") referring to the art of medicine. For a recent study of the text, see Mann [54].

[2] In this regard, among the many studies that have been published in the past two years, see: Ofri [59], Moniz et al. [56], Petrou et al. [61], and Adams et al. [40].



What does your future hold?
Have a future. Get vaccinated.
Author: Francesca Agnelli, #ContagiousWords#ContagiousImages, 2022

the humanities (i.e., literature, philosophy, ethics, history, and religion) can play a big role in supporting the practice of medicine, especially in fostering a valuable doctor-patient relationship as well as addressing medical burnout effectively.

This study aims to emphasize the role of the humanities in medical education and why their integration may be essential to educating a physician workforce, together with all the different health professionals[3] that can effectively contribute to optimal health care outcomes for patients and communities. By considering an historical example from the Graeco-Roman medical tradition, specifically Galen's vision of medicine and the role of philosophy in defining the medical art, the present article attempts to address the issue through an historical lens[4]. If doctors and patients represent medicine, what is the idea of medicine that they embody today? How different is it from the past? While it is crucial to distinguish present-day human health and medicine from that of the past, an historical investigation of the topic might offer a new point of view to answer such complex questions. Throughout this approach, which appears to be both historical and interdisciplinary, the study objective is to illuminate the unique position of medicine among "the two cultures" [3][5].

Medicine Between "Hard" and "Soft" Sciences

Medical training emphasizes the hard sciences (i.e., anatomy, physiology, biochemistry, pathology, microbiology, and pharmacology) as the foundation stones of clinical knowledge. Yet, medical practice consists in dealing with patients as well; generally speaking, doctors spend much of their time trying to understand patients, their stories, their personalities, and quirks, and trying to use that understanding to provide patients with the best care possible. This "softer" side of medicine can be a puzzling process for which the hard sciences provide little help. How can doctors be trained for this important aspect of clinical knowledge?

The current global health risks posed by climate change, mental illness, violence, loneliness, racism, and distrust urge to reconsider the nuts and bolts of medicine, where the field of medical humanities[6] may find its way into physicians' training and practice. In the medical curriculum, there is a false dichotomy between the hard sciences and the humanities[7], where the humanities have been often marginalized, preventing new, challenging ways of thinking. Although in recent decades the institutional growth of the medical humanities has accelerated, nonetheless they engage a small, self-selecting group of students [73][8]. Such a disposition could be interpreted as if the humanities have little to do with medical knowledge or health care.

But the time may be right for the humanities to play a decisive role in medicine. It is interesting to notice that they represent in some ways a very old way of thinking of medicine: in ancient and modern times, medicine was not distinct from theology and natural philosophy. In the ancient Graeco-Roman world, for example, health is about everything: it is about your environment as well as yourself. It is also about how you interact with that environment. Earlier societies acknowledged something about the human condition that current medicine has lost. For more than two thousand years, there existed a mind–body idea of health that was dynamic and holistic; in the nineteenth century, medical specializations emerged and brought detachment and separation. Today, these disciplinary boundaries have become blurrier again.

There are many ways to interpret people's cultural upbringings and their stories and seeing them in multiple lights is essential to equitable care. Together with the social sciences and the arts, not only do the humanities shed light on the cultural context of diseases, but they also help doctors connect with patients as multidimensional

[3] In this article, the terms "doctor" and "physician" are often used interchangeably. For a brief history about "doctor vs physician", see Kao and Geraghty [51]. Although our focus is on medical education and practice, this can and should be expanded to the whole "healthcare professional" workforce. For a definition of "health professionals", see Transforming and Scaling Up Health Professionals' Education and Training: World Health Organization Guidelines [70]. Geneva: World Health Organization; 2013. Annex 1, Definition and list of health professionals. Available from: https://www.ncbi.nlm.nih.gov/books/NBK298950/. Accessed 3 Mar 2024.

[4] The authors' decision to exclusively focus on doctors, rather than healthcare professionals in a broader sense, in the initial passages of the article is intentional. Although Galen's perspective on medicine can now be extended beyond the sole figure of the physician to encompass everyone who works for the well-being of patients in the healthcare system, for the sake of historical accuracy, the narrow translation of the term seems to be more appropriate.

[5] In his Rede Lecture delivered in Cambridge in 1959, Snow talked about "the two cultures" for the first time; the lecture was published in the book *The Two Cultures* and the Scientific Revolution the same year. Snow claimed that the intellectual life of the western society has split science and humanities into two cultures: in his opinion, this division is a major handicap in solving the world's problems.

[6] The medical humanities are today defined as the area of health humanities specifically dedicated to the application of the humanities, the social sciences, and the arts to medical education. The health humanities consider their application broadly to healthcare and clinical practice.

[7] For a discussion about a definition of 'hard' and 'soft' sciences, see VanLandingham [66]. Also: Storer [64]; Cassell [46].

[8] To review the historic and current state of arts and humanities integration into medical education in North America, see Howley et al. [50].

beings in their complex human experiences. Moreover, history, literature, and philosophy deal with the big questions of healing, suffering, life, and death. In Socrates' words, "An unexamined life is not worth living": that is, it is essential to make time to explore and embrace the world in its multifaceted complexity.

If medicine is not a science but "an art that uses science as one of many tools" [4–6] to effectively respond to current and future health challenges, both scientists and humanists should ask new questions, realize how much they do not know, and perhaps learn from each other.

Nonetheless, defining a good doctor remains unclear and, consequently, how to make one is very limited by time and space. According to the *Cambridge Dictionary Online* [7], doctors are people "with a medical degree whose job is to *treat* people who are ill or hurt": but how to do such a job well, especially if no *treatment* is available? Does a doctor's duty end where there is no cure left? Good doctors "gather together the full array of resources –medical, human, societal and spiritual– that will contribute to the patients' healing" [8]. While being trained as "technicians," doctors need "input from a belief in humanity" [9].

Many medical schools now offer required and elective courses that integrate medicine with the humanities and the arts. According to the National Academies of Sciences, Engineering, and Medicine's 2018 report, "the goals of the medical humanities curriculum are to: (i) ingrain aspects of professionalism, empathy, and altruism; (ii) enhance clinical communication and observation skills; (iii) increase inter-professionalism and collaboration; and (iv) decrease burnout and compassion fatigue"[9]. Literature, poetry, narrative, theater, and visual arts in medical education [10] help medical students develop diagnostic skills and increase their humanistic attitude [11]. As a consequence, the presence of medical humanities programs in the medical curriculum grew exponentially in the last twenty years [12]. For the 2017–2018 academic year, for example, 94% of medical schools surveyed had required and/or elective courses in medical humanities[10].

Alan Bleakley explains how medicine and humanities are deeply connected, since when medicine grows so happens for democracy. Therefore, the medical humanities can also become "a potentially representative form of governance through the imperative to 'be humane!' problematizing the naïve view that medical humanities are automatically liberating (from the chains of reductive science or the deadening effects of an instrumental clinical practice)" [13]. A medicine defined only by the hard sciences seems to be reductive: medicine, instead, "combines scientific and humanities-based modes of knowledge" [14]. How could a clinician nurture an interest in humanity studying only biology and anatomy [15]?

Despite the increasing numbers of medical humanities-based courses, an unfavorable attitude towards humanities persists in medical students; it is not surprising that such elective courses belong to the so-called hidden cv or informal curriculum of medical education [16]. Medical students are expected to be *in action*: that is, doing surgical procedures, administering drugs, reducing pain; and they are asked to develop a working knowledge by reading statistics, giving numbers about research protocols, and monitoring blood levels. Thus, most of the medical students are not very enthusiastic when asked to take extra courses from the humanities curriculum. Their attitude reflects the dichotomy between hard and soft sciences as well as the profound difficulty to consider the latter as an essential component of their training. Moreover, all medical schools in the USA, and many in Canada, require the Medical College Admission Test (MCAT) scores for regular admission to medical school. The MCAT exam tests' content was found in introductory-level courses at most undergraduate institutions, including biology, general and organic chemistry, and physics, as well as first-semester biochemistry, psychology, and sociology. The MCAT exam has four test sections: Biological and Biochemical Foundations of Living Systems; Chemical and Physical Foundations of Biological Systems; Psychological, Social, and Biological Foundations of Behavior; Critical Analysis and Reasoning Skills [17]. Although the Critical Analysis and Reasoning Skills section includes passages from a variety of humanities and social sciences disciplines, the first three sections are organized around foundational concepts, or "big ideas," in the sciences. They reflect current research about the most effective ways for students to learn and use science, emphasizing deep knowledge of the

[9] National Academies of Sciences, Engineering, and Medicine. The Integration of the Humanities and Arts Sciences, Engineering, and Medicine in Higher Education: Branches from the Same Tree. Washington, DC: The National Academies Press; 2018. In the same report, "Studies on the integration of the arts and humanities with medicine show a positive impact on students. Studies of narrative medicine have demonstrated efficacy in increasing empathy, resilience, and teamwork [63], while the integration of arts observation—including philosophy—into medical training has been shown to improve visual diagnostic skills [10], increase tolerance for ambiguity, and interest in communications skills [53]. Students, who participated in a medical school curriculum at Harvard that incorporated psychosocial and humanistic concepts through problem-based learning, were more likely to pursue primary care and rated themselves higher on a scale rating their preparation to practice humanistic medicine and ability to manage patients with psychosocial problems [60]."

[10] 38 in 147 surveyed medical schools included the topic in either a required or an elective course in the 2017–2018 academic year; see: https://www.aamc.org/data-reports/curriculum-reports/interactive-data/content-documentation-required-courses-and-elective-courses. Accessed 3 Mar 2024.

most important scientific concepts over knowledge simply of many discrete scientific facts. Therefore, the MCAT does not draw many of its examinees from the ranks of humanities majors, who must do significant work in science, in addition to fulfilling the requirements for their major, in order to be prepared for the MCAT and apply to medical school. Even though they were in the minority, the humanities majors taking the test were strong performers relative to majors in other fields [18].

Furthermore, according to the LCME's Premedical Education/Required Coursework, "a medical school encourages potential applicants to the medical education program to acquire a broad undergraduate education that includes the study of the humanities, natural sciences, and social sciences, and confines its specific premedical course requirements to those deemed essential preparation for successful completion of its medical curriculum [19]."

This dichotomy seems to be only apparent, if medicine is defined—in Fauci's words—as "the perfect melding" of both humanities and sciences [20].

What Is Medicine?

The integration of the humanities into medical education is the first step towards the depolarization between hard and soft sciences; yet it is not enough. A systemic change cannot happen without considering first how the practice of medicine is described today.

Today as in the past, medicine has a distinctive feature: it relates to human beings. However, because the sciences play the most influential role in the medical profession, the most "human" aspect of medicine appears to have gone far from the medical field. Unfortunately, it reflects a simplified representation of human nature and, as a consequence, of human health. For instance, the World Health Organization's description of health as "… a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" fails to recognize the multiple dimensions (e.g., spiritual, or moral) of the human beings [21].

Changes in medical interventions that are not focused only on acute illness have led to the definition of Huber et al. [22]: "The ability to adapt and to self-manage in the face of social, physical and emotional challenges." Huber's definition of health is more dynamic, based on the resilience or capacity to cope and maintain and restore one's integrity, equilibrium, and sense of wellbeing. However, it does not yet recognize human health as "interdependent and closely linked to the health of domestic and wild animals, plants, and the wider environment, including ecosystems" [23]. In addition, more consideration needs to be given to the social determinants of health (SDOHs), which encompass nonmedical patient-related factors, such as finances, food quality, housing, transportation, education, living conditions, and social support, and may be associated with 60 to 80% of health outcomes [24, 25]. If, to a large degree, health is shaped by the conditions in which people are born and grow, live, work, and age, what is the role of medicine in addressing their social needs as part of clinical care? What can physicians and other clinicians along with health care organizations do to maximize their influence on SDOHs, particularly when these are so fundamental to improving health [26]?

A core role of the medical profession is preparing the next generation. But how does redesigning medical education help equip physicians for creating a healthier world? It is often said that drawing on the past can help us pave the way for the future. In Rosen's words [27], "our current crisis is just one inflection of a broader debate that goes back much further than our new millennium or even the previous century." In an effort to better approach the problems around today's medicine, our study will consider Galen of Pergamum and his vision of medicine in the second century Roman empire[11], for Galen was a physician passionately committed to advocating for a liberal arts education as necessary for the practice of medicine.

Why choose Galen as a historical example?

"First among doctors and unique among philosophers"
Marcus Aurelius' praise of Galen [28]

Galen was a doctor at the crossroads of two cultures [29][12]. Born in Pergamum in 129 CE, Galen received his first medical training in his native city in Asia Minor, and then continued his studies in Smyrna (i.e., Izmir, Turkey), Corinth (Greece), and Alexandria (Egypt). Later, in his thirties, he settled in Rome, where he practiced medicine integrating Asian and Roman lifestyles. Galen is the perfect example of "a doctor who straddled two cultures" [30]: his success could also be attributed to his extraordinary adaptability and his capacity to differentiate between Greek and Roman patients, conforming his sensitivity to the importance of different cultural backgrounds.

Galen was both doctor and philosopher: to consider either in isolation is to miss their fruitful interaction. Not only did Galen believe that his medical experience and knowledge could contribute something to the philosophical debate, but

[11] For the purpose of the historical example, the present study will limit our view to the Western medical tradition. Nonetheless, the authors are aware that a more comparative study is necessary to consider this issue from a more inclusive and exhaustive perspective.

[12] In this study, the terms 'doctor' and 'physician' are used interchangeably to describe any practitioner of medicine. To reflect upon the meaning of the Greek term 'ἰατρικός', iatrikós, and how it is translated into English as both 'physician' and 'doctor', see Nutton [57]. Also, Means [55].

he also applied the critical approach of philosophy to the medical problems that he faced and to the medical phenomena that he investigated. In its most authentic etymological sense, Galen was someone "who literally 'loves' wisdom, a public intellectual, capable of thinking deeply about a broad range of questions" [31].

Towards the end of his life, Galen wrote three treatises, *My Own Books, My Own Opinions*, and *The Best Physician is also a Philosopher*[13], that, each in its own way, exemplifies his conviction of the supreme importance of philosophy for the practicing doctor. If Galen's philosophical writings were to be listed into modern categories, they would be methodology, logic, philosophy of language, epistemology, and psychology. For Galen, medicine and philosophy were intertwined as part of an exercise that was useful to both. The epistemological similitude between philosophy and medicine is well recognized by Galen more than it would be today.

Galen was a "rare bird" of his time, and he was fully aware of the fact. Like Hippocrates and the members of his school, Galen was among the very few educated practitioners who were intellectually capable of becoming "philosophers" and yet being dedicated to the practice of medicine. Unlike most other practitioners of his day, he also studied philosophy. In Rome, a doctor, and a Greek doctor in particular, could gain great wealth, which often resulted in greed, role power, and corruption. He addressed explicitly such an issue in two treatises: *The Best Physician is Also a Philosopher* and *On the Constitution of the Art of Medicine*. Both texts describe medical education in Galen's times, reflecting his own perspective.

In *The Best Physician*, Galen complains bitterly about the lack of knowledge and low ethical standards in those doctors who were only concerned with enriching themselves. Rosen highlights the three main problems identified by Galen [27]:

> "(1) "doctors pay lip-service to Hippocrates," but are too lazy to actually reach his level of expertise, (2) because they don't follow Hippocrates properly, they lack training in logical theory, and (3) what he calls the "bad upbringing current in our times," which encourages people to value wealth over virtue. For, as he asserts, "it is impossible to pursue financial gain at the same time as training oneself in so great an art [as medicine]; someone who is really enthusiastic about one of these aims will inevitably despise the other."

On the other hand, the best doctor is one who applies different aspects of philosophy. He cultivates logic and science, and practices ethics not only in his profession but also in his private life. Galen continues [27]:

> "(the doctor) will have mastered all the divisions of philosophy: logic, science, and ethics. First the doctor will need logic and should be trained in demonstrative reasoning: it will help him make discoveries about the body, distinguish diseases, and devise appropriate therapies. Secondly, he needs physics, that is the natural philosophy (i.e., 'science'), to provide him with an understanding of the world around him as well as the body's make-up, its elements, mixtures, and uniform parts. Thirdly he needs ethics, not just to be knowledgeable about what goodness and virtue are, but to *be good*. His patients should know that he is devoted to the art and practices it out of benevolence for humankind, not just to make money."

The Thinking Doctor

Galen considered the body as a living universe, responding to changes and actively seeking whatever it needs to exist and to function, a view that was not shared by all ancient physicians. Before Galen, Hippocrates (c. 460–c. 370 BCE) in his *Airs*, *Waters*, *Places*[14] [32] described how illnesses not only vary in relation to season, the patient's environment, and the places s/he lives in, but also in terms of the nature of the patient, gender, and age. Galen added his observation and acute perception of the cultural component to treat patients differently. Therefore, differences in lifestyle were first and foremost at the bottom of the different treatments for his patients.

According to Galen, the doctor would have had to take into account two parameters: their customs and practices. Appealing to the authority of the Hippocratic *Airs*, *Waters*, *and Places*, Galen claimed that the environment affects someone's mental as well as physical state. He was also aware that emotions—e.g., fear, anger, or grief—could negatively affect the body, sometimes even leading to death. Stress can also impact the body, but its effects can be mitigated by appropriate philosophical training. For Galen, education broadly considered is the key to defeat errors; that is, errors originate from false belief, affections, and anything that is not amenable to reason. They are best eliminated by a proper training in logic and in the sort of practical thinking displayed "by architects, geometers, lawyers, and the like" [33]. Rationality plays a part to control affections or emotions, and it also requires a combination of natural talent and education. On

[13] For bibliographical references, beyond the English translation, the Latin title of the Greek texts will be cited in our study (either full title or abbreviation according to OCD and CMG). Respectively, De libris propriis, De propriis placitis and Quod optimus medicus sit quoque philosophus. For a complete bibliography of the Corpus Galenicum, see Corpus Galenicum. Verzeichnis der galenischen und pseudogalenischen Schriften (version 2019/12).

[14] For an interesting biography, see King [52].

the other hand, natural disposition also plays an important part in determining how one behaves. All these aspects need to be considered while practicing medicine [33].

Galen was an exceptional philosopher both for his acquaintance with the history of philosophy—especially the works of Plato and Aristotle—and his intellectual freedom. He used philosophy as a tool to attain clarity, precision, and certainty, qualities that, as both ancient and modern doctors all know, however desirable, are not always achievable in medicine. His philosophical writings provide training doctors with ways of logical thinking that allow them to gain a better understanding and assessment of the immediate medical situation. At the same time, he uses medical knowledge to challenge philosophical theories as well as to suggest new approaches.

The close connection between medicine and philosophy had long been considered before Galen. For example, Erasistratus (c. 304–c. 250 BCE) defined medicine and philosophy as sisters: "one cures the ills of the body, the other of the soul"[15]. In his *Advice about Keeping Well* [34], Plutarch criticized a doctor who refused to have anything to do with philosophical debates. There are inscriptions where doctors are praised not only for their medicine but also for their philosophical writings [35: 525–7, no. 481]. For example, a Roman was remembered by his wife as "a doctor by profession and admired for his philosophical language and behavior" [35: 5223, no. 478].

Galen's desire to integrate medicine into philosophy was not isolated within the ancient Greek and Roman medical tradition. Yet, Galen dedicated a particular attention to the subject, with over relevant 120 titles in *My Own Books*. As Nutton [29] put it, "that, despite his flaws and his self-centeredness, Galen can still withstand the most detailed analysis and criticism and still have something interesting, if not always convincing, to say is a sure testimony to his abilities as a thinking physician".

Galen's Lesson: a (Re)new Vision of Medicine

Not only Galen exhorts his contemporaries to adopt philosophical values in medical education and practice, but he also argues that "if philosophy is necessary for the physician, it is clear that he who is the best physician is also a philosopher" [27: I, 61]. Why, then, did he want to go beyond the distinction between the philosopher and the medical doctor[16] to claim so passionately that the "best" doctor is *ipso facto* a philosopher? Through the new social image of the doctor-philosopher[17], Galen aimed to rehabilitate the medical profession by providing doctors with logic and critical thinking to understand and practice the Hippocratic *Art*.

In the same manner, the integration of the humanities through medical education can educate trainees and physicians to become better observers and interpreters; and build empathy, communication, and teamwork skills, and more. Together with the arts, humanities are essential to the human experience and their benefits to medical education go far beyond joys and pleasures. The humanities can not only support, but also rehabilitate the image of the good doctor.

The historical example of Galen and his vision of medicine testifies a strong interdependence between medicine and philosophy. Philosophy, broadly considered an expression of humanistic knowledge, can help doctors understand the complexity of the patient's experience through the doctor-patient encounter, which is through communication. The doctor, who is also a philosopher, is able to enhance the moment of sharing with the patient. Benefits result in terms of both relational and clinical outcomes. In particular, good communication enhances trust between the speakers, thus fostering a strong therapeutic alliance [36–38].

In conclusion, this article advocates for a new position of the humanities in medical education. Examples from the past could help us envision how to practice and integrate humanistic knowledge in the medical curriculum. Galen's vision of medicine is one within which attention to overall states of the body tends to predominate over localization, and there are intricate accounts of the mutual dependence of "soul" and "body." This dependence explains the intrinsic relation that Galen understands between medicine and philosophy and his model of doctor-philosopher. His philosophy is practical, one that looks for achievable solutions. His medicine conveys elements of sciences and humanities, but also of art, skills, and artisanal craft.

For those readers who are interested in further analyzing the topic, please see: [41–45, 47–49, 62, 65, 68, 69, 71, 72, 74].

If the aim of medicine is still to offer the hope of alleviating suffering, to invoke and influence human change, it needs more than science and technology. In Francis' words [39], "As a profession, medicine is suffused with the language of science and technology, but to practice it effec-

[15] Erasistratus was a famous Greek anatomist and the founder of a school of anatomy in Alexandria. See Nutton [58].

[16] See for example Arist. Sens. 436a-b: "It is further the duty of the natural philosopher to study the first principles of disease and health; for neither health nor disease can be properties of things deprived of life. Hence one may say that most natural philosophers, and those physicians who take a scientific interest in their art, have this in common: the former end by studying medicine, and the latter base their medical theories on the principles of natural science."

[17] Among the several studies about how philosophical and medical strands have been combined in Galen's thought, see Vegetti [67], who captured well the central role that Galen assigned to medicine regarding scientific and moral progress.

tively is a lifetime's work, and it's my experience that no knowledge related to our humanity, however and wherever gleaned, is wasted."

Author Contribution Monica Consolandi: project conception, project design, manuscript drafting and revision, final approval, agreement of accountability; Sara Agnelli: project conception, project design, manuscript drafting and revision, final approval, agreement of accountability.

Data Availability Data availability is not applicable to this article as no new data were created or analysed in this study.

Declarations

Ethics Approval This study does not involve human or animal subjects.

Patient and Public Involvement Statement It was not appropriate or possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.

Competing Interests The authors declare no competing interests.

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