INDICATORS FOR THE INSTITUTIONAL PROCESS OF RESUSCITATION

1. INDICATOR

Name of the indicator	Extent of training in CPR
Quality dimension	Efficiency
Type of the indicator	Structural indicator (if we think of training as a structural element of the institutional design of CPR) Process indicator (if we think of training as a step in the institutional process of resuscitation)
Denominator	Total number of healthcare and non-healthcare workers to be trained during a given period (half year, 1 year) Person to be trained: person working in the health care institution, regardless of qualification, weekly/monthly working hours, type of employment (including staff of partner company working in the health care institution, e.g. cleaning company, residents, education institutes, etc.)
Numerator	Total number of healthcare and non-healthcare workers trained during a given period (half year, 1 year) Trained: regardless of qualification, weekly/monthly working hours, type of employment (including staff of partner company working in the health care institution, e.g. cleaning company, residents, education institutes, etc.), all persons working in the healthcare institution who have received training at the appropriate level (ALS, BLS, instructor, etc.) according to local regulations for their job
Dimension	%
Data source	Denominator: HR/labour databases, contracts with external companies Numerator: training documentation (attendance sheet with signature, unique identifier), personnel files (to prove participation in training outside the institute, if accepted by the institute instead of the own training)
Exclusion criteria	Staff members who are absent on a long-term basis (e.g. more than 30 days in any 1-year period) (e.g. due to childbirth, working abroad, unpaid leave, etc.) or whose work did not cover the whole period because they started working in the institution either later (e.g. more than 30 days in any 1-year period from the beginning of

	the period) or finished earlier (e.g. more than 30 days in any 1-year period before the end of the period)
External bias	-
Population concerned	The circle of colleagues displayed for the denominator All persons working in the healthcare institution during a given period
Target value, interpretation of the result	100% (over 95% considered good) The indicator shows the percentage of all staff working in a healthcare institution, irrespective of their level of education, working hours or type of employment, who have attended certified CPR training at the level and frequency appropriate to their job role during a given period.
Potential source of error in the formation of the indicator	If the turnover rate is high, the exclusion criterion will result in too many staff being excluded, and thus there is no real information on whether the current staff are adequately informed and trained in CPR. Valid data on the staff of partner companies working in the healthcare institute is not necessarily available, the scope of staff is often constantly changing, and often the scope of staff working in the healthcare institute and the training they receive are not included in the contract. In the case of incorrect/incomplete management of HR, labour databases, there is also no valid information on the persons to be included in the indicator calculation.
Potential care problems underlying inadequate results	See the table of failure modes of the related general good practice
Patient risks independent of care	The "patient risk" in this case corresponds to the staff risk, since the subjects of CPR education are the staff, not the patients. Rotational systems: e.g. residents may be undergoing a core training course at another institution at the time of their planned training Ensuring continuity of care: if attendance at training sessions is an impediment to ensuring continuity of care, staff may not be able to attend. This risk can be minimised through well-organised training practices.
Explanation of the indicator	The indicator shows the percentage of all staff working in a healthcare institution, irrespective of their level of education, working hours or type of employment, who have attended certified CPR training at the level and frequency appropriate to

	their job role during a given period. The higher the value of the indicator, the higher the percentage of staff who have received training.
Notes	*It is necessary to specify in the relevant local regulations of the health care institution which types and levels of CPR training are considered acceptable for which jobs and within which time intervals. Similarly, it should be specified which external training courses are acceptable, and in which form additional training in the local specificities of resuscitation can be provided or accepted.* *The frequency with which training is expected for the different jobs should be taken into account when choosing the time interval. This will normally be one year, but for higher level training (e.g. instructor) more frequent training may be required to maintain the level. If this interval is not same for all workers, then in the case of the common indicator, only those who have met the higher frequency requirement for them are included in the numerator, or a separate indicator is created for these job group(s).*

2. INDICATOR

Name of the indicator	Time to defibrillator use in case of CPR
Quality dimension	Efficiency, adequacy
Type of the indicator	Process indicator
Denominator	Total number of unexpected cardiac arrests (sudden death) detected in the healthcare institute and during a given period. Unexpected cardiac arrest can occur not only among patients in the healthcare institute, but also among all persons present (employees, relatives, etc.).
Numerator	Those cases in the denominator where the time from the time of the resuscitation alarm to the first defibrillation was within a given time window. For the time window in question, the literature gives values of 2-5 minutes from detection. The time of alarm is the documented time closest to the time of detection, which is to be taken into account in a consistent manner (this may be the time of the cry for help or the time of the alarm of the resuscitation team or person in charge, depending on which time is systematically recorded by the institution).
Dimension	%
Data source	Denominator: regular reporting by departments and units on the occurrence of unexpected cardiac arrests, or in the absence of such reports, on resuscitation events (resuscitation protocol), or in the absence of such reports, on medical records Numerator: if departments or units also provide information on the exact time of the alarm and defibrillation when reporting related events, the reports may also be the source. In addition, the description of the resuscitation event, protocol, handover sheets, decurse, other medical documentation may be the source for recording the exact time of detection/alarm or defibrillation. The fact and time of defibrillation may sometimes be recorded and stored by the defibrillator itself.
Exclusion criteria	Cases of sudden cardiac death should be excluded from the denominator where defibrillation is not required by professional practice, i.e. the heart rhythm is not appropriate for the indication.
External bias	-
Population concerned	All persons present in the healthcare institution during the given time period.

	Unexpected cardiac arrest can occur not only among patients in the healthcare institute, but also among all persons present (employees, relatives, etc.).
Target value, interpretation of the result	100% The indicator shows the percentage of cases of unexpected cardiac arrest in a healthcare institution during a given time interval in which the first defibrillation occurred within a given time window from detection/alert.
Potential source of error in the formation of the indicator	Incomplete medical documentation, resuscitation protocol, report card (for example, it is not always possible to determine whether a defibrillator was used, what heart rhythm was detected and when). The exact time of detection is not indicated, the time of detection or alarm is written down from memory (the later it is written down, the more distorted the data may be).
Potential care problems underlying inadequate results	See the table of failure modes of the related general good practice
Patient risks independent of care	-
Explanation of the indicator	The indicator shows the percentage of cases of unexpected cardiac arrest in a healthcare institution during a given time interval in which the first defibrillation occurred within a given time window from detection/alert. The higher the value of the indicator, the higher the rate of compliance with professional expectations and the higher the likelihood of successful resuscitation.
Notes	*Sudden cardiac arrest is one of the leading causes of death in Europe. The initial rhythm of sudden circulatory arrests is 25-50% ventricular fibrillation. In cases where detection occurs very rapidly, the incidence of VF can be as high as 76%. In the case of ventricular fibrillation, immediate resuscitation and rapid defibrillation are required. The defibrillator can be used to treat certain abnormal, life-threatening cardiac arrhythmias, thus increasing the chance that the patient's heart can continue to function in a normal heart rhythm (sinus rhythm) after shock.* *The time interval should be chosen with a minimum of 30 cases in the denominator, otherwise the indicator will not be statistically valid.* *Within a given institution, it is necessary to define uniformly which moment in time of detection/alarm is the basis for the calculation.*

	Similarly, the exact value of the time window defined should be treated in a uniform way.
	Comparisons between institutions are hampered if institutions use different time windows or different starting times. In any case, it should also be taken into account that some institutions do not have the necessary number of cases for comparison.
	Within an institution, it may be useful to track the value of the indicator over time, which could indicate changes in the process. It may also be worthwhile to monitor and analyse the indicator values at the level of the organisational unit within an institution - if there are enough cases - as this may help to identify and analyse the reasons for low indicator values and help to formulate more precise proposals for solutions (e.g. where to place the defibrillator).

3. INDICATOR

Name of the indicator	Primary resuscitation success rate
Quality dimension	Effectiveness
Type of the indicator	Outcome indicator
Denominator	Total number of unexpected cardiac arrests (sudden death) detected in the healthcare institute during a given period. Unexpected cardiac arrest can occur not only among patients in the healthcare institute, but also among all persons present (employees, relatives, etc.).
Numerator	Of the cases included in the denominator, the total number of cases with successful primary resuscitation in the healthcare institute. A successful primary resuscitation is defined as a resuscitation that results in at least a return of circulation at the site of resuscitation.
Dimension	%
Data source	Denominator: regular reporting by departments and units on the occurrence of unexpected cardiac arrests, or in the absence of such reports, on resuscitation events (resuscitation protocol), or in the absence of such reports, on medical records Not all unexpected cardiac deaths will be resuscitated, e.g. if there is a sufficient delay in detection, resuscitation may not even be started, so the number of unexpected cardiac arrests may be greater than the number of resuscitations. Numerator: primary success can be judged from medical records (e.g. decurse, ECG, etc.), resuscitation minutes, handover documentation if information on vital signs is included. If departments or units also provide information on the success of related events when reporting them, the reports may also be the source. In this case, the previous ones may be used to validate the information contained in the report.
Exclusion criteria	Cases of unexpected cardiac arrest for which the professional rules do not require resuscitation to be started even if they are due to a cause outside the control of the healthcare institution (e.g. terminal condition without known cure, injury/condition incompatible with life, related valid statement). However, it should not be excluded that, although professional rules do not require the initiation of resuscitation (e.g. detection of lividity and rigor), the underlying cause may be the responsibility of the healthcare institution, e.g. delayed detection.

External bias	Patient mix, change in care profile, change in area of care
Population concerned	All persons present in the healthcare institution during the given time period. Unexpected cardiac arrest can occur not only among patients in the healthcare institute, but also among all persons present (employees, relatives, etc.).
Target value, interpretation of the result	The average rate is 25% (overall, not for inpatient care), according to international data, but there are also reports of 65% primary success rates even among Hungarian institutes. In this case, the target value is highly dependent on the profile and patient mix of the healthcare institution, so it is recommended that targets are set per institution and indicators are tracked over time (trend analysis). The indicator shows the percentage of cases of unexpected cardiac arrest in a healthcare institute during a given time interval that were resuscitated with primary success.
Potential source of error in the formation of the indicator	Incomplete medical documentation either in terms of primary success rate or detection of unexpected cardiac death.
Potential care problems underlying inadequate results	See the table of failure modes of the related general good practice
Patient risks independent of care	Age, underlying condition(s), comorbidity, etc.
Explanation of the indicator	The indicator shows the percentage of cases of unexpected cardiac arrest in a healthcare institute during a given time interval that were resuscitated with primary success. The higher the value of the indicator, the more cases of successful primary resuscitation.
Notes	*The time interval should be chosen with a minimum of 30 cases in the denominator, otherwise the indicator will not be statistically valid.* *Comparison of individual health care institutions on the basis of the value of this indicator is not recommended given that different patient populations and care profiles have a strong influence on the value of the indicator. However, tracking the indicator over time within a given healthcare institute will provide an informative picture of how the quality of resuscitation varies over time (of course, changes in patient composition and profile over time may limit its assessment). It may be useful to calculate the indicator not only for the healthcare institute as a whole, but also to construct sub-indicators broken down by individual departments. This will reduce the number of influencing factors and can be analysed on a*

	specialty-specific basis, but may also imply lengthening the time interval to obtain a meaningful number of cases.