CASE: Mountain View Community Hospital

After completing a course in database management, you have been hired as a summer intern by Mountain View Community Hospital. Your first assignment is to work as part of a team of three people to develop a high-level E-R diagram for the hospital. You conduct interviews with a number of administrators and staff to identify the key entity types for the hospital. As a result, your team has identified the following entity types:

- Patient - a person who is either admitted to the hospital or is registered as an outpatient. Each patient has an identifier, the medical record number (MRN), and a name.
- Physician - a member of the hospital medical staff who may admit patients to the hospital and who may administer medical treatments. Each physician has a physician ID (identifier) and name.
- Bed - a hospital bed that may be assigned to a patient who is admitted to the hospital. Each bed has a bed number (identifier), and a room number.
- Nurse - Each nurse has an employee number (identifier) and name.
- Diagnosis - a patient's medical condition diagnosed by a physician. Each diagnosis has a diagnosis ID/code and diagnosis name. Mountain View Community Hospital is using the HIPAA-mandated ICD-9-CM Volume 1 diagnosis codes for patient conditions (e.g., 00.50, STAPH FOOD POISONING, 173.3, BASAL CELL CARCINOMA, 200.2, MALIGNANT MELANOMA, BURKITT'S TYPE, or 776.5. CONGENITAL ANEMIA).
- Treatment - any test or procedure ordered by and/ or performed by a physician for a patient. Each treatment has a treatment ID/treatment code and treatment name using standard codes. HIPAA-mandated ICD-9-CM Volume 3 Procedure Codes are used for diagnostic and therapeutic procedures (e.g., 03.31, SPINAL TAP, 14.3, REPAIR OF RETINAL TEAR, 87.44, ROUTINE CHEST X-RAY, or 90.5, MICROSCOPIC EXAMINATION OF BLOOD).
- Order - any order issued by a physician for treatment such as diagnostic tests (radiology, laboratory) and therapeutic procedures (physical therapy, diet orders), or drugs and devices (prescriptions). Each order has an order ID, order date, and order time.

The team next recorded the following information concerning relationships:

- A patient may be referred to the hospital by exactly one physician. A physician may refer any number of patients or may not refer any patients.
- A patient must be admitted to the hospital by exactly one physician. A physician may admit any number of patients or may not admit any patients.
- Prior to a patient being seen by a physician, a nurse typically obtains and records relevant information about the patient. This includes the patient's weight, blood pressure, pulse, and temperature. The nurse who assesses the vital signs also records the date and time. Finally, the reasons for the visit and any symptoms the patient describes are recorded.
- A given patient may or may not be assigned to a bed (since some patients are outpatients). Occupancy rates are seldom at 100 percent, so a bed may or may not be assigned to a patient.
- Physicians diagnose any number of conditions affecting a patient, and a diagnosis may apply to many patients. The hospital records the following information: date and time of diagnosis, diagnosis code, and description.
- A physician may perform an order for a patient or may not perform any order to the patient. The order may have any number of treatments for the patient. For each treatment rendered, the hospital records the following information: treatment date, treatment time, and result. A treatment may be performed on any number of patients.