Cribra Orbitalia, Porotic Hyperostosis, Linear Enamel Hypoplasia, and Sinusitis in three diachronic urban sites from the Dutch province of Zeeland (1030-1800 CE)

Maia Casna & Sarah A. Schrader, Faculty of Archaeology, Leiden University

THE URBAN SEA

In the 11th century, the Dutch province of Zeeland witnessed the emergence of its earliest cities. These urban centers, strategically positioned along international maritime routes, flourished as vital trade hubs (Brusse & Henderikx 2012). However, while prior bioarchaeological studies observed a correlation between Dutch urbanization and declining health (e.g., Casna et al. 2023; Schats 2022), these analyses primarily centered on inland environments, potentially diverging from the urbanization dynamics along coastal epicenters. To fill this gap, this study investigates the health implications of urbanization on 246 adult individuals from maritime urban sites spanning the early-medieval (1030-1200 CE), late-medieval (1300-1590 CE), and post-medieval (1600-1800 CE) periods, shedding light on the unique challenges faced by Dutch coastal communities during these transformative times.

MATERIALS AND METHODS

The urban populations of Aardenburg (early-medieval) and Vlissingen Oude Markt and Scheldekwartier (late-medieval and post-medieval, respectively) (Figure 1) were selected as their well-understood historical context allowed for a contextualized diachronic bioarchaeological investigation. A total of 246 individuals was analysed for the purpose of this study. For every individual included in the final samples we assessed the presence/absence of cribra orbitalia (CO), porotic hyperostosis (PH), linear enamel hypoplasia (LEH) and chronic maxillary sinusitis (CMS). All lesions were analyzed macroscopically and according to established scoring methods (see Casna & Schrader 2022 for further information on the scoring of each lesion).

RESULTS

- Statistically significant increase in prevalence rates of PH ($\chi^2=8.369$, $p=0.015$) and CMS ($\chi^2=8.069$, $p=0.018$) over time.
- Significantly increase of PH, LEH, and CMS prevalence rates between the early-medieval and post-medieval periods (Figure 2).

DISCUSSION AND CONCLUSION

Our results align with prior observations from other studies on Dutch urbanization suggesting that the transition from the medieval to the post-medieval period exerted a more pronounced influence on people’s well-being compared to the shift from the early-medieval to the late-medieval era (e.g., Casna et al., 2023; Schats, 2016). Factors such as air pollution, overcrowding, and overall lack of housing facilities and infrastructure likely gained prominence during the 18th century, therefore leading to an increase in prevalence rates of non-specific stress indicators and CMS in post-medieval Vlissingen (Wintle 2000). Moreover, the surge in maritime activities associated with the colonization of the Americas and the systematic introduction of intoxicants such as tobacco and sugar in the 17th century may have also significantly impacted public health (Brusse & Henderikx 2012). To conclude, this study bears significant implications for the historical understanding of the urbanization phenomenon, both in Zeeland and in the Netherlands. Additional research is warranted into the prevalence of non-specific stress markers in relation to urban development.

Figure 1. Map of Zeeland showing the location of the sites under study: ▲ Aardenburg, early-medieval (n=103); ■ Vlissingen Oude Markt, late-medieval (n=52) and Vlissingen Scheldekwartier, post-medieval (n=91).

Figure 2. Prevalence of CO, PH, LEH, and CMS for all samples under study.

SCAN QR CODE FOR BIBLIOGRAPHY
We are thankful to Joost van den Berg and Enisa Saric (Erfgoed Zeeland) for kindly granting us permission to research. We also thank the Leiden University Medical Center (LUMC) for providing the loan of a medical endoscope. Thank you Bo van de Vaart for helping with poster design.

This work was supported by the Dutch Research Council (NWO) [project number: PGW.21.008].