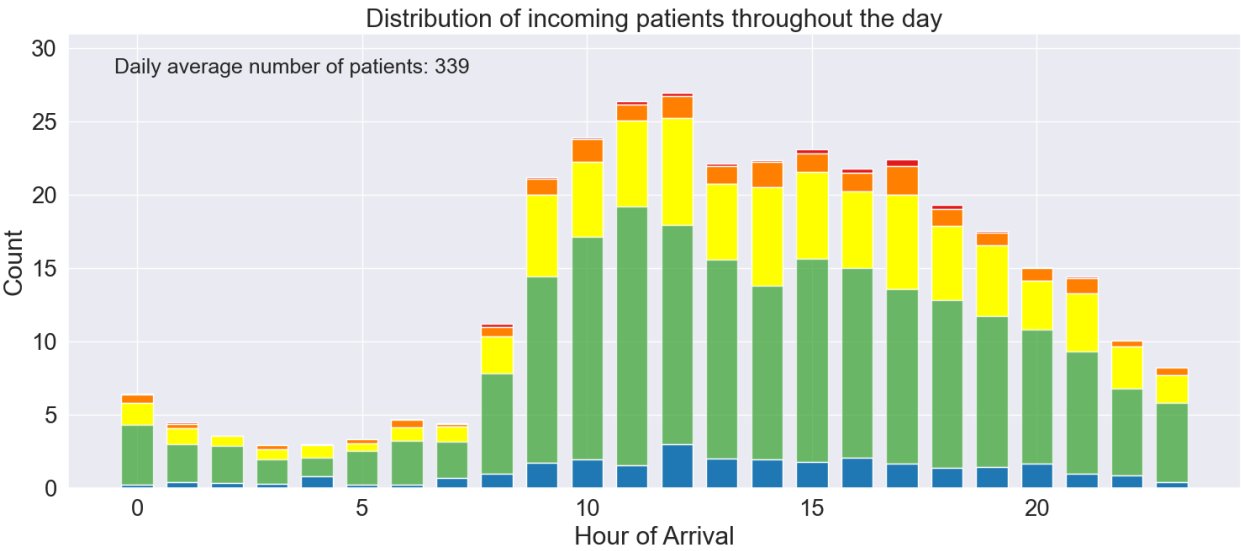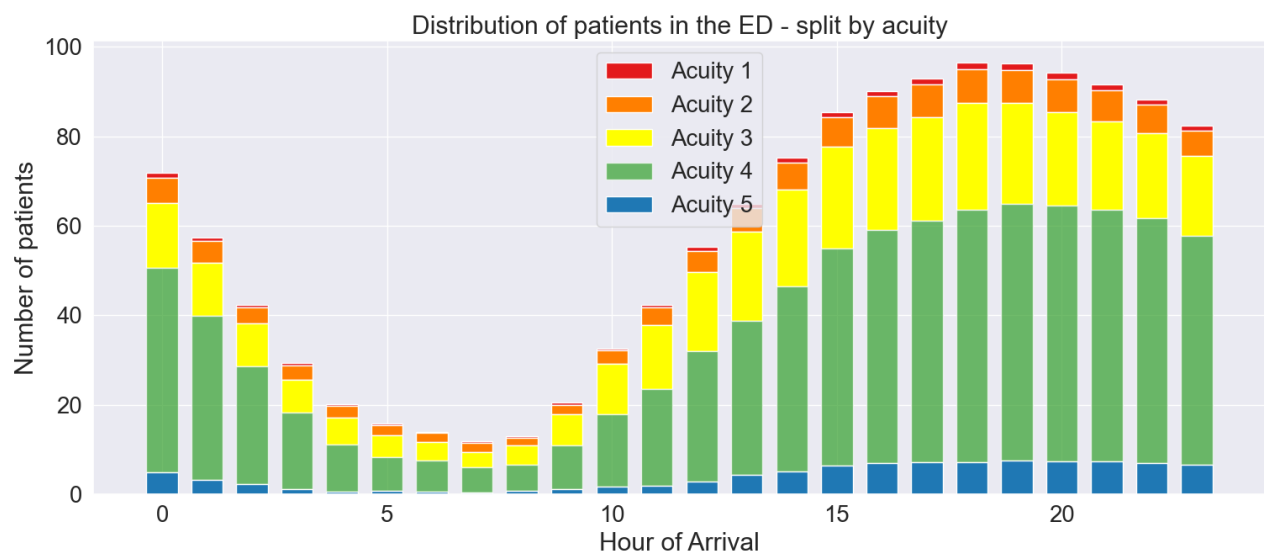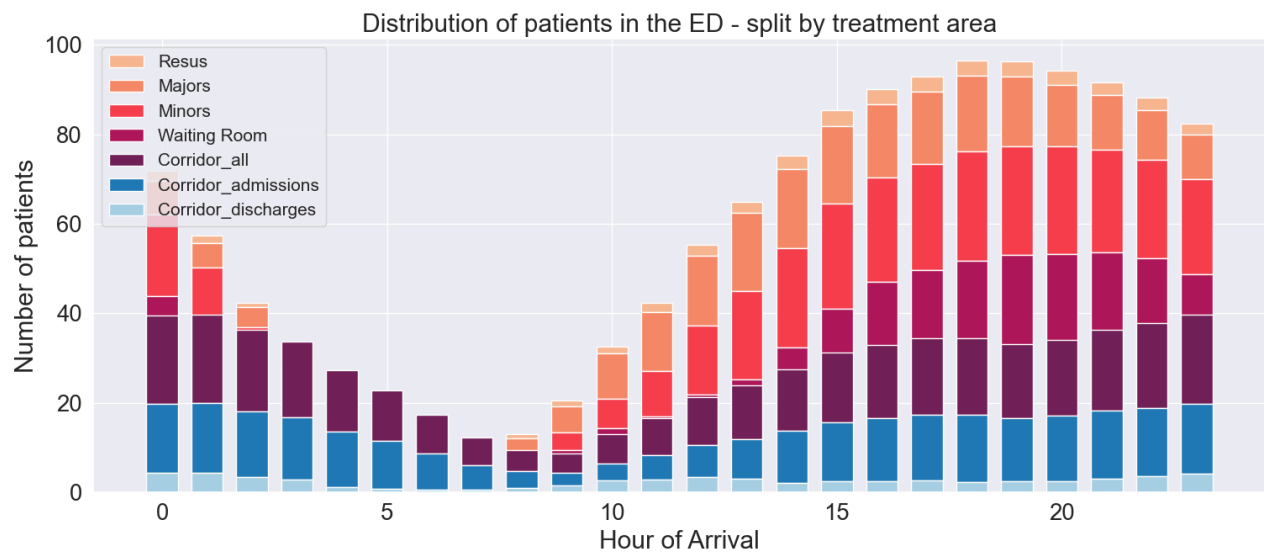# Emergency Department Simulator

Setup
Type of ED: Custom
Daily Attendance = 335 patients
Number of doctors = 16 doctors
Number of sdec_doctors = 10 sdec_doctors
Number of rat_doctors = 2 rat_doctors
Number of nt_doctors = 2 nt_doctors
Resus cubicles = 5 cubicles
SDEC cubicles = 10 cubicles
Majors cubicles = 26 cubicles
Minors cubicles = 25 cubicles
Waiting room capacity = 40 seats
Days to run simulation = 14.0 days

Number of incoming patients / patients in the ED and distribution throughout the day
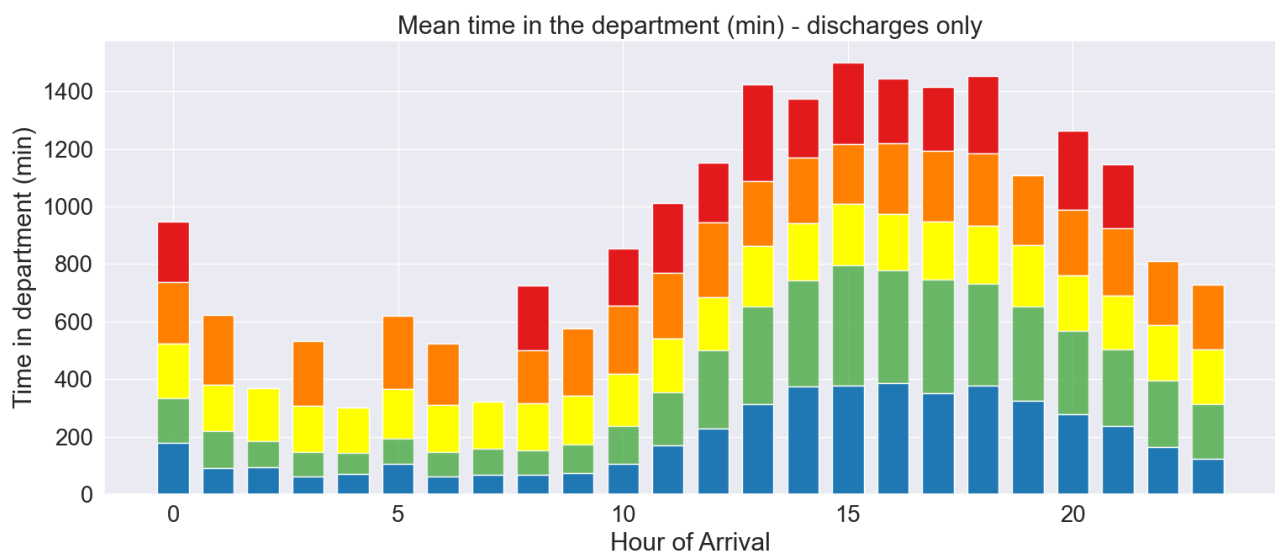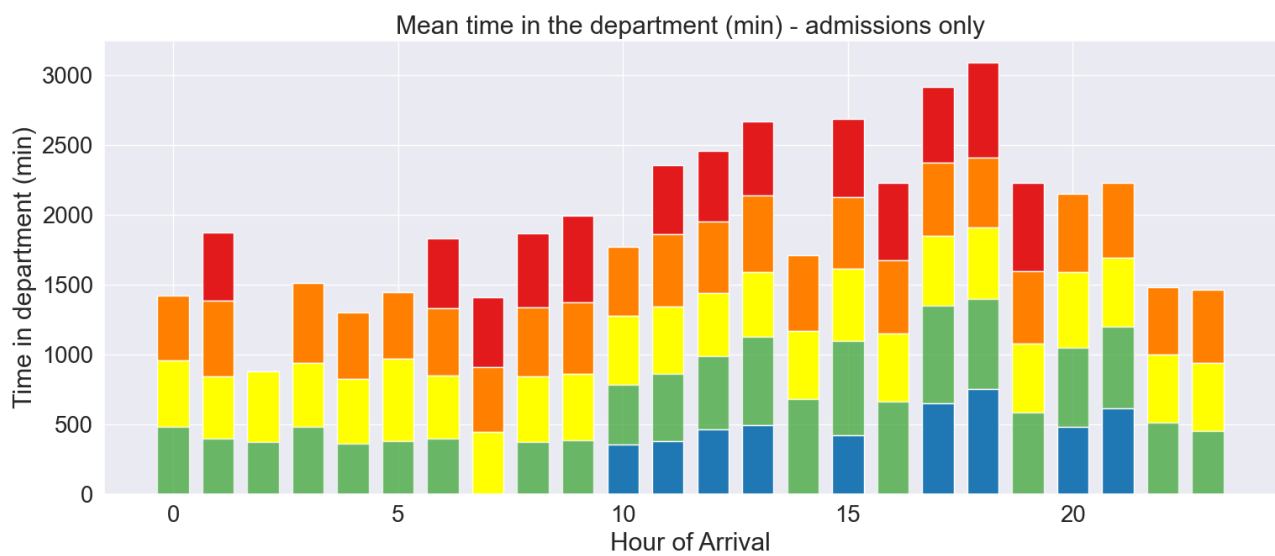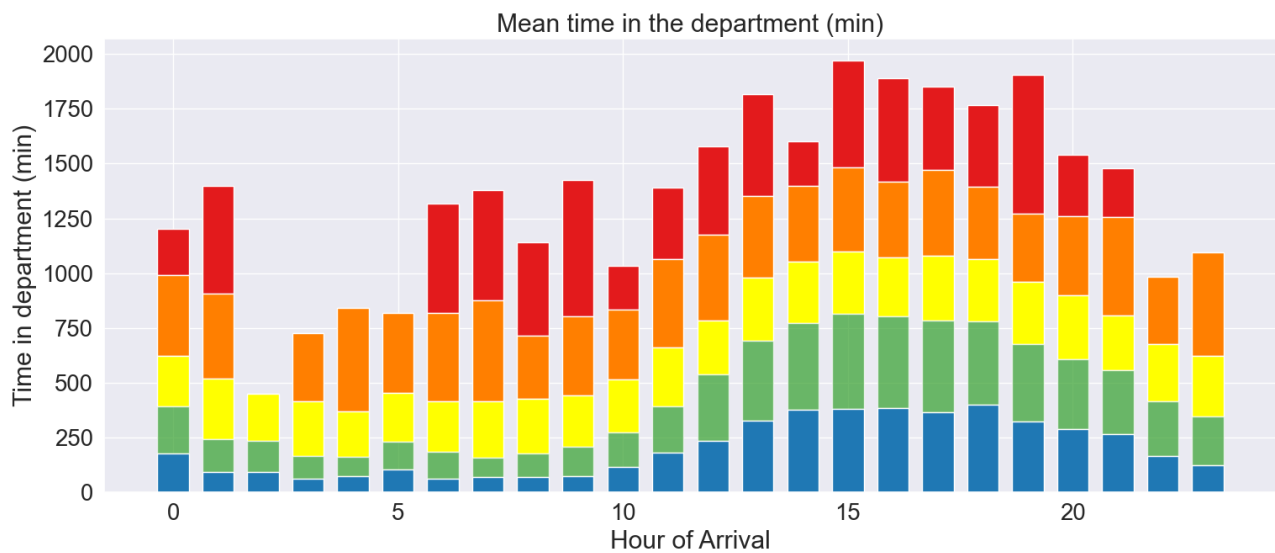
	Acuity 1	Acuity 2	Acuity 3	Acuity 4	Acuity 5
Percentage	0.88%	5.5%	24.65%	60.68%	8.29%
Daily number	3	18	83	203	28

Distribution of incoming patients throughout the day

Daily average number of patients: 339

Distribution of patients in the ED - split by treatment area

Distribution of patients in the ED - split by acuity

Main metrics regarding time spent in the department depending on acuity

	Acuity 1	Acuity 2	Acuity 3	Acuity 4	Acuity 5
Mean time ± std	402±164	367±152	266±142	284±183	243±166
Longest time	691	745	756	1065	778
Time to see doctor - mean ± std	36±46	29±42	33±43	153±127	152±124
Mean number left / day	0	0	0	7	1

Mean time in the department (min)

Mean time in the department (min) - admissions only

Mean time in the department (min) - discharges only
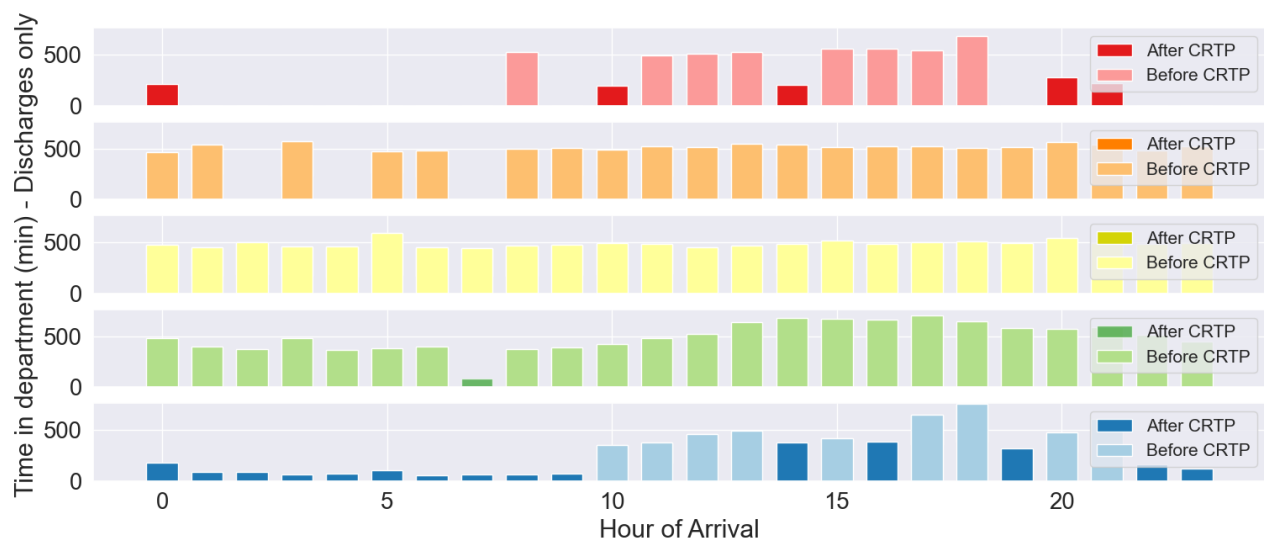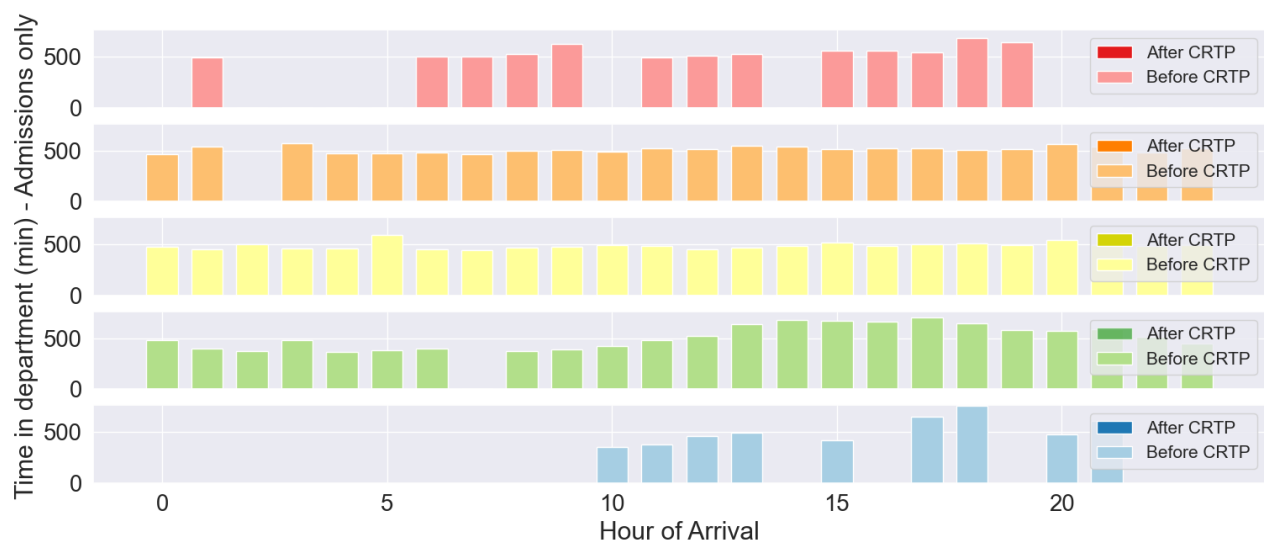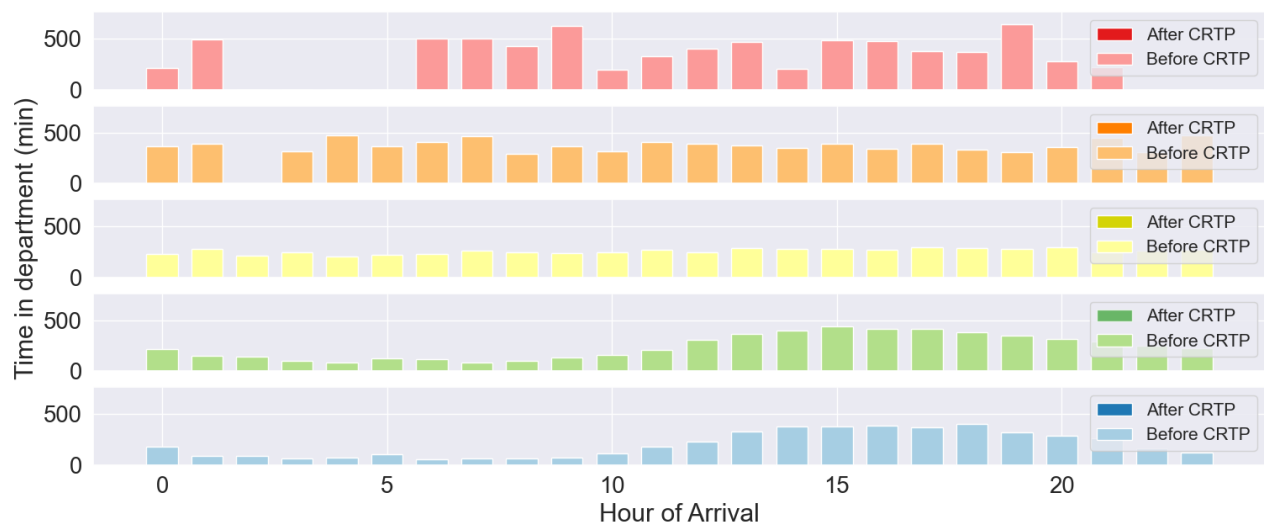
Percentage of admitted and discharged patients as a function of the time spent in ED

Flow chart - Admissions (darker) vs Discharges (lighter)

Attends: 4529;   Adms: 717;   NonAdms: 3812

% Patients left by: 4hrs = 52%;   % Adms at: 12+hrs = 1.2%;
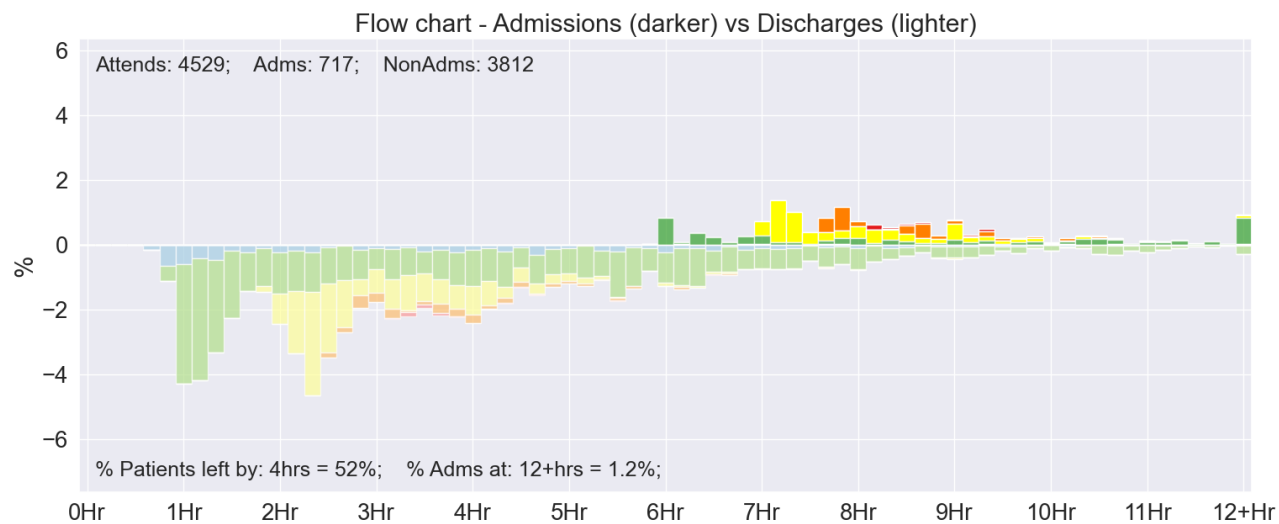
List of model input parameters:

{
  "Acuity_Percentages": {
    "Acuity 1": 0.88,
    "Acuity 2": 5.50,
    "Acuity 3": 24.65,
    "Acuity 4": 60.68,
    "Acuity 5": 8.29
  },

  "Sim_Parameters": {
    "daily_num_patients": 335,
    "num_doctors": 16,
    "num_sdec_doctors": 10,
    "num_rat_doctors": 2,
    "num_nt_doctors": 2,
    "max_resus": 5,
    "max_sdec": 10,
    "max_majors": 26,
    "max_minors": 25,
    "max_waiting_room": 40,
    "sdec_Percentage_a3": 0,
    "sdec_Percentage_a4": 0,
    "ambulance_vs_nonambulance_Percentage": 31.57,
    "ac12_ambulance_Majors_vs_Resus_Percentage": 50,
    "ac12_nonambulanceNonResus_MajorsDirect_Vs_WR_Percentage": 50,
    "a12_nonambulance_resus_vs_non_resus_Percentage": 50,
    "a3_AmbulanceMHPatient_Percentage": 1.9,
    "a3_NonAmbulance_MHPatient_Percentage": 1.9,
    "sdec_opening_hour": 8,
    "sdec_closing_hour": 16,
    "UTC": {
      "baseline_daily_patients": 115,
      "baseline_opening_hour": 8,
      "baseline_closing_hour": 22,
      "scenario_daily_patients": 115,
      "scenario_opening_hour": 8,
      "scenario_closing_hour": 22,
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      "Mean_UTC_Time": 240
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      "scenario_daily_patients": 0,

```json
        "Mean_AAU_Time": 600
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  },

  "Target_Parameters": {
    "W": {
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    "S": {
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      "std_target": 0.0
    }
  },

  "Target_Parameters_Default_Values": {
    "W": {
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      "std_target": 60.0
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    "S": {
      "mean_target": 30,
      "std_target": 15.0
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  },

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    "80": {
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      "std_bed": 0.0
    },
    "85": {
      "mean_bed": 90,
      "std_bed": 0.0
    },
    "90": {
      "mean_bed": 90,
      "std_bed": 0.0
    },
    "95": {
      "mean_bed": 90,
      "std_bed": 0.0
    }
  },
```

```json
"Bed_Occupancy_Default_Values": {
    "80": {
        "mean_bed": 30,
        "std_bed": 30.0
    },
    "85": {
        "mean_bed": 120,
        "std_bed": 60.0
    },
    "90": {
        "mean_bed": 480,
        "std_bed": 120.0
    },
    "95": {
        "mean_bed": 600,
        "std_bed": 240.0
    }
},

"Doctor_Times": {
    "acuity 1":{
        "time_assess_nt": {
            "mean": 3,
            "stdev": 0.0
        },
        "time_assess_rat": {
            "mean": 3,
            "stdev": 0.0
        },
        "time_wait_mh": 0,
        "time_assess": 15,
        "time_treat": 110,
        "time_discharge": {
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            "stdev": 0.0
        }
    },
    "acuity 2":{
        "time_assess_nt": {
            "mean": 3,
            "stdev": 0.0
        },
        "time_assess_rat": {
```

```json
        "mean": 3,
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    },
    "time_wait_mh": 0,
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    "time_treat": 90,
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        "mean": 35,
        "stdev": 0.0
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},
"acuity 3":{
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        "mean": 3,
        "stdev": 0.0
    },
    "time_assess_rat": {
        "mean": 3,
        "stdev": 0.0
    },
    "time_wait_mh": 120,
    "time_assess": 10,
    "time_treat": 65,
    "time_discharge": {
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        "stdev": 0.0
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},
"acuity 4":{
    "time_assess_nt": {
        "mean": 3,
        "stdev": 0.0
    },
    "time_assess_rat": {
        "mean": 3,
        "stdev": 0.0
    },
    "time_wait_mh": 0,
    "time_assess": 5,
    "time_treat": 10,
    "time_discharge": {
        "mean": 10,
        "stdev": 0.0
    }
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```json
        },
        "acuity 5":{
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                "mean": 3,
                "stdev": 0.0
            },
            "time_assess_rat": {
                "mean": 3,
                "stdev": 0.0
            },
            "time_wait_mh": 0,
            "time_assess": 5,
            "time_treat": 5,
            "time_discharge": {
                "mean": 5,
                "stdev": 0.0
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    },

    "Registration_Times": {
        "acuity 1": 1,
        "acuity 2": 1,
        "acuity 3": 1,
        "acuity 4": 1,
        "acuity 5": 1
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    "Max_Waiting_Times": {
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        "60": 0.68,
        "120": 1.11,
        "240": 3.11,
        "300": 2.53,
        "100000000": 92.02

    },

    "Prob_Admission": {
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        "acuity 2": 0.489,
        "acuity 3": 0.264,
        "acuity 4": 0.103,
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    "Diagnostic_Tests":{
        "acuity 1":{
            "ct_percentage": 21.5,
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            "XRay_percentage": 26.2,
            "time_XRay_mean": 28,
            "time_XRay_stdev": 0.0,
            "blood_percentage": 59.5,
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        "acuity 2":{
            "ct_percentage": 17.7,
            "time_ct_mean": 87,
            "time_ct_stdev": 0.0,
            "XRay_percentage": 32.9,
            "time_XRay_mean": 54,
            "time_XRay_stdev": 0.0,
            "blood_percentage": 74.9,
            "time_blood_mean": 12,
            "time_blood_stdev": 0.0
        },
        "acuity 3":{
            "ct_percentage": 12.8,
            "time_ct_mean": 96,
            "time_ct_stdev": 0.0,
            "XRay_percentage": 22.3,
            "time_XRay_mean": 57,
            "time_XRay_stdev": 0.0,
            "blood_percentage": 60.9,
            "time_blood_mean": 16,
            "time_blood_stdev": 0.0
        },
        "acuity 4":{
            "ct_percentage": 4.7,
            "time_ct_mean": 98,
            "time_ct_stdev": 0.0,
            "XRay_percentage": 9.8,
            "time_XRay_mean": 48,
            "time_XRay_stdev": 0.0,
            "blood_percentage": 30.2,
```

          "time_blood_mean": 18,
          "time_blood_stdev": 0.0
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      "acuity 5":{
          "ct_percentage": 1.8,
          "time_ct_mean": 100,
          "time_ct_stdev": 0.0,
          "XRay_percentage": 4.4,
          "time_XRay_mean": 33,
          "time_XRay_stdev": 0.0,
          "blood_percentage": 16.6,
          "time_blood_mean": 20,
          "time_blood_stdev": 0.0
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  },

  "Time_to_Exit": {
      "mean": 10,
      "stdev": 10
  },

  "Hourly_Arrivals": {
      "0": 6,
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      "2": 4,
      "3": 3,
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      "5": 4,
      "6": 4,
      "7": 6,
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        "22": 10,
        "23": 8
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}
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