CHAPTER 2
GENERATING HCW CONTACT NETWORKS

In this chapter we introduce a graph representation of spatial information about the University of Iowa Hospitals and Clinics (UIHC) – a 3.2 million square foot facility with 700 beds and about 8000 healthcare workers – and a set of over 19.8 million de-identified healthcare worker activity logs, based on login records for an electronic medical records (EMR) system. Using these data we introduce a comprehensive method for constructing a healthcare worker (HCW) contact networks that serve as proxies for contact patterns between HCWs. Analysis of the constructed contact networks reveals that despite spatial and job-related constraints on healthcare worker movement and interactions, there is a surprising structural similarity between the healthcare contact networks we generate and social networks that arise in other settings (e.g., movie or scientific collaborations, on-line friendships, etc.).

2.1 Constructing HCW Contact Networks

The biggest obstacle to using contact networks in epidemiology is the absence of reliable data from which to infer contact networks that make epidemiological sense. There is now considerable research on the structure of online social networks (see for example, [4, 73, 56]) and on how information travels through these networks [57]. But such online social networks are not always epidemiologically relevant, as they are not based on physical contact, and may be structurally very different from networks induced by spatial proximity.