

## **SUPPLEMENTAL DIGITAL CONTENT 1: Description of Simulation Cases**

The below simulation cases were introduced in the 19th International EMS Competition “RALLYE REJVÍZ” which was held in Kouty nad Desnou (Czech Republic) on May 27-31, 2015. The cases were designed by experienced EMS instructors and modelled just as close to actual situations as possible. Each case was performed in a corresponding natural environment (e.g., in forest, at school, in a pub) in Kouty nad Desnou and surrounding communities; trained actors served as patients. Firefighters and the police with their standard equipment were also present in the case they were part of the simulation scenario. Before the competition, EMS crews received a schedule and a map with the locations where the scenes were set. The crews used their own ambulances (fully equipped) for transportation between the scenes. In the main competition, the results of which are reported in this study, the daily tasks were completed on May 29, 2015, and the night tasks in the night from May 29 to 30.

Description of the tasks is presented below. Detailed scoring system for each task is presented in Supplemental Digital Content 2. Reproduced with permission from <http://rallye-rejviz.com/rallye-rejviz-2015/>

## BRAVE MAN

**Case Summary:** A biker (man, 25 years) has bumped into tree branches during a downhill ride through the forest and fallen from bike; he has massive hemorrhage from the right side of the neck and from the front area right side of the chest. He has helmet, lies on his left side, is pale, has wet skin, is conscious, answers with latency, is oriented, and dyspneic. Pharmacological anamnesis: negative; allergological anamnesis: NSAID; personal history: negative.

**Assessment:** GCS 4-5-6; SpO<sub>2</sub> 88%; glycaemia 20.2 mmol/l (363.6 mg/dl); BP 90/50 mmHg; peripheral pulses 120/min; weak radial pulse; capillary refill time 4s; RR 24/min; normal neurological status; breaking contused wound on the right side of the neck with massive bleeding from the vena jugularis externa; deviation of trachea to the left; penetrating injury in right front axillar line in the 3th-4th intercostal space; breath sounds are normal on the left, they are absent on the right; begin subcutaneous emphysema and hyper-resonance by percussion; abdomen negative; pelvis fixed; legs without edema; abrasions on the legs and arms.

**Objectives:** Assess the scene; demonstrate a safe approach; take the patient's history (incl. allergological anamnesis); perform a thorough clinical examination; AcBCDE approach; stop bleeding from the v. jugularis externa l. dx.; take off the helmet; put a neck collar; treat the pneumothorax l. dx. by semipermeable dressing or chest drain; treat the evolving hemorrhagic shock and pain; direct the patient to the trauma center optimally by helicopter rescue; recognition of diabetes mellitus.

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call from a woman: A man, 25 years old, has fallen from MTB bike in the forest, massive hemorrhage from the neck and the chest, he is conscious, further details not known.

#### Your task:

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 10 minutes.

#### Conditions on the scene:

May 29, 11:00, clear, no wind, 19°C (66°F). The time from call to arrival on-scene is 8 minutes.

If any further information necessary, report to the judge marked as DISPATCHER.

#### Local situation:

- A. The nearest hospital is 20 km away overland. Depts.: surgery, internal medicine with ICU, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 42 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric department.
- C. A specialized center is 55 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- D. Leave the patient at the scene.

#### Means of transportation:

- E. Air; helicopter rescue (by request; arrival 15 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## GARDEN PARTY

**Case Summary:** A rotten tree has fallen down during the annual Firemen's Day event in the castle park. The place is secured by policemen and firemen until the arrival of an EMS crew. As the (competing) crew arrives, the chief fireman gives basic information: the fall of a rotten tree, the firefighters have secured the fallen tree, three persons have been affected: 1x unconscious child; 1x adult without injury, just shocked; 1x conscious adult, still under the tree, the extrication is just being completed. Another paramedic crew arrives at the scene four minutes later. This additional crew is less experienced than the competing crew.

### Priorities:

- **Primary examination:** 1x red (P1; the unconscious child; TBI), 1x yellow-red (P2; the adult under the tree; injury of the abdomen with incipient hemorrhagic shock), 1x green (P3; the adult without injury; acute stress reaction).
- **P1:** A child (12 years, 40 kg); unconscious after being hit by a falling branch; hypoventilation. He does not keep the airways open; reflexes of airways are sustained. Circulatory stable. The priority is the examination and treatment (stay and play), with the competing crew performing the treatment: Putting a neck collar on the child; anesthesia; OTI; mechanical ventilation; capnometry; restrictive fluid strategy; subsequent analgesia; positioning; warm comfort; transport to the Intensive Care Department or trauma center. (For a paramedic crew: Consultation with a physician from the MCO; oxygen mask; airways tolerated; the rest as above).
- **P2:** An adult (40 years, 80 kg); abdomen trauma with a suspicion of internal bleeding; the priority of examination and transport (load and go); primary examination and treatment by the competing crew; hand over the patient to the additional crew for transport in their ambulance. Oxygen; i.v. analgesia; restrictive fluid strategy; max. 500 ml of crystalloid solution; prevention of heat loss; quick transport (load and go) to a trauma center.
- **P3:** An adult without injury (a witness of the accident); acute stress reaction; stiffness; no aggression; no need for further treatment.

### Assessment:

- **P1:** AVPU – U; GCS 5; RR 8/min; HR 55/min; BP 150/90 mmHg; peripheral pulse present; SpO2 89%; capillary return in norm; temperature 36.1°C (97°F); blood sugar 5.2 mmol (93.6 mg/dl); pale; surface breathing; attempts to breathe; unable to keep free airways; reflexes of airways sustained. The laceration on the head in the area of P-O; slight bleeding; no effusion from the ears and nose; anisocoria 4/5; no photoreaction; no other injuries.
- **P2:** AVPU – A; GCS 15; RR 30/min; surface breathing due to the pains and bigger abdomen; HR 135/min; BP 90/45 mmHg; SpO2 91%; capillary return > 2s; iso pupils; photoreaction in norm; clear breathing; surface breathing due to the pains and bigger abdomen; the abdomen above of the chest level; strong pain (VAS 8 pp.); external findings: hematomas, excoriation, no foetor ex ore.
- **P3:** GCS 15; RR 20/min; BP 155/90 mmHg; HR 100/min; normal capillary return; no injuries. Neither medication nor transport are necessary.

### INSTRUCTION FOR PERSONNEL

A call from 112 Dispatch: A tree has fallen down during the Firemen's Day event in the castle park. At least three injured people; the place of the accident is accessible; firemen on-site. Another paramedic crew is arriving in about five minutes.

#### Your task:

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**INSTRUCTION FOR PERSONNEL** *(continued)*

**Time limit:** 12 minutes.

**Conditions on the scene:**

May 29, 11:30, clear, partly cloudy, wind gusts, 18°C (64°F). The time from call to arrival on-scene is 10 min. If any further information necessary, report to the judge marked as DISPATCHER.

**Local situation:**

- A. The nearest hospital is 10 km away overland. Depts.: surgery, internal medicine, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 22 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric department.
- C. A specialized center is 38 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, NMR, neurosurgery, pediatric ICU, and hyperbaroxy.
- D. Leave the patient at the scene.

**Means of transportation:**

- E. Air; helicopter rescue (not available).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew; arrival in about 5 min.
- H. Road; another ambulance with a physician (by request; arrival 40 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## OHS

**Case Summary:** A woman (32 years) is lying on the floor in the living room, with her feet on couch. She is pale and shaken. She has had vertigo and felt faint. She reports having heart palpitations and pain under her ribcage during inspiration. Signs of tachycardia, tachypnea, hypertension.

Breathing: bilateral vesicular sounds from the lung periphery, soft, dull percussion. Shortness of breath during a non-strenuous physical activity (e.g., walking). Abdomen distended, soft, diffusely tender, dull percussion, peristaltic sounds present.

The woman complains of pain in the lower abdomen and feels bloated. No problem with urination. Because of nausea, she only ate a bowl of soup and a yoghurt yesterday. Overnight, she vomited six times and had diarrhea twice. No blood was present in either the stool or vomitus. No discharge or blood noted during vaginal examination. She reports having a headache, her pupils are isochoic, no neck stiffness, able to walk unsupported. Limbs in norm. Blood sugar in norm. Skin pale and clammy, normal turgor, dry lips, and dryness in the mouth. She lives with her husband who is a paraplegic using a wheelchair.

Assessment	Upon arrival	During the task
RR	24/min SpO2 96%	24/min SpO2 97%
HR	138/min	135/min
BP (mmHg)	165/105	160/100
EKG	Sinus Rhythm, Tachycardia	
Temperature	36.9°C (98.4°F)	
Blood Sugar Level (mmol/l)	4.6 (83 mg/dl)	

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call from a man: His wife has been vomiting all night, she also has stomach pains and diarrhea. She has collapsed in the living room.

#### Your task:

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 12 minutes.

#### Conditions on the scene:

May 29, 7:30, clear, no wind, 10°C (50°F). The time from call to arrival on-scene is 8 minutes. If any further information necessary, report to the judge marked as DISPATCHER.

#### Local situation:

- The nearest hospital is 20 km away overland. Depts.: ambulant surgery and gynecology, internal medicine, anesthetist on duty nonstop, RTG, biochemistry, and hematology laboratory.
- A higher-level hospital is 36 km away overland. Depts.: as A + ED, anesthesia and general intensive care, surgery, gynecology and obstetrics, pediatric dept., and CT.
- A specialized center is 85 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- Leave the patient at the scene.

#### Means of transportation:

- Air; helicopter rescue (by request; arrival 20 min after the request; landing at the scene possible).
- Road; team's own ambulance.
- Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- Road; another ambulance with a physician (by request; arrival 15 min after the request).
- Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## STONE

**Case Summary:** A man (35 years), healthy, no prior medical treatment, no medication intake, allergy to pollens, no allergy to medication or drugs. He reports on sudden severe colic pain in the left lumbar area, with lancing into the groin and scrotum, nausea and vomiting, and dark urine. A physical examination reveals that everything else is in norm, belly freely open, palpable, painless, left tapottement positive. The patient actively leads the crew to an application of spasmolytics; a gradual relief after the application.

- Phase I:** First two minutes after the application. The patient becomes restless, gives a slight cough, breathes spastically, shows a wheezing respiration, reports on tightness in the throat and feels nauseous. Itching all over the body after a while.
- Phase II:** The third and fourth minutes after the application. The patient feels faint; tachypnea, communication difficulties; restlessness, and then sleepiness.
- Phase III:** The fifth and sixth minutes after the application. Unconscious; physiological shock symptoms.
- Phase IV:** The seventh and eighth minutes the application. Cardiac arrest.

Assessment	
Constant parameters	T 36.5°C (97.7°F); glucose 5.6 mmol/l (100.8 mg/dl)
Dynamic parameters	
Before analgesics	BP 140/85; HR 90/min; 98% SpO <sub>2</sub> , RR 16/min sinus. rhythm
Phase I	BP 140/70; HR 110/min; 93% SpO <sub>2</sub> ; RR 20/min sinus. rhythm; capillary return 2s
Phase II	BP 80/50; HR 120/min; 88% SpO <sub>2</sub> ; RR 45/min; ECG: supraventricular tachycardia (SVT); capillary return over 2s
Phase III	BP 60/30; HR 140/min; RR 45/min; SpO <sub>2</sub> immeasurable; ECG: SVT; capillary return over 4s
Phase IV	BP indeterminable; ECG: fast PEA; clinical cardiac arrest

**Objectives:** Assess the scene; perform a basic examination; treat the detected renal colic using spasmolytics IV or IM; detect the incipient, severe anaphylaxis; provide an appropriate treatment and stop the progression of anaphylaxis.

### Treatment

- Phase I:** Ensuring IV line, at least 20 gauge; oxygen at least 2 l/min; Dithiaden 1 mg IV; Corticosteroid, at least HCT 100 mg/MP 40 mg/DX 8 mg IV.
- Phase II:** Treatment Phase I + oxygen half mask, at least about 6 l/min; crystalloids at least 500 ml + quick adrenaline 0.5 mg IM or IV; titration at least 0.1 mg.
- Phase III:** Treatment Phases I and II + second IV Line, at least 20 gauge; further crystalloid 500 ml; oxygen at least 12 l/min.
- Phase IV:** Identification of cardiac arrest; Indication of CPR (Will not be performed; the task ends at this point).

**Important:** If the appropriate treatment is given in Phases I to III, the progression of anaphylaxis will stop and the patient's state improve and reach the earlier Phase-level within the next 2-min interval.

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call from a woman: Her husband (35 years) reports on sudden back pain and nausea.

**INSTRUCTION FOR PERSONNEL** *(continued)***Your task:**

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see below).
- If a hospitalization is necessary, determine the means of transportation (see the list below) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 12 minutes.

**Conditions on the scene:**

May 29, 10:30, clear, no wind, 22°C (72°F). The time from call to arrival on-scene is 5 minutes.

If any further information necessary, report to the judge marked as DISPATCHER.

**Local situation:**

- A. The nearest hospital is 20 km away overland. Depts.: surgery, internal medicine with ICU, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 42 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric dept. with ICU.
- C. A specialized center is 55 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- D. Leave the patient at the scene.

**Means of transportation:**

- E. Air; helicopter rescue (by request; arrival 15 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## HONEY

**Case Summary:** A woman (35 years) is expecting her third baby; EDD in a week. No complications in the delivery history. She is at a party, has stomachache, has vomited. While going in her room to have a rest, she meets a waitress. The pregnant woman is pale and her clothes are dirty because of vomiting. The waitress volunteers to call an ambulance, the woman refuses. After a while, the waitress calls 112.

Upon arrival, the crew is expected to contact the waitress. The waitress does not know the room number, but the husband of the pregnant woman is also at the party; he brings the crew in the room. Just about a minute before they enter the room, the woman has delivered a baby, cut off and tied the umbilical cord, and wrapped the baby in a wet towel. The woman is not bleeding; her vital signs are normal. She is holding the baby in her arms. The child does not cry; it is pale and not moving.

**History:** OA negative; FA 0; GA: 3th birth; previous births without complications and in due time. The current pregnancy without complications; EDD in a week. Today, the woman drank about 300 ml of wine; had meat with potatoes and salad for lunch; nausea after eating. She went to the toilet and vomited; abdominal and lower abdomen pain. On her way to the room, she met the waitress who suggested to call an ambulance, but she refused. She entered the room, washed herself, put a wet towel on her forehead, and went to bed. Abdominal pain became worse; pressure on the rectum; the amniotic fluid drained out. She wanted to call for help, but could not get up because of a strong urge to begin pushing.

**Childbirth:** She gave birth after pushing two times. The baby had the umbilical cord around his neck, but when she turned the baby, the umbilical cord loosened and she tied off the umbilical cord with ribbons taken from the gifts in bed (she saw a similar procedure during her previous childbirth). She then cut the umbilical cord with scissors that were next to the gifts and wrapped the baby in a towel. The baby was not crying, only slightly frowning, but fell asleep soon.

**Vital functions of the mother:** BP 120/80, HR 90/min, SpO2 99%, DF 14, capillary return 2 sec.

**Examination and treatment of the newborn:** Gently take the child from the mother's arms and put on a dry mat. The child is pale; blue acre; considerably lowered tonus. Wipe the child; stimulate its legs or chest (color and tonus); protect the child from hypothermia.

Examination: Mouth with amniotic fluid; apnea; cardiac arrest. Initiate CPR; if performed properly, the child will be saved and start crying. Mild hypothermia after CPR.

During the treatment, it is also necessary to check the mother's bleeding and uterine tonus (normal) and to continue communicating the parents of the newborn. Spontaneous childbirth in due term; placenta in utero. Prepare for transport; inform the parents; secure the child's thermostability. APGAR-score 10.

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call: A woman, 35 years old, abdominal pain, vomiting, pregnancy. A waitress from the pension Honey has called.

#### Your task:

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 11 minutes.

#### Conditions on the scene:

May 29, 13:30, clear, no wind, 22°C (72°F). The time from call to arrival on-scene is 5 minutes.

If any further information necessary, report to the judge marked as DISPATCHER.



**INSTRUCTION FOR PERSONNEL** *(continued)***Local situation:**

- A. The nearest hospital is 20 km away overland. Depts.: surgery, internal medicine with ICU, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 42 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric dept.
- C. A specialized center is 55 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- D. Leave the patient at the scene.

**Means of transportation:**

- E. Air; helicopter rescue (by request; arrival 15 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## WAND

**Case Summary:** GP has asked to transport a patient (man, 48 years) with headache and high blood pressure to Hospital A. Upon arrival, the patient is sitting in a waiting room and holds an envelope with GP Referral Letter. GP's office is closed; the doctor has gone to write a death certificate and his nurse has gone to take some medicines from a pharmacy. The patient is fully conscious, cooperative and talkative; his breathing is normal with no behavioral, perceptual, mental or speech disorder; he follows all instructions. There are two little pills, almost dissolved, in his mouth given by the GP "to do something with his high blood pressure". In Referral Letter, it is written: "2 pills of Tensiomin captopril 25 mg to dissolve in the mouth".

**Clinical status upon arrival:** Normal perfusion; wrist pulse palpable and regular. Heart auscultation: normal heart sounds, regular, no murmur. Lungs: symmetrical air entry, alveolar clear breathing sounds. Abdomen: soft, no pain response to palpation, no palpable mass, bowels sounds normal. Lower extremities with no edemas and no signs of DVT. Neurological examination: FAST with no pathology, no signs of side weakness.

Four minutes later, the patient is not as talkative as before, if asked he tells "I am feeling sick and weak", his responses are generally slowed-down with difficulties in understanding; peripheral weakness of the right upper extremity. The necessity to re-analyze the situation; revise the GP's recommendation of Hospital A, and inform EMS Dispatch Center about the patient's worsening. Contact a neurologist from the Stroke Treatment Center or the Cerebrovascular Diseases Treatment Center (both correct) and prepare the patient for transport.

**Clinical status four minutes later:** Neurological examination (FAST): moderate aphasia, isomiotic pupils 2/2, photoreaction normal, normal eye movements, right teeth show fails, tongue in middle line, no cervical pain, no cervical movements restriction. Upper extremities: Mingazzini test with right acral slow fall; positive right arm retardation; he cannot write due to the fine fingers movements disorder; weakened grip strength of the right hand; no ataxia. Lower extremities: Mingazzini test with no fall. Wide stance; needs a help to walk but no significant signs of paresis. Sensitivity: no sensory loss. No signs of meningeal syndrome. Others: blood pressure falls to 125/80, other vital signs without change.

**Resume:** Acute stroke; triage positive patient. Assessment: moderate aphasia, new faciobrachial right hemiparesis (incomplete hemiparesis capsular type) developed during EMS assessment. Recent hypertension; decapitated due to ACEI treatment prior to EMS arrival. No circulatory failure. GCS 15.

<b>Vital signs</b>	<b>Upon arrival</b>	<b>During the task (4 min after arrival)</b>
Pulse rate (/min)	75 (regular)	75 (regular)
Respiratory rate (/min)	14	14
Capillary refill time (s)	1	1
BP (mmHg)	160/90	125/60
SpO2 (%)	96	96
Blood Sugar Level (mmol/l)	5.1 (= 90mg/dl)	5.1 (= 90mg/dl)
Temperature (°C)	36.8 (= 98.2°F)	36.8 (= 98.2°F)
GCS	15	15
ECG	Sinus rhythm	Sinus rhythm

**The GP's Referral Letter:** "Nothing significant in medical history; only appendectomy in childhood. Thomas takes no medication on regular basis; has pollen allergy (hay); smokes 10 cigarettes a day and usually takes 4-5 cups of coffee a day, and drinks 2-3 beers a day. An elevated blood pressure 165/90 mmHg was found last week; today's measurement revealed 180/100-110 mmHg. Heart rate 75/min; circulation is stable. He complains about a weak headache since this morning, but he is overworked, sleepless, and reports on occasional cervical spine pain. Diagnosis ICD: I10 Essential (primary) hypertension. Tensiomin (captopril) 25 mg; two tablets to chew up. I kindly ask to run a detailed assessment, blood tests, and set up a treatment. Yours sincerely. Myslik Ferdinand, M.D., PhD., MBA."

**Anamnesis:** Thomas Wand, born on 17. 9. 1967 in Brno, Czech Republic. No prior illnesses; smoker (10 cigarettes a day); 4-5 cups of coffee a day; 2-3 beers a day; no illicit drugs abuse; he denies hypertension, heart problems, myocardial infarction, stroke, and diabetes. He had an appendectomy when 5 years old. No

regular medication intake. Family medical history unknown. Recent complains: A week ago, an enhanced BP was found (165/90) in a regular, preventive examination; advised to visit his GP for repeated measurement. He took a day off due to a tiredness, some shopping, and a household reconstruction and also went to the GP. Thomas is surprised about the high blood pressure; he does not consider it serious. The GP does not want to waste time and, therefore, he sends Thomas to the Internal Medicine Hospital. When asked directly, Thomas confirms headache – not severe but unpleasant, located to forehead, temple and scruff; it has started this morning and is still quite unpleasant.

### **INSTRUCTION FOR PERSONNEL**

Emergency Dispatch Center has received an emergency call: GP (family physician) asks to transport a patient with headache and newly found high blood pressure to Hospital A.

#### **Your task:**

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 12 minutes.

#### **Conditions on the scene:**

May 29, 11:30, clear, no wind, no rain, 22°C (72°F). The time from call to arrival on-scene is 10 minutes. If any further information necessary, report to the judge marked as DISPATCHER.

#### **Local situation:**

- A. The nearest hospital is 8 km away overland. Depts.: biochemistry and hematology, general surgical ward, internal medicine ward, and neurology ward.
- B. A higher-level hospital is 20 km away overland. Depts.: emergency and resuscitation unit, CT scanner, biochemistry and hematology, general surgical ward, internal medicine ward, neurology ward with ICU, pediatric ward with ICU, stroke treatment center ICU, infectious diseases ward with ICU, ENT ward, and psychiatry.
- C. A specialized center is 30 km away overland. Depts.: emergency and resuscitation unit, CT scanner, NMR scanner, Cath lab, biochemistry and hematology, general surgical ward, internal medicine ward, neurology ward with ICU, pediatric ward with ICU, stroke treatment ICU, infectious diseases ward with ICU, ENT ward, psychiatry, cerebrovascular diseases treatment center (higher level than a stroke treatment center), neurosurgery, burn treatment unit, and trauma center level I.
- D. Leave the patient at the scene.

#### **Means of transportation:**

- E. Air; helicopter rescue (by request; arrival 15 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## SCHOOLBAG

**Case Summary:** Elementary School in the village Velké Losiny; 10-15 children in the class; from first to eighth grade (6 to 14 years old). The teacher has tripped over a school bag, fell on the floor and is lying there; he seems to be sleepy, slurred speech, little laceration on his forehead. The school principal is usually at school, but not today; he is having a meeting outside of school. The janitor is out too; some children have looked for him, but he is neither in his office nor answering the phone.

Upon arrival: The teacher is lying on the floor; head supported with the teacher's jacket (if the EMS crew sift through, they will find antidepressants and insulin in the pocket,); two of the children look after him, the others are very nervous, restless, and noisy. There is a bottle of water on the teacher's table (if the crew open the bottle, they will notice it smells like the plum brandy or vodka). No other adults at the scene.

**Assessment:** The teacher is sleepy GCS 3-3-5; pupil isocoric; slowed reaction to light; breathing freely, clean, 96% SpO<sub>2</sub>; pulse at the periphery well-palpable; BP 140/90 mmHg; HR 110/min; pale skin; sweating; small abrasions on his forehead; no other injuries. Glycaemia 1.9 mmol/l (34 mg/dl). If 40% Glucose is administered into a vein, the teacher will come to himself by 60 ml.

### Procedure:

- (1) Call the Dispatch Centre and ask for sending an adult who can take care of children (e.g., police, mayor, principal).
- (2) Thank the children who took care of the teacher.
- (3) Do not leave the children alone until the arrival of an adult (one of the crew should keep a watch on the children, the others should treat the teacher). Calm down the children; if asked, they give information about the teacher's medical history: "The teacher sometimes swallows pills when he opens the bottle; the water stinks; the teacher is drunk sometimes; he behaves strangely...".
- (4) Take the children out of the classroom; don't speak about possible diagnosis, alcohol, or drugs in front of children; do not undress the teacher in front of the children.
- (5) Emphatically explain to the children that the teacher had an accident (e.g., "he is sick, maybe he ate something bad"), explain that the crew is going to treat him and take him to the hospital. No promises, nothing specific.
- (6) If proceed properly (i.e. administration of the glucose; identification of drugs and alcohol), the teacher will come to himself. If the crew asks, the teacher will admit that he has got the drugs from a friend (he has not visited a psychiatrist) and he possibly took too many of them. He denies suicidal thoughts; he complains only about the children at school "I have been fed up with these bastards for a long time." He further explains that he visited his GP 14 days ago with sinusitis, still taking antibiotics, and that he suffers from diabetes.
- (7) Indicate a suspicion of possible chronic problems with alcohol and drugs, which may be problematic because he works with children, in the medical report.

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call: Elementary School Velke Losiny, a teacher has tripped over a school bag and is lying on the floor, not moving, unconscious, but breathing. One of the pupils called, they are alone, only with the teacher.

#### Your task:

- Assess the scene and provide correct care on-site.
- Examine and treat the patient(s).
- Define a working diagnosis, administer a proper therapy.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 12 minutes.

**INSTRUCTION FOR PERSONNEL** *(continued)***Conditions on the scene:**

May 29, 10:00, clear, no wind, 22°C (72°F). The time from call to arrival on-scene is 5 minutes.

If any further information necessary, report to the judge marked as DISPATCHER.

**Local situation:**

- A. The nearest hospital is 10 km away overland. Depts.: surgery, internal medicine with ICU, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 22 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric department with ICU.
- C. A specialized center is 35 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- D. Leave the patient at the scene.

**Means of transportation:**

- E. Air; helicopter rescue (by request; arrival 20 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".

## INTERNSHIP

**Case Summary:** The crew is guided through an operating room, where a laparoscopic gallbladder surgery is being performed. The surgical team (a doctor and a nurse) is working back turned to the crew, so the crew can only see their backs and the monitor transmitting the operation, but not the laparoscopic training device the surgeons are actually using. After a few introductory words about the equipment and high demands of this job, the nurse collapses. Seeing this, the doctor is collapsing as well. The guide declares that this is quite normal and that they will come to themselves after a while, but, in the meantime, it is necessary to continue with the surgery. It is emphasized that the surgical team is not a part of this task; the competing crew need not take care of them.

The crew chooses two of its members (a doctor and a nurse) to continue with the surgery; they have one minute to get familiar with the laparoscopic equipment. Thereafter, the crew has up to 10 minutes to complete the task: to put on scrubs, insert the laparoscopic instruments and the laparoscope (a lighted camera) into the patient's "body" (= the laparoscopic training device), cut off the gallbladder in the marked area, and pull the gallbladder out. The time is measured from the first contact with the scrubs; the participants can get dressed by themselves to save time. The doctor controls the laparoscopic instruments, while the nurse controls the camera and wipes the sweat off the doctor's forehead. The doctor can control the laparoscopic instruments in real time, by viewing all manipulations on the video monitor.

The task is over when the gallbladder has been cut off and pulled out, or after the 10-min limit has been reached. If the crew completes the task within the 10-min limit, they earn one plus point for each second saved. For cutting off in other than the marked area, a rupture during the surgery, and taking out the instruments without completing the task, the score is reduced.

### INSTRUCTION FOR PERSONNEL

Dear colleagues, welcome to our high-tech clinic "Postmortem". We like to invite you to a small teaching internship at our newly opened operating room. Leave all equipment in the car. We are happy to guide you through our clinic equipped with the latest technology and to demonstrate some highly-specialized medical operations by our specialists. We hope you will enjoy the internship.

**Time limit:** 10 minutes.

**PS:** No equipment necessary.

**MINION**

**Case Summary:** After an operation in the field, the crew has returned to the station to end today's shift. The crew members leave the ambulance and go home (= back to the hotel), using a private car. The whole crew is in the car. On the way to the hotel, they see a woman at the edge of the road who is waving and calling for help. Her partner has collapsed, is not moving, and she does not know what to do. The patient is laying on the verge, is not moving, not breathing, cyanosis. The crew should diagnose cardiac arrest, put the patient on a flat surface, and perform CPR for 10 minutes without any equipment and aids. The crew chooses two members to simultaneously perform CPR. A standard CPR manikin (and not the acting patient) is used for CPR.

**INSTRUCTION FOR PERSONNEL**

After a medical assistance at the Firemen's Day event, return to the station (see the map), end the shift, and go home. You are now off duty.

**Your task:**

- Return to the station and leave the ambulance.
- Drive back to the hotel.

**Time limit:** 13 minutes.

**Conditions on the scene:**

May 29, 22:30, clear, no wind, 17°C (63°F).

## BIRTHDAY

**Case Summary:** Shooting at a birthday party; police on the spot. Upon arrival, the crew should look for the police patrol commander to check for potential risks. When asked about risks, the commander declares that the police have made the area safe and the crew is now allowed to enter the building. The commander can also respond any further questions, if necessary.

There are 12 injured victims on the scene. Perform proper life-saving actions, including the use of triage cards. Policemen on the spot will cooperate with the EMS crew, if the crew asks for.

**Important:** Before entering the scene and starting the task, the competing EMS crew gets a handheld radio to communicate with EMS dispatch center. A judge outside the scene acts as EMS dispatcher.

### INSTRUCTION FOR PERSONNEL

Emergency Dispatch Center has received an emergency call: Shooting at a birthday party; the number of injured unknown; the police on the spot.

#### Your task:

- Assess the scene and provide correct care on-site.
- Make an initial triage, use the START method or the TIK MK method (your choice).
- Perform life-saving actions.
- Specify further steps according to the local situation (see bellow).
- If a hospitalization is necessary, determine the mean of transportation (see the list bellow) and prepare the patient(s) for the transport.
- Report any further steps to the judges on-site.

**Time limit:** 10 minutes.

#### Conditions on the scene:

May 29, 23:30, clear, no wind, 16°C (61°F). The time from call to arrival on-scene is 10 minutes.

If any further information necessary, report to the judge marked as DISPATCHER.

#### Local situation:

- A. The nearest hospital is 17 km away overland. Depts.: surgery, internal medicine with ICU, neurology, anesthesia and general intensive care, gynecology and obstetrics, CT, and biochemistry.
- B. A higher-level hospital is 36 km away overland. Depts.: as A + ED, ENT, oncology, psychiatry, infectious diseases, and pediatric department with ICU.
- C. A specialized center is 55 km away overland. Depts.: as B + trauma center, burn unit, cardio center, stroke unit, and NMR.
- D. Leave the patient at the scene.

#### Means of transportation:

- E. Air; helicopter rescue (by request; arrival 15 min after the request; landing at the scene possible).
- F. Road; team's own ambulance.
- G. Road; another ambulance with paramedic crew (by request; arrival 15 min after the request).
- H. Road; another ambulance with a physician (by request; arrival 15 min after the request).
- I. Others (describe and justify to the judge).

Report the transportation to the judge. An example: "Direction A, transport F".



**PAIRS**

**Case Summary:** The crew is presented with 20 medicaments that are used to treat four different diagnoses. The task is to match the medicaments with the corresponding diagnoses within 5-min time limit. The diagnoses and the matching medicaments are:

1. **Essential (primary) hypertension:** Lorista (losartan); Prenessa (perindopril); Agen (amlodipin); Betaloc (metoprolol); Moduretic (amilorid)
2. **Schizophrenia:** Tisercin (levomepromazin); Haloperidol (haloperidol); Zyprexa (olanzapin); Risperdal (risperidon); Zoleptil (zotepin)
3. **Arterial and/or venous thrombosis:** Plavix (clopidogrel); Godasal (acetylsalicylic acid); Fraxiparin (nadroparin); Pradaxa (dabigatran etexilat); Heparin (heparin)
4. **Allergic/anaphylactic reaction:** Nasonex (mometason); Aerius (desloratadin); Zyrtec (cetirizin); Solu-Medrol (methylprednisolon); Adrenalin (epinefrin)

**INSTRUCTION FOR PERSONNEL**

You will be presented with 20 medicaments that are used to treat four different diagnoses. Match the medicaments with the corresponding diagnoses.

**Time limit:** 5 minutes.

**PS:** No equipment necessary.