Artificial Keys

- Father id
- Pregnancy id
- Appointment id
- Medical test id
- Baby id

Assumptions

- Healthcare Institutions have overlap and covering constraints – each entity of the superclass must either be community clinic or a birthing center.
- If a couple already had a pregnancy in the past, they cannot reattend other information sessions (only for new members).
- In the Pregnancy entity set, "birthplace decided" is a Boolean representing whether the birthplace has been decided (initially false). If set to true and there is no relationship between the pregnancy and birthing center, then the location of birth is home.
- Medical tests and notes are only made in an appointment – we cannot test someone without appointment.

Restrictions

- By additional assumption (m), a couple should attend at least one information session before they are assigned a midwife. I did not put a participation constraint on the mother – info session relationship since couples are invited to information sessions after registration. The "registered" and "attended" attributes on the relationship are Booleans representing whether the couple has registered / attended or not a session, respectively. Attended should not be set to true if registered is false.
- The "continue" attribute inside mother is a Boolean representing whether a couple wants to continue with the program or not. It should be set to false until the couple attends at least one information session and can be set to true then if the couple wants to continue with the program.
- If "continue" is set to false, then we do not need any more information. Otherwise, the restrictions below apply.
- In the Pregnancy entity set, we cannot have "birthplace decided" set to false and a "birth at" relationship with birthing center – if we have not decided where the babies will be born, this relationship doesn't make sense. Birthplace decided must be set to true before giving birth.
- A midwife must be assigned to the pregnancy via the "assisted by" relationship before setting any appointments – this represents the main midwife assigned for the pregnancy.
- The test in the "ultrasound test" pregnancy – medical test relationship should be a dating ultrasound test – this represents the dating ultrasound test used as an expectation on the due date (stored inside "result"). It should be set during one of the initial appointments (there should be at least one appointment).
- If a mother is not assigned to a father initially, a father entity should be created and mapped to the mother at some point to register the blood father type (other values except id key are set to null).

- There should be at least one pregnancy – baby relationship before giving birth, and "number babies" inside pregnancy should be equal to the number of such relationships.
- A midwife must be assigned to the pregnancy via the "backup by" relationship midway through the pregnancy – this represents the backup midwife assigned for the pregnancy.
- The "main midwife" attribute inside the appointment entity is a Boolean representing whether the test was conducted by the main midwife (true if it is the case, false if it was conducted by the backup midwife). We cannot set this to false if no backup midwife has been set up for the pregnancy at the time of the appointment.
- The medical test relationship with technician should be set when test result is ready.

Relational Translation

- HealthcareInstitution(email, name, phonenumber, address, website)
- CommunityClinic(email), **email** foreign key referencing **HealthcareInstitution**
- BirthingCenter(email), **email** foreign key referencing **HealthcareInstitution**
- Midwife(pid, name, email, phonenumber, works), **works** foreign key referencing relation **HealthcareInstitution**
- Baby(id, name, gender, blood, birthdate, birthtime, of), **of** foreign key referencing relation **Pregnancy**
- Pregnancy(id, number, finalduedate, initialduedate, birthplacedecided, numberbabies, expectedbirthtimeframe, lastperiod, of, assistedby, backupby, birthat, ultrasoundtest), **of** foreign key referencing relation **Mother**, **assistedby** foreign key referencing relation **Midwife**, **backupby** foreign key referencing relation **Midwife**, **birthat** foreign key referencing relation **BirthingCenter, ultrasoundtest** foreign key referencing relation **MedicalTest**
- Appointment(id, time, date, mainmidwife, of), **of** foreign key referencing relation **Pregnancy**
- MedicalTest(id, type, dateprescribed, datesampletaken, datelabworkdone, result, of, by), **of** foreign key referencing relation **Appointment**, **by** foreign key referencing relation **Technician**
- Technician(id, name, phonenumber)
- Note(appointmentid, date, time, content), **appointmentid** foreign key referencing relation **Appointment**
- Mother(hcardid, name, email, blood, phonenumber, profession, address, dateofbirth, continue, partnerwith), **partnerwith** foreign key referencing relation **Father**
- Father(id, name, email, hcardid, dateofbirth, blood, phonenumber, profession, address, partnerwith), **partnerwith** foreign key referencing relation **Mother**
- InfoSession(midwifeid, date, time, language), **midwifeid** foreign key referencing relation **Midwife**
- SessionInvites(midwifeid, date, time, motherid, registered, attended), **(midwifeid, date, time)** foreign key referencing relation **InfoSession**, **motherid** foreign key referencing relation **Mother**

We cannot combine more relations without introducing redundancy, since we have already combined all which had a key constraint.

The ER participation constraint for **Mother** to **Pregnancy** is not captured in the relational model.