

MCIT-H

ALGORITHM



MCIT-H

Mass Casualty Incident Triage algorithm for
the Hospital phase

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THE MCIT-H ALGORITHM

The MCIT-H algorithm is the recommended methodology to use for hospital triage during a mass casualty event. The algorithm is implemented for triaging all patients, trauma and non-trauma patients involved in a major trauma event and / or in other extraordinary circumstances. This includes situations in which the sheer number of patients involved or the number of patients with higher acuity presentations may exceed the capabilities of the healthcare organizations to which they are presenting.

The MCIT-H is a tool used by hospital triage staff with clear and valid criteria, using clinical assessment parameters in accordance with the Primary Survey assessment principles (x-A-B-C-D-E) of Emergency Medicine (external hemorrhage – Airway – Breathing – Circulation – Disability – Exposure & Environment).

Table 3 explains the individual criteria and clinical signs for each triage level. Explanations are provided as examples only and are neither exhaustive nor complete.

In the event of a Mass Casualty Incident (MCI), it will not always be possible or viable to provide an accurate and detailed assessment of each patient when adhering to the principle of “doing the greatest good for the greatest number”. Incoming patients are therefore likely to be assigned to a triage level based on the same or similar clinical signs. Standard Emergency Department processes or procedures are not designed to cope with the influx that occurs during a MCI, as such the MCIT-H algorithm becomes an essential tool that focuses on staff’s effort, on the patient urgency and best use of available resources.

The MCIT-H algorithm is based on established principals for treatment and transport priorities of the pre-hospital triage system [figure 1]. This ensures common ground through institutions involved in the chain of emergency services.

During the transport from the scene of the incident to the hospital, the patients’ condition may deteriorate or improve. Pre-hospital priority decisions have to be reevaluated for all patients upon arrival, triage needs to be a dynamic process and each patient needs to be reassessed based on the hospital assessment tool upon first contact within hospital staff. Staffing, room availability and material resources in a pre-hospital setting differ from those in the hospital. Due to these differences, the urgency level for hospital treatment may differ from the initial decision.

PRE-HOSPITAL TRIAGE SYSTEM: TREATMENT AND TRANSPORT PRIORITIES

Since January 2020, a new patient routing system is being used in the pre-hospital setting, the PLS Switzerland [Figure 1]. This system was created by a working group called “New PLS Switzerland” in 2019. PLS comes from a German word (Patienten-Leit-System) and means patient routing system. This system allows paramedics to undertake a patient focused triage decision for pre-hospital treatment and transport priorities [Table 1]. Every patient receives from the medical professionals a PLS Switzerland card with their triage category and a wristband with its own QR code with a unique identification number (ID Nr.).

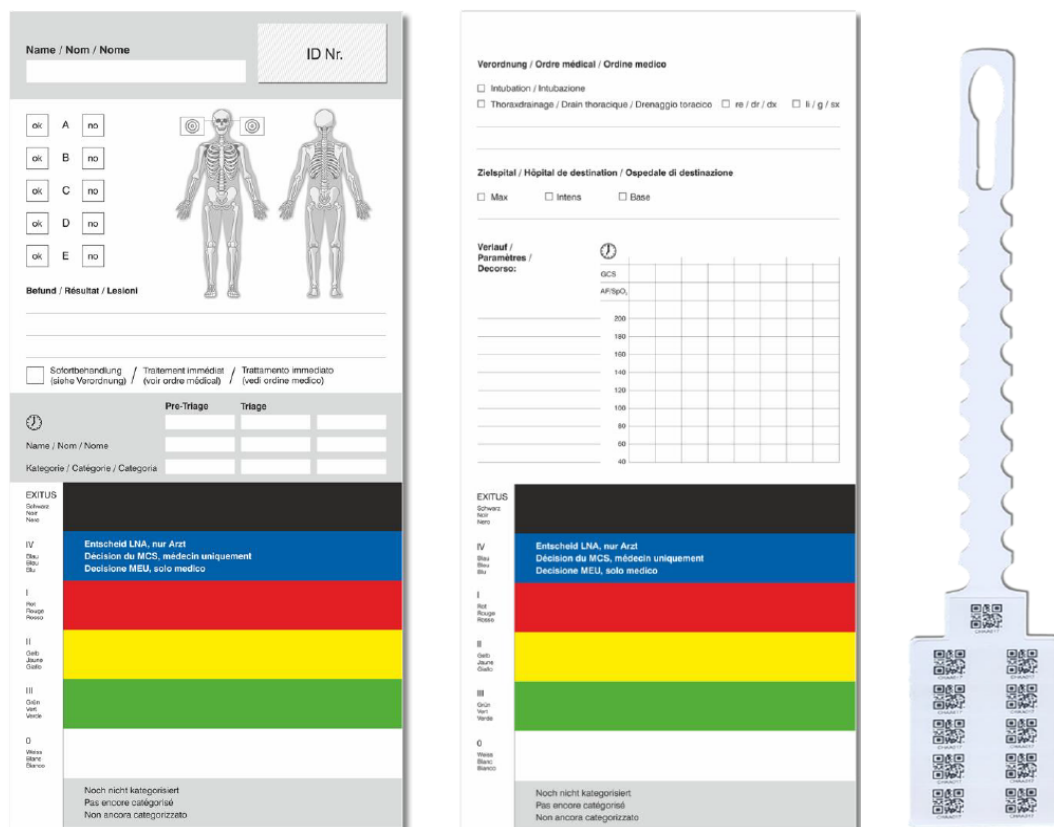


Figure 1: PLS Switzerland card with wristband and QR code [working group New PLS Switzerland, 2019]

Triage	PLS Switzerland treatment and transport priorities	
Not yet categorized	Not yet categorized	Patients who are identified with this color category must still be assessed by triage
0 White	Uninjured/not ill person who were involved in the incident and have been examined by a medical professional Transport to collection point for the uninjured or to the care team	
I Red	Patient with life-threatening injuries Immediate treatment or immediate transport	
II Yellow	Severely injured/ill patient Urgent treatment/urgent transport	
III Green	Mildly injured/ill patient Non-urgent treatment, non-urgent transport	
IV Blue	No chance of survival Palliative care Only the most senior emergency physician has the authorisation to allocate the color category blue. This category can be applied by physicians as part of the triage process.	
Exitus Black	Deceased person Leave on-site (to protect evidence) or transport to a mortuary for ethical reasons	

Table 1: Pre-hospital treatment and transport prioritization with PLS Switzerland [Source: working group New PLS Switzerland, 2019]

COMPARISON OF PRE-HOSPITAL TRIAGE VERUS TRIAGE IN A HOSPITAL SETTING

In a MCI, the PLS category/number can either be applied at the scene of the incident or for "walk-in patients", directly at the hospital triage site. This phase of triage takes place within an allocated area, either in front of the hospital or directly inside the hospital entrance. For the initial period in which patients keep coming in, all patients will be screened and allocated according to the patient routing system (PLS Schweiz). However only patients involved in the MCI receive a PLS number.

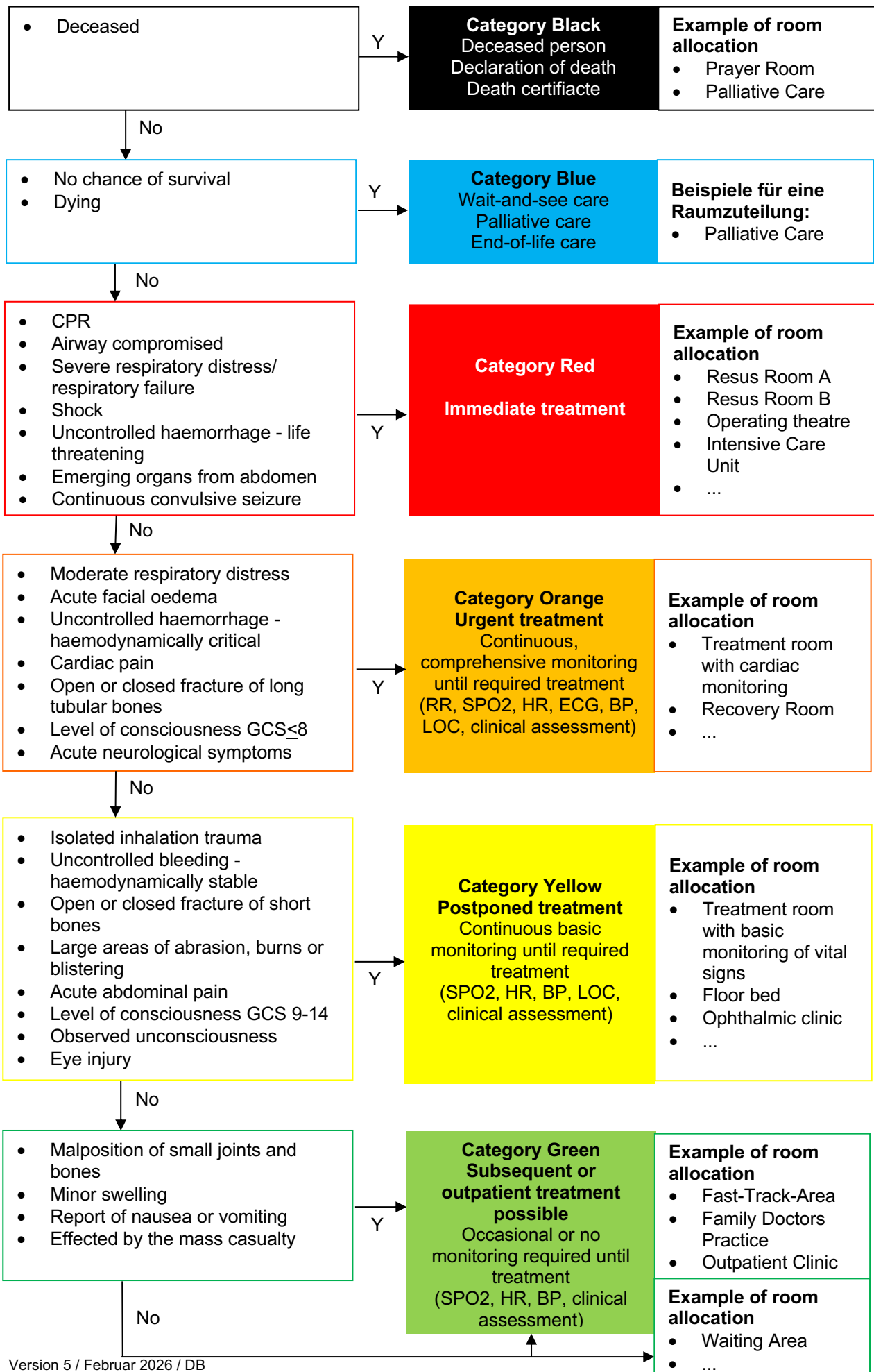
During the triage process in the hospital, the unique identification number with a QR code is merged with the hospitals internal patient identification system, the PLS category and PLS number help to identify the patients.

Table 2 illustrates the comparison of the pre-hospital and hospital triage decisions and specifies the rationale for each hospital triage category.

Pre-hospital triage using PLS Switzerland		Hospital triage using the MCIT-H	
Not yet categorized	Not yet categorized Admit to pre-triage/triage	Not yet categorized	Admit to hospital triage
T I Red	Life-threatening injuries immediate treatment or immediate transport	Immediate treatment	Category Red
T II Yellow	Severely injured/ill patient urgent treatment/urgent transport	Very urgent treatment Continuous, comprehensive monitoring until treatment is available	Category Orange
		Urgent treatment Continuous basic monitoring until treatment available	Category Yellow
T III Green	Slightly injured/ill patient Non-urgent treatment, non- urgent transport	Subsequent or outpatient treatment possible Occasional or no monitoring until treatment is available	Category Green
T IV	No chance of survival Palliative care	Wait-and-see care Palliative care End-of-life care	Category Blue
Death	Deceased person Leave on-site (to protect evidence) or transport to a mortuary for ethical reasons	Deceased person Declaration of death Death certificate	Category Black

Table 2: Comparison pre-hospital and in-hospital triage [Becker, D.]

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DESCRIPTION OF TRIAGE CRITERIA

Criteria / Clinical Sign	Declaration of the criteria and clinical signs
• Deceased	Patients who died during transport or upon arrival at the hospital before triage was performed.
• No chance of survival • Dying	Due to the severity of the injuries and the (limited) available resources survival is unlikely.
• CPR	Patients who need immediate cardiopulmonary resuscitation.
• Airway compromised	Occluded airway or an immediate risk of airway obstruction due to a foreign body or swelling.
• Respiratory failure	Clinical signs of respiratory failure e.g., acute cyanosis, laboured breathing, severe use of accessory muscles, shortness of breath, abnormal breathing patterns, severe retractions. Risk of respiratory exhaustion.
• Shock	Signs of hypovolemic, cardiogenic, distributive, or obstructive shock.
• Uncontrolled haemorrhage - life threatening	Active, severe haemorrhage of large vessels that cannot be stopped by direct pressure as well as massive bleeding into the thorax, abdomen, pelvis, thighs, which require immediate surgical treatment.
• Emerging organs from abdomen	Abdominal organs protrude through the open abdominal wall or foetal parts are visible or palpable through the closed abdominal wall in pregnant women.
• Continuous convulsive seizure	Patients who have generalized seizures on arrival.
• Severe respiratory distress	Clinical signs of severe respiratory distress e.g., cyanosis, abnormal breathing patterns shortness of breath, laboured of breathing with use of accessory muscles, retractions, laboured breathing in children. Respiratory rate <10 or >30
• Acute facial oedema	Rapid swelling of the face and lips.
• Uncontrolled haemorrhage - haemodynamically critical	Active haemorrhage from large vessels, as well as bleeding into the thorax, abdomen, pelvis, thighs, which require urgent surgical treatment.
• Cardiac pain	Acute thoracic / retrosternal pain that is not corresponding with breathes, radiates into the jaw, neck or left arm.
• Open or closed fracture of long tubular bones	Open or closed fractures of long tubular bones such as the thigh or upper arm with or without vascular or nerve lesions, which require urgent surgical treatment.
• Level of consciousness GCS<8	Severe altered LOC due to traumatic brain injury or intoxication.
• Acute neurological symptoms	Neurological changes that occurred within six hours and indicate a stroke.
• Isolated Inhalation trauma	Soot deposits in or around the mouth and nose, as well as singed nose and facial hair without further injuries.
• Uncontrolled bleeding hemodynamically stable	Active bleeding from small vessels, as well as bleeding from the body or extremities, which require haemostatic treatment.
• Open or closed fracture of short bones	Open or closed fractures of short bones such as the lower leg or forearm with or without vascular or nerve lesions, which require urgent surgical.
• Large areas of abrasion, burns or blistering	Skin abrasions, burns or blistering that affect more than 10% of the patient's body surface.
• Acute abdominal pain	Acute abdominal complaints that have occurred within the last 6 hours and suggest surgery.
• Level of consciousness GCS 9-14	Moderate altered LOC due to a traumatic brain injury or intoxication.
• Observed unconsciousness	Reported by the patient, paramedics, fellow patients, or other observers at the scene of the accident that the patient was unconscious.
• Eye injury	Any injury to the eye from foreign objects, direct trauma, or with unfamiliar fluids/chemicals.
• Dislocation of small joints and bones	Dislocation in the distal extremities, which require an immobilisation.
• Minor swelling	Slight increase in size or girth.

<ul style="list-style-type: none"> • Report of nausea or vomiting 	<p>Any type of nausea, with or without vomiting and any type of vomiting, with or without nausea.</p>
<ul style="list-style-type: none"> • Effected by the mass casualty 	<p>All arriving patients who were involved in the event with minor injuries or discomfort who are not showing any of the above criteria / clinical signs.</p>
<p>None of the above criteria or clinical signs</p>	<p>All incoming patients who do not show any of the above criteria / clinical signs.</p>

Table 3: Description of triage criteria [Becker, D.]

ROOM ALLOCATION

As in pre-hospital triage, MCIT-H also allocates spaces to the respective triage categories. The hospital's emergency management procedures determine room and staff resource allocation in accordance with patterns of injury or illness and provides way finding signage to direct patients, staff and relatives. The room allocation system presented here serves as an example only and must be adapted to each individual hospital situation.

EXAMPLES OF ROOM ALLOCATION

Examples of room allocation in different hospitals, using the MCIT-H algorithm.

Spital Limmattal



Patientenkategorie	Schwerverletzte T I	Mittelschwerverletzte T II a	T II b	Leichtverletzte T III	Abwartend, palliativ verstorben T IV
Anzahl	2	10		maximal 50	
Primärer Behandlungsort nach Triage	Schockraum Notfall (Überlauf AWR)	Notfall		Notfallpraxis Warträume Patienten Ambulatorium	Bettenstation Chir Bettenstation Med
Sekundäre Verlegung nach	IPS / OPS/ AWR	Bettenstation Chir Bettenstation Med		Notfall/Bettenstation Entlassung	

Figure 2: Spital Limmattal [Source: Matter, H.]

Kantonsspital Aarau

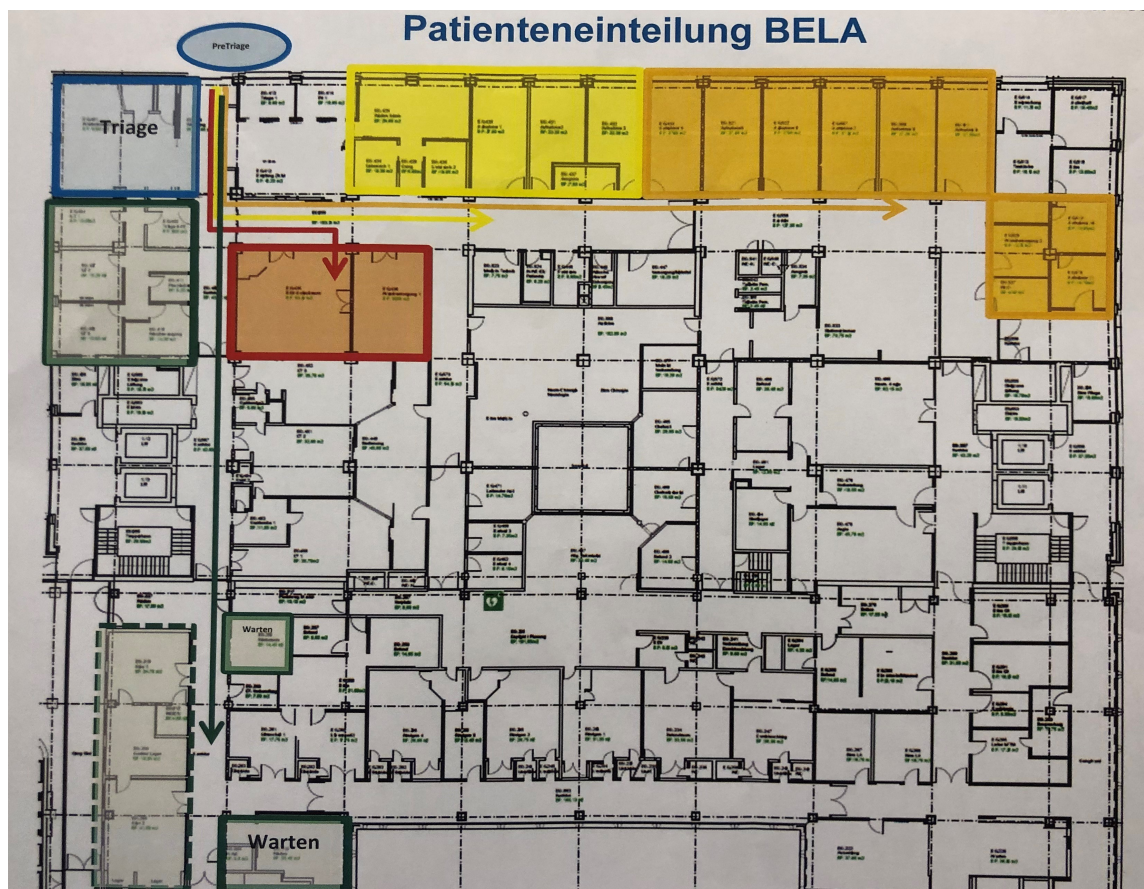


Figure 3: Kantonsspital Aarau [Source: Tobias, P. & Pries, H.]

Zuger Kantonsspital

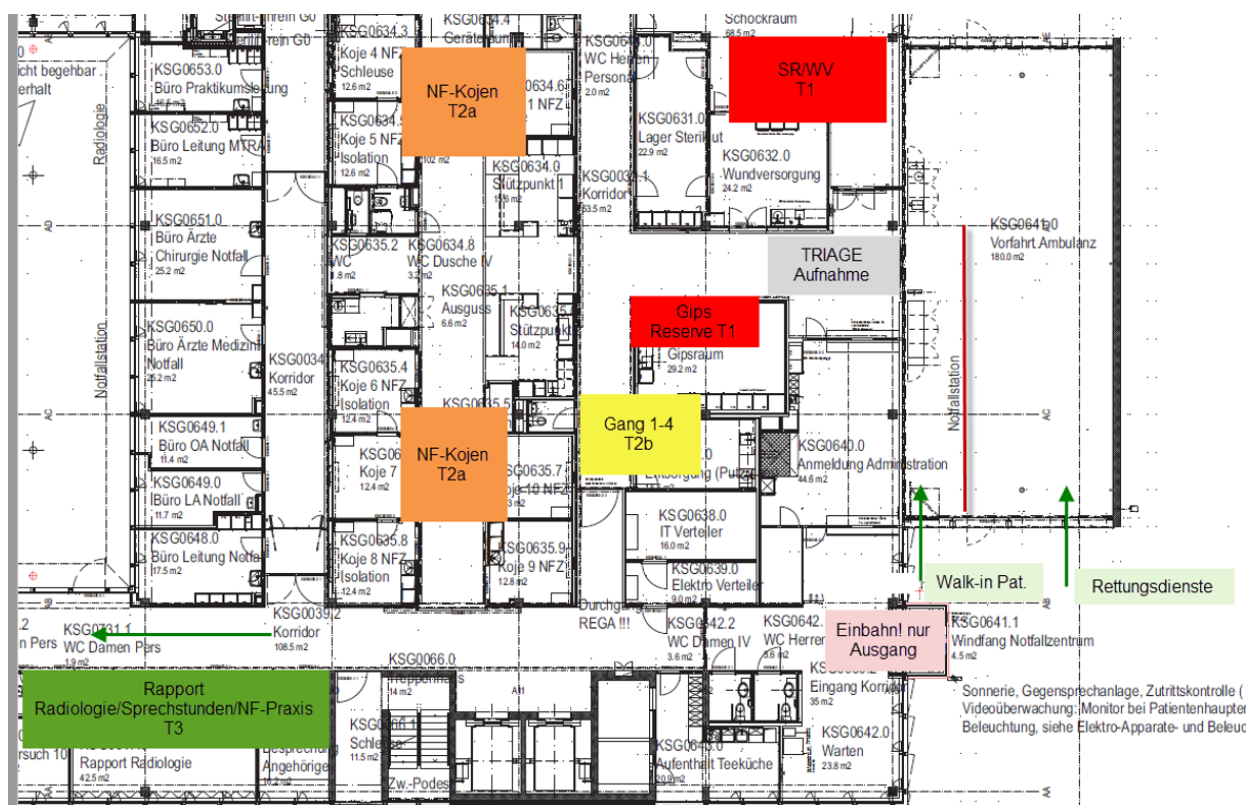


Figure 4: Zuger Kantonsspital [Source: Walder, A.]

Stadtspital Zürich Triemli

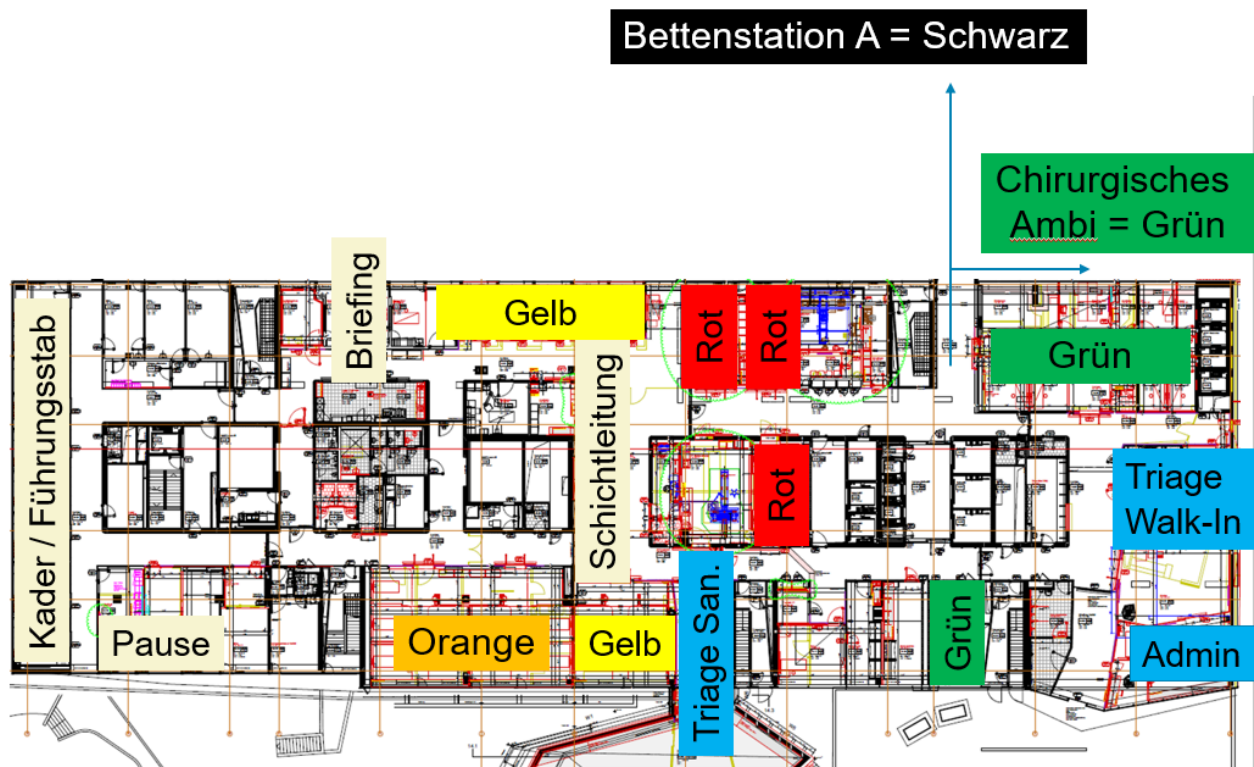


Figure 5: Stadtspital Zürich Triemli [Source: Becker, D.]

COMMENTARIES

Notfallpflege Schweiz	Reviewed by Notfallpflege Schweiz with no objections to unreservedly recommending the MCIT-H algorithm as a triage tool in the event of an MCI for triage in a hospital setting. July 2017
SFG	SFG recommends the MCIT-H algorithm as a triage tool in the event of an MCI for triage in a hospital setting. June 2017
SGNOR	Reviewed by SGNOR with no objections to unreservedly recommending the MCIT-H algorithm as a triage tool in the event of an MCI for triage in a hospital setting. January 2018
PEMS	Reviewed by PEMS with no objections to unreservedly recommending the MCIT-H algorithm as a triage tool in the event of an MCI for triage in a hospital setting. September 2017
SGC	Submitted for review on 9 January 2018, awaiting response.
SGAIM	Submitted for review on 9 January 2018, forwarded by the SGAIM to the ICKS on 23 April 2018, awaiting response.
SGAR	Reviewed by SGAR with no objections to unreservedly recommending the MCIT-H algorithm as a triage tool in the event of an MCI for triage in a hospital setting. April 2018

LIST OF ABBREVIATIONS

CPR	Cardio Pulmonary Resuscitation
GCS	Glasgow Coma Scale
ICKS	Swiss Society of Leading Hospitalists in Internal Medicine
MCI	Mass Casualty Incident
MCIT-H	Mass Casualty Incident Triage - Hospital Phase
PEMS	Pediatric Emergency Medicine Switzerland
PLS	Patient Routing System
SFG	Medical services management major incident
SGAIM	Swiss Society of General Internal Medicine
SGAR	Swiss Society for Anesthesiology and Resuscitation
SGC	Swiss Society of Surgery
SGNOR	Swiss Society of Emergency and Rescue Medicine

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Valk-Zwickl, P. participated in the translation of the English version of the MCIT-H algorithm.

SOURCES

Working group “New PLS Switzerland” (2019). *Gebrauchsanweisung PLS Schweiz*. Ittigen: Geschäftsstelle KSD

PROPOSED CITATION

English version:

Becker, D (2022). *MCIT-H – Mass Casualty Incident Triage algorithm for the Hospital phase. Version 4.*

German version:

Becker, D. & Sieber, R. (2026). *MANV-H Algorithmus – Ein Algorithmus zur Triage bei einem Massenanfall von Verletzten für den Hospitalisationsraum. Version 5.*