

example, T could be the 4 week period starting on 2006-09-03 and ending on 2006-09-30. Let V^T denote the set of users who have logged into the EMR system at least once during time window T . Fix parameters $d \geq 0$ and $t \geq 0$. Each healthcare worker $u \in V^T$ has a set L_u of login sessions, where each login session $I \in L_u$ is defined by its *start time* $s(I)$, its *end time* $e(I)$, and its location or *placement* $p(I)$. Two healthcare workers $u, v \in V^T$ are connected by an edge if for some login sessions $I \in L_u$ and $I' \in L_v$, the distance in the hospital graph between $p(I)$ and $p(I')$ is at most d hops and the time interval $[s(I)-t, e(I)+t]$ intersects the time interval $[s(I'), e(I')]$. In other words, u and v are connected by an edge if their login sessions occur within t time units of each other and within d hops of each other in the hospital graph. The edge $\{u, v\}$ is assigned an edge-weight $w(u, v)$ that is the number of distinct login sessions I and I' that satisfy the above conditions. Thus $w(u, v)$ represents the number of distinct contacts between u and v , within the specified time window T , as indicated by their login records. Varying the values of d and t allows us to consider alternate notions of when a contact occurs. Specifically, as d and t increase, we essentially “loosen” the definition of a contact, thus producing denser contact graphs. The d and t values for which we have constructed various *healthcare worker contact networks* – a *HCW contact network*, in short – are given in Figure 2.7). For our discussion we focus use the names **sparse_i**, **moderate_i**, and **dense_i** to denote the HCW contact networks with parameters $(d = 1, t = 0, T = i)$, $(d = 3, t = 15, T = i)$, and $(d = 5, t = 30, T = i)$ respectively. Example subgraphs for the *sparse₁*, *moderate₁*, and *dense₁* graphs are given in Figure 2.8.