

# Interoperable Data Lake (IDL)

Netcompany



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# IDL Innovative Functions in brief

- + It collects and integrates **existing historical or needed open data**
- + It aggregates, stores and manages **live triage and other data from the on-field components** (sensors, drones, etc.) to **be fed to other components** for decision support, predictive modeling, querying, information retrieval and visualization
- + It **aggregates, manages and stores results and outputs** from other Nightingale components (predictive tools, DSS, C3/IMS, etc.)
- + It provides **Interactive Visualization Dashboards** with **customized aggregated information visualizations** of different types per need and temporal instance
- + It provides a data-driven **Decision Support System**, which through an interactive frontend offers **filtered and processed data visualizations** and **enables real-time alerting to C3** in case of abnormal monitored vitals trends and wearable vital signs sensors malfunctioning.
- + It ensures **data interoperability** in terms of **unified, standards-based data descriptions** and **seamless data access**
- + It is used both **during the management of an MCI** and in **post-MCI phase** for **aggregated statistics, reports and KPIs generation**

# IDL in more detail

- + The IDL platform is designed to enhance real-time information monitoring, data curation, situational awareness and early warnings, performed by the **Data Officer**.
  - + The **Data Officer** is a newly introduced operational role within the NIGHTINGALE project and is responsible to handle and evaluate the huge amount of data generated by the diverse tools and technologies of NIGHTINGALE.
- + Inputs that are managed, stored and processed by IDL are:
  - + Data and vitals measurements gathered by the smart devices and sensing elements (DTT, TSS, VSE, TVSA, UAR-SAS, UAR-TIS)
  - + Predictions and results produced by the Artificial Intelligence (AI) tools and Machine Learning (ML) models
  - + Operational information and actions provided by the Command-and-Control Centre, the Headquarters modules and the Field components
- + Outputs that are offered by IDL either to the Data officer through its DSS Frontend or to consuming data- and AI-driven tools are:
  - + Data retrieval capabilities for all the monitored and stored information through REST APIs
  - + Alerts and warnings for victims' vitals and on-field deployed devices
  - + Post-MCI analytics and information

# IDL's DSS Frontend provides

- + **Active incidents dashboards** presenting interactive information visualizations for the Data Officer:
  - + Near real time vital monitoring including upper/lower thresholds
  - + Time series aggregated data
  - + Victim information visualization/analytics
  - + Dynamic prioritized victim list based on vitals trends
  - + Early warnings for
    - + Victims' health deterioration
    - + Wearable vital signs sensors malfunctioning
- + **Post-MCI Report dashboards** presenting:
  - + After incident reports in the form of visual analytics and KPIs from all data
  - + Interactive diverse dashboards (pie charts, bar charts etc.) and statistics for the selected mass casualty incident

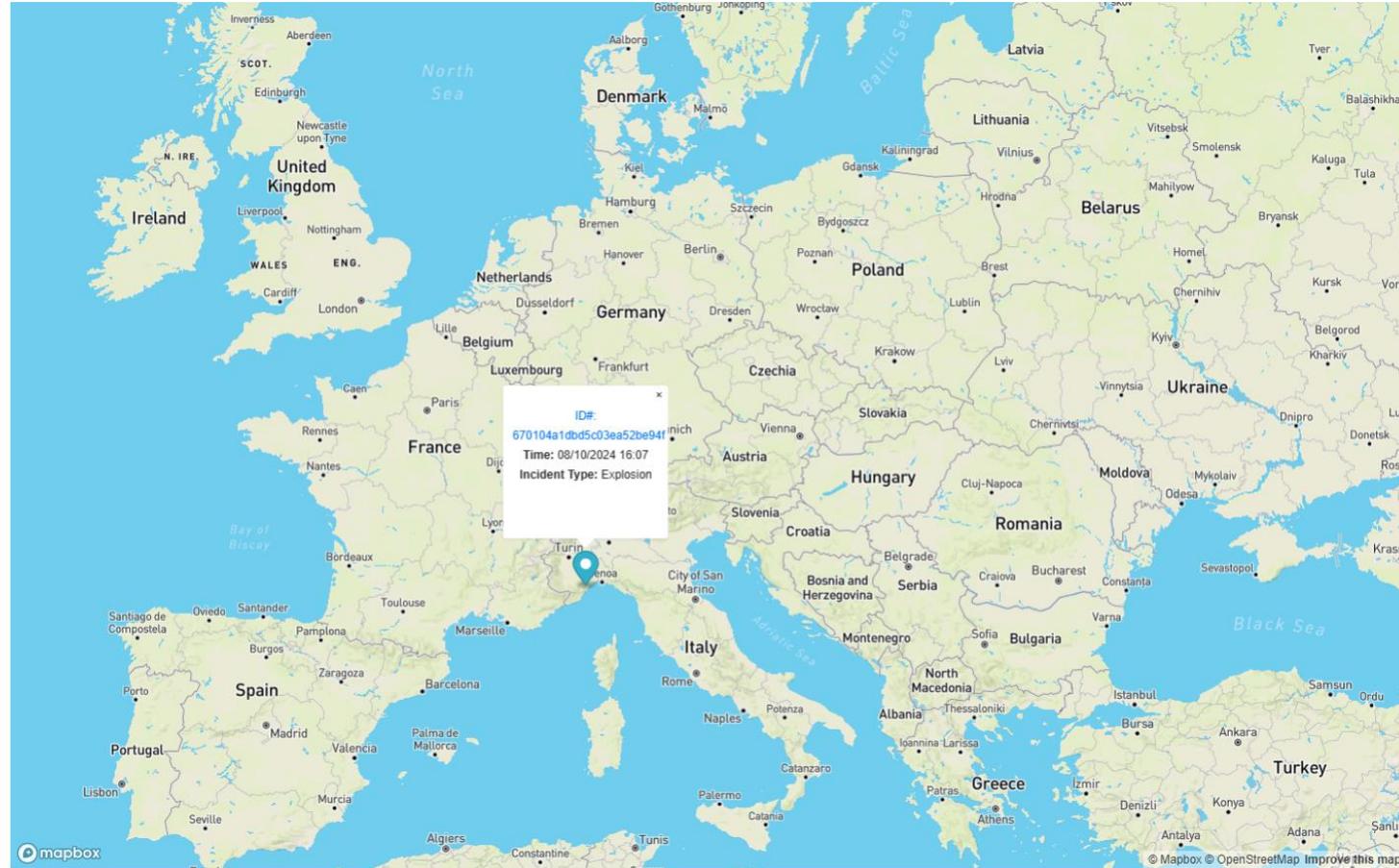
# Step-by-step User Guide

## Active Incidents and Maps

- + List with the ongoing accidents and their location as map pins
- + Description details for each incident
  - + Timestamp
  - + Type (e.g., bus crash, explosion, terrorist attack, earthquake)
- + Search box for filtering

Active	Completed
Active Incidents	
	Incident
	Explosion
	08/10/2024 16:07

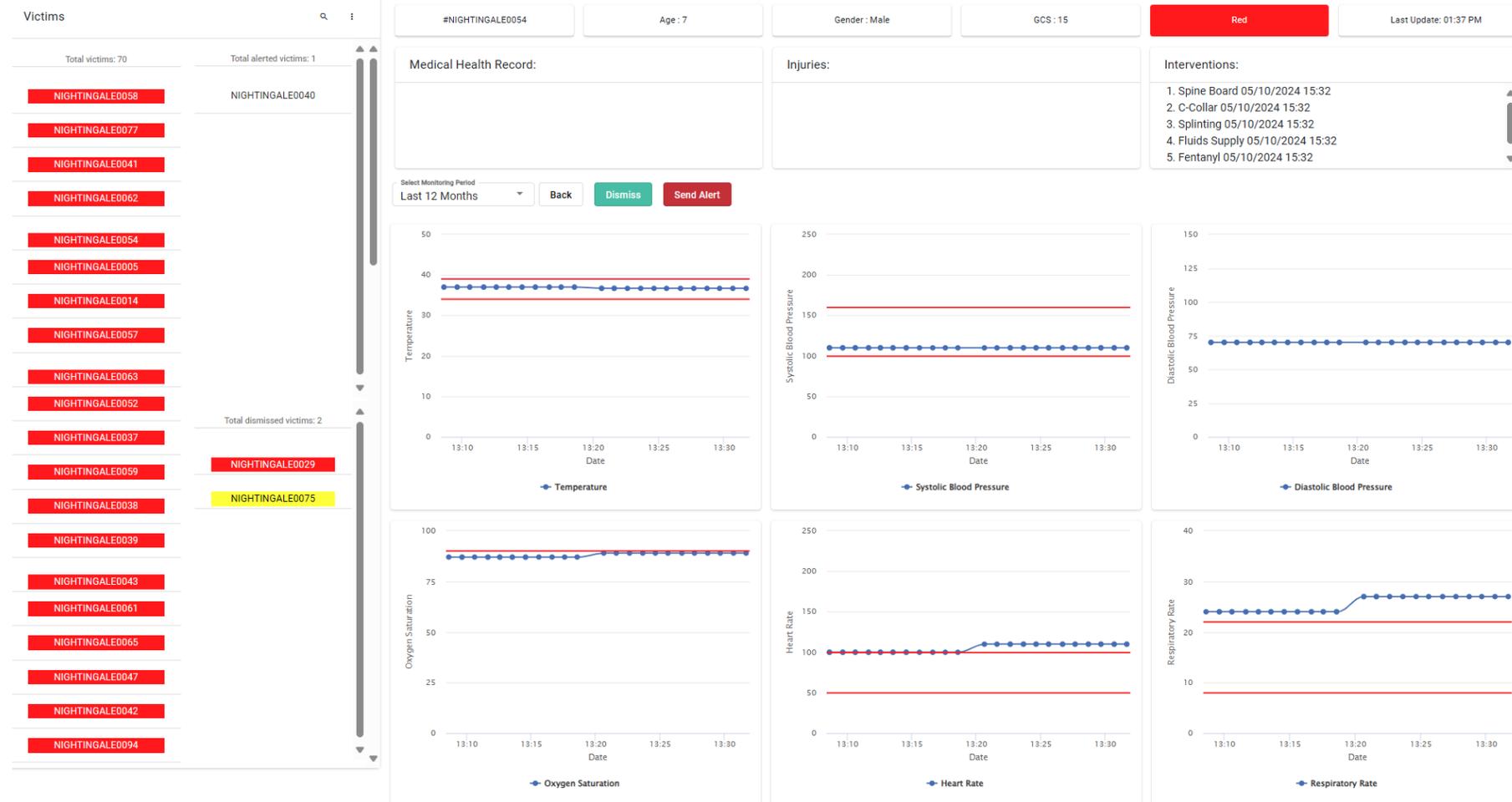
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# Step-by-step User Guide

## Active Incident Dashboards

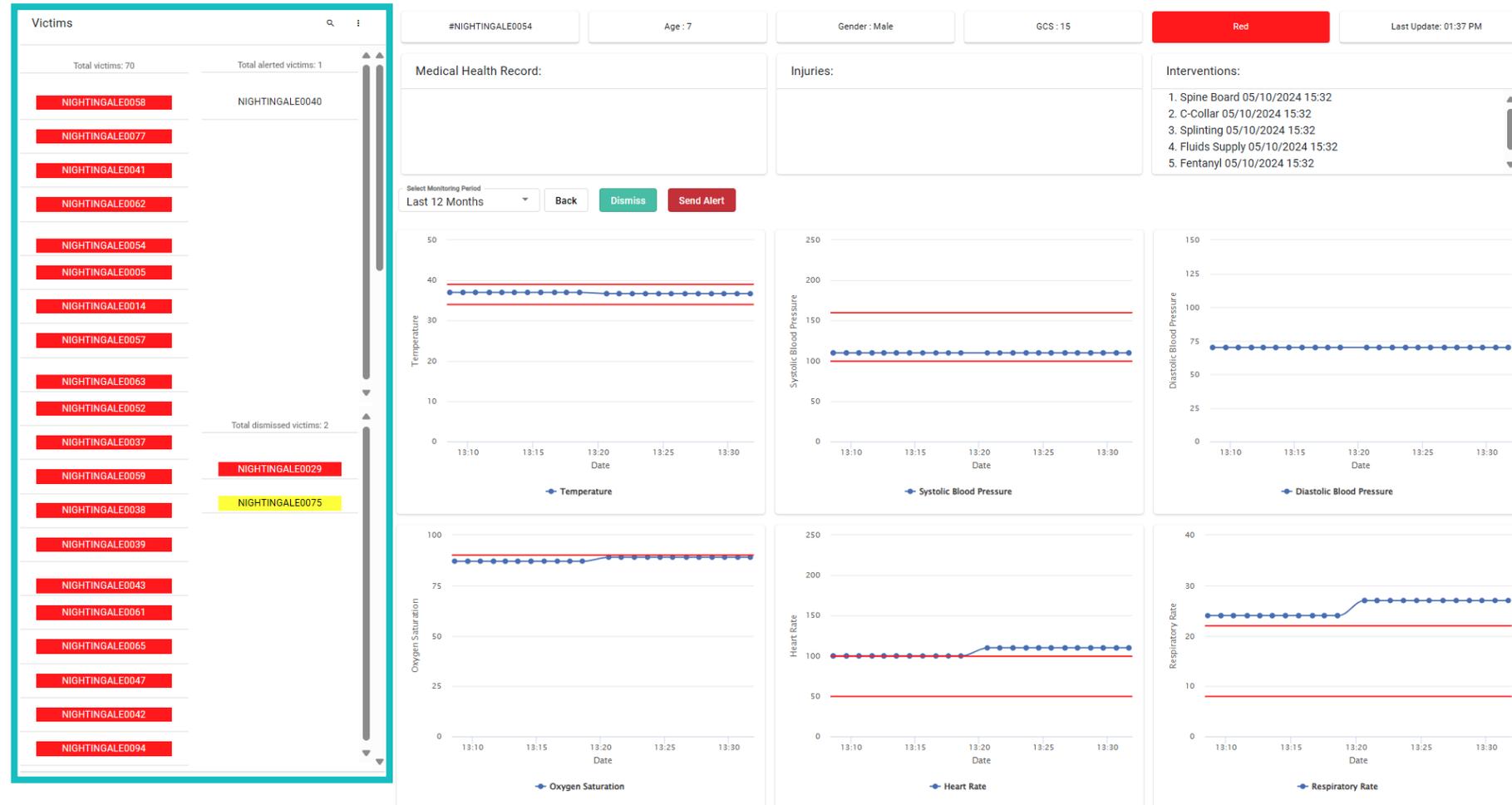
- + The overview screen depicts the information of the selected active incident.
- + It appears upon clicking on either the corresponding row of the list or on the map pin.
- + The Data Officer can return to the initial list of incidents by clicking the Back button.



# Step-by-step User Guide

## Active Incident Dashboards

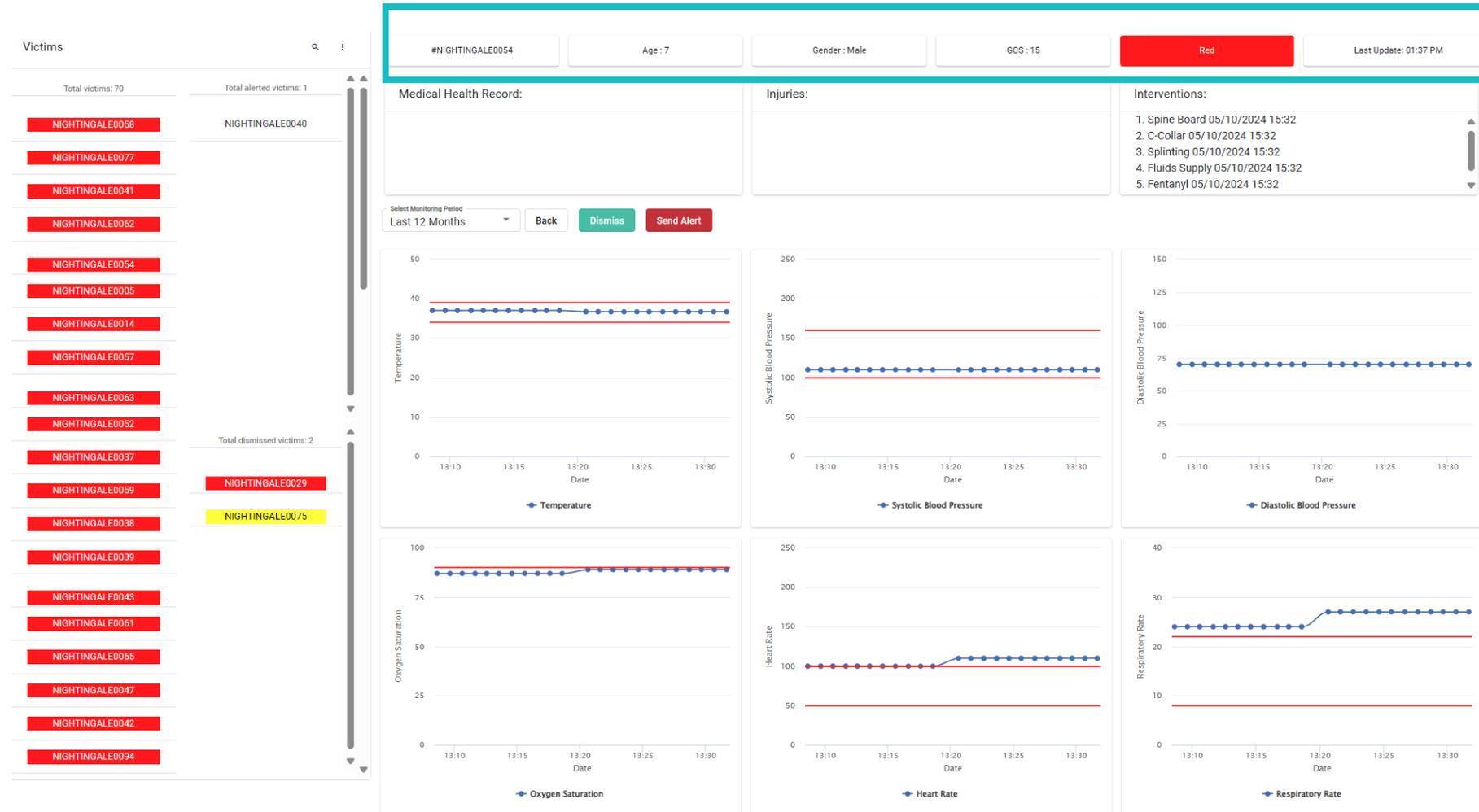
- + There are three columns with victim ids
- + The leftmost column consists of the victim ids synced with the devices and app data in near real time.
- + Prioritized ordering of the victims showing first the ones with vitals exceeding the upper/lower thresholds of the normal health value ranges or indicating trends for potential health deterioration.



# Step-by-step User Guide

## Active Incident Dashboards

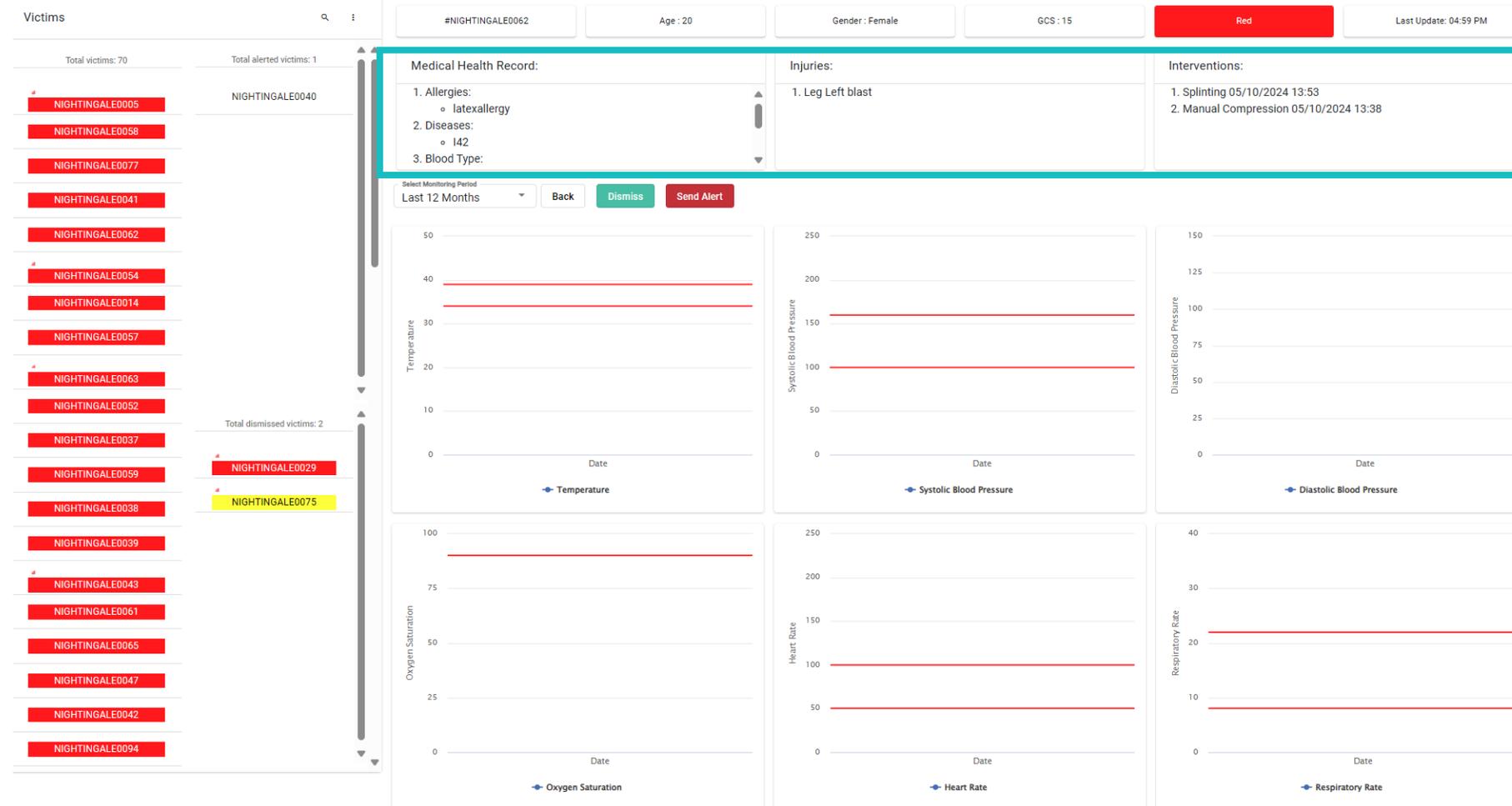
- + For the selected victim, the Data officer can view information like age, gender, triage color and Glasgow Coma Scale (gcs).



# Step-by-step User Guide

## Active Incident Dashboards

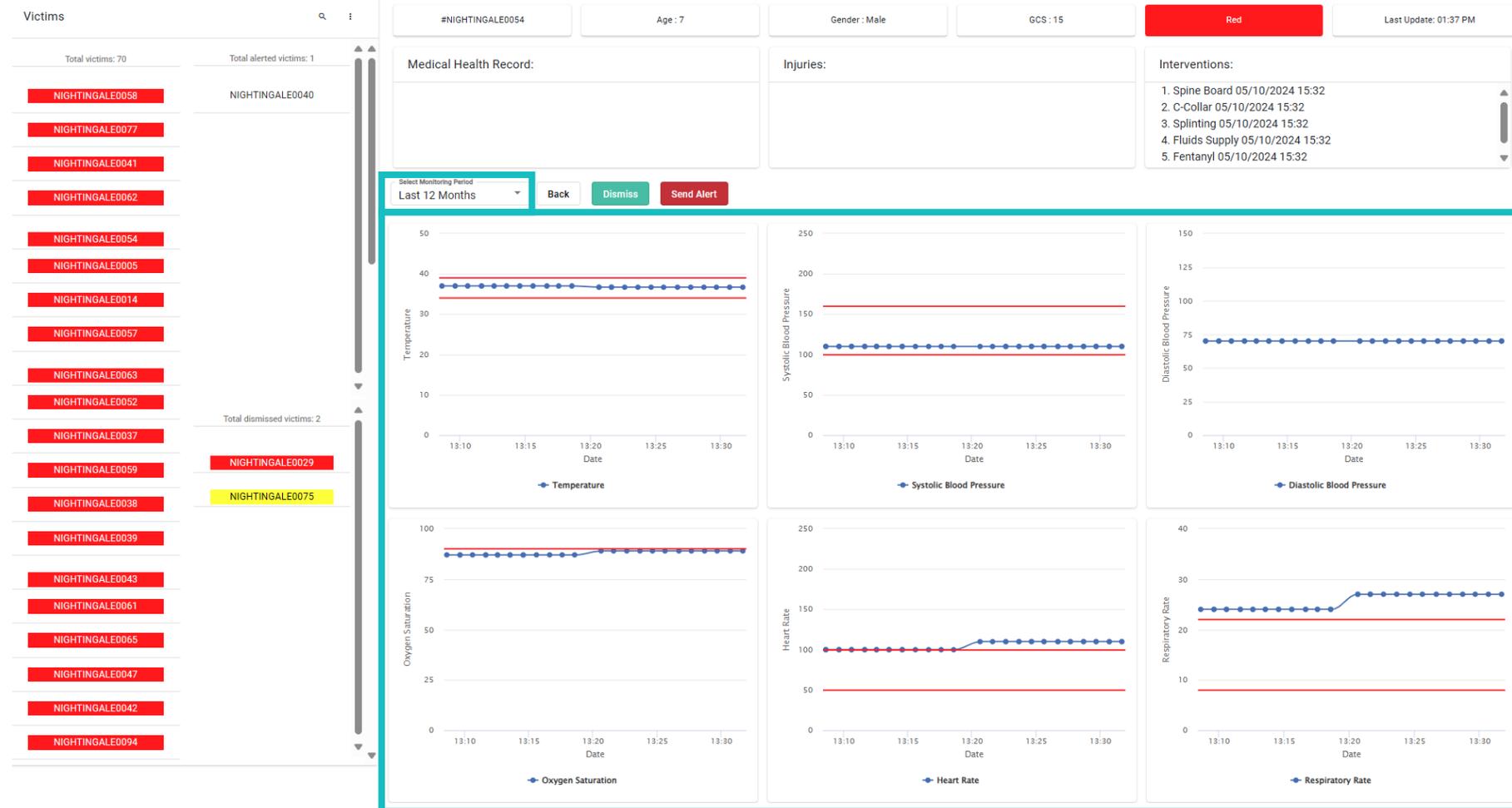
+ The Data Officer can further view for a more informed decision additional information for the victim such as elements of its medical health record, listed injuries and applied interventions with the time they have been applied



# Step-by-step User Guide

## Active Incident Dashboards

- + Near real time temporal vitals sequences visualization
  - + Temperature
  - + Systolic blood pressure
  - + Diastolic blood pressure
  - + Oxygen saturation
  - + Heart rate
  - + Respiratory rate
- + Monitoring temporal period selection
- + Red horizontal lines illustrate the upper – lower thresholds per vital type of the vital normal range values



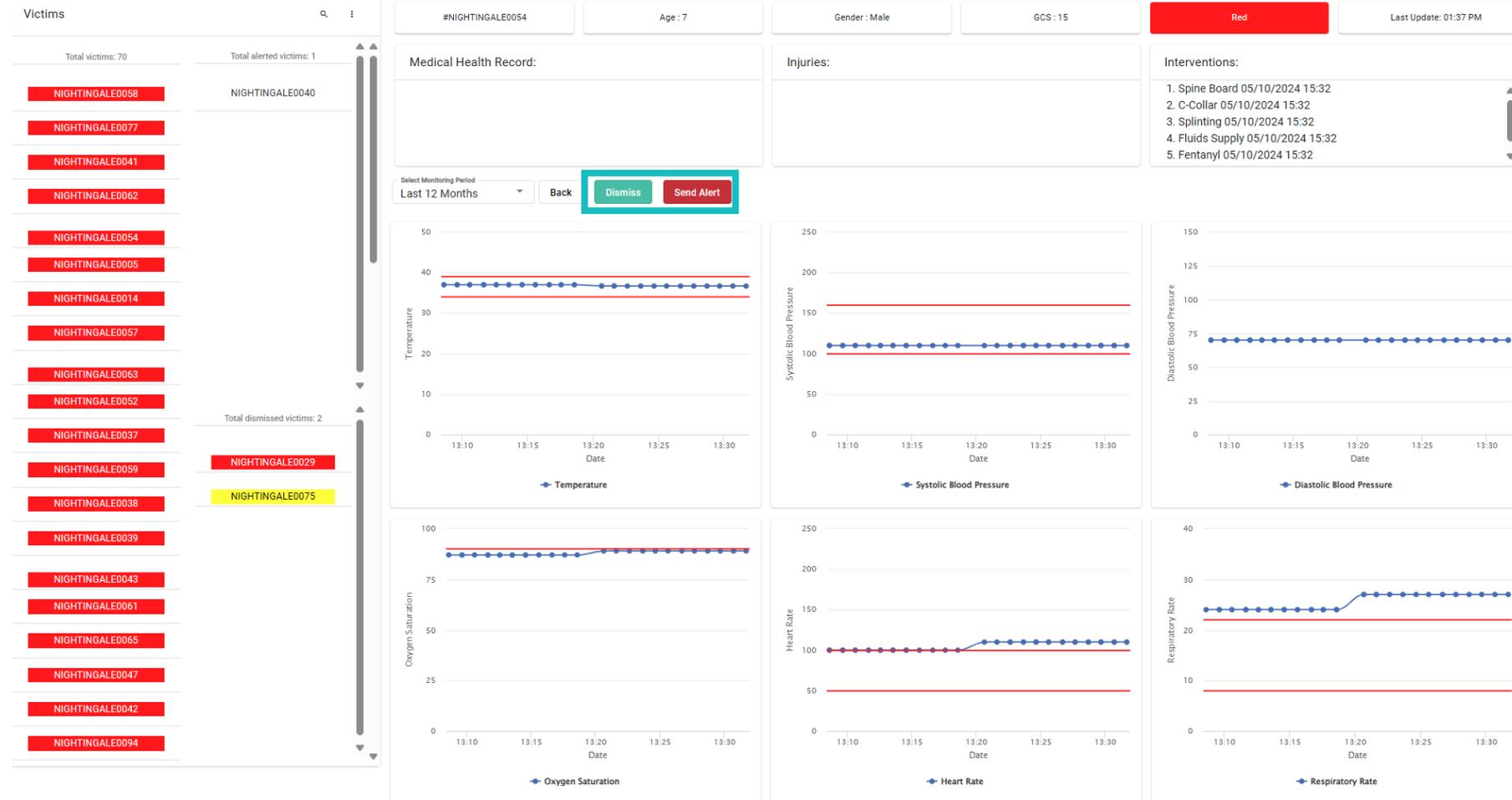
# Step-by-step User Guide

## Active Incident Dashboards

+ The Data Officer evaluates all the information provided along with the vital sequences and makes an informed decision per victim whether to click the "Send Alert" or "Dismiss" button.

+ Send Alert : notify C3I commander with an early warning on the health status of the respective victim

+ Dismiss: no current warning is needed, re-evaluate the victim health status after a short temporal window (default is 10 minutes)



# Step-by-step User Guide

## Active Incident Dashboards

- + If the Send Alert button is clicked, a dialog box appears to allow the Data Officer to quickly select the preformatted description of the warning message to C3I.

The screenshot displays the Nightingale Active Incident Dashboard for patient #NIGHTINGALE0054. The interface includes a 'Victims' list on the left, patient details at the top, and several vital signs graphs at the bottom. A 'Send Alert' button is highlighted in a red box, and an 'Insert Diagnosis' dialog box is overlaid on the graphs.

**Victims List:**

- Total victims: 70
- Total alerted victims: 1 (NIGHTINGALE0040)
- Total dismissed victims: 2 (NIGHTINGALE0029, NIGHTINGALE0075)

**Patient Details:**

- #NIGHTINGALE0054
- Age: 7
- Gender: Male
- GCS: 15
- Status: Red
- Last Update: 05:01 PM

**Medical Health Record:**

**Injuries:**

**Interventions:**

1. Spine Board 05/10/2024 15:32
2. C-Collar 05/10/2024 15:32
3. Splinting 05/10/2024 15:32
4. Fluids Supply 05/10/2024 15:32
5. Fentanyl 05/10/2024 15:32

**Vital Signs Graphs:**

- Temperature: 36.5°C
- Systolic Blood Pressure: 120 mmHg
- Diastolic Blood Pressure: 75 mmHg
- Oxygen Saturation: 95%
- Heart Rate: 100 bpm
- Respiratory Rate: 22 bpm

**Insert Diagnosis Dialog Box:**

- high temperature
- low temperature
- high systolic pressure
- low systolic pressure
- high diastolic pressure
- low diastolic pressure

# Step-by-step User Guide

## Active Incident Dashboards

+ Upon sending the alert:

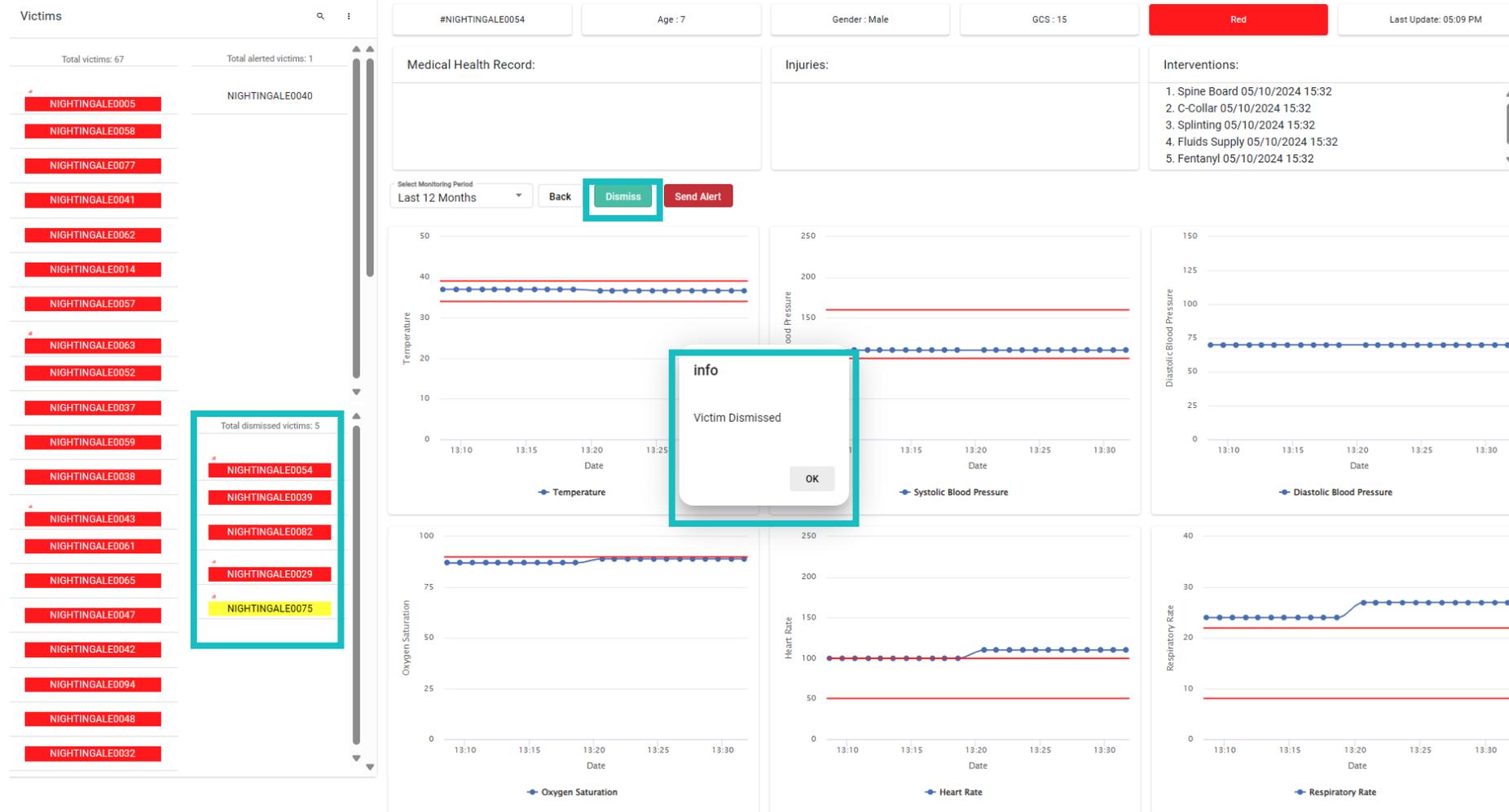
- + The victim id is moved to the alerted victims' column from the main ordered utmost left victim list.
- + The corresponding alert message is sent to the C3I.
- + When the first responders have been notified for the alerted victim by C3I, the victim id is moved to the dismissed column.

The dashboard displays a list of victims on the left, categorized into 'Total victims: 69', 'Total alerted victims: 2', and 'Total dismissed victims: 2'. The alerted victims list includes NIGHTINGALE0054 and NIGHTINGALE0040. The dismissed victims list includes NIGHTINGALE0029 and NIGHTINGALE0075. The main dashboard area shows details for victim #NIGHTINGALE0054, including Age: 7, Gender: Male, GCS: 15, and a Red status. The Medical Health Record and Injuries sections are currently empty. The Interventions section lists five actions: 1. Spine Board 05/10/2024 15:32, 2. C-Collar 05/10/2024 15:32, 3. Splinting 05/10/2024 15:32, 4. Fluids Supply 05/10/2024 15:32, and 5. Fentanyl 05/10/2024 15:32. Below the interventions, there are six line graphs showing vital signs over time (13:10 to 13:30): Temperature (around 37°C), Systolic Blood Pressure (around 120 mmHg), Diastolic Blood Pressure (around 75 mmHg), Oxygen Saturation (around 95%), Heart Rate (around 100 bpm), and Respiratory Rate (around 20 bpm). A 'Send Alert' button is highlighted in a red box, and an 'info' dialog box with the message 'Diagnosis has been saved' is also highlighted in a red box.

# Step-by-step User Guide

## Active Incident Dashboards

- + If the Dismiss button is clicked, the corresponding victim ID is moved to the dismissed victims' column.

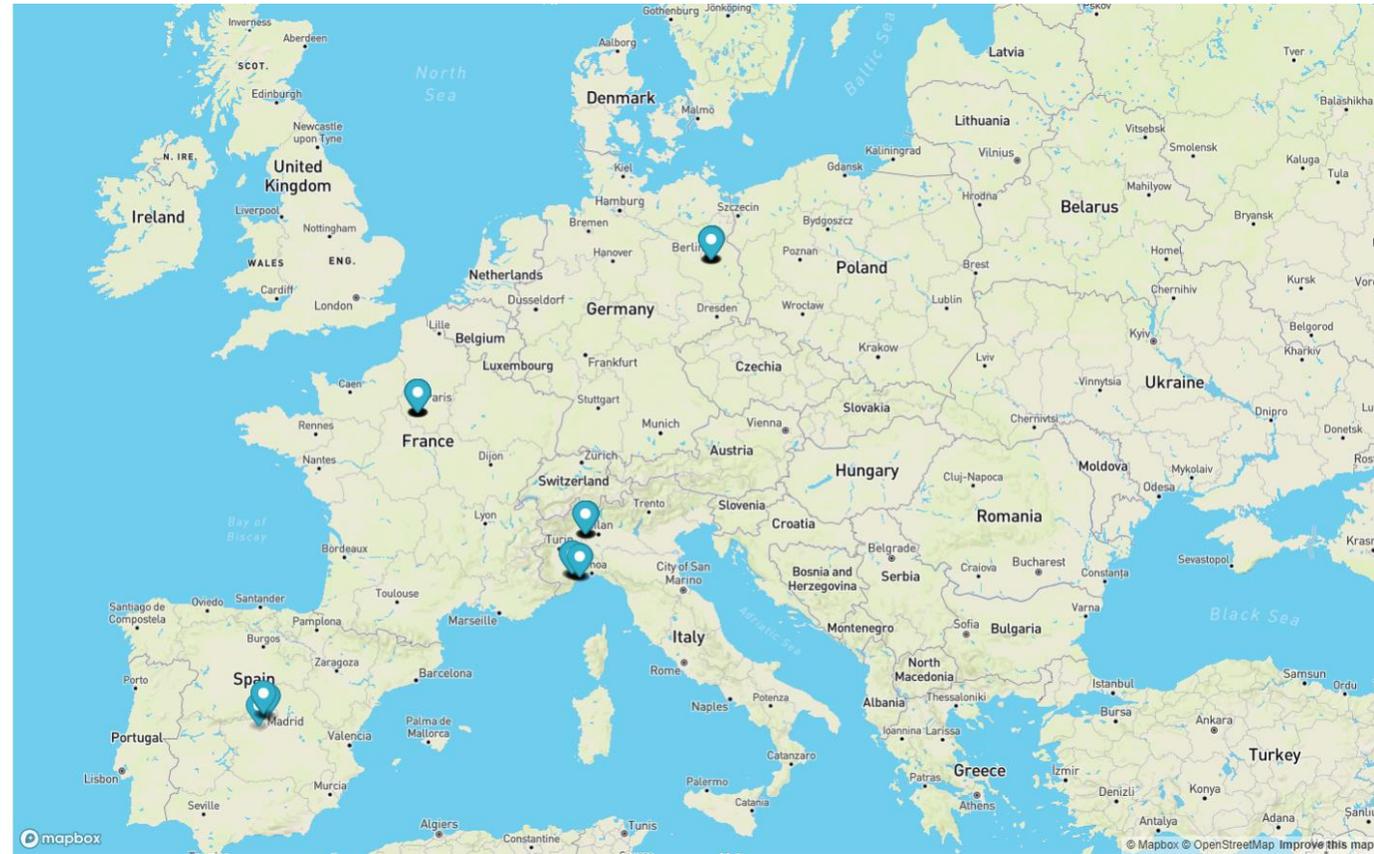


# Step-by-step User Guide

## Completed Incidents and Maps

- + A separate tab for completed incidents is provided by IDL
- + Similar functionalities are offered as the ones for the active incidents, namely:
  - + Search
  - + Description - Type
  - + Location on map

Active	Completed
Completed Incidents	
Incident	
Explosion	04/10/2024 17:44
Explosion	04/10/2024 13:09
Mass Casualty	04/10/2024 04:28
Explosion	03/10/2024 12:30
Explosion	03/10/2024 10:55
Explosion	02/10/2024 16:14
Explosion	02/10/2024 15:26
Explosion	27/09/2024 16:55
MCI	27/09/2024 15:32
MCI	27/09/2024 15:19
Explosion	27/09/2024 14:29
MCI	24/09/2024 14:55
Mass Casualty	18/09/2024 02:22
Mass Casualty	18/09/2024 02:22

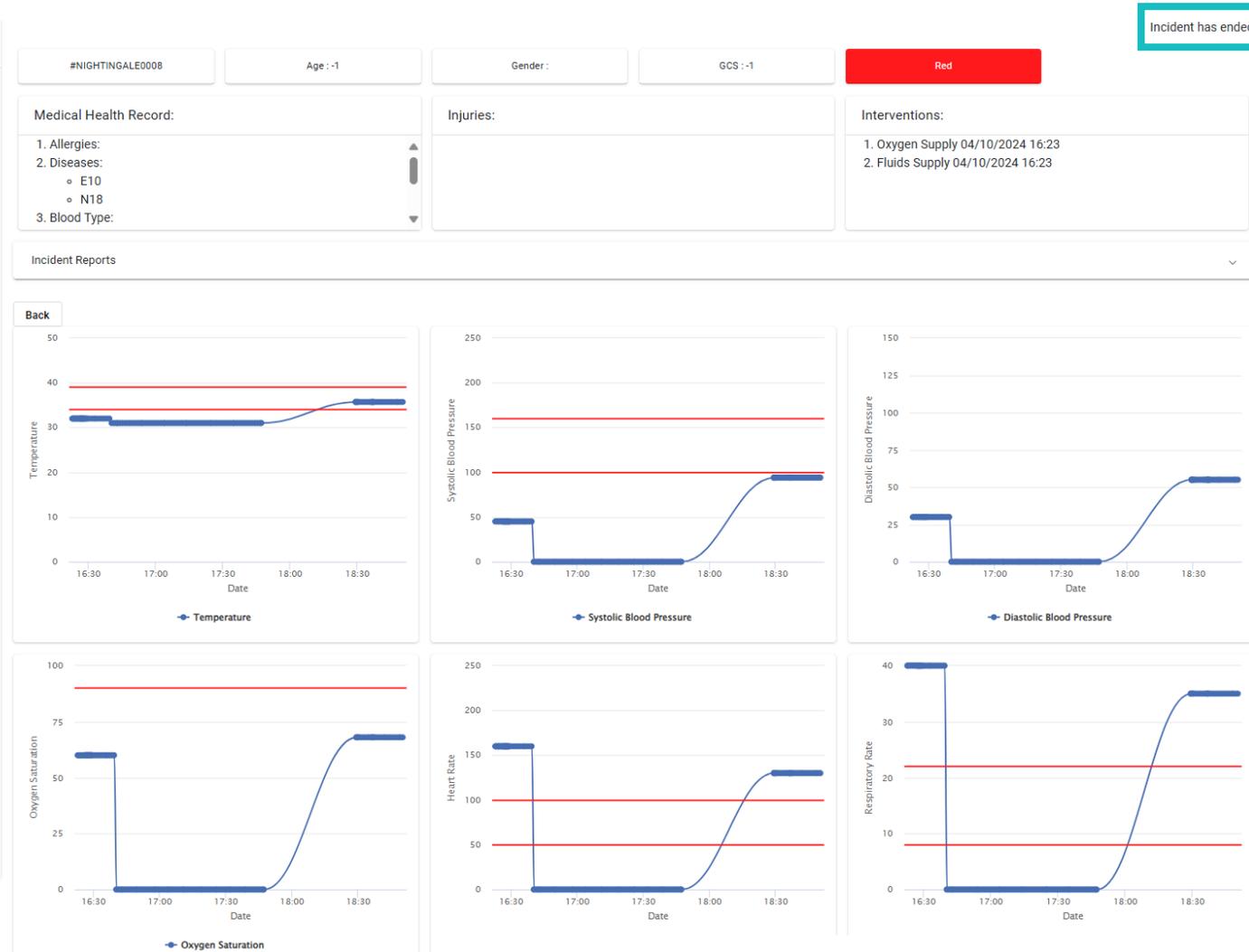


# Step-by-step User Guide

## Post-MCI Report Dashboards

- + General overview of the victim list

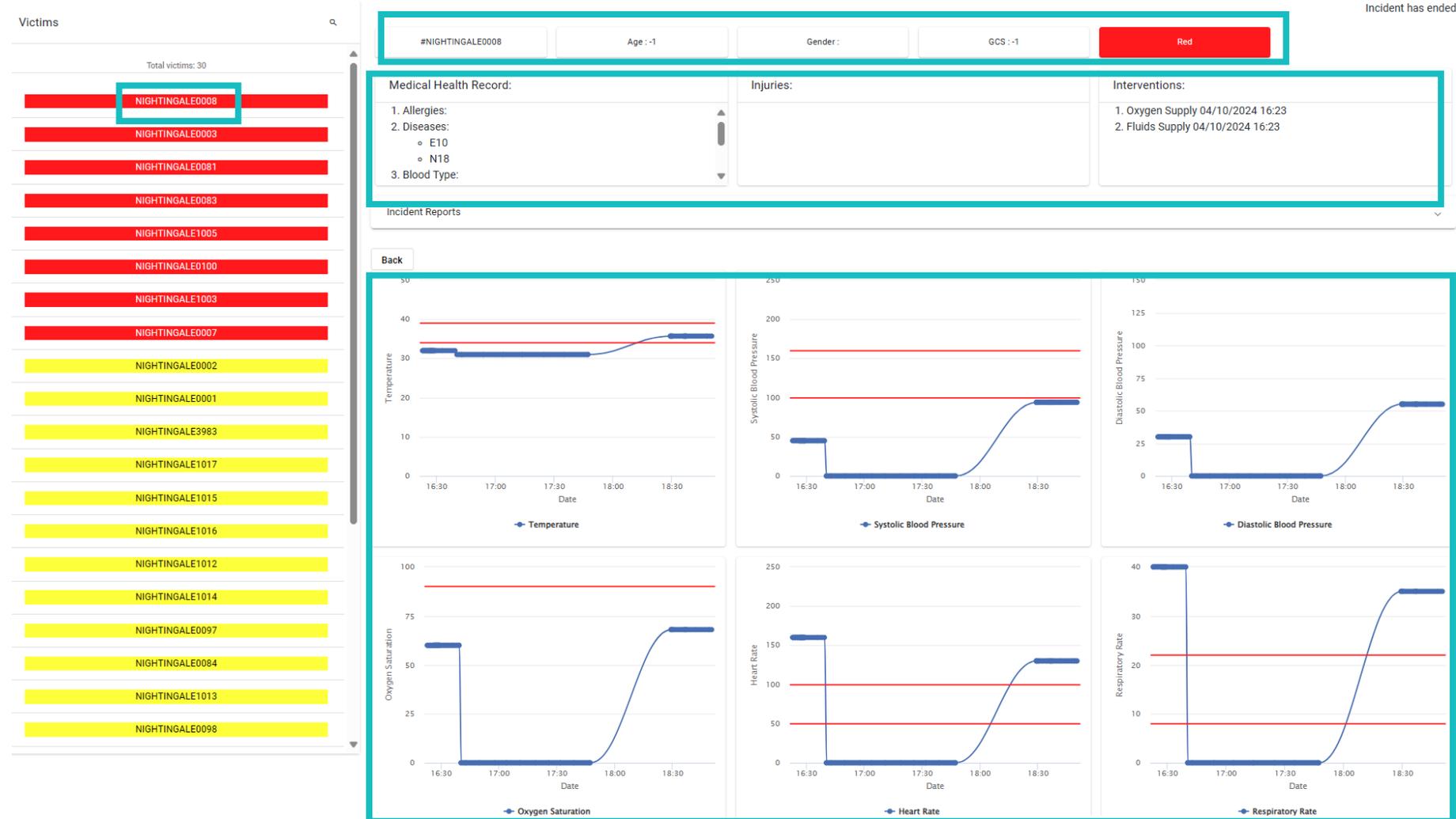
Victims
Total victims: 30
NIGHTINGALE0008
NIGHTINGALE0003
NIGHTINGALE0081
NIGHTINGALE0083
NIGHTINGALE1005
NIGHTINGALE1000
NIGHTINGALE1003
NIGHTINGALE0007
NIGHTINGALE0002
NIGHTINGALE0001
NIGHTINGALE3983
NIGHTINGALE1017
NIGHTINGALE1015
NIGHTINGALE1016
NIGHTINGALE1012
NIGHTINGALE1014
NIGHTINGALE0097
NIGHTINGALE0084
NIGHTINGALE1013
NIGHTINGALE0098



# Step-by-step User Guide

## Post-MCI Report Dashboards

- + Victim information is retrieved upon clicking on the Victim Id
  - + Age, Gender, GCS etc.
  - + EHRs, injuries, interventions
- + The complete stored temporal sequences of the monitored vitals per victim are visualized



# Step-by-step User Guide

## Post-MCI Report Dashboards

- + A Drop down list is offered for opening the incident's aggregated data reports from all victims

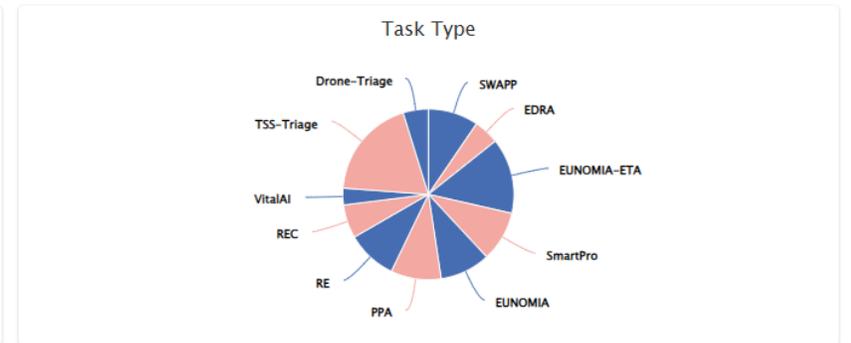
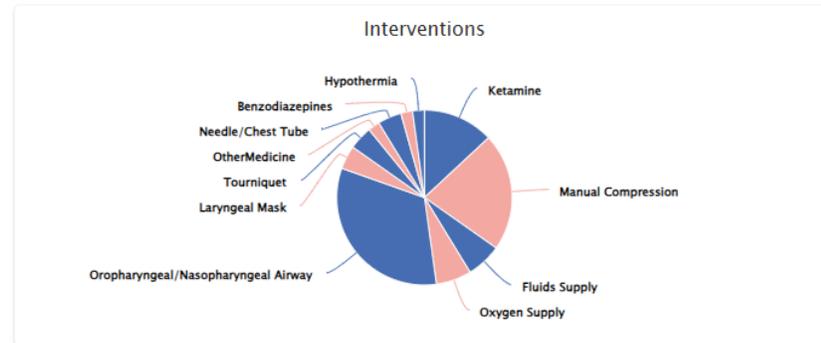
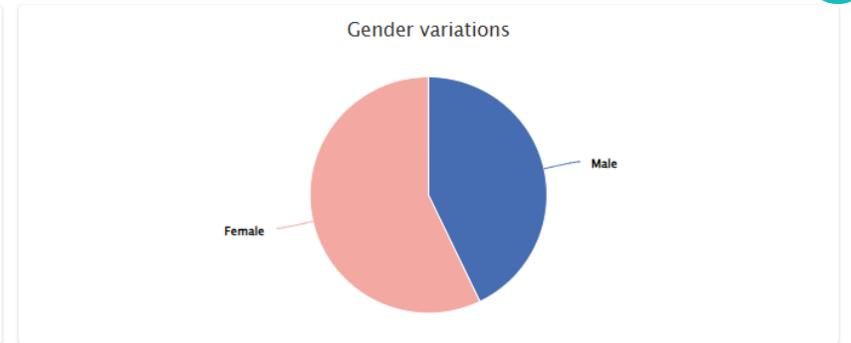
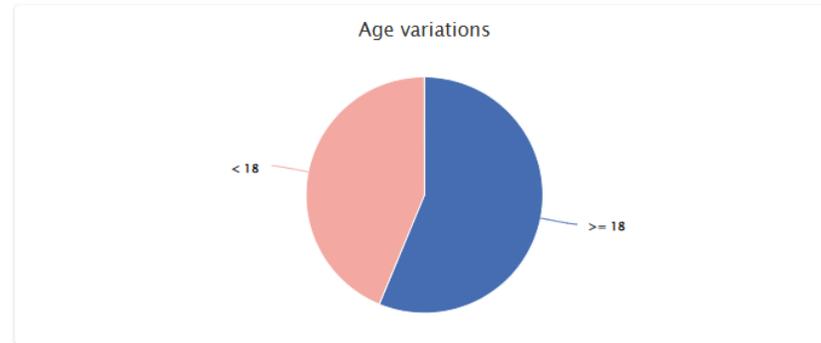


# Step-by-step User Guide

## Post-MCI Report Dashboards

Incident Reports

- + This results in being presented with diverse interactive visualizations with aggregate results and statistics for the selected incident
  - Age span of victims
  - Gender statistics of victims
  - Types of applied interventions in accordance to registered injuries
  - The assigned tasks to tools and FRs and their final status



# Step-by-step User Guide

## Post-MCI Report Dashboards

- + The triage colors of all victims over time is further reported visually for the selected time period of the completed MCI





## Contacts

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# NIGHTINGALE

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**Thank you!**



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