Synthea™
Synthetic Patient Generation

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High Demand for EHR Datasets

Non-clinical or secondary uses including:
software development, testing, clinical training where realistic data is required
Restrictions

*Real patient records carry privacy, confidentiality, consent, policy, and legal restrictions*
Privacy Risks

_Deidentified and anonymized records have been successfully reidentified_
Synthetic Patient Generation
Realistic Health Data
No Cost, No Restrictions
Modules are written in **JSON**

```
"Infection": {
  "type": "ConditionOnset",
  "target_encounter": "Pediatrician",
  "codes": [ { "system": "SNOMED-CT", "code": "65363002", "display": "Otitis media" } ],
  "direct_transition": "Pediatrician"
},
"Pediatrician": {
  "type": "Encounter",
  "encounter_class": "ambulatory",
  "codes": [ { "system": "SNOMED-CT", "code": "183492007", "display": "Non-urgent pediatric admission" } ],
  "distributed_transition": [
    { "distribution": 0.6, "transition": "Antibiotic" },
    { "distribution": 0.4, "transition": "Painkiller" }
  ]
}
```
Synthea Module Builder UI
https://synthetichealth.github.io/module-builder/

Examplitis
State Type: ConditionOnset

Enter value

Target Encounter: Wellness_Encounter
Add Assign to Attribute

Codes
- remove
- System: SNOMED-CT
- Code: 123
- Display: Examplitis

Transition Type: Direct
Transition To: Wellness_Encounter

Diagram:
- Initial
- Age_Guard
- Guard
- Allow if age > 40 years
- 10%
- Pre_Examplitis
- Delay
- 0 - 10 years
- Examplitis
- ConditionOnset
- SNOMED-CT[123]: Examplitis
- Diagnose at Wellness_Encounter
- Wellness_Encounter
- Encounter
- Wait for regularly scheduled wellness encounter
Control States control the flow through the state machine.

- **Age_Guard**
  - Guard: Allow if age $\geq 18$ years

- **Initialize_Chemo_Counter**
  - Set Attribute: Set 'cr_chemo_count' = '0'

- **Count_A_Chemo_Treatment**
  - Counter: increment value of attribute 'cr_chemo_count' by 1
Clinical States drive the progression of disease and care

**Emphysema_Symptom1**

**Symptom**: Shortness of Breath: 70 - 100

**Medication Order**
- **RxNorm[308192]**: Amoxicillin 500 MG Oral Tablet
- **Assign to Attribute**: 'antibiotic_prescription'

**Chest CT Scan**
- **Procedure**: SNOMED-CT[418891003]: Computed tomography of chest and abdomen
- **Perform at Diagnosis Encounter II**
- **Reason**: Suspected Lung Cancer
- **Duration**: 20 - 60 minutes

**Record_HA1C**
- **Observation**: Record value from Vital Sign 'Blood Glucose' in %
- **LOINC[4548-4]**: Hemoglobin A1c/Hemoglobin total in Blood Category: laboratory

**Diabetic_CarePlan**
- **SNOMED-CT[99360004]**: Diabetes self management plan
- **Reason**: diabetes stage
- **Activities**:
  - SNOMED-CT[16067007]: Diabetic diet
  - SNOMED-CT[22906009]: Exercise therapy
- **Goals**:
  - Observation "LOINC [4548-4] Hemoglobin A1c total in Blood" ≤ 7.0
  - Maintain blood pressure below 140/90 mmHg
  - Improve and maintenance of optimal foot health
  - Address patient knowledge deficit on diabetic self-care
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