Syphilis, Blame, and Stigma Across the Centuries

ANTHROP 4SO3: Term Paper

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Introduction

This research will examine how blame can impact a disease and its presentation over time. This temporal change is exemplified by syphilis, a disease significant in the late 15th century Europe through to contemporary societies. Throughout its course, the blame and stigma associated with syphilis was focused on various groups. This type of research is important as it can provide insight into modern diseases which follow similar trajectories as well as modern experiences giving insight in past ones, and what blame patterning can indicate, rather than assuming guilt.

Certain infectious diseases have persisted throughout human history, permeating social and cultural barriers. Syphilis, caused by the bacteria *Treponema pallidum pallidum*, transformed throughout time from an infectious disease capable of mass casualties and transmission, to one that is treatable and manageable with modern medicine. Syphilis has been widely studied through anthropological works, historical analyses, and osteological remains. I will examine how blame, symptomology, and the severity of syphilis changed throughout its history, and how blame interacts and coevolves with different social and political climates. During the early days of mass infection, syphilis was often nicknamed to implicate political enemies (Crosby, 1968). The Italians termed it the "French disease" while the French named it the "Neapolitan disease" (Crosby, 1968). I will evaluate this relationship using osteological reports and modern assessments of historical records. Syphilis was widespread across the globe and was non-discriminatory in who it affected. Thus, discrimination arises in terms of *who* is stigmatized and blamed for the disease, which reflects cultural, societal, and political pressures.

Background

To fully understand how and why syphilis became a stigmatized disease, we must better understand the disease itself and its origins. Venereal syphilis is a sexually transmitted infection caused by spirochete bacterium with humans as the only natural host (French, 2007). This infection is more likely to spread in times of high mobility, social disruption, and if there is a collapse of medical services (French, 2007). Syphilis is an infection spread through lesion contact (French, 2007), a process mostly associated with sexual transmission (Marra, 2004). This disease progresses through primary, secondary, and tertiary stages (French, 2007). The primary stage of syphilis has an incubation period of two to three weeks and presents as a local infection with associated lesions at the initial site of infection (French, 2007). If left untreated, the lesion will disappear approximately four to five weeks later, however, the individual will remain undiagnosed and contagious (French, 2007). The secondary stage of syphilis occurs four to eight weeks after the primary infection (French, 2007). There are a variety of symptoms in this stage including rash, hepatitis, iritis, nephritis, and neurological problems (French, 2007). Those without treatment in this stage will spontaneously recover within three to six weeks (French, 2007). Primary and secondary stages of syphilis can be concurrent within an individual (Marra, 2004). The tertiary stage, or late syphilis, can occur five to twelve years after initial infection and is associated with neurosyphilis (French 2007). Neurosyphilis is when Treponema pallidum pallidum invades the central nervous system, affecting the brain and spinal cord (Marra, 2004). It is important to note that the syphilis experienced in the modern world today is much less severe than the venereal syphilis experienced in the 15th century (Crosby, 1968). In the past, syphilis often resulted in early death, however, modern medical advances have increased early diagnosis

and survival rates (Crosby, 1968). Now understanding what venereal syphilis is, its origin theories can be examined.

Prior to the end of the 15th century, syphilis was not recorded as being widespread in Europe, however, it may have existed as misdiagnosed leprosy (Baker et al., 1988). The mass onset at the end of the 15th century triggered the recognition of syphilis as a separate disease (Baker et al., 1988). An extremely virulent form of syphilis spread across Europe during the 16th century, likely originating in the Iberian Peninsula (Livingstone, 1991). This timing and origin point prompted the emergence of many persistent explanatory theories. The first theory is the Columbian hypothesis. According to the Columbian hypothesis, Columbus' crew members contracted syphilis in the New World and brought it back to Europe with them (Tampa et al., 2014). These sailors spread syphilis to their sexual contacts, and from there its rapid spread suggests that Europe had not previously been exposed to this particular strain (Baker et al., 1988). This early association with non-Western European groups and beliefs surrounding these groups led syphilis to be a disease that was stigmatized from the outset. Although this narrative circulated widely since the mass outbreak in the 15th century (McAllister, 2000), there are competing theories (Tampa et al., 2014).

The second theory is the Unitarian hypothesis. This hypothesis suggests that treponemal infections have always had a global distribution, and that the venereal and non-venereal variants exist because of climatic differences around the world (Tampa et al., 2014). The evolution of endemic syphilis would have accompanied urbanization due to larger populations, potentially leading to lower levels of sanitation which allowed the microbe to evolve alongside human populations in the New and Old Worlds (Baker et al., 1988).

The final hypothesis is the pre-Columbian hypothesis. This posits that treponemal variants were widespread in both the Old and New Worlds, while in the Old World it was mistaken for leprosy (Tampa et al., 2014). Again, while Columbus and his crew were in the New World, they contracted the venereal form and spread it upon their return to Europe (Tampa et al., 2014). While there are forms of support for all of these theories, none conclusively determine the origins and spread of syphilis and none are unanimously agreed upon. These theories give insight into how certain groups were inherently blamed in the origins of syphilis, and how that lends itself to stigma through time.

Methods

For this research, I undertook a literature review of modern articles from databases that refer to historical records and incorporated paleopathological studies of syphilis. I used the biocultural oriented paleopathology framework to gain a deeper understanding of the social and medical stressors associated with syphilis. By assessing pathology from skeletal remains in conjunction with written records, and modern analysis, I gained insight into how social factors induced pressure on health outcomes. I have narrowed my scope to focus on the Western world (Europe and America), which focused my research on the bulk of the literature. I searched for the incorporation of historical records as well as any associated societal and political factors within the associated time periods. Using this data, I created a logical timeline, grouping century time periods in separate sections and aimed to identify a pattern for syphilis within the discussion section.

Syphilis Across the Centuries

The 15th–16th Century

At the end of the 15th century, Western Europe was exposed to venereal syphilis in an unprecedented way. This was a period of conflict between imperial powers with changing political alliances across the continent. The conflict-ridden era created an environment for this "new" disease to spread, and with it blame.

Wars are situations which can breed disease, and with it blame. Political viewpoints and clashes in the 15th–16th centuries informed social stigmas surrounding syphilis (Baker et al., 1988). During the 16th century, France entered into a conflict against Naples (Baker et al., 1988). Through the course of this conflict, Italian troops noted that some French troops had apparent syphilitic lesions (Sartin & Perry, 1995). Therefore, the French were subsequently blamed for spreading syphilis in Italy (Tampa et al., 2014). Thus, while the Italians called it the French disease, the French referred to it as the Neapolitan disease (Baker et al., 1988). These colloquial terms for the disease were a direct result of the political clash between the two powers. Contrary to this, the English referred to it as the Spanish disease, while the Polish called it the German disease (Crosby, 1968). This pattern was repeated throughout the 15th–16th century and beyond. While political interests played a role in who blamed whom, there were also societal factors at play.

Societal factors of this time were informed by religious viewpoints. At the time, religious rhetoric indicated that those who were afflicted were morally failing, and were being punished by God (Boehrer, 1990). This rhetoric negatively targeted groups who were more likely to be afflicted by the disease including women, who were thought in general to be less moral than men (Boehrer, 1990). Women who depended on sexual contact for their livelihood, were especially

blamed for the disease and being "immoral" (Boehrer, 1990). During this time period, women were rather limited in terms of employment if they were on their own (Penn, 1987), which could have led to many having to engage in sex work to support themselves. Therefore, societal views negatively impacted those who were most at risk for contracting syphilis.

Cemeteries from this time indicate the impacts of syphilis. It is important to note that only skeletons with advanced stages of the disease are identifiable in the archaeological record, as early stages of the disease do not leave marks on the bone (Rothschild & Rothschild, 1997). As such, cases of syphilis regardless of stage may be underreported in the archaeological record and may not represent the full scope of the disease. The Kritny ossuary in the Czech Republic is an example of a site with syphilitic individuals. In this skeletal sample, 15 individuals out of 554 were identified as having tertiary syphilis (Horáčková & Vargová, 2001). This site was associated with the city of Krtiny, a small market town which would have housed peasants and merchants (Horáčková & Vargová, 2001). As such, these people were of a lower socioeconomic status (SES). Poorer groups were frequently seen to be more "immoral" than the upper classes simply due to their SES (Boehrer, 1990). As cited in Horáčková and Vargová, records from this time indicate that the number of syphilis cases were rapidly increasing and spreading throughout the Czech Republic (Horáčková & Vargová, 2001). While individuals with a high SES would not have been immune to syphilis, there is less evidence of them in these town cemeteries. This could be due to a variety of factors like access to both funds and health care. The location and number of lower SES individuals in the osteological record when analyzed in conjunction with historical records suggests that this group of people were likely blamed. The Kritny ossuary is not the only site to show syphilitic individuals from this time period. In a separate paleopathological study, the remains of seven individuals who demonstrated tertiary syphilis

from across northern and southern Poland were assessed for traces of mercury (Kępa et al., 2012). Mercury was used throughout the Middle Ages as a treatment and prevention method for both syphilis and leprosy (Kępa et al., 2012). Two females were identified as having high mercury likely from the contact method of treatment since their concentration was so high (Kępa et al., 2012). In light of the historical records, it is likely that women were at a higher risk of contracting the disease due to their standing in society, especially if they were of lower SES.

During the 15th to 16th centuries, syphilis became more prevalent in Europe. As a "new" disease, it created opportunity for blame and stigma. Political enemies were blamed for the disease through colloquialisms while disadvantaged groups were blamed on the home fronts.

The 17th–18th Century

The 17th through 18th centuries demonstrated a similar patterning of blame as the prior centuries. Blame continued to be thrown at political enemies, demonstrated through changing colloquialisms (McAllister, 2000). At this point in time, the French and Dutch blamed the Spanish; while Italians blamed Neapolitans (McAllister, 2000). As well as the political influence on colloquialisms, there is another feature of blaming the Americas for syphilis. Anti-American prejudice was a prevalent aspect of British society which lead to the continued belief in the Columbian hypothesis as well as general blaming of Americans (McAllister, 2000).

However, despite the view that those with syphilis deserved punishment persisted (Boehrer, 1990), medical recognition of this condition increased. Syphilis came to be widely treated by mercury in the 1600s (Sartin & Perry, 1995). Despite this discovery, mercurial treatment was not necessarily available to those that needed it. Many hospitals in England did not allow venereal disease patients to enter and often refused treatment (Waugh, 1971). This tied into previous centuries' belief that those who suffered from syphilis were to blame and were being

punished. For example, Westminster Hospital refused to admit cases of venereal disease unless the patient paid a substantial fee (Waugh, 1971). In fact, when hospitals admitted syphilis cases, they were likely to receive a negative response from the surrounding neighbourhoods (Waugh, 1971). On the other hand, some hospitals were founded specifically for the treatment of venereal disease (Waugh, 1971). However, it could be argued that this effectively separated syphilis patients from the rest of society, leading to their social isolation and ostracization. Cases of syphilis continued to affect those most vulnerable, such as those who were of low SES or were disadvantaged in society.

The osteological record provides further evidence for this hierarchical disadvantage. The excavation of the historic Viennese Neuer Schottenfriedhof cemetery for the Schotten parish, dated to the mid 18th century, revealed cases of both adult and congenital syphilis (Gaul & Grossschmidt, 2014). The Schotten parish was most frequented by a poor, hardworking lower class (Gaul & Grossschmidt, 2014). Within this excavation, 24 out of 400 burials were determined to have syphilis (Gaul & Grossschmidt, 2014). In this case, those of a lower SES are afflicted by this disease, and as such were likely stigmatized for it. A Czech Republic cemetery, associated with the town of Veselí nad Moravou, from this time demonstrates a similar pattern. Within this excavation, 21 out of 185 individuals demonstrated tertiary syphilis, with almost half of them being congenital (Vargová et al., 2014). This particular site was associated with tradespeople and peasants (Vargová et al., 2014). This again demonstrates that lower SES individuals are being exposed to this disease.

Mercurial treatment is also evidenced in the osteological record of this time. Skeletal remains from a New London Bridge site assessed for mercurial poisoning indicated that four out of seven of the individuals tested demonstrated very high levels of mercury, potentially

indicating medical treatment of syphilis (Tucker, 2007). This site was both close to a hospital which treated syphilis, as well as being in the center of the City of London, an area which may have been populated by members of a poor lower class (Tucker, 2007). The osteological record shows that groups who were disadvantaged in society were majorly afflicted by this unseen enemy and the historical record in line with this suggests that they were likely stigmatized and blamed for it as well.

Throughout the 17th–18th centuries, people continued to blame political enemies. Societal norms also continued to put pressure on lower classes as an at-risk and stigmatized group, as shown through historical records and osteological reports.

The 19th Century

While the old versions of blame and stigma still existed, they were no longer as prevalent as they had been in past centuries. While one might assume that syphilis was no longer as much of an issue as in past centuries, the disease and its surrounding stigma continued. One part of life that was impacted was treatment for the disease itself. Men were primarily treated for syphilis while the women that they may have infected, frequently their wives, were never informed of their potential condition (Harsin, 1989). This lack of information extended into pregnancies which were not carried to term, and if the child was carried to term the wife was secretly treated with mercury (Harsin, 1989). Doctors' goals during this time were to assist the men, while keeping their potential brides or wives in the dark (Harsin, 1989). In this way, syphilis was still clearly stigmatized as a disease that people did not want anyone to know they had it, as the affliction was seen as unclean. Women were left unaware, and as such were disproportionately afflicted. The old associations underscored the new practice of keeping those afflicted blissfully unaware.

While these women were afflicted, other disenfranchised sects of populations were also impacted. These sects were those who were disadvantaged and of a low SES. Foundling homes were greatly impacted by syphilis and blamed for it as they were likely to house syphilitic children. In Italian societies, there was a high rate of infant abandonment out of fears of syphilis (Kertzer, 1999). Infants who presented with apparent signs of congenital syphilis were left at foundling homes (Kertzer, 1999). Due to both fears and symptomology, these children would be left at foundling homes (Kertzer, 1999). These homes were overwhelmed often with sick children and consequently, had a high infant mortality rate (Kertzer, 1999). In an effort to combat this mortality rate, wet nurses were brought in to assist in feeding the children (Kertzer, 1999). At this time, it was not known that this disease could transmit via breastfeeding, therefore, wet nurses would be infected by the children and would then spread it to their own families (Kertzer, 1999). Both the foundlings and wet nurses were disadvantaged within society, due to associated SES. Those who are disadvantaged in society are again stigmatized for their standing and as such are more vulnerable to the disease. Therefore, there is a feedback loop of class into vulnerability and stigmatization.

There is also osteological evidence of congenital cases. A case study in 2015 analyzed a syphilitic child aged 8 – 10 years old from the 19th century (Ioannou et al., 2015). Not only did this child present with syphilis, but also tuberculosis symptomology on the skeleton (Ioannou et al., 2015). The indicators of syphilis which this child presented were that of dental lesions (Ioannou et al., 2015). Not only did the child have syphilitic dental lesions, but their dental indicators have the potential to be the result of mercurial treatment as well (Ioannou et al., 2015). The St. Mary's cemetery where the child was recovered was provided by the government and used by paupers as they were unable to afford a proper burial (Ioannou et al., 2015). Due to the

records of this time and the associated low SES area this child was buried in, it is likely that they faced stigma for their condition and SES.

The 19th century was a period which continued to be influenced by previous thought patterns, with blame and stigma still applied to vulnerable populations. The main idea remains that those members of society who are of a low SES are victims of blame.

The 20th–21st Century

In this century, political factors fed into societal views. Political conflicts again informed societal blame. As discussed above, in previous centuries women were deemed to be less moral, and were blamed and stigmatized for syphilis. This viewpoint resurfaced during the World Wars (Brandt, 1988). Concern about venereal disease in armed forces came to light when the WWI American draft had a rate of 13% infected with venereal disease (Brandt, 1988). Militaries then instituted large anti-venereal disease campaigns (Brandt, 1988). Red-light districts, as areas of sex work, were seen to be health risks because of venereal disease, and those who worked within them were targeted by public health campaigns (Brandt, 1988). For example, propaganda was focused on the "unclean" women who worked in these districts (Brandt, 1988). On top of this, large groups of women were quarantined during the war to prevent the spread of syphilis (Brandt, 1988). Similar measures and attitudes toward disenfranchised women were instituted during the second World War (Brandt, 1988). Women and individuals from lower SES groups may have had a higher chance of coming into contact with syphilis due to limited employment opportunities and its ramifications during this time. In this case, political conflicts informed public health measures which were used to isolate a disadvantaged group.

In America, African Americans were often the target of blame as well. Historically, this group was not afforded the same rights as white Americans and they faced ostracism and

discrimination (Nightingale, 2006). Due to this, they also faced stigma for syphilis during this time. It was believed that syphilis was experienced differently by non-white communities (Corbie-Smith, 1999). To investigate this, the Tuskegee study came into fruition (Corbie-Smith, 1999). This study took 400 infected African American sharecroppers and studied the course of the disease (Brandt, 1978). These men were not informed of the severity of their condition and were not provided treatment, despite the promise of treatment and increasing availability of penicillin for syphilis treatment in the 1950s (Brandt, 1978). By the time the study was terminated, 100 men had died as a direct result of syphilis (Corbie-Smith, 1999). This study was built on foundations of stigmatization and presumed racial differences; unjust societal viewpoints dictated that these men should receive no treatment and allowed the study to continue.

The emergence of HIV/AIDS at the end of the 20th century demonstrated more societal stigmas and in-built prejudice. While HIV/AIDS is non-discriminatory in the populations that can be infected, a disproportionate number of homosexual men were impacted by the disease (Brant, 1988). An already marginalized and oppressed group of individuals faced further societal onslaught. Numerous individuals who had an HIV/AIDS diagnosis had a comorbid syphilis diagnosis; the co-occurrence of the two diseases has important implications (Yang et al., 2010). It is believed that primary syphilis may enhance acquisition and transmission of HIV (Yang et al., 2010). Among homosexual and bisexual men, a history of syphilis has been found to be more frequent in people who were HIV-seropositive (Nelson et al., 1991). This puts an already vulnerable group at a higher risk. Those who are experiencing syphilis are already stigmatized as being "unclean" and are at a higher risk of contracting another stigmatized sexually transmitted infection. Also, men who identified as homosexual and were intravenous (IV) drug users had a higher chance of having a history of both HIV and syphilis (Nelson et al., 1991). This is another

group who is disadvantaged and stigmatized within modern society due to the IV drug use and the factor of their sexuality. The 20th century saw the continuation of those who were disadvantaged within society blamed for syphilis and HIV/AIDS and were stigmatized as a result.

As we move into the 21st century, concerns around syphilis have dissipated. However, there is still cause for concern. Syphilis remains a common affliction worldwide (French, 2007). In fact, there are over 12 million new cases of syphilis a year (Yang et al., 2010). While blame may no longer be attached to certain groups, there is an inherent underlying stigma associated with syphilis and its common mode of transmission. In contemporary society, blame and stigma remain due to the disease's history. Western society is more accepting, however, there are still factions within these systems that prevent full acceptance of individuals who deviate from heteronormality. Consequently, the LGBTQIA2+ community continues to be burdened with blame for syphilis and numerous other sexually transmitted infections.

Discussion

Syphilis is an infectious disease which, like many others, has a history of blame and stigma attached to it. Throughout the centuries, this blame and stigma has shifted in relation to both political and societal views. Over time, the societal pressures outweighed the political in terms of who was blamed for the disease. Disadvantaged and vulnerable populations were often the victims of blame. This pattern of blame is not an isolated event. As we have seen with syphilis, the most vulnerable members of a population are likely to be blamed for societal challenges. The osteological record in conjunction with historical records sheds some potential light on syphilis stigmatization in that high numbers of syphilis cases were uncovered in cemeteries in lower SES areas (Figure 1). This demonstrated that those of low SES may have

been more prone to suffering from this disease and could have likely faced social stigma, as indicated by historical records discussed above. During the HIV/AIDS crisis, marginalized groups immediately faced blame and were ostracized from society. This same pattern of blame may be applied to understand the experience of those who lived with syphilis in past societies, given what the historical records show of the past and what modern accounts of HIV/AIDS indicate.

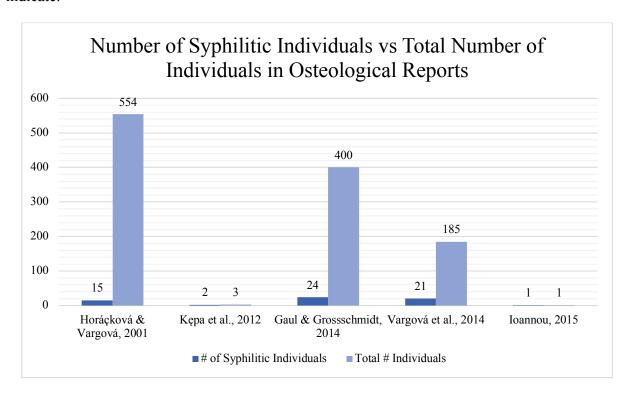


Figure 1: A graph indicating the number of syphilis cases from osteological reports throughout time. The first two rows represent the $15^{th} - 16^{th}$ century, the third and fourth depict the $17^{th} - 18^{th}$ centuries, and the fifth column shows the case study from the 19^{th} century.

Conclusion

Syphilis is a disease which has evolved over time in both its symptomology and blame framework. During the 15th–16th centuries, political enemies and "immoral" individuals were the subjects of blame. In the 17th–18th centuries, there was still some political influence, however, more blame was placed on populations of lower SES. In the 19th century, there was no longer a

political affiliation with blame, but those who were disadvantaged within society, such as foundlings, were burdened with the effects of syphilis and its associated stigma. In the 20th century, political interests informed societal pressures on blame—women and other disadvantaged members of society were disproportionately blamed and stigmatized for the spread of syphilis. During the 21st century, syphilis loses focus. However, those individuals who are already disadvantaged in society tend to be the chosen host for blame, such as homosexual men. Moving forward, the blame and stigma patterning of syphilis can be applied to understand more prevalent diseases of today such as HIV/AIDS, to gain a deeper understanding of why these groups might have an elevated risk for contracting the disease and dealing with associated blame. Throughout the centuries, as demonstrated through historical records and high numbers of syphilitic remains in low SES areas, those who are likely to have suffered stigma and blame for disease are those who are disadvantaged within society.

References

- Baker, B.J., Armelagos, G.T., Becker, M.J., Brothwell, D., Drusini, A., Clabeaux Geise, M., ... & Saunders, S.R. (1988). The origin and antiquity of syphilis: Paleopathological diagnosis and interpretation. *Current Anthropology*, 29(5), 703–737.
- Brandt, A.M. (1978). Racism and research: The case of the Tuskegee syphilis study. *The Hastings Center Report*, 8(6), 21–29.
- Brandt, A.M. (1988). The syphilis epidemic and its relation to AIDS. *Science*, 239(4838), 375 380.
- Boehrer, B.T. (1990). Early modern syphilis. *Journal of the History of Sexuality*, 1(2), 197–214.
- Corbie-Smith, G. (1999). The continuing legacy of the Tuskegee syphilis study: Considerations for clinical investigation. *The American Journal of the Medical Sciences*, 317(1), 5–8.
- Crosby, A.W. (1968). The early history of syphilis: A reappraisal. *American Anthropologist*, 71, 218–227.
- French, P. (2007). Syphilis. BMJ: British Medical Journal, 334(7585), 143–147.
- Gaul, J.S., & Grossschmidt, K. (2014). A probable case of congenital syphilis from 18th century Vienna. *International Journal of Paleopathology*, 6, 34–43.
- Harsin, J. (1989). Syphilis, wives, and physicians: Medical ethics and the family in late nineteenth-century France. *French Historical Studies*, 16(1), 72–95.
- Horáčková, L., & Vargová, L. (2001). Inflammatory changes in the osteological remains from the Krtiny ossuary (Czech Republic). *Anthropologie*, *39*(1), 57–62.
- Ioannou, S., Henneberg, M., Henneberg, R.J., & Anson, T. (2015). Diagnosis of mercurial teeth in a possible case of congenital syphilis and tuberculosis in a 19th century child skeleton. *Journal of Anthropology*, 1–11.
- Kępa, M., Koztowski, T., Szostek, K., Drozd, A., Walas, S., Mrowiec, H., ... & Grupa, M. (2012). Analysis of mercury levels in historical bone material from syphilitic subjects pilot studies (short report). *Anthropologischer Anzeiger*, 69(3), 367–377.
- Kertzer, D. (1999). Syphilis, foundlings, and wetnurses in nineteenth-century Italy. *Journal of Social History*, *32*(3), 589–602.
- Livingstone, F. (1991). On the origin of syphilis: An alternative hypothesis. *Current Anthropology*, 32(5), 587–590.
- Marra, C.M. (2004). Neurosyphilis. Current Neurology and Neuroscience Reports, 4, 435–440.

- McAllister, M.E. (2000). Stories of the origin of syphilis in eighteenth-century England: Science, myth, and prejudice. *Eighteenth-Century Life*, *24*, 22–44.
- Nelson, K.E., Vlahov, D., Cohn, S., Odunmbaku, M., Lindsay, A., Anthony, J.C., & Hook, E.W. (1991). Sexually transmitted diseases in a population of intravenous drug users: Association with seropositivity to the human immunodeficiency virus (HIV). *The Journal of Infectious Diseases*, *164*(3), 457–463.
- Nightingale, C.H. (2006). The transnational contexts of early twentieth-century American urban segregation. *Journal of Social History*, *39*(3), 667–702.
- Penn, S.A.C. (1987). Female wage-earners in the late fourteenth-century England. *The Agricultural History Review*, 35(1), 1–14.
- Rothschild, B.M., & Rothschild, C. (1997). Congenital syphilis in the archaeological record: Diagnostic insensitivity of osseous lesions. *International Journal of Osteoarchaeology*, 7, 39–42.
- Sartin, J.S., & Perry, H.O. (1995). From mercury to malaria to penicillin: The history of the treatment of syphilis at the Mayo Clinic 1916–1955. *Journal of the American Academy of Dermatology*, 32(2), 255–261.
- Tampa, M., Sarbu, I., Matei, C., Benea, V., & Georgescu, S.R. (2014). Brief history of syphilis. *Journal of Medicine and Life*, 7(1), 4–10.
- Tucker, F. (2007). Kill or cure? The osteological evidence of the mercury treatment of syphilis in 17th to 19th-century London. *London Archaeologist*, 220–224.
- Vargová, L., Horáčkova, L., Vymazalová, K., & Svoboda, J. (2014). Inflammatory changes on skeletons from the 16th to 17th century in Veselí nad Moravou, Czech Republic. *Journal of Paleopathology, 24*, 39–49.
- Waugh, M.A. (1971). Attitudes of hospitals in London to venereal disease in the 18th and 19th centuries. *British Journal of Venereal Diseases*, 47, 146–150.
- Yang, C., Lee, N., Lin, Y., Lee, H., Ko, W., Liao, C., ... & Hung, C. (2010). Jarisch-Herxheimer reaction after penicillin therapy among patients with syphilis in the era of the HIV infection epidemic: Incidence and risk factors. *Clinical Infectious Diseases*, *51*(8), 976–979.