Computers	People	average person degree	average computer degree
4,861	6,875	14.13 (± std. dev. 25.832)	9.99 (± std. dev. 12.562)

Figure 2.9: These statistics show that the computers-people graph is relatively sparse However, both person-degrees and computer-degrees show a large standard deviation raising the possibility of a few heavily used computers and a few highly mobile healthcare workers.

2.2 Computers-People Graph

An alternate graph-theoretic view that explicitly shows the interactions between healthcare workers and computers is the *computers-people graph* (see Figure 2.9 and Figure 2.10). The computers-people graph is a bipartite graph where one part consists of healthcare workers and the other consists of computers. Roughly speaking, an edge is placed between a healthcare worker and a computer if the computer was used by that individual during a particular time window based on the EMR login data. More precisely, fix a time window T and let U^T be the set of computers which had at least one login during time period T, and V^T be the set of healthcare workers that logged into the EMR system at least once during time period T. Each computer $u \in U^T$ and each user $v \in V^T$ is connected by an edge $\{u, v\}$ if v has logged into u at least once during time period T. The edge $\{u, v\}$ is assigned an edge-weight $w(u, v)$ equal to the number of times v has logged into u during time window T.

The computers-people graph encodes a variety of useful information. For example, the degree of each healthcare worker in this graph captures the "login-heterogeneity" patterns of a healthcare worker's access the EMR. In Chapter 4 we evaluate a vaccination policy in which healthcare workers with highest degree in the