

Triage and Flow Processes in Emergency Departments

A Systematic Review

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Summary and Conclusions of the SBU Report:
**Triage and Flow Processes
in Emergency Departments**

A Systematic Review

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SBU's Conclusions

This report uses the term *triage* in referring to systematic categorisation of emergency department (ED) patients according to their level of medical urgency, i.e., how quickly patients need to receive care based on their medical condition.

Flow processes refer to various means used to organise the work of processing patients in the ED, with the aim of speeding up patient throughput.

The report compiles findings from studies of patients that visited the ED, regardless of severity level. Hence, the effects of triage scales and/or flow processes on disease course and survival of specific diagnostic groups cannot be determined.

- ❑ Scientific studies of triage scales show that the risk of death shortly after triage is small in cases found to be least urgent. In this respect, triage scales are safe to use. Nevertheless, a small percentage of these patients may need to be admitted for hospital care. Consequently, patients cannot be referred, e.g., to primary care, from a hospital ED solely on the grounds of triage level.

The scientific evidence is insufficient to determine the extent to which triage scales are reproducible, i.e., the frequency with which different evaluators reach the same conclusion.

- ❑ The scientific evidence is insufficient to determine if differences exist in safety, validity, and reliability among the three triage methods that are most common in Sweden, i.e., the Medical Emergency Triage and Treatment System (METTS), Adaptive Process Triage (ADAPT), and the Manchester Triage Scale (MTS).

- ❑ When ED routines are organised in different flow processes (e.g., a special process for patients with high probability of being admitted to hospital), this reduces the patient's waiting time to see a physician and the overall length of stay in the ED. Since the various flow processes have not been studied head to head, it is not possible to determine which ones have the greatest effect.
- ❑ A so-called fast track (which involves using a special process to handle patients with minor disorders) is the flow process backed by the strongest scientific evidence. This flow process shortens the time before initial contact with a physician and shortens the length of stay in the ED.
- ❑ When the degree of medical urgency is assessed by a care team involving different categories of staff (physician, nurse, and nursing assistant or secretary) this is called team triage. This flow process can shorten the time before initial contact with a physician and shorten the length of stay in the ED. Team triage also leads to fewer patients spontaneously leaving the ED before they have been medically evaluated.
- ❑ Limited evidence suggests that the length of stay in the ED can be shortened if lab specimens are analysed in the ED, or if referrals for certain x-ray examinations are written by nurses instead of by physicians.

SBU's Summary

Background and aim

Most people that visit an ED are seriously worried about their health and feel a need for prompt evaluation and help. A smaller percentage of patients is severely ill and need immediate help. Others do not have the same need for rapid care. Caring for such a broad spectrum of patients in an adequate and timely manner presents a major challenge for health services.

From the hospital's perspective, it is essential for the ED to be well organised. Given its key position in a hospital's organisational structure, a poorly functioning ED impacts on the entire hospital's activities. Patients that must wait long periods in the ED, often with a high level of anxiety, may lose trust in health services. If EDs function poorly, this jeopardises not only the patient's health and safety but also public trust in the health service as a whole. Given these factors, it is remarkable how little assessment and research has been directed at EDs.

To accurately group ED patients based on their medical needs, a classification system – triage – has been developed. Which patients need to be treated immediately, and which ones can wait? Australia, Canada, the United Kingdom, and the United States were among the first countries to introduce different triage systems in EDs. Triage represents only one part of the process

that patients encounter in conjunction with emergent care, and a major need to structure the entire care process and flow of ED patients has been recognised.

Given the dual objectives of introducing a better system to evaluate patients (aimed at patient safety) and improving the processes in EDs (aimed at patient flow), in Sweden there have been developed two different systems for triage and flow processes, i.e., the Medical Emergency Triage and Treatment System (METTS) and Adaptive Process Triage (ADAPT). Rough estimates, according to figures from June 2009, show that one third of the hospitals currently uses METTS, one third uses ADAPT, and one third uses the British Manchester Triage Scale (MTS) or locally developed triage scales. The benefits and risks of these methods are uncertain.

In several instances, the introduction of triage and new flow processes in Swedish EDs has been inspired by the lean approach, a broad concept originating from the Japanese automobile industry. The fundamental principles of lean production address flow orientation, the reduction of unnecessary work elements, continuous improvement, and the participation of all employees. Flow orientation shifts the focus from efficient units and utilisation of production resources to rapid and simple flow, e.g., of patients. Flow orientation can be particularly appropriate for elective or planned care, characterised by relatively high volumes of somewhat similar patients. But after modification, it should be possible for flow orientation to function well when loads vary substantially, e.g., in emergency medicine.

Several questions about triage and flow systems were raised:

- Is scientific documentation available regarding the effects that different triage scales and flow processes have on patient safety, waiting times, and patient experiences in comparison to conventional care at EDs?
- Does the scientific evidence show that some triage systems have an advantage over others?
- Are there analyses showing the resources that triage and flow processes require (e.g., staffing, training, and renovation)?

Objective

The original objective was to conduct a systematic review of the scientific evidence for triage in a narrow sense, i.e., the classification of ED patients based on risk assessment. The project group reviewed the scientific evidence on vital signs and reasons for ED visits that are included in triage scales. The group also reviewed the reliability and validity of triage scales. A panel of experts investigated the scientific evidence on interventions aimed at affecting patient flow/processes in EDs.

Methods

The report is based on a systematic review of the scientific documentation in the subject area. The literature search covers a period from 1966 through March 31, 2009, and the intent has been to identify all relevant scientific studies. Inclusion was limited to studies of adult patients visiting EDs for nonpsychiatric reasons. Studies were reviewed for quality by using methods validated for internal validity, precision, and applicability to Swedish condi-

tions (external validity). The *methodological quality and clinical relevance* of each study was graded as high, medium, or low.

Randomised controlled trials (RCT) are generally considered to be the research method with the best potential for high validity. However, most of the studies found to be relevant for this report were observational studies involving prospective intervention methods and data collection, but with a control group based on previously collected data. A smaller number of studies was quasi-randomised, i.e., the intervention and control methods were tested during predefined time units such as specific weekdays, weeks, or months.

The project group consisted of 11 experts from different professions and specialties. Five external reviewers appraised the final report.

Synthesis and evidence grading of conclusions

The report synthesises the results from studies that met the inclusion criteria and quality standards. The internationally developed GRADE system was used to arrive at an overall appraisal of the scientific evidence upon which the report's conclusions are based.

The following factors were considered in appraising the overall strength of the evidence: study quality, concordance/consistency, transferability/relevance, precision of data, risk of publication bias, effect size, and dose-response. None of the studies reviewed in this report was found to have *high* quality and relevance. In synthesising the data, studies having *low* quality and relevance were included when studies of *medium* quality and relevance were not available. Despite the knowledge gaps, the project group found

it important to present “the best available evidence” and identify developing areas in the research field.

Based on the overall quality and relevance of the studies reviewed, each conclusion was rated as having strong, moderately strong, limited, or insufficient scientific evidence. If studies were not available, this was noted. Concepts used in interpreting the strength of the evidence, according to GRADE, were as follows:

Facts 1 Study Quality, Relevance and Evidence Grading.

Study quality refers to the scientific quality of an individual study and its capacity to answer a specific question in a reliable way.

Evidence grade refers to the assessed strength of the collective body of scientific evidence and its capacity to answer a specific question in a reliable way. SBU uses an international evidence grading system called GRADE. Study design is the primary factor considered in the overall assessment of each outcome measure. Secondary factors that can increase or decrease the strength of the evidence include: study quality, relevance, consistency, transferability, effect size, data precision, risk of publication bias, and other aspects, e.g. the dose-response relationship.

Evidence grades – four levels

Strong scientific evidence (⊕⊕⊕⊕)

Based on high or medium quality studies with no factors that weaken the overall assessment.

Moderately strong scientific evidence (⊕⊕⊕○)

Based on high or medium quality studies with isolated factors that weaken the overall assessment.

Limited scientific evidence (⊕⊕○○)

Based on high or medium quality studies having factors that weaken the overall assessment.

Insufficient scientific evidence (⊕○○○)

Scientific evidence is deemed insufficient when scientific findings are absent, the quality of available studies is low, or studies of similar quality present conflicting findings.

The stronger the evidence, the lower the likelihood that new research findings would affect the documented results within the foreseeable future.

Conclusions

SBU's conclusions present an overall assessment of benefits, risks, and cost effectiveness.

Results of the Systematic Literature Review

Triage scales: Vital signs and reasons for ED visits

This report addresses the scientific evidence underlying the vital signs, e.g., blood pressure, pulse, and respiration rate (Table 1), used in the most common triage scales. In assessing the patient's degree of medical urgency, most triage scales also consider the symptoms or causes for which the patient is seeking care.

Table 1 Use of different vital signs and reasons for ED visits in the triage scales addressed in the report.

Triage scale	Respiration rate	Saturation	Pulse	Blood pressure	Level of Consciousness	Temperature	Reason for ED visit
ATS	*	*	*	*	*	*	No
CTAS	*	*	*	*	*	*	Yes
MTS	**	**	**	**	**	**	Yes
TTS	**	**	**	**	**	**	Yes
ESI	***	***	***	***	***	***	No
METTS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ADAPT	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Vital signs used to varying degrees, based on judgement of triage nurse.

** Vital signs used to varying degrees, based on reason for ED visit.

*** Vital signs used are based on assigned triage level, i.e., vital signs are not measured in patients assigned to triage levels 1 or 2.

ADAPT = Adaptive Process Triage; ATS = Australian Triage Scale; CTAS = Canadian ED and Acuity Scale; ESI = Emergency Severity Index; METTS = Medical Emergency Triage and Treatment System; MTS = Manchester Triage Scale; TTS = Taiwan Triage System

- Oxygen saturation in blood (saturation) and level of consciousness on arrival to the ED are factors, each of which independently predicts the risk of death soon after evaluation (limited scientific evidence ⊕⊕○○).
- Respiration and pulse rate, blood pressure, and body temperature on arrival to the ED are not sufficiently studied to determine if they contribute to predicting the risk of death soon after evaluation (⊕○○○).
- Studies are lacking on the extent to which different reasons for patient visits to ED might contribute to predicting the risk of death, or other risks.
- Moderately strong scientific evidence shows that patient age contributes to predicting death soon after evaluation (⊕⊕⊕○).

Triage scales: Reliability, safety, validity, and patient satisfaction

Reliability

- For all 5-level triage scales, the scientific evidence is insufficient to draw conclusions about reliability, i.e., the degree of concordance among findings of different reviewers (⊕○○○).

Validity

- The scientific evidence is insufficient to appraise the validity of the different triage scales, i.e., their capacity to accurately predict a clinical event such as the need for immediate attention (⊕○○○).

Safety

- At the lowest level of the 5-level triage scales, the risk of death is low. In this respect, the scales are safe (limited scientific evidence ⊕⊕○○). Of the patients assigned to the lowest triage level on a 5-grade scale, 2–7 percent are admitted to hospital (limited scientific evidence ⊕⊕○○). Hence, patients cannot be transferred from the ED solely on the basis of triage level.

General

- Studies that directly compare different triage scales are lacking.
- Studies showing how patients experience the use of triage scales are lacking.
- Regarding the triage systems developed in Sweden, the scientific evidence is either insufficient (METTS), or published studies are lacking (ADAPT).

Flow processes in emergency departments

Fast track

Fast track refers to a special, coherent process for patients with minor disorders or injuries.

- Introducing a fast track leads to shorter waiting times before the patient has initial contact with a physician. The total time that patients spend in the ED is also shorter (moderately strong scientific evidence ⊕⊕⊕○).
- Introducing a fast track leads to fewer patients leaving the ED before being medically evaluated (moderately strong scientific evidence ⊕⊕⊕○).

- The scientific evidence is insufficient to show that a fast track increases patient satisfaction (⊕○○○).

Team triage

Team triage means that triage is performed by a team consisting of different categories of staff (physician, nurse, assistant nurse, or secretary).

- Introducing team triage leads to fewer patients leaving the ED before being medically evaluated (moderately strong scientific evidence ⊕⊕⊕○).
- Introducing team triage shortens the waiting time before the patient has initial contact with a physician and shortens the total length of stay in the ED (limited scientific evidence ⊕⊕○○).

Assigning patients to different processes (streaming)

- Streaming of patients shortens the waiting time before the patient has initial contact with a physician and shortens the total length of stay in the ED (limited scientific evidence ⊕⊕○○).

Point of care testing (POCT) in emergency departments

- Introducing point of care testing in the ED shortens the response times (moderately strong scientific evidence ⊕⊕⊕○).
- Introducing point of care testing in the ED shortens the total length of stay for patients in the ED (limited scientific evidence ⊕⊕○○).

Nurse-requested x-rays

- Permitting nurses to order certain x-ray examinations shortens the lengths of stay and/or waiting times for patients in the ED (limited scientific evidence ⊕⊕○○).

Nurse practitioners instead of physicians

- The scientific evidence is insufficient to show the extent to which lengths of stay and/or waiting times in the ED are affected when nurse practitioners rather than physicians manage certain patients (⊕○○○).

Patients safety

- There are no comparative studies of what impact different flow processes may have on the safety of the ED patients.

Organisational and management research

In organisational and management research, the sparse literature available on EDs offers some support for the observations in the part of the literature review addressing quantitative studies published in medical journals. The most important aspects involve introducing fast track and team triage, based in part on the *lean* approach, which can have favourable effects on patient flow in the ED.

Health economics

- There are no studies in health economics addressing the cost-effectiveness of the different types of triage and triage scales.
- The scientific evidence is inconsistent regarding the cost-effectiveness of allowing nurse practitioners instead of physicians to handle certain cases.

- There are no studies in health economics addressing the cost-effectiveness of other methods that affect patient flow in the ED, e.g., fast track, team triage, streaming, and nurse-requested x-rays.

Practice survey

In the early summer of 2009, a questionnaire survey was delivered to all of Sweden's 74 hospital-based EDs. The results showed that 54 (73%) used triage and 20 (27%) did not. METTS, ADAPT, and MTS were reported to be the most common at 33 percent, 28 percent, and 22 percent, respectively. Fifteen EDs (12%) used other scales or methods developed in house. Figure 1, which shows the geographic distribution of the different triage methods in Sweden, suggests some regional groupings. A reasonable interpretation here would be that geographic proximity favours the dissemination of a particular triage method, which could play a role in collaboration among hospitals, e.g., in matters concerning patient safety and in development projects.

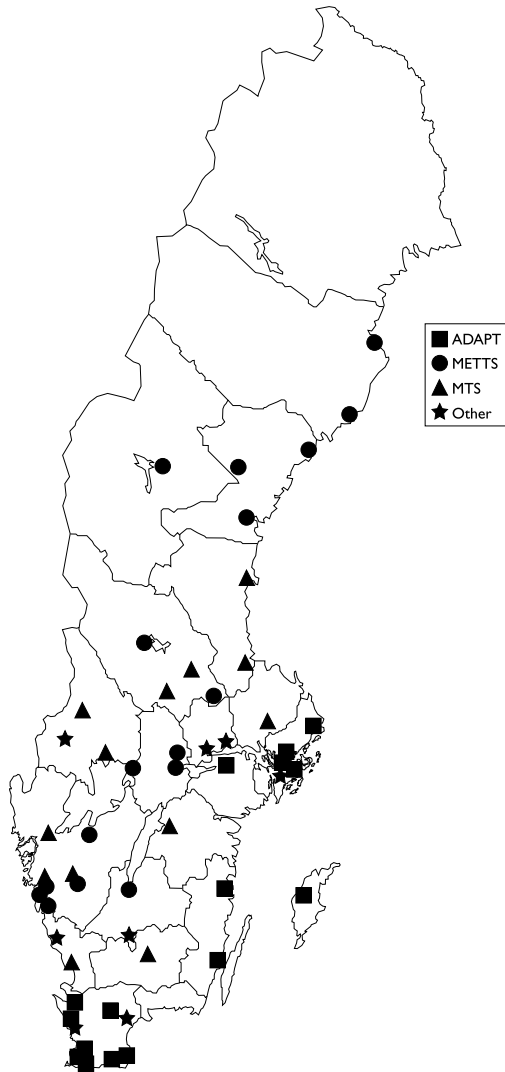


Figure 1 Geographic distribution of different triage methods in Sweden.

When asked if the introduction of triage – involves organisational changes, the majority responded yes, i.e., 48 ED (89%), while 4 (7%) responded no, and 2 (4%) did not respond. Most of the changes involved education, staffing, technical equipment, and renovation. Although these actions probably involve economic resources, studies have not investigated this aspect. The short- and long-term economic consequences need to be clarified.

Discussion

This systematic literature review reveals shortcomings in the scientific evidence on triage systems introduced in Swedish EDs. However, more extensive evidence – albeit of varying scientific strength – is available for several of the flow processes.

A general weakness in the studies is that they often use before-and-after surveys (i.e., historical controls). The fact that any new method, regardless of which one, is introduced often has noticeable effects. Hence, additional controlled studies with better designs are needed, e.g., direct comparisons between different scales/systems for triage or between different interventions to shorten waiting times and lengths of stay in EDs. Such studies have yet to be conducted.

Evidence on triage systems is limited or insufficient

Although triage systems have become widely popular in Swedish EDs in recent years, scientific evidence is deficient. More convincing scientific evidence is needed to show that the vital signs and reasons for ED visits used by current triage scales are the optimal parameters to use for EDs.

The same concern applies to the three systems used most frequently in Sweden: METTS, ADAPT, and MTS. These triage systems have similar designs, in the sense that they are based on a form of shared view and shared interpretation of previous knowledge in the field. But as long as a solid scientific basis does not exist for selecting vital signs, threshold values, and reasons for ED visits, there is a risk that triage scales/systems will be continually modified without being assessed.

The introduction of a new evaluation method in health services is usually accompanied by certain quality standards. It is essential to report on the reliability (precision) of a method, i.e., the extent to which different people assessing the same patient reach the same conclusion. This report found there was insufficient scientific evidence to assess reliability. With moderate resources it should be possible to correct this deficiency. Direct comparisons of reliability between METTS, ADAPT, and MTS would be of particular importance.

Limited evidence for assessing the safety and validity of triage scales

Limited scientific evidence shows that patients assigned to the lowest triage level have a low risk of dying (in the short term). When a patient is assigned the lowest triage level it does not necessarily mean that he/she does not need to be admitted to hospital for care (approximately one in 20 of these patients needs to be admitted). Hence, patients cannot be referred from the ED solely on the basis of triage level, i.e., without having received more extensive medical evaluation.

The safety and validity of triage scales need to be documented further, and they need to be compared to determine whether any of the scales have advantages over others.

Several flow processes reduce waiting times and lengths of stay in EDs

Although, individually, scientific studies often failed to be optimally designed, the overall appraisal according to the GRADE system suggests that some flow processes are supported by moderately strong scientific evidence. This is because the studies are often large (with good statistical power), the effects have been large, and the findings from several studies have been consistent.

The best scientific documentation is available for fast tracks, where a special, coherent process is used to manage patients with minor disorders or injuries. Fast tracks shorten the time that patients wait for initial physician evaluation and shorten the total length of stay in the ED – not only for the patients on the fast track, but also for other patients. Also, fewer patients spontaneously leave the ED before being evaluated. Fast tracks, which represent one of many changes associated with the *lean* concept at EDs, have been introduced recently at several sites in Sweden.

Team triage, which is an important component in both of the Swedish triage systems (METTS and ADAPT), has been introduced in several Swedish EDs in conjunction with introducing the *lean* approach. Team triage, which to date has been studied only outside of Sweden, is supported by moderately strong or limited scientific evidence, depending on the study.

The scientific evidence suggests that analysing lab specimens in the ED has favourable effects on response times. The total time the patient spends in the ED also decreases. Collecting specimens in the ED would mean returning to the situation in effect before the establishment of large, centralised hospital laboratories. The reason for centralisation was to improve quality and to better utilise shared hospital resources. However, recent technical advances – faster and more reliable analytical methods on site in the ED – have changed the situation. Test results can become avail-

able more quickly, probably at the same level of quality. But converting the shorter waiting time for test results into a shorter total length of stay for patients in the ED requires that test results must be managed in a well functioning flow process.

Routine, nurse-requested x-rays can be a simple way to shorten waiting times. However, the scientific evidence for this approach is limited.

Insufficient information on patient satisfaction and health economics

Given the high level of anxiety associated with long waits, the criticism often levelled at EDs, the key importance of the ED in overall hospital organisation, and the major resources required, it is remarkable that useable information about patient satisfaction and health economics is absent from the scientific literature.

When new flow processes are introduced, the fact that fewer patients spontaneously leave the ED before receiving medical evaluation could possibly be an indirect sign of reduced dissatisfaction.

The sporadic mention of resource utilisation in the discussion sections of scientific articles suggests that fast tracks and team triage have been introduced without supplementary resources (except for educational initiatives). Not infrequently, the new processes have been used during daytime hours (and occasionally during evenings), which would suggest that they are best suited to the time of day when ED loads and staffing levels are highest.

Ethical and social aspects

- The selection, introduction, and application of a triage method (with associated flow systems) require fundamental ethical analyses in each individual situation. The analysis must focus on the interests and values of the different actors. It is not certain that patients, health services, and society hold the same values. There is also a risk that individual triage methods might conflict with overarching ethical principles – that priorities are set that are not consistent with these ethical principles and that regional and local differences arise. Hence, due to changes in the organisational system, it is important to perform regular ethical analyses of the triage methods introduced.
- Special solutions such as using a fast track for minor cases could, from an ethical standpoint, complicate the triage system and could also lead to perceiving health services as unjust, or that risks increase for certain patient groups. The scientific literature does not address these issues.
- There is a risk that triaging a patient to a low level becomes too influential over subsequent evaluations – a patient found early in the process to have a low level of urgency has less chance of objective assessment later in the process. For an individual patient, the aim of shortening the stay in the ED might conflict with the possibility of receiving accurate evaluation (and this would not be reflected in aggregate data on larger groups of patients).
- Knowledge about triage methods and flow processes in ED is incomplete, and these gaps in knowledge have potential moral implications. Hence, it is important to thoroughly study areas of uncertainty and to survey and appraise them prior to implementation. Knowledge about human decision-making shows the need for education, training, follow-up, and lucid guidelines and manuals.

Consequence Analysis

Triage

Nearly all EDs in Sweden have introduced or are introducing triage systems, often combined with implementing new flow processes. Triage and flow processes could be considered sub-components of *lean* production, a concept that is much broader than the limited aspects described in this report. Two thirds of the hospitals have decided to use one of the Swedish process-oriented triage systems (METTS and ADAPT) while the remaining one third uses different varieties of the more refined MTS triage scale. Scientific evidence shows that improved flow processes can shorten patient waiting times and lengths of stay in the ED (perhaps without increasing extra costs). Hence, it is reasonable to assume that even the hospitals that use MTS will connect this triage scale to improved flow processes. If so, the three triage systems will be similar to each other on a fundamental level.

METTS and ADAPT are based on the same clinical development work. In recent years they have taken different directions. The differences primarily concern their design, while the content does not differ markedly. On one hand, we can view this development as healthy competition (in a slightly commercial market), which might stimulate faster development of the triage systems. On the other hand, the regionalisation of triage systems is troubling since the potential for using a common clinical language throughout Sweden decreases. This could create a risk for unproductive professional conflicts. If the development and assessment of Swedish triage systems were co-ordinated, then resources could probably be utilised more efficiently.

If representatives for METTS, ADAPT, and MTS cannot reach a mutual agreement, there could be a role for co-ordination on the national level. The goal is not necessarily to achieve a common system; agreeing on a common basic structure could be suf-



ficient. This could be compared to developments in the diverse IT field, where the national actors in health services are developing a common basic structure while maintaining a range of different practical applications.

Questions concerning triage systems and their integration with flow processes are important and real issues for several professional groups in health care. Naturally, the professional organisations representing physicians and nurses play a key role in national co-ordination.

Flow processes

Several of the flow processes presented in this report appear to have sufficient scientific support to be used in regular clinical practice. The benefits for patients could be shorter waiting times before the initial physician contact and a shorter total length of stay in the ED. Flow processes could also lead to fewer patients spontaneously leaving the ED before receiving medical evaluation.

Some flow processes could probably be introduced and used in both large and small hospitals around the clock (e.g., simple lab specimen analyses in the ED and nurse-requested x-rays). Introducing special, coherent processes (e.g., fast track) might require a certain patient base to optimally utilise resources. Controlled scientific studies have generally been conducted in moderately large to large hospitals, and the flow processes tested have often been used only during daytime hours. If and when they are introduced in Swedish health care, it would appear to be most important to involve large and moderately large hospitals during the periods of the day when loads and staffing levels are highest. Smaller EDs might need to develop specially adapted flow processes, which should include rigorous assessment so the experiences can be shared with other hospitals.

Knowledge Gaps and Research Needs

Quantitative studies

- Most of the studies in the systematic literature review involve before-and-after surveys. Further *controlled trials* are needed, especially *direct (head-to-head) comparisons* between different triage scales/systems and between different interventions to shorten waiting times and lengths of stay in the ED. It is essential that assessments consider the age distribution at different triage levels, something that is seldom reported.
- The literature shows variations in the *vital signs* and *reasons for ED visits* included in triage scales. It is unclear whether the selected vital signs are the best at distinguishing different risk groups. Further, evidence supporting the selected thresholds is deficient.
- The designs used for studies on the *reliability of triage scales* are often inadequate. Many are based on fictitious cases instead of authentic patients. Studies using samples representative of patients that visit EDs are nearly non-existent.
- Triage *safety* is assessed primarily on the risk of death soon after evaluation, while some studies also include the need for hospital admission; both are rough measures. Generally, studies of flow processes do not include information about patient safety, which is remarkable given the fact that in-hospital injuries are common, and ED services probably represent a particular risk.
- Controlled studies have not addressed *patients' perceptions* of being subjected to triage (without having any actual input), or their perceptions on being assigned to various flow processes, e.g., fast track.

- The scientific literature is also lacking in information on *resources utilised* by the various triage scales and flow processes. Hence, it is not possible to determine whether the scales increase or reduce costs (or if they are cost-neutral), and the *cost-effectiveness* of new systems compared to older ones cannot be determined.
- More knowledge is needed on the fundamental *ethical aspects* of triage and flow processes in EDs.

Organisation and Management

If systematic literature reviews such as those produced by SBU are to include the scientific field of organisation and management, several factors should be considered:

- The use of concepts varies among research groups, and new concepts are continually emerging. Hence, *literature searches* based on keywords fail to capture all relevant studies.
- In an organisational context, every intervention is *system dependent*, which means that associated factors must be adequately considered due to the risk that quantitative studies alone might not lead to meaningful conclusions. Much of the science and research on organisations and management is based on a scientific approach to *identify patterns and combinations of interventions* that have a particular effect on the organisation, given a particular situation and environment. Researchers attempt to *understand the mechanisms* that underlie observed differences in outcome.

- Social sciences in general and organisational research in particular study objects that *change over time*. Formulating theory therefore becomes, to some extent, a contemporary history product.
- Awareness that an organisation is doing *something* has an *organisational placebo effect*, which creates a problem in interpreting the results from the many before-and-after studies published in the organisational field. Instead, the focus could be placed on underlying mechanisms, which are often more appropriately studied using qualitative rather than quantitative research methods.
- *Variations* are wide within and between organisations, and it is seldom or never directly possible to apply the same interventions as in a typical case study; this often requires translation and adaptation to local conditions.
- Organisational and management research often looks for new phenomena and applies theories to these. *Generalisation* is often used between different types of organisations based on theoretical reasoning concerning the associations and mechanisms identified. It is less common for an association (or a mechanism) that is established in one organisation to be replicated in several other conceivable organisations. This contrasts with clinical research where the general rule is to repeat studies of the same intervention in different environments.

Although it may require adapting SBU's working methods to be able to cover organisational and management research, it is obvious that organisational and management research needs to adapt to the culture found in health services. Broad skepticism exists in health services concerning this type of research, and researchers have not been able to reduce this skepticism. To a greater extent, they need to show how routine health services can derive practical benefits from advances in this research.

Need for Additional Systematic Reviews

This report is limited to triage and flow processes in EDs. However, EDs are only part of a continuum of services for acutely ill and injured patients. Correspondingly, there is a need to study other aspects in the continuum of care.

Areas that require systematic review, and where there is at least some scientific evidence, include:

- Telephone triage
- Prehospital triage
- Psychiatric triage
- Paediatric triage
- Effects on the ED of blocked access to beds for patients that need to be admitted to hospital and organisational interventions to improve the flow from the ED to inpatient units.

Further, there is a need to systematically review the evidence on the early continuum of care for acutely ill and injured patients – from the first telephone contact with health services to discharging the patient from the ED or admitting the patient to hospital.

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SBU Evaluates Health Care Technology

Below is a brief summary of the mission assigned to SBU by the Swedish Government:

- SBU shall assess healthcare methods by systematically and critically reviewing the underlying scientific evidence.
- SBU shall assess new methods as well as those that are already part of established clinical practice.
- SBU's assessments shall include medical, ethical, social and economic aspects, as well as a description of the potential impact of disseminating the assessed health technologies in clinical practice.
- SBU shall compile, present and disseminate its assessment results such that all parties concerned have the opportunity to take part of them.
- SBU shall conduct informational and educational efforts to promote the application of its assessments to the rational use of available resources in clinical practice, including dental care.
- SBU shall contribute to the development of international co-operation in the field of health technology assessment and serve as a national knowledge centre for the assessment of health technologies.

Triage and Flow Processes in Emergency Departments

The report on Triage and Flow Processes in Emergency Departments from the Swedish Council on Health Technology Assessment (SBU) is a systematic review of the scientific literature in the field.

This document presents the summary and conclusions of the full report approved by SBU's Board and Scientific Advisory Committee.

The full report is available at www.sbu.se