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ASSIGNMENT 1

Storyboard for Chronic Hypertension Monitoring

Use Case

A healthcare system that continuously checks a patient's blood pressure using a wearable device. Whenever the blood pressure goes above a set limit, the system sends a notification to the patient's doctor.

Actors

1. **Patient** — Wears a device that measures blood pressure, heart rate (pulse), and oxygen level.
2. **Physician** — Receives the patient's blood pressure updates and changes the treatment plan in the EHR (electronic health record) when needed.
3. **Remote BP monitoring system** — Collects and keeps the patient's readings and watches their blood pressure all the time.
4. **EHR** — Stores the patient's medical records and records any changes in medicines or care.

Scenario

Anshul, a 50-year-old man with a history of high blood pressure, joins his clinic's remote blood pressure monitoring program. He uses a smartwatch that sends his blood pressure readings to the provider's system. The system uses FHIR standards to exchange the data.

Workflow

Anshul has a family history of high blood pressure and heart problems. He goes for regular check-ups and gets his blood pressure measured often. At a visit, the doctor notices his

readings are a bit higher than the safe range and asks him to keep a closer watch. Worried because his father died from unnoticed high blood pressure, Anshul agrees to change some habits and signs up for the clinic's remote monitoring service. He gets a wearable device that is registered in the program. The device takes his blood pressure three times a day and sends the readings to the healthcare system. The system keeps checking the readings, and if a value goes over the set limit, it sends an alert to the clinician. The clinician looks at the alert and, if treatment is needed, updates Anshul's care plan and medicines. The program helps Anshul manage his high blood pressure proactively. With near real-time monitoring he can spot trends and changes early and tell his doctor before things get worse. It also helps him make better lifestyle choices and stay updated on his health. In addition, the collected data can help healthcare teams find patterns that improve public health programs.

FHIR Resources Used

1. **Patient** — Represents the person receiving care (Anshul). It holds identity details like name, date of birth, and gender and links the patient to other records in the provider's system.
2. **Device** — Describes the smartwatch that measures blood pressure; it records and sends the device measurements.
3. **Observation** — Stores the blood pressure measurements taken by the smartwatch and allows looking at readings over time.
4. **RiskAssessment** — Estimates the patient's chance of a serious high-blood-pressure event (hypertensive crisis) based on trends and family history.
5. **Communication** — Used to send alerts to the clinician when blood pressure readings go beyond safe limits so the clinician can respond quickly.
6. **CarePlan** — Manages the patient's treatment plan for hypertension, including lifestyle steps, medicines, and follow-up visits, using past readings and family history.
7. **MedicationRequest** — Records when the clinician prescribes blood-pressure medicine and the dosage instructions.
8. **Practitioner** — Represents the treating doctor and includes their name, contact details, and professional qualifications (degrees or certifications).
9. **Goal** — States the patient's target for blood pressure control, including the desired systolic and diastolic values (see explanation below).

Attributes and profiling

1. **Patient** — Include `id`, `name`, `gender` (restricted to `male`, `female`, or `other`), and `birthDate`. Set `name`, `birthDate`, and `gender` to appear exactly once (`1..1`) [means the field must be present exactly one time].
2. **Device** — Include `id`, `type` (limited to a value set for blood pressure devices), a reference to the `patient`, and `status` (must be `active` or `inactive`).

3. **Observation** — Set `valueQuantity` units to `mmHg` [millimeters of mercury, the common unit for blood pressure].
4. **RiskAssessment** — Include `id`, the `subject` reference, and `condition` (limited to hypertension-related conditions). Include `prediction` [a likelihood estimate] derived from trends in the blood pressure readings.
5. **Communication** — Include `id`, set `status` to `completed`, and limit `category` to `emergency` or `alert`.

6. **CarePlan** — Include `id` and `activity` elements for items such as medicines or lifestyle interventions.
7. **MedicationRequest** — Limit `status` to `active` or `completed` and restrict medication choices to hypertension-related drugs.
8. **Practitioner** — Require `name`, `id`, and `qualifications` (professional degrees or certifications).
9. **Goal** — Include `id` and `subject`; ensure the `target` specifies both **systolic** and **diastolic** blood pressure values.

    - **Systolic** (pressure when the heart pumps) [brief: top number that shows pressure during a heartbeat].

    - **Diastolic** (pressure when the heart relaxes) [brief: bottom number that shows pressure between heartbeats].

Reference — HAPI FHIR resource documentation: https://hapifhir.io/hapi-fhir/docs/
