

All roads lead to Rome: Aspects of public health in ancient Rome

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SUMMARY

Modern western civilization can be traced back to the Roman antiquity in terms of policy, legislation, art, and culture. The development of ancient Rome from a kingdom in Latio to a democracy and finally a thriving empire has paved the way for medicine and public health. As a kingdom, Rome has established laws for maternal health and abortion. Later on, as a democracy, Rome paid special attention to sanitation and infections control building aqueducts and public baths. During the imperial period, apart from the aforementioned, Ro-

man administration improved public health measures with regard to pandemics. The correlation of infectious outbreaks with animals, are considered as one of the first noticed of zoonotic diseases in the field of public health. The term public health itself (*medici publici*) can be traced back to doctors appointed with public health and disease control duties in Ancient Rome.

Keywords: Public health, Rome, infections, sanitation, water, epidemic.

INTRODUCTION

Rome was founded around 625 BC in the areas of ancient Italy known as Etruria and Latium. The first period in Roman history is known as the Period of Kings, and it lasted from Rome's founding until 510 BC. This brief period has been marked by considerable military, political and financial advances. Rome entered its Republican Period in 510 BC. This period lasted till 31 BC. Rome expanded and gained a prestigious status in the Mediterranean setting the fundamentals of the imperial period. The imperial period started on 31 BC when Octavian was proclaimed Augustus. The imperial period was ended by the fall of the Western Roman Empire on 476 AD [1]. Public health was a pillar of Rome facing practical

needs such as the sanitary issues of large cities, the response to infectious outbreaks in Roman territory, the sustainment of military might as well as the health of high-ranking officials [2].

PUBLIC HEALTH IN THE KINGDOM OF ROME

Since the 8th century BC the king Numa Pompilius (753-653 BC) issued the regal laws (*leges regiae*) which dictate that a fetus should be removed from the uterus in case the pregnant woman is seriously ill or in case of death during childbirth. Abortion, miscarriage and perinatal death would be investigated for malpractice, with this measure used intensively in times when the roman population was decreased. Roman high society would be more flexible with regard to these laws, so as to ensure that the desired number of heirs would come to life. This stated, abortion, miscarriage or perinatal death could be tolerated in case a family had already one or more healthy heirs to continue its legacy without dividing the family wealth in an extensive manner [3].

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■ PUBLIC HEALTH IN DEMOCRATIC ROME

When the Roman State transitioned from the royal period to the democracy, new laws for the protection of public health were established. In 293 BC cremations were performed outside the borders of Rome. Moreover, new sanctuaries of Asclepius were founded in Tiber Island in order to protect Roman population from possible infections coming from ill people who were displaced outside Roman walls. The State also appointed physicians examining whether hygienic measures needed to be implemented in particular areas of the city. These community doctors were also responsible for the identification and the mitigation of emerging infections. However, the numbers of *medici publici* were significantly increased only in the late Roman imperial period, that is, in the 2nd century AD [1].

Beyond the field of legislation, the Roman administration intervened in the field of public health in other ways as well. The first beneficial invention in terms of public health and the further development of life expectancy were aqueducts. Water was running and even though high-strung families could have it and in their own home it did not exclude the poor to be able to get it from some cistern. At the same time, there was a pervasive thought that connects the state of water with health, as also comes from the writing of water treaties, such as that of Sextus Julius Frontinus (30 AD-104 AD) entitled *De Aquis Urbis Romae*, but more generally by laws, where a penalty for anyone contaminating water sources. Aqua Appia, created in 272 BC, for example, transported water to Rome underground, not only saving money and time, but also preventing water from contamination by hostile forces [4]. Aqua Marcia, built in 144 BC was the first water transfer to the city using bridges (at least in part). Moreover, Agrippa was appointed as a *Curator Aquarum*, (water expert) and built Aqua Virgo in the late 20th century. Agrippa even created more than 700 fountains and 130 public springs. At the end of the first century AD Rome had 9 aqueducts, while 1/3 of the water was reserved for semi-urban areas, farms and gardens, as well as for the privileged class villas. Sewage was also linked to aqueducts with the homes of the rich, but not with those of the poor. A large proportion of the citizens of Rome refused to link their home to the sewers because of a pos-

sible river overflow and consequently contamination of the water. Also due to the fact that there were no traps, there was one constant smell in their homes, as well as a constant fire hazard due to HS (hydrogen sulphide) [4]. However, Romans managed to develop very advanced sewer system named *Cloaca Maxima*, which had already been built during the years of the Tarcinius Superbus in the late 6th Century BC [1].

Public health in imperial Rome

There used to be countless physicians and remedies in ancient Rome, but few pharmacists. One of the first pharmacists mentioned is Antonius Musa, who, as a physician and pharmacist of Emperor Augustus, rescued him from a severe liver disease and this led to his advancement in the equestrian class. But the most important pharmacist of Roman antiquity is Scribonius Largus. In 47 AD he published a medical manual including 271 prescriptions for many diseases while he also used electricity from torpedo fish in order to treat diseases such as headache, gout and prolapsed anus [5, 6].

Largus also considered Dietetics, Pharmacology and Surgery as major aspects of clinical practice in Medicine. In this context, he came on a dispute with the pharmacist Ambrosius who suggested the use of a drug for dissolution of bladder stone. Ambrosius supported the misconception that the therapeutic potential of the drug stemmed from its preparation by a man who would not wear an iron ring and would only use a stone mortar. Largus rejected this practice as superstitious. Note that in this Roman era drugs for psychiatric illnesses included drinking the patient blood from the skulls of gladiators or eating part of their liver, practices that were not approved by Largus as irrelevant to the "*Professio*" of Medicine [7]. It seems that Largus focused on a "professional culture" where the physicians cooperate and support each other thus signaling the transition of Greek Medicine to the Roman world with the availability of medications both in Latin and Greek language. Moreover, he contributed to enriching the ethical basis of Medicine not only as an art, but mainly as a science [8].

Public baths were another concern in urban construction and public hygiene. There used to be more than 900 public baths in Rome, supporting up to three hundred people, while Rome's public

toilets reached two hundred. In this way, the Roman administration tried to restrict its Roman practice of throwing people's droppings out of their balconies and staying on the streets. However, statues of gods would be placed near to public toilets, in the hope of divine protection from diseases' transmission. Moreover, hospitals of the Roman era known *valetudinaria* would provide care to soldiers and slaves, while Roman citizens would be examined and treated by doctors at home. More hospitals were established during the eastern roman (byzantine) imperial era. These hospitals would combine adherence to scientific and hygienic standards of the era with their division into specialized departments such as surgical, obstetrical gynecological and mental diseases [2].

Another aspect of hygiene in Roman era were the several pandemic outbreaks such as the Antonine Plague (165-180 AD) which had a severe impact on the decline and fall of Roman Empire since it killed more than 5.000.000 people and a significant part of the roman army. This pandemic outbreak emerged from the eastern borders of the empire was probably smallpox, anthrax, or measles and its death toll was estimated at about 5 million [9, 10]. Concerning the role of infectious diseases in the decline of Roman Empire and particularly Western Roman Empire (in the region of Latium in 600AD) a long conversation has been raised about the role of malaria, which was endemic there, a major cause of which is the mosquito attacks [11, 12]. Ancient Romans came to connect contact with animals with infectious diseases outbreaks. Nowadays, this speculation has been confirmed, given that more than 60% of infectious outbreaks was caused by pathogens shared with wild or domestic animals [13, 14]. A common example is rabies, whose symptomatology has been described in detail by ancient Greek physicians, who were aware of the zoonotic origin of the disease [15]. The same applies to the Black Death (Great Bubonic Plague in Europe from 1347 to 1670 [16]. Indeed, zoonotic diseases remain a global health concern considering serious disease outbreaks in history such as H1N1 influenza and the severe acute respiratory syndrome (SARS) [17].

Public health lessons from ancient Rome

Nowadays the global SARS-CoV-2 pandemic seems to be of zoonotic origin, with bats and pangolins carrying viral strains closely related to the ones infecting humans [18]. The main public

health lessons from ancient Rome to the modern world can be summarized in one sentence; States need to invest in public health, otherwise public health crises might destroy them. Ancient Rome grew from a minor hegemony to an empire along with the improvement of its public health policies. Public health became part of its citizens daily life or even amusement, taking into consideration the public baths, where people combined socializing with sanitation. Likewise, modern states can re-brand COVID-19 mitigation measures with socializing and amusement, rather than imposing them as restrictions. If physical distancing policies were combined with virtual - live streamed concerts and theatrical plays or simply social media gatherings, the public would be keener to comply with them. Playful activities like the "Iwearingmask" social media challenge could help citizens engage with public health measures introduced by the state. Simultaneously, ancient Rome paid attention to scientific specialization and population health. Modern states can create employment opportunities for public health, water sanitation and environmental sustainability specialists, while making community and occupational medicine more attractive to young doctors with regard to prestige, income and personal and professional development. Finally, yet importantly, given that a large-scale epidemic contributed to the demise of the Western Roman Empire, it is crucial for modern states to pay attention to pandemic preparedness. In the early stages of the COVID-19 pandemic, the cross-border spread of the infection fueled multi-level public health crises affecting not only healthcare, but also the economy and the environment. Recently, the European Union has taken important legislative steps focusing on the timely detection and containment of cross-border health threats. In a globalized world, it is pivotal to create such a framework for every region and country prompting global collaboration and exchange of good practices and feedback.

■ CONCLUSION

Progress in the field of public health has followed the historical path of ancient Rome. The expanding and multicultural roman state provided opportunities as well as challenges for the physicians of the era. In response, physicians and authorities managed to address health at the level of

population and investigate aspects of human health, that are beyond the presence or absence of disease at the individual level. Solid concepts of public health, such as zoonotic diseases and water sanitation have been introduced or enhanced in ancient Rome. Reflecting on that period can provide lessons with an eye on contemporary public health crises.

Conflicts of interest

The authors declare no conflict of financial or other interests as far as the submitted work under the title "All roads lead to Rome: Aspects of public health in Rome" is concerned.

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