

Table 3

Database Modeling Minimum Construct Set

Modeling Constructs	Justification
Strong and weak entities	Strong and weak entities are the most basic types and therefore necessary. They represent independent data (e.g., Patients) and dependent data (e.g., Encounter and Medication pairings), respectively.
Attributes: primary keys, foreign keys, basic types, and decorations	The data are stored in attributes that must be modeled. Decorations delineate attribute types such as composite, multivalued, derived, and key. Data integrity relies on concepts such as primary and foreign key definitions.
Relationships	Associations between entities.
<ul style="list-style-type: none">• Unary, binary, and n-ary	Unary relationships are those between an entity and itself, for example, patient and spouse (both patients). Binary relationships, connecting two entities, are the most common, for example, Patients and Encounters. In some situations, three or more entities participate in a relationship (e.g., Encounters, Procedures, and Providers).
<ul style="list-style-type: none">• Minimum and maximum cardinalities	Cardinality is the specification of the minimum and maximum number of tuples in a relationship—a crucial data integrity control. For example, an encounter is for exactly one ($min = max = 1$) patient. If more than one patient or no patient were allowed in an encounter, for instance, then to whom would the bill be sent?