Guideline
For Implementation Of Manchester-Triage-Systems In An Hospital Information System

Content

Content

Content 2
Basics Manchester-Triage-System 3
Implementation of Manchester Triage in an HIS 6
Description of process and support of integration 8
Documentation 19
Visualizations 21
Evaluations 23
Quality Managament Support 26
Interfaces and definitions 29

As of March 11th 2018
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Basics Manchester-Triage-System

Purpose

Manchester Triage System (MTS) is a tool of clinical risk management: all arriving patients undergo a structured procedure to assess their urgency. Manchester triage system make use of an assessment of the patient's presentation and symptoms. Nomenclature is as follows: the complaints are named *presentations* (German: Präsentationsdiagramme) and the symptoms *discriminators* (German: Indikatoren).The system is suitable for hospitals of all care levels and all sizes and can be used in both pure emergency rooms (NA) and mixed elective / emergency outpatient clinics. Therefore, if in the following the term NA is used always mixed structures are included.

Procedure

The assessment is carried out immediately after arrival of the patient (ideally before the patient's administration) and leads to the allocation of a time window within which a first physician contact should be made (not the start of treatment!). Symptoms are associated with timeframe fixed groups of urgency; this association is based on the likelihood of risk to patient with this symptom.

A particular symptom is always assigned the same level of urgency (regardless of the selected presentation).

Additionally symptoms are sorted by urgency within the urgency levels. The ABCDE scheme is used for this (not an alphabetical sorting!).

If the time window can not be adhered to, a so-called secondary assessment is carried out as a documentation of the patient's observation. Therefore, a second assessment carried out does not extend the waiting time of the patient. However, in the event of a deterioration urgency may increase.

Time scale for hospitals in German speaking countries

Ziffer	Name	Farbe	Max. Zeit	Kontrolleinschätzung spätestens nach
Eintreffen bis Ersteinschätzung			5-10 Minuten	
1	Sofort	ROT	0 Minuten	
2	Sehr dringend	ORANGE	10 Minuten	10 Minuten
3	Dringend	GELB	30 Minuten	30 Minuten
4	Normal	GRÜN	90 Minuten	90 Minuten
5	Nicht dringend	BLAU	120 Minuten	120 Minuten

The sheet shows the urgency/time-matrix. The timeframe shown above is agreed within the national reference groups of Germany, Austria, Switzerland and Italy and could not be changed. The timeframe used in the UK, Portugal, Spain, Brazil and other countries is a management tool of health politics and at this point does not focus on the patient's risk.

Further use

The result of the initial assessment can be used within the hospital to establish standard procedures for patients with this chart-indicator combination (synonym : standard operating procedures, Leitlinien, Behandlungspfade, ...), which could (proven in studies) have positive economic effects, satisfaction increase, acceleration of treatment and legal compliance with the specialist standards can be guaranteed. The same applies to composites of smaller rural hospitals, where the cooperation between the sites and the similar action can be supported.

Interface "Out-of-hour-services"

However, the result of triage can also be used at the "common counter" to enable the allocation of a patient to the out-of-hour-treatment area of the "Kassenärztliche Vereinigung (KV)" or the emergency department of the hospital. The concept of a common counter has been described by "Kassenärztliche Bundesvereinigung (KBV)" in its report (published September 2017) as the most suitable model. The medical assistants (MFA) of the KV and the triage nurse of the ED are using the same instrument (MTS) for triage; the result decides during the working hours of the KV outpatient clinic about the assignment of minor problems to the KV outpatient clinic.

Responsibility and development

Given the purpose, it is clear that the Manchester Triage System could only be used "as it is". Further development of the system is be done by the international conference of the International Reference Group and is based always on studies. The translation and adaption to health politics of the agreed changes is object of the national reference groups. At the international conference distinctions are made between urgent and non-urgent changes, the first are to be implemented in IT in a timely manner.

Quality improvement of triage

The developers given exact definitions of how quality improvement of triage should be carried out as an audit. Sample size is exactly defined (n = 2%, but at least 10 episodes per user), as test criteria and targets. The frequency of audit is agreed by international consensus conference with at least once a quarter. Hospitals recognize more and more the need to undergo such an internal audit on a regular basis. The need of an external audit is not yet common in Germany, but it is to be expected that this requirement will arise with the restructuring of the emergency care in Germany through the decisions of the Joint Federal Committee (Gemeinsamer Bundesausschuss G-BA).

Impact on IT implementation

In face of the complexity of the organization "Emergency Department" and the task triage, it is easily to be seen, that it is not enough "simply" to transfer the presentations and discriminators into an HIS and everything is fine. There are many dependencies and requirements to observe. These are presented (also with optional aspects) in the following in this "Implementation Guide".

Legal aspects

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Ensuring correct implementation

To ensure the correct implementation of the MTS in any HIS, an Excel map is available, which is regularly updated after the international conference and made available to the licensed software companies via the publishers Wiley / Hogrefe. From the content of the Excel map the specific databases of the IT solution can be generated. A manual entry from the book "Ersteinschätzung in der Notaufnahme" is explicitly not desired, since copying by hand raises risk of errors.
Important note: The Excel map also includes the Presentations „Massenanfall – primäres Diagramm“, Massenanfall – sekundäres Diagramm“ and „Misshandeltes Kind“. These presentations are listed only for completeness in the sheet and are not be implemented in an HIS!

Implementation of Manchester Triage in an HIS

It is imperative that ***all presentations*** (compared to the printed medium: except for the diagrams in the appendix) and ***all discriminators*** with the associated explanations are applied ***unchanged*** in the IT system.

When mapping, the order of the discriminators in the presentations is binding.

When mapping, "risk limit" ("Risiko-Grenze") must be shown at the correct position in the respective diagram.

The documentation of the ***exclusion of a discriminator*** by the user is ***not done individually for each discriminator***, but as a ***"summary confirmation" at each level of priority***. Formally, this corresponds to a confirming click on the "No" below the priority level.
The design of the "exclusion button" is left to the systems, but it must be easy and quick to recognize and use. Acceptable labels of buttons are "Nein" (as in the presentations) or "Keine(s)" (mental addition: …of the ones listed here.) or "Risiko-Grenze" at the correct position to replace the "Nein". ***The risk limit has not explicitly to be confirmed but can be used instead of "Nein" (or similar)***.

The ***discrimators are displayed as a block tier by tier***, the discriminators of the ***next priority level*** are displayed ***after the exclusion button for this level of urgency has been pressed***.

Both on the selection menu for the presentations as in selecting discriminators the ability of a ***call of the explanations (as shown in the book) have to be provided*** to ensure quality of decision. The form of implementation should follow the conventions of the individual system (e.g.: balloon tip, drop-down, overlay on the page). For reasons of clarity and system performance, the ***display as a call-up as PDF is forbidden***!

To make it easier for users to ***access and choose the presentations***, they should not be shown in a single- or multi-column layout (with long scrolling to find the desired presentation). Conceivable is a visualization as buttons in alphabetical order as a raster on a page or a search field, which limits the choice when selecting the first letters. Already been proven is a more elegant solution: before selecting the presentation a list of upper groups is preceded. The user selects from one of several upper groups, after which a reduced list of all suitable presentations opens. From this, the user selects the appropriate presentation and goes through the discriminators (see chapter Process of triage and integration support). In this model, the last selection option of the list of upper groups should always be the option "All presentations" (Alle Diagramme) - if a user is completely unsure.

Within the upper groups the diagrams are sorted in alphabetical order, exception is the diagram "general indicators", which in the upper group "miscellaneous" is necessarily last to be shown.

This "upper group selection" is as an useful option offered to users of all system.

The following sheets are part of the Excel map:

Sheet „Obergruppen" (note the blocking notes!):
Name of the upper gropups
List of assigned (selectable) presentations

Sheet „Präsentationsdiagramme“ (note the blocking notes!):

Name of presentation	Shown as it is
Explanation of presentation	Enable call up as it is
Reference to other presentations	Integrate in explanation of presentation
Risklimit under	Beneath this tier the “Risiko-Grenze” should be shown

Sheet „Indikatoren“ (Discriminators) (note the blocking notes!)

Current number of discriminator	Attention: could change with integration of new discriminators!
Name of discriminator	Shown as it is
Explanation of discriminators	Enable call up as it is
Tier	At which tier (1-5) the discriminator has to appear
Absolute rank	First digit codes Urgency level, second and third digit encode the absolute order of discriminators within the tier, overall this results in an absolute hierarchy of the discriminators in the system
Columns F – BF	Mark „X“ shown, if the discriminator has to be inserted in this presentation.

This representation should allow automatic generation of visualization in the HIS.

Description of process and support of integration

Almost immediatly (legally defined as within 10 minutes) the patient will be triaged (see timeframes on p 2). Based on the result of triage it will be decided, where and when the patient will be treated.

From the perspective of risk management and the idea of a "common counter" with referral to out-of-hour-service it would be very desirable if ***triage will take place before any administrative task is done***. In SAP, such a procedure is named "id-free documentation", this id-free document is personalized (either by entering first name/name or by reading the insurance card), the case-id will be created later and then the document mapped to it. It may be that the order (1st initial assessment, 2nd administration) will even be codified in the future (G-BA or law). Against these backgrounds the following requirement is defined:

> ***The case-id-free implementation / documentation of triage with a basic data set of the patient is a need.***

Since the emergency surgeries are using separate IT systems (AIS – physician-information-system), it is necessary that ***the result of triage could be transferred by use of an HL7 message***. The necessary ***interfaces are to be seen as a basic function of the MTS integration into the HIS and must be made available as standard.***

> ***For this purpose a standard ORU message is used which must transfer the following values in the OBX segment(s):***
>
> ***1. Reason for coming (shortened to 50 characters, if necessary)***
> ***2. Presentation used (name as named in the system)***
> ***3. Discriminator used (name as named in the system)***
>
> ***If required on customer request, other types of interfaces can be used or other parameters can be transferred in other segments.***

Situation will raise, where delays in administration or even early triage happens. These delays can become security-relevant problems and should therefore be recognizable to those responsible for organization of ED. The problem, however, is that the first timestamp of this patient is generated at the delayed contact.

> ***As solution, the implementation of a self- service terminal should be offered to the customer. The arriving patient can draw a number at the terminal. As this number is produced in the terminal it includes a time-stamp – this time-stamp can be mapped with the case-id*** and supports anonymous visualization in the waiting room (see visualizations). It also allows to detect critical delays for the patient treatment.

Situation can be, that a patient in obviously critical situation is treated by a physician (e.g. patients arriving by ambulance accompanied by emergency physician) or if triage must be interrupted (e.g. patients who need to give an urine sample).

> ***Therefore, documentation of triage must allow an (incomplete) caching; start of triage or completion must be possible after physicians contact. Incomplete triage has to be represented by the highest color code ever detected (the color of the urgency level that could not previously be excluded).***

Especially emergency rooms of smaller hospitals are not only responsible for treatment of emergencies, it comes to a widespread mix of patients. However, patients with an appointment as well as in-house consultation or wound-reviews do not need a triage. In order to ensure that these are not displayed on the monitors as non-triaged ***a special subgroup should be set up and displayed for patients with appointment***. For more information, see Visualizations.

IT-based process of triage goes the following steps:

1. Welcome patient, ask the reason for coming
2. Documentation of the reason for coming, selection of the appropriate presentation (e.g. via the intermediate step “upper group”)
3. Discrimination of urgency across all discriminators with documentation of the (urgency-)phased exclusion of discriminators
4. Recording of necessary vital parameters (defined in each presentation)
5. Carry out of necessary corrections to the classification (see Test Routines)
6. Completion of triage
7. As needed: Call of clinical treatment paths
8. As needed: Processing treatment paths
9. As needed: Carrying out a second assessment

Upon completion of triage documentation is finally stored. As during temporary storage a change the values was still possible, the status and findings are now "frozen" - a change is no longer possible; a new version of triage might have to be created. At this moment, IT-system checks the quality of the documented triage and points out missing parameters and parameters that indicate higher ranking.

> ***The decision as to whether the triage should be finalized incompletely or whether an elevated parameter should have no influence on the classification is always a decision of the user. IT does not make any automatic changes to the classification but makes suggestions.***

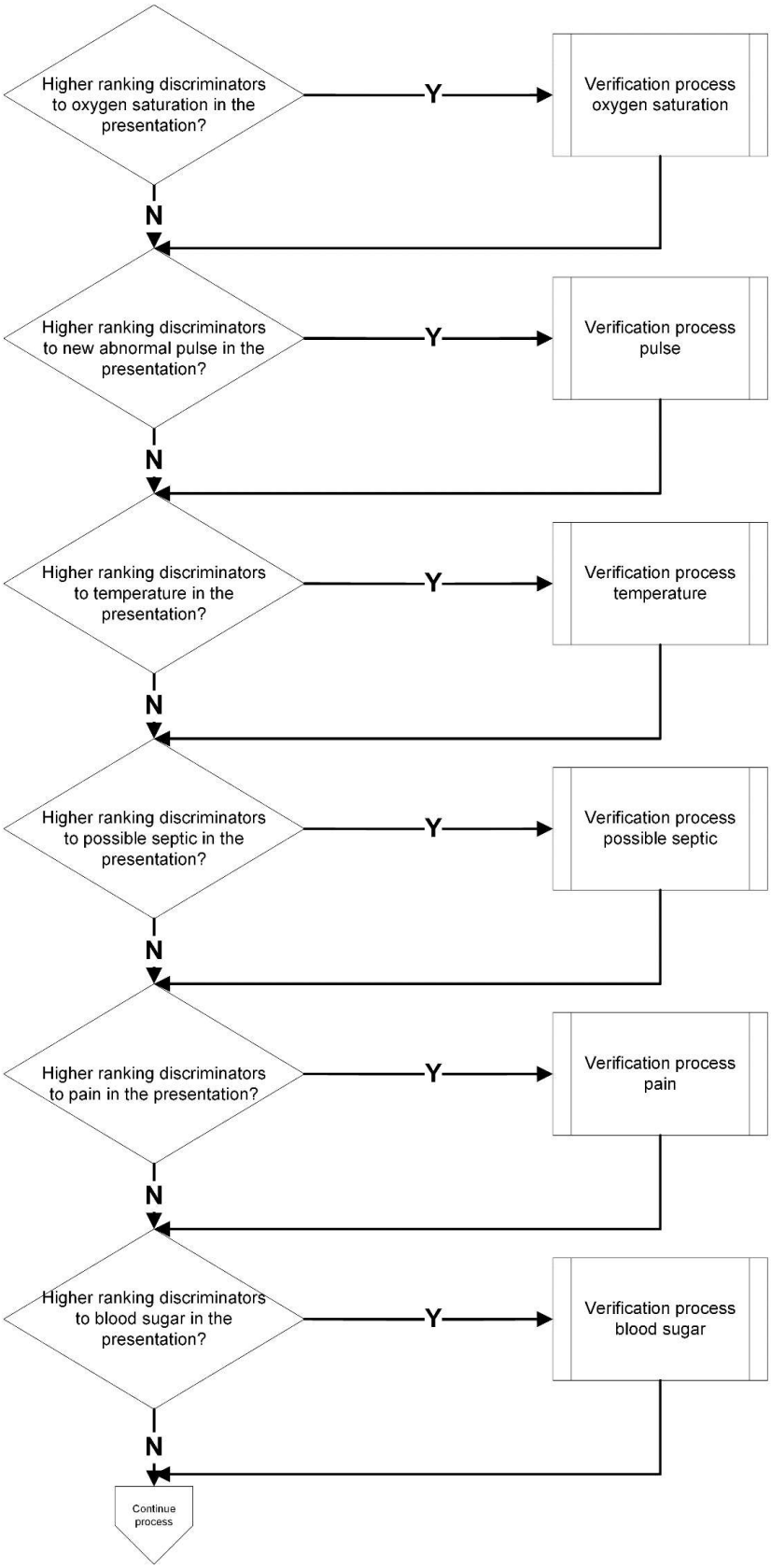
Vital signs below the selected tier of urgency or results of a vital parameter below the choosen discriminator will not be visualized.

The following graphics (attached also as PDF) visualize the test routines. The order of checks (and therefore of the graphics) is largely based on the ABCDE scheme and should be mapped in the program logic as well.

The Excel map contains in the sheets "Parameter-Prüfung" and "Erfassungsgrade Parameter" the list of checks and the deselection options, as well as important values. This shows which presentation require which checks.

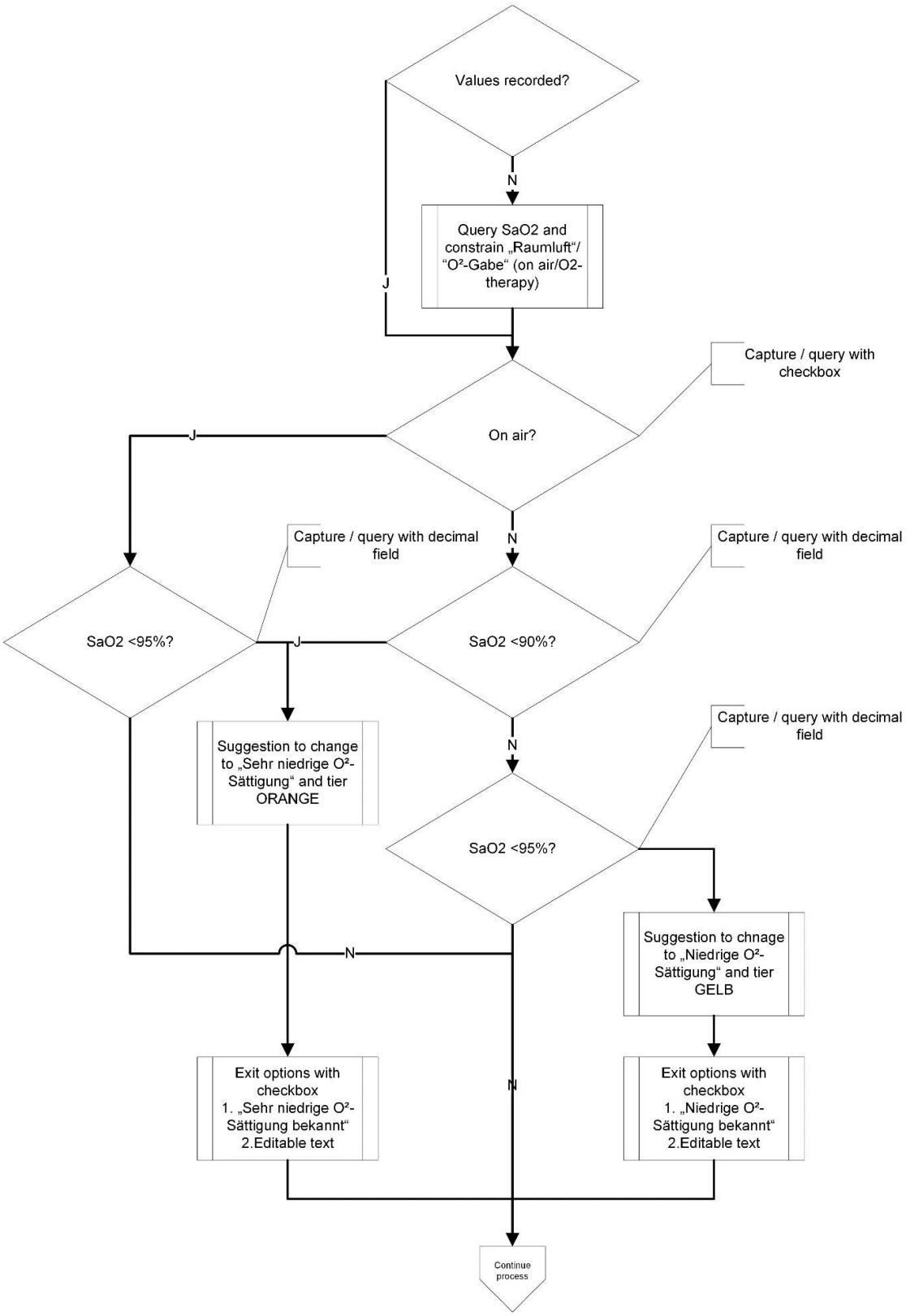
Final Examiniation Vital Signs At End Of Triage

Version 1 – December 2017



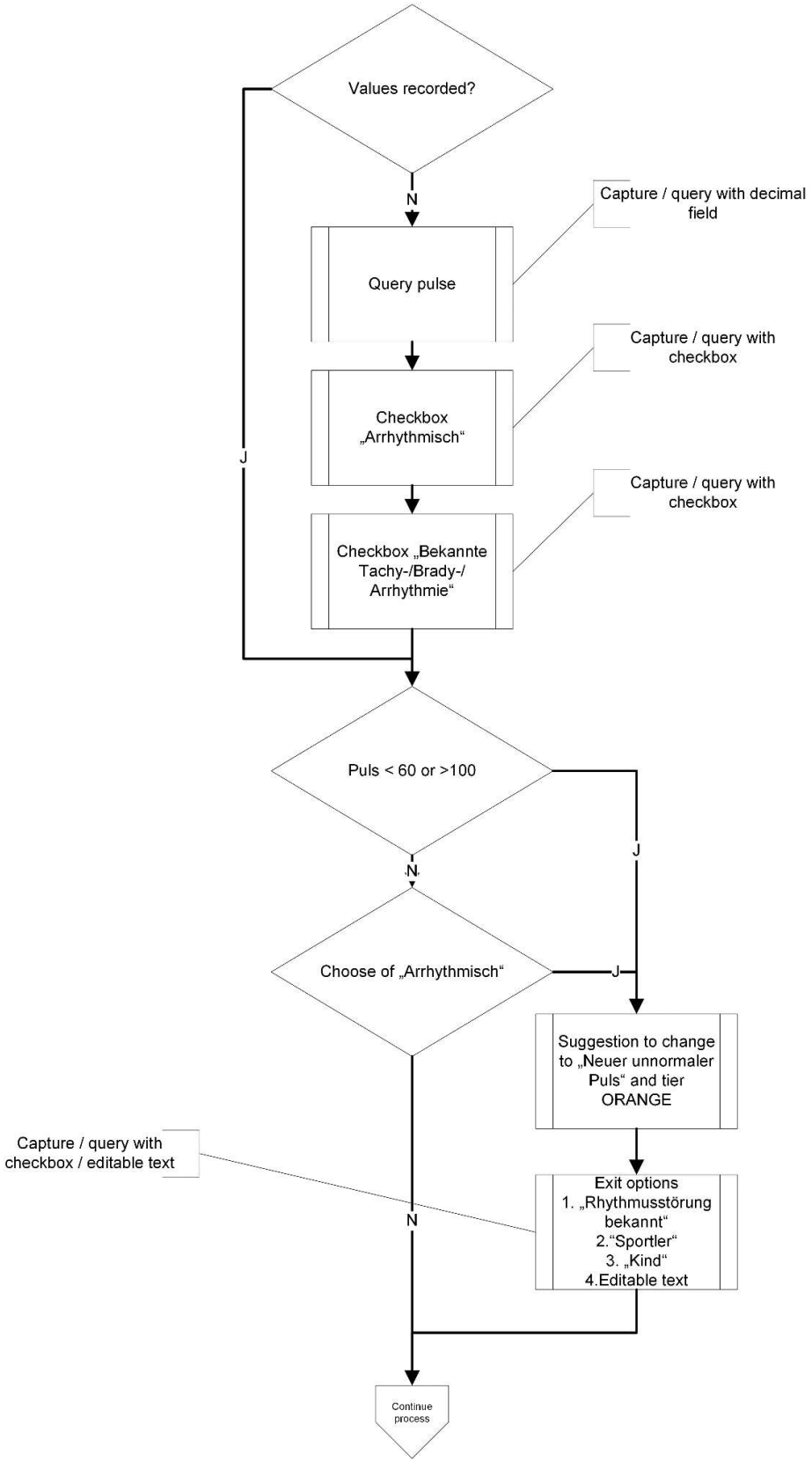
Examination „Sauerstoffsättigung“

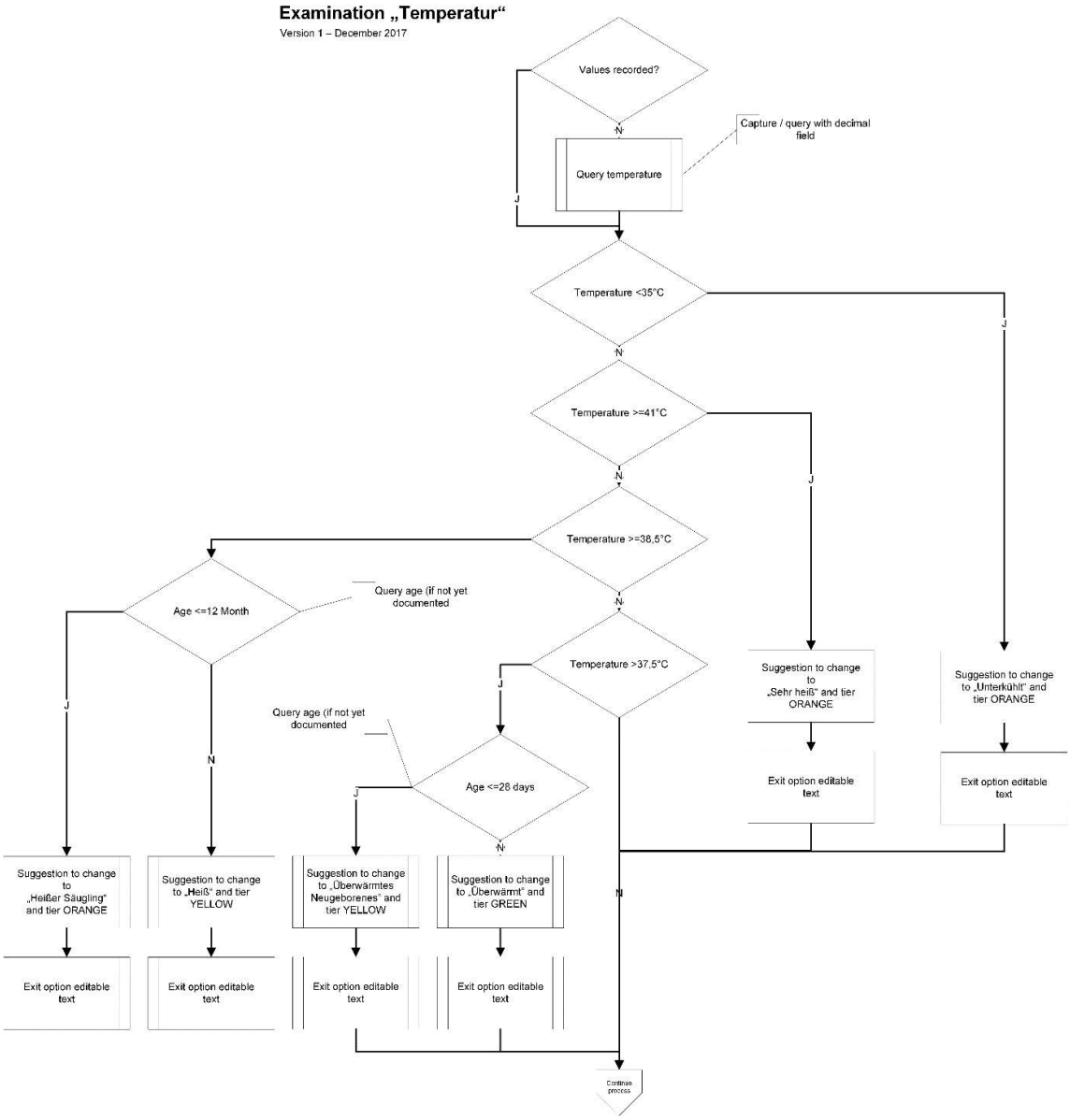
Version 1 – December 2017



Examination „Neuer unnormaler Puls“

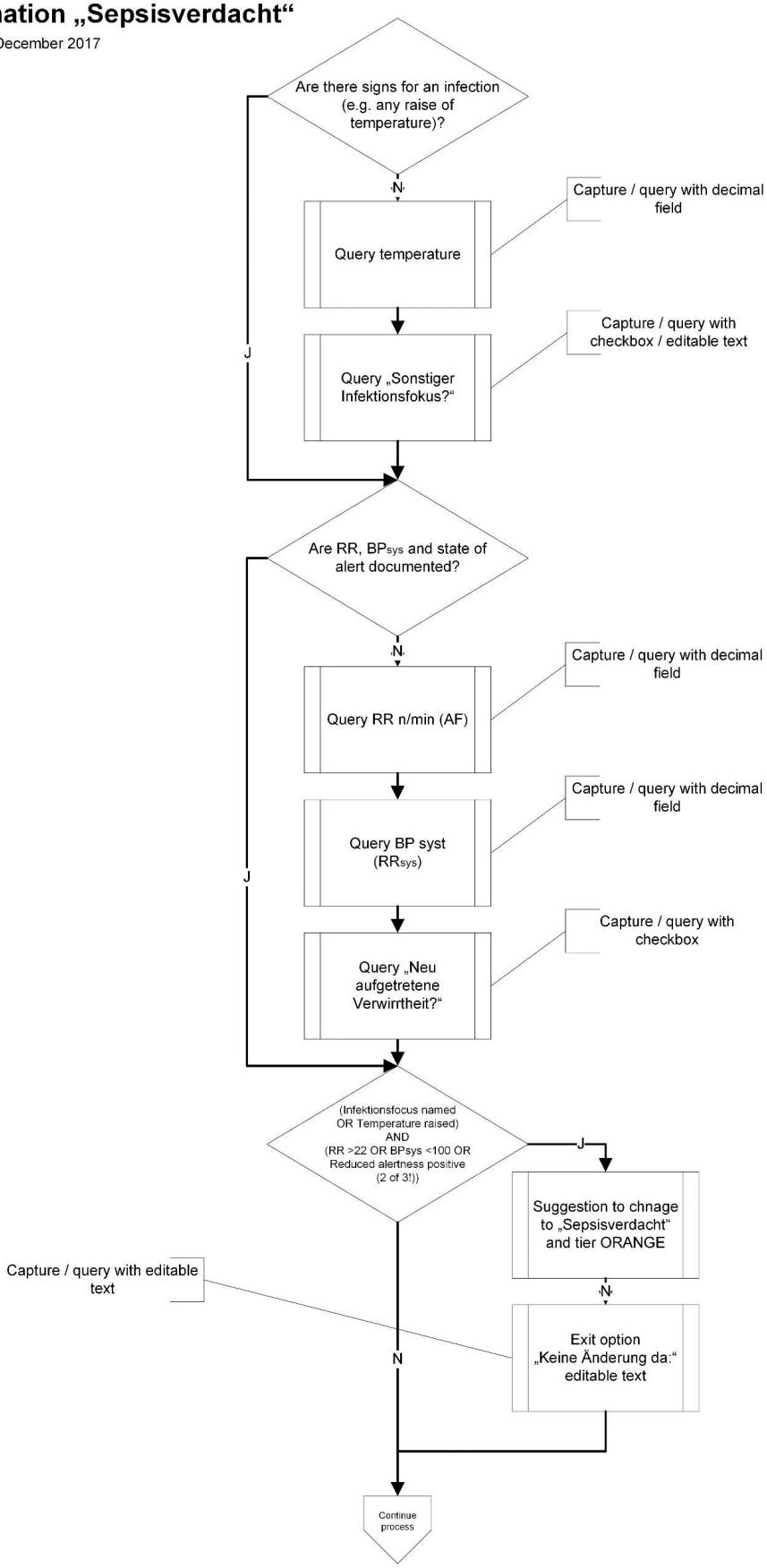
Version 1 – December 2017




Examination „Temperatur“
Version 1 – December 2017
Values recorded?
N
J
Capture / query with decimal field
Query temperature
Temperature <35°C
J
N
Temperature >=41°C
J
N
Temperature >=38,5°C
Age <=12 Month
Query age (if not yet documented
J
N
Temperature >37,5°C
J
N
Suggestion to change to „Sehr heiß“ and tier ORANGE
Suggestion to change to „Unterkühlt“ and tier ORANGE
Exit option editable text
Exit option editable text
Query age (if not yet documented
Age <=28 days
J
N
Suggestion to change to „Heißer Säugling“ and tier ORANGE
Suggestion to change to „Heiß“ and tier YELLOW
Suggestion to change to „Überwärmtes Neugeborenes“ and tier YELLOW
Suggestion to change to „Überwärmt“ and tier GREEN
Exit option editable text
Exit option editable text
Exit option editable text
Exit option editable text
Continue process

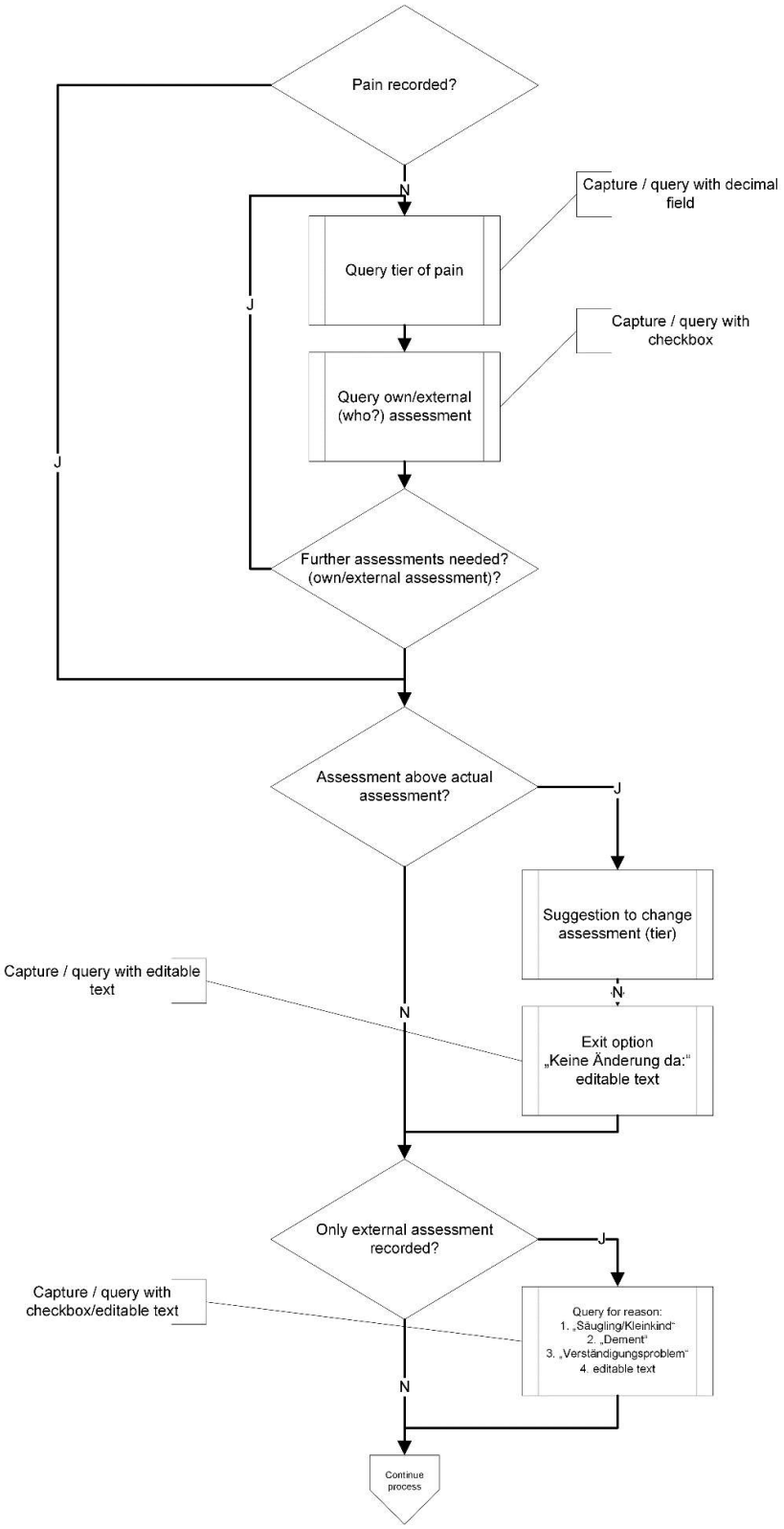
Examination „Sepsisverdacht“

Version 1 – December 2017



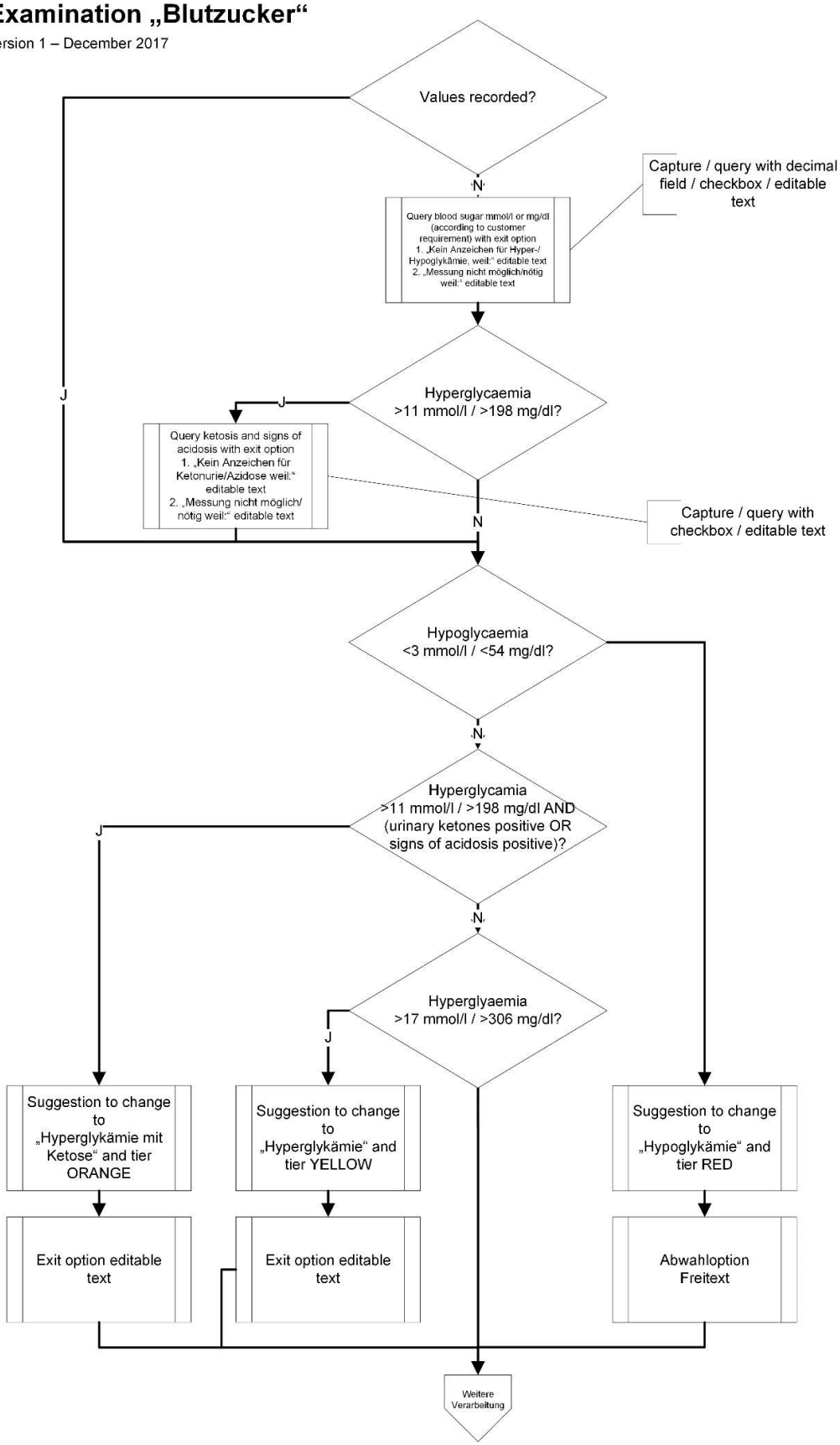
Examination „Schmerz“

Version 1 – December 2017



Examination „Blutzucker“

Version 1 – December 2017



Episods of triage in which an „exit"-option is selected (the proposed correction was rejected by the triage nurse) will marked as to be proofed and will be selected automatically for audit of triage (see Evaluations and Quality Management Support).

With completion of triage "time begins to run". The time frames described below describe the time in which the patient should not be at risk. The progress of the waiting time is displayed (see Visualizations), for this two variations are possible:

1. ***The time calculated from the time stamps "end of triage"+"waiting time of the emergency level" is displayed.***
2. ***The running backwards "remaining waiting time" resulting from the time stamp "waiting time of the triage tier" is displayed.***

A static display of the waiting time of the tier is not allowed.

Ziffer	Name	Farbe	Max. Zeit	Kontrolleinschätzung spätestens nach
Eintreffen bis Ersteinschätzung			5-10 Minuten	
1	Sofort	ROT	0 Minuten	
2	Sehr dringend	ORANGE	10 Minuten	10 Minuten
3	Dringend	GELB	30 Minuten	30 Minuten
4	Normal	GRÜN	90 Minuten	90 Minuten
5	Nicht dringend	BLAU	120 Minuten	120 Minuten

As soon as the physician sees the patient a green signal is shown in the working list (see Visualization). The documentation of physicians action should be as pragmatic as possible, but still legally sound. This can be e.g. the call of an input field by the physician with subsequent entry of a PIN, but can also done by inserting a smart card and PIN. The necessity of a complete user change (logging in and out) should be avoided.

If time is exceeded, it should be displayed in the work list by a red signal. Either now in the manner described above, ***the physician contacts the patient and the warning signal is replaced by the green signal (!)*** or the physician is too busy, this is the latest time for a second assessment.

Based on the assumption that a large proportion of patients (80%?) will remain unchanged even if the waiting time is exceeded, and to facilitate the documentation of the secondary triage assessment, the documentation of the second assessment should be as follows:

1. ***Quick access to the existing initial triage form (eg by clicking on the time of day)***
2. ***Display of the completed first triage form***
3. ***Selection of a button "Zweiteinschätzung" by the user***
4. ***The result of the first triage will now be shown next to / below / beneath***
5. ***The user can (if the patient is unchanged) confirm and conclude the secondary triage assessment by confirming the completion (no temporary storage!).***

6. However, it must be possible for the user to change everything (really everything, including a possibly implemented upper group). Vital parameters in the secondary assessment must be detectable, they must be recorded and displayed in addition to the vital parameters of the initial assessment, the vital parameters of the initial assessment must not be overwritten.
7. The red warning signal remains displayed in the work list (the physician has not yet contacted the patient), ***the waiting time of the patient is not extended (!), he remains at the point in the work list that was determined by his urgency on arrival***. The display of the time window from the secondary assessment only serves as an indication of when a renewed check will be necessary.
8. ***If the patient worsens, he may ascend to a higher position***, this is determined by the time of the first assessment and the results of the second assessment, but never go than "now". This will happen when a secondary triage assessment has been made for recognition of deterioration during waiting time.

The result of triage can provide additional to optimize the treatment processes. Largest problem for hospitals facing different degrees of expertise and qualification of his staff is to provide quality of specialists standards. ***Organizationally the problem can be solved by definition of standards by the head physician of the relating departments:***
Aus dem Ergebnis der Ersteinschätzung können zusätzliche Benefits zur Optimierung der Behandlungsprozesse erzeugt werden. Das große Problem für die Krankenhäuser ist die Einhaltung des Facharztstandards bei unterschiedlich ausgeprägter Fachlichkeit und Qualifikation der Ärzte und des Pflegepersonals. ***Die Probleme können organisatorisch dergestalt gelöst werden, dass durch die Fachabteilungen definiert wird:***

1. Identify: Which department is responsible for which (part of) a presentation
2. What measures are necessary (for the defined patient) at what point in time of nursing / medical care in order to comply with the guidelines of the specialists societies
3. When should the specialist be consulted?
4. When can patient admitted in which specialists department/ward?

This organizational approach must be supported in IT by a function that for selected presentation-discriminator-combinations an in-house standard is storable and accessible.

Documentation

Basically, core of triage documentation consists of the statements:

1. Reason for coming
2. Selected presentation
3. Selected discriminator

The urgency level and the time to treatment is an automatical result from the selection.

It is unequivocally clear that this is not a complete documentation of triage, but that there are still a number of additional (vital) parameters missing. The following graphic shows an example of a possible documentation sheet.

PLATZ FÜR LOGO

Klinik XYZ Zentrale Notaufnahme

BLAU	GRÜN	GELB	ORANGE	ROT
2	2	2	2	2

Patientendaten

Grund des Kommens

Eintreffen
Datum
Zeit

Ersteinschätzung (1)
Zeit
Kürzel

Eingesetztes Diagramm

Eingesetzter Indikator

Zweite Einschätzung (2)
Zeit
Kürzel

A – Atemwege	1	2	B – Atmung	1	2
frei			unauffällig		
verengt			unzureichend		
verlegt			keine		
C – Kreislauf	**1**	**2**	**D - Bewußtsein**	**1**	**2**
normofrequent			wach/kooperativ		
tachycard			wach/unkoop.		
bradycard			reag.Ansprache		
arrhythmisch			reag. Schmerz		
Asystolie			nicht ansprechb.		
D - Immobilität	**1**	**2**	**D – Neurologie**	**1**	**2**
keine			Status epileptic.		
vorhanden/bek.			Z.n.Krampfanfall		
vorhanden/neu			Periph. Ausfälle		
Blutung	**1**	**2**	**Pupillenreaktion/-größe**		
keine			R	L	
kontrollierbar					
klein/unstillbar					
groß/unstillbar					

Verabreichte Medikationen

Schmerzmed. verabreicht lt. Akte	
Allergie geg. dieses Schmerzmed. verneint	
Sonst. Medikation verabreicht lt. Akte	

Arztkontakt
Zeit

Durchgeführte Maßnahmen

Lagerung auf Trage	
Transport im Rollstuhl	
Anlage Armschiene	
Anlage Beinschiene	
Anlage Halskrause	
Applikation (Eis-)Kühlung	
Anlage/Wechsel Verband	

Vitalparameter	**1**	**2**
RR links	/	/
RR rechts	/	/
Puls	/min	/min
Temp.	°C	°C
O_2-Sättig.	%	%
AF	/min	/min
BZ	mg%	mg%
U-Stix		

Schmerzeinschätzung (Eigen=E, Fremd=F)

1 — 0 — 5 — 10 — 1
2 — 2

Notizen/Ergänzungen

Version 7.2 – April 2013 Dokumentation nach Richtlinie Deutsches Netzwerk Ersteinschätzung - www.ersteinschaetzung.de

The hospital will expand the documentation manifold, this remains their responsibility. It must, however, be documented:

1. Reason of admittance, presentation chosen, discriminator chosen, urgency level
2. Text field for important information in addition to triage
3. All vital parameters resulting from the test routines for first and secondary assessment (!)
4. When assessing pain, in addition to recording the first and second assessments, it must also be possible to record the patient's own and an external assessment (nurse, parents, carers). For more precise defining see test routines. In principle, the self-assessment

of the patient (if any) is decisive for the classification. In the case of the external assessment, it must be shown (check option) whether the external assessment has been carried out by parents/carer or the nurse.

5. The pain assessment uses the following classifications:
   - Slight pain: pain scale 1-4
   - Moderate pain: pain scale 5-7
   - Strongest Pain: Pain Scale 8-10

The documentation of the presentations and the discriminators is mandatory from a selection list or selection button. ***A free text input is not allowed!***

Performing the initial assessment results in the following time stamps:

1. Arrival of the patient (self-service terminal?)
2. Time of administrative recording
3. Time of triage
4. (Time of a secondary triage)
5. Time of first contact to physician

In the further course of treatment, the next time stamps are added

6. Start of treatment (if not identical to 5.)
7. End of treatment
8. Time of admittance to ward/time of discharge

These timestamps have a high urgency for evaluations (see Evaluations and QM Support)

In the future it will be necessary to hand over to the patient an information paper with the presentation of his urgency rating. A model of such a paper is part of the IT-documentations. The paper should show (beneath some information) only the result of triage (urgency level) but no time should be shown.

The decision whether to use or not and which information should be given is up to the hospital/ED. The model gives an advice but is no formal specification.

Visualizations

The visualization of occupancy views - whether outpatient or inpatient, whether examination area or ward - is highly depending on the conventions of the respective IT system. Therefore, there can't be absolutely identical visualization through all systems. However, the options presented below have proven themselves in daily use in a wide variety of systems and have proven to be quality-assured during treatment. For the sake of the highest possible quality, the following visualization options should therefore be available to all customers. The decision as to which visualization is used will always remain with the customer and his responsibility (including the consequences). However, the following principles has to be respected:

The visualizations must show all patients who are in an area for treatment. This will include ***outpatients*** and ***inpatients*** who belong to this area only, ***regardless of their specialty,*** as well as patients who are actually assigned to other wards, but who are undergoing examination or treatment in the ED (***"Konsile" consular patients***). ***A separate presentation by in-/outpatient or specialty is only permitted as a supplement.***

The visualizations must represent the patients in treatment, as well as separately shown patients before treatment (in the waiting area) and in examination areas (such as X-ray and, if required, other typical treatment areas of the hospital).

1st Visualization:
Here the customer must have a representation available in which to recognize which patient should be seen next by the physician. As already shown, either the time of the necessary contact or a timer with a display of the remaining minutes should be shown. If the time is exceeded, a warning sign appears, and the delay is shown by increase of negative numbers. Once the physicians contact has taken place warning signal disappears. Documentation of a secondary assessment does not stop the warning signal. Even after start of treatment by the physician, the urgency of the patient remains recognizable, it could still serve as an indication of the potential risk the patient had at arrival.

As color coding for the urgency levels it is mandatory to use the colors from the MTS (RED - ORANGE - YELLOW - GREEN - BLUE), for patients who do not receive a triage color code WHITE is recommended, for not yet triaged patients the color GRAY. In the latter 10 minutes after arrival a warning signal has to appear, if triage has not yet been begun. This expires with execution of triage.

2nd Visualization:
In many emergency rooms a simplified visualization of the ED as top view of the layout (Dashboard, Layout, Birdview ...) has proven itself. Even in such a representation, the urgency level is to be displayed and a possibly necessary warning to be visualized. However, this floor plan representation can't replace the working list of patients (1st visualization)!

3rd Visualization:
An anonymous presentation of the occupancy situation of the emergency room in the waiting room has proven to be useful. This gives the waiting patients the reason for the waiting time and (especially in combination with an information leaflet with their own triage) to identify the expected delay. In this case, for example, a top view (2nd visualization) can be used, but the information should be reduced to the essentials (level of urgency). If, in the future, the function of a waiting number is used, these numbers can be used for anonymisation, otherwise an abbreviation of the name (one letter each of first name and name) can be used.

4. Visualization:

The information from the HIS should replace the frequently used whiteboards in the office and hallway. For the corridor of the emergency room, the anonymous presentation may also be used. Always indicate the urgency levels and possible warning signals.

Evaluations

The KIS should be able to store the following evaluations and make them available (on request) automatically:

1. Number of patients per day according to time of arrival (diurnal lines - Tagesganglinien), undifferentiated, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: absolute numbers
        - Value representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
2. Number of patients per day according to time of arrival (diurnal lines), differentiated according to urgency, levels (related to urgency):
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: absolute numbers
        - Value representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
        - Non triaged patients should be shown as separate group
3. Ratio of the assessed patients for the number of total patients in percent, undifferentiated, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: percent
        - Value representation: Maximum, Mean, Minimum
4. Waiting time of patients after arrival to triage (Door to Triage) according to time of day of arrival, undifferentiated, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: minutes
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
5. Waiting time of patients after arrival to triage (Door to Triage) according to time of day of arrival, differentiated according to urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month

- Year
    - Value: minutes
    - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum

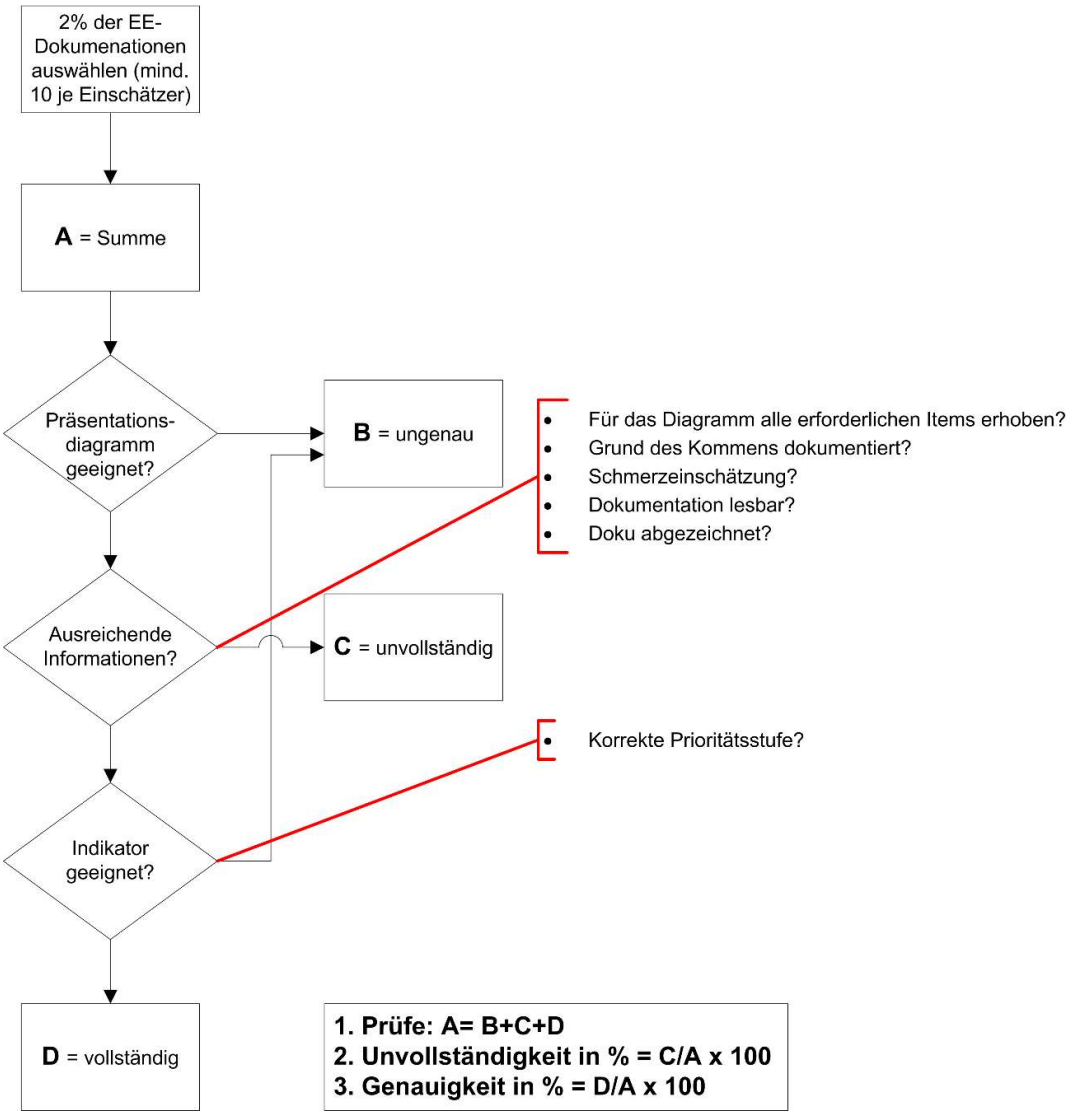
6. Waiting time of patients to contact with physician (Door to Physician), undifferentiated, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: minutes
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
7. Waiting time of patients to contact with physician (Door to Physician), differentiated according to urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: minutes
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
8. Physician contact within timely manner, differentiated per urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: percentage
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
9. Number of secondary triage episodes, differentiated per urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: total numbers
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
10. Number of secondary triage within timeout in percent, differentiated per urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: percentage

        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum

11. Length of stay in ED (Door to Door), undifferentiated, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: minutes
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
12. Length of stay in ED (Door to Door), differentiated per urgency, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: minutes
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum
13. Type of treatment of patients after completion of treatment in ED, differentiated according to urgency, sorting criteria outpatient / inpatient / other, levels:
    - Hour of day
    - Day
    - Weekday
    - Month
    - Year
        - Value: total number
        - Value Representation: Maximum, Upper Quartile, Average, Lower Quartile, Minimum

Quality Managament Support

The IT-implementation should basically be able to support a regular audit. The audit process is as follows:



It has to be noted:

1. The audit function should be available but deactivated. The activation requires an operating/service agreement with the works counsil. The absence of this agreement shouldn't cause a delay of implementation of the electronical triage function. .
2. The specifications of the developers of the MTS require a sample of 2% of all triage episodes of a given period, but at least 10 triage episodes per user in this period.
3. Audit of triage should be undergone in a regulary manner, ideally every month, but at last once a quarter.
4. In principle, works counsils always insist that no behavioral and performance control of the employees takes place. "Deutsches Netzwerk Ersteinschätzung" is formulating a model of an agreement between employer and works consil which will contain the following specifications:

- The sample for the audit is drawn automatically by the IT system and stored not anonymously in a separate storage area which only can be accessed by the authorized auditor and a designated member of the works consil.
- The auditor will select the sample, clarify individual problems with the respective employee and then trigger an anonymization function (employee and patient). A behavioral and performance control does not take place, the results have no employment law consequences.
- The anonymized results are now made available for the presentation of quality, statistical evaluations and as basis for identification of team trainings for anybody with a legitimacy/need for use (e.g. Quality department, management, in-house training centre).

Therefore, the following functions have to be prepared:

1. Automated provide a random controlled 2% sample of a selectable (month, quarter) period.
2. At least 10 initial assessment episodes shall be provided for each employee involved in the audit period.
3. The sample should include all episodes with selected exit option (see chapter Process description and integration support) - they are counted as the basis for fulfilling the 2%.
4. The sample consists of the documentation of the initial assessment as a PDF with the parameters collected and documentations made. Attached is the documentation sheet "Audit Ersteinschätzung" in evaluable form.
5. In the case of episodes selected due to a use of the exit option, a special note is given to the auditor on the "Audit Ersteinschätzung " documentation sheet.
6. The results are displayed after anonymization as follows:
   - Sum sample = A
   - Sum of all episodes with inaccuracies = B
   - Sum of all episodes with incompleteness = C
   - Complete and accurate episodes = D

   In this case, B or C counts in the order the item was selected in the documentation sheet “Audit Ersteinschätzung”, even if further deficits were subsequently documented (it is intentioned to be possible).

Fallidentifikation	Ausführer		
Präsentationsdiagramm geeignet? [B]	**Ja**	**Nein**	**Bemer-kung**
Bemerkungen			
Ausreichende Informationen? [C]	**Ja**	**Nein**	**Bemer-kung**
Grund des Kommens dokumentiert? [C]	**Ja**	**Nein**	**Bemer-kung**
Schmerzeinschätzung durchgeführt? [C]	**Ja**	**Nein**	**Bemer-kung**
Dokumentation lesbar / verständlich? [C]	**Ja**	**Nein**	**Bemer-kung**
Dokumentation abgezeichnet / Ausführer erkennbar? [C]	**Ja**	**Nein**	**Bemer-kung**
Bemerkungen			
Indikator geeignet? [B]	**Ja**	**Nein**	**Bemer-kung**
Korrekte Prioritätsstufe zugeordnet? [B]	**Ja**	**Nein**	**Bemer-kung**
Bemerkungen			
Bewertung (B = Ungenau; C = Unvollständig; D = Vollständig)	**B**	**C**	**D**

Bewertungsbogen Internes Audit - Version 1 (2014) - © Jörg Krey, Deutsches Netzwerk Ersteinschätzung

Interfaces and definitions

The software must (unless it is a subsystem of a HIS) have communication capabilities in the usual standard communication dialects. This includes explicit an HL7 interface at least version 2. In addition, communications should be possible using HCM, xDT , XML. VITAL (Vital Signs Information Representation) should be implemented for communication with medical devices.

[Only if the software is not subsystem of a HIS:] The interface must be unidirectional from the triage software to the HIS the above mentioned documentation, due to the variety of HIS systems at least as pdf file.

Depending on the software and hardware requirements of the customer, the interface should be able to communicate unidirectionally with medical devices for vital parameters in order to be able to automatically and on-demand receive the collected values..

The vital signs are displayed using following units:

- Temperature in degrees Celsius [°C]
- Pulse in beats per minute [/min]
- Blood sugar in milligrams per deciliter [mg / dl] as a basic setting - a representation in [mmol/l] only as additional selectable feature.
- Blood pressure in [mmHg]
- Oxygen saturation in percent [%]

Pain levels are grouped on a 10-point scale as follows:
- Mild pain ("Jüngerer leichter Shmerz"): pain scale 1-4
- Moderate pain ("Mäßiger Schmerz"): pain scale 5-7
- Severe pain („Stärkster Schmerz"): pain scale 8-10

Triage and secondary triage, each with "own (Eigeneinschätzung)" and "third-party (Fremdeinschätzung)" assessments, must be representable.