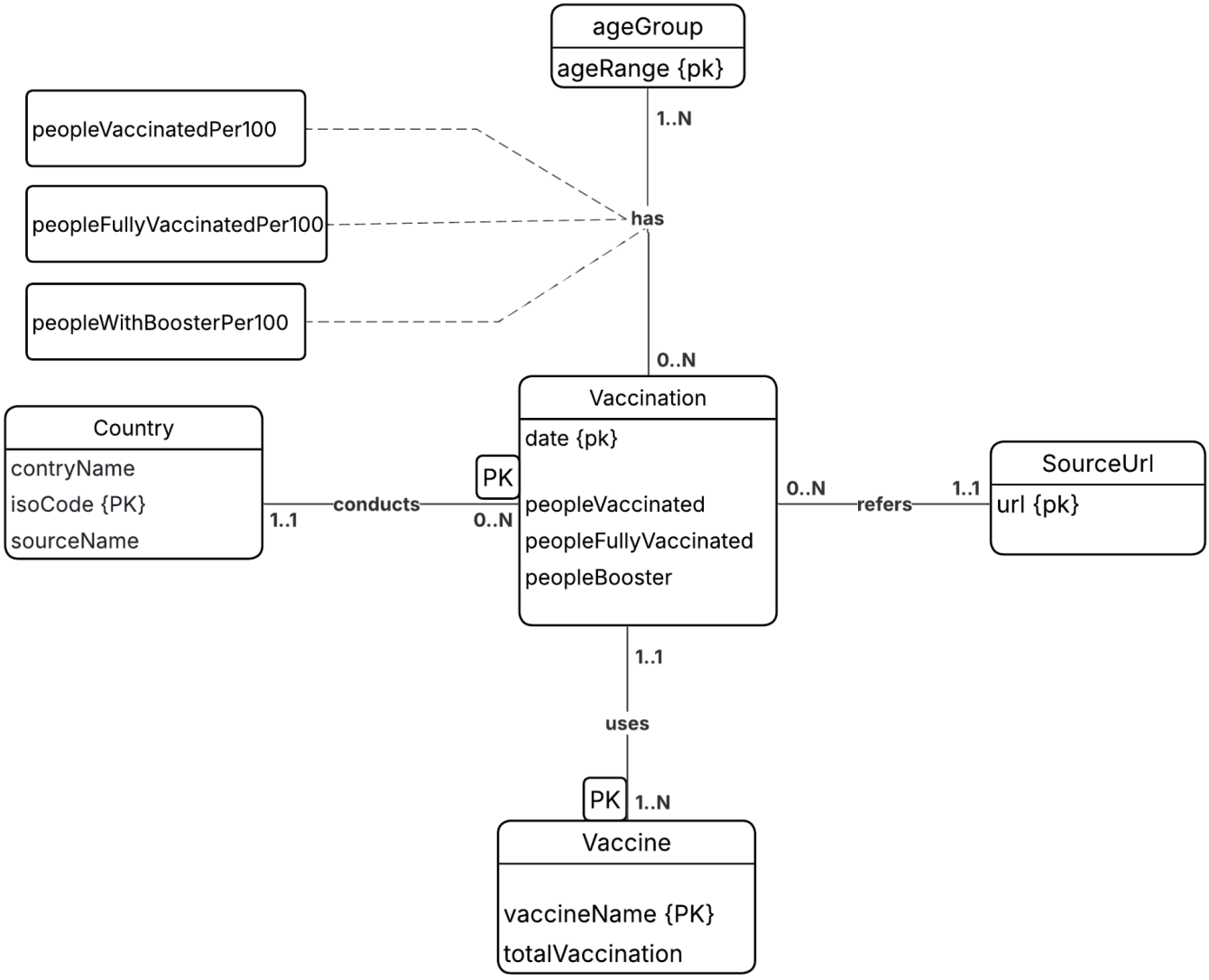
Design ER diagram



Mapping ER diagram

1. Map Strong Entities
    - Country (isoCode , countryName, sourceName)
    - AgeGroup (ageRange)
    - SourceUrl (url)
2. Map Weak Entities
    - Vaccination (isoCode*, date, peopleVaccinated, peopleFullyVaccinated, peopleBooster)
    - Vaccine (isoCode*, date*, vaccine , totalVaccination)
3. Map 1:1 Relationships
   No action needed (there is no 1:1 relationship)
4. Map 1:N Relationships
   No action need for vaccine table (it's already done in step 2)
    - Vaccination (isoCode*, date, peopleVaccinated, peopleFullyVaccinated, peopleBooster, url*)
5. Map M:N Relationships
    - VaccineAgeGroup (isoCode*, date*, ageRange*, peopleVaccinatedPer100, peopleFullyVaccinatedPer100, peopleWithBoosterPer100)
6. Multi-valued Attributes
   No action need
7. Map higher-degree relationships
   No action need

Final schema

- Country (isoCode , countryName, sourceName)
- AgeGroup (ageRange)
- SourceUrl (url)
- Vaccination (isoCode*, date, peopleVaccinated, peopleFullyVaccinated, peopleBooster, url*)
- VaccineAgeGroup (isoCode*, date*, ageRange*, peopleVaccinatedPer100, peopleFullyVaccinatedPer100, peopleWithBoosterPer100)
- Vaccine (isoCode*, date*, vaccine , totalVaccination)

Normalization

Functional Dependencies

1. isoCode → countryName , sourceName
2. isoCode , date → peopleVaccinated , peopleFullyVaccinated, peopleBooster, url
3. isoCode , date , ageRange → peopleVaccinatedPer100, peopleFullyVaccinatedPer100, peopleWithBoosterPer100
4. isoCode , date , vaccine → totalVaccination (for each vaccine)

Based on the final schema and the functional dependencies analyzed and provided above, each attribute in every relation is considered a single-valued attribute. Therefore, the schema satisfies 1NF.

Moreover, since every composite primary key in each relation has full functional dependency, it also satisfies 2NF.

In addition, there is no transitive dependency in any relation, meaning the schema also satisfies 3NF.

Therefore, this schema is already in Third Normal Form (3NF) and does not require further normalization.