Description of a Synthetic, High-Fidelity, Emergency Department Patient Dataset

The dataset contains temporally static and dynamic patient-level data for 54 emergency department patients.

The entirety of the simulation runs over a period of 500 minutes (8:20 hrs) with timestamp information always expressed in units of decimal minutes of simulation time. Therefore, times of “500” indicate end-points of durations that would exist until the end of the simulation. Note that there is no “absolute” time for minute 0, so the simulation could be started at any time of day.

Also worth noting is that the last four patients (#’s 51–54) are ED boarders, and therefore their data can look a bit different than the others. Patients #51 and 52 are the only two patients who have been in the ED since before the simulation began (indicated by negative timestamp values).

For details regarding how this information was used in our study and how it populated our screen designs, please see the following publications:


Below are descriptions of each table column. Note that not every patient has a value for every field/column.

A  Patient Number
   Arbitrarily assigned

B & C  Patient Names
   Each name was chosen randomly out of a Buffalo, NY phonebook. First names and last names were chosen independently of one another.

D  Age

E  Sex

F  Medical Record Number
   Arbitrarily chosen

G  Initial Complaint
   Assigned at triage time

H  Triage Comment
   Triaging clinician’s comment

I  Bed Assignment

J  Pod
   Beds are assigned to certain “pods”, or sub-wards, within the ED

K  Initial ESI (Emergency Severity Index) Score
   Assigned at triage time

L – Y  Initial Vitals
   Heart Rate, Systolic BP, Diastolic BP, Temperature, O2 saturation, Respiration Rate, Pain and accompanying Alerts. Includes the values of vitals taken at triage time, including pain on a subjective 1–10 scale. An Alert value of “1” indicates abnormal results that should be displayed more saliently in the interface. Alerts were assigned subjectively by the subject matter experts and were not calculated according to any algorithm.
Z & AA  Second ESI Score and Time

The time at which a second ESI is assigned to the patient and its value

AB – AP  Second set of Vitals, Alerts, and Time

See L – Y. Also contains the time at which the second set of vitals values come into effect, replacing the previous patient’s set as the new “current” set of vitals (if any new vitals values are missing, the old values are to be retained).

AQ – BE  Third set of Vitals, Alerts, and Time

See L – Y and AB – AP

BF & BG  Waiting Room Bump Alert Time and Description

If a patient in the waiting room worsened or their condition somehow updated in a relevant manner, the display showed them in an extra-salient—or “bumped”—status; these are the reasons for that heightened status and the time at which the “bump” occurred.

The dataset contains information on a variety of order types: Consults, Labs, Advanced Imaging (e.g. CT), X-rays, ED Procedures (e.g. EKG), Medications, and Transports (e.g. from the ED to X-ray or CT for imaging and back). A patient could have any combination of the above order types, and there could be more than one order of a given type for a given patient—for example someone could have three labs, two medications, and no X-rays.

Each order is composed of multiple constituent “events”. For example, Consults are first 1) “Requested”, then 2) “In Progress”, and finally 3) “Complete” at three unique times. Each of the events, or “stages”, in an order has both a timestamp and (usually) an accompanying description. Additionally, “Results” events will have a “flag” value that if equal to “1” indicates abnormal results that should be displayed more saliently in the interface (identical in nature to the Vitals “flag”, see L – Y).

BH – BM  Consult Order

“Requested” time and department; “In Progress” time and description; “Completed” time and description

BN – CG  Lab Orders 1, 2, 3, and 4

“Order” time and description; “Result” time, description, and flag
**CH – CM**  **Advanced Imaging Order**

“Order” time and description; “Posted” time; “Results” time, description, and flag

**CN – CT**  **X-ray Order**

“Order” time and description; “Posted” time and description; “Results” time, description, and flag

**CU – DI**  **ED Procedure Orders 1, 2, and 3**

“Order” time and description; “Results” time, description, and flag

**DJ – DY**  **Medication Orders 1, 2, 3, and 4**

“Order” time and description; “Complete” time and description

**DZ - EE**  **Transport Orders 1 & 2**

Time at which patient left the ED; Destination; Time at which patient returned to the ED

**EF - EG**  **Name Alerts**

If multiple patients have similar names (e.g. share last names), a “Name Alert” would appear near their name on the display between the start and end times

**EH**  **Acuity State**

Values of “1” indicate high-acuity patients (simply all patients with ESI scores of 1 or 2)

**EI & EJ**  **Non-medical Alert**

Start time and description for non-medical alerts (e.g. combative or flight risk)

**EK – EO**  **MD (Attending) Assigned and Note**

Clinician’s name, the time they were assigned to the patient, and the start and end times of a “note” or “comment” text that would appear in the interface, as if entered by that clinician specifically
Patients passed through a series of five “phases” throughout their ED stay: 1) In Waiting Room, 2) In a Bed/Needs to See MD, 3) Evaluation/Treatment, 4) Orders Complete/Needs Assessment, and 5) Disposition Complete. Patients would move sequentially through the phases, but could repeatedly loop between phases 3 and 4 if their assessment, after orders had resulted, warranted further evaluations and/or treatments.

Hyphens represent divisions between phases, underscores represent sub-phases. For example, FE (“1-2”) represents the time at which patients were taken back to an ED bed from the Waiting Room and FJ (“4_2-3_3”) represents the time at which patients entered their third Evaluation/Treatment phase from their second Orders Complete/Needs Assessment phase.

Note that not all patients went through all six rounds of phases 3 and 4. For phases that were “skipped”, their duration was zero. So for example, patient #1 (Nora Skrobacz) went straight through the phases with no looping (indicated by the repeated values of 221.07 from columns FH through FR), while patient #7 (Douglas Darling) went through three iterations of phases 3 and 4.

FD (“0-1”) is the time at which patients entered the Waiting Room (and therefore the system/simulation). Again, times of 5000 indicate that the patient would never leave that stage for the remaining duration of the simulation (see top of document).
**FR**  Admission Destination

If admitted (see FT), where the patient is heading upon disposition

**FS**  Diagnosis

The condition the patient ultimately ended up having

**FT – FV**  Previous ED Visits

Dates of up to three previous ED visits

**FW – GP**  Patient Comments

General (non-clinician-specific) comment field for patient. “Time” columns list the times at which the associated “Comment” field should be populated. Subsequent values are intended to override previous ones. For example, Nora Skrobacz’ comment field is blank until minute 126 when it becomes “CBC, BMP, LFT, UA/Upreg ordered. Morphine, Zofran, IVF ordered”. At minute 195, that string should be overridden to display “labs done”, and from minute 221 until discharge (or, more generically, the end of the simulation) it should read “DC”.

--DL, 1/23/2017