Measurement guidance – recognition and response systems

This measurement guidance will support hospitals to implement their recognition and response system, monitor progress, and identify areas for continuous quality improvement. The measures capture information on the processes of recognising and responding to clinical deterioration as well as patient outcomes at a hospital level.

This replaces version two of this document. It is organised into two sections:

1. Quality and safety marker
2. Data to support implementation

The quality and safety marker section sets out the information District Health Board (DHBs) are being asked to report quarterly to Health Quality & Safety Commission (the Commission), in order to monitor sustainability of the interventions and impact of the patient deterioration programme over future years.

The section on data to support implementation sets out guidance on what additional data can be collected and used to support local teams to identify how well their recognition and response system is working. Collecting this will give an in-depth understanding of what is influencing the quality and safety marker measures, as well as identifying opportunities for quality improvement such as to help with reducing variation and improving reliability.

Additional outcome and impact measures are being explored at a national level through the National Minimum Dataset (NMDS) and the ANZICS Adult Patient Database.

Section 1: Quality and safety marker (QSM)

The QSM measures were finalised, following feedback from all DHBs during September and October 2017 and informed by a survey on current data collection processes. The table provides a summary of the measures to be reported to the Commission.

Patient deterioration QSM

Type	*QSM measure*	*Collection mechanism*
Structural	**Percentage** of eligible wards using the New Zealand early warning score	Implementation monitoring by DHB project team
Process	**Percentage** of audited patients with an early warning score calculated correctly for the most recent set of vital signs	Audit of at least 130 patients each quarter across the DHB's hospital(s) by random sampling.
	Percentage of audited patients that triggered an escalation of care and received the appropriate response to that escalation as per the DHB's agreed escalation pathway.	Recommend do regular audits to spread workload and aid early identification of any issues
Outcome	**Number** of in-hospital cardiopulmonary arrests in adult inpatient wards, units or departments.	Total number of events.
	Number of rapid response escalations	Retrospective switchboard call records or prospective rapid response team data collection across the DHB's hospital(s).

Definition, calculation and collection of QSM measures

Structural measure (interim)

This measure aims to show the implementation and spread of the New Zealand early warning score to eligible wards within all district health boards' (DHBs) hospitals. Implementation may be through the national vital signs chart or an electronic vital signs charting system.

1. Percentage of eligible wards using the New Zealand early warning score	
Definition	An 'eligible ward' is a ward, unit, clinical area or department caring for adult inpatients where a general observation chart would usually be in use. A 'general observation chart' has the capacity to document regular vital sign measurements and may or may not include an early warning score. Non-eligible wards are defined as those clinical areas providing inpatient maternity care, high acuity specialist care such as intensive care, post anaesthetic recovery, and emergency departments. The New Zealand early warning score is found on the national vital signs chart and can be incorporated into electronic vital signs charting systems.
Numerator	Number of eligible wards using New Zealand early warning score
Denominator	Total number of eligible wards in DHB
Calculation	(Numerator /denominator) x 100
Collection	At the end of each month, determine the total number of wards using the New Zealand early warning score and update the *hospital level dashboard tool* or locally equivalent tool. At the end of every quarter, calculate the percentage. Suggested approach: Capture the data on a monthly basis. At the end of each quarter, submit the data to the Commission.
Comment	The national vital signs chart may be used in emergency departments, high acuity specialist care and outpatient settings. For the purpose of tracking the progress on implementation, the Commission is only collecting information from areas where adult inpatient care is provided, note that this excludes maternity. This measure will be removed once DHBs have implemented the New Zealand early warning score into eligible wards.

Process measures

The two process measures provide an overview of how the recognition and response process is operating. Data for these measures can be collected using the audit tool (Appendix 1).

	2. Percentage of audited patients with an early warning score calculated correctly for the most recent set of vital signs (total and by ethnicity).	
Definition	An 'audited patient' includes the vital signs charting and associated documentation in the clinical record (paper and/or electronic) for the patient selected for auditing. The patient will need to have been in the ward, unit or clinical area for a minimum of 24 hours. The 'set of vital signs' are the documented observations of the core vital sign parameters (respiratory rate, oxygen, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness). A 'correctly calculated early warning score' is where the total early warning score is calculated correctly using the associated score for the core vital sign parameters. Each of these core vital sign parameters have coloured zones (yellow, orange and red) that are associated with a score of 1-3. The score for each of these seven vital sign parameters is added together to give a total early warning score. Note that correct calculation should take into consideration any current modifications recorded on the vital signs chart.	
Numerator	Total number of patients for whom the most recent set of vital signs was completed, and early warning score calculated correctly. (This is a 'yes' response to Q3 in the audit tool)	
Denominator	Total number of audited patients	
Calculation	(Numerator /denominator) x 100	
Collection	Collect data through audit or electronic vital signs systems. The audit reviews the last 24 hours of vital sign charting and associated documentation in the clinical record. Number of patients: Collect data for at least 130 patients over the quarter. This approximates to at least 44 patients per month. Sampling: randomly sample patients who have had at least 24 hours' admission across all inpatient clinical areas, including surgical, medical and mental health, across all hospitals in each DHB. Ethnicity: where possible, collect the patient's ethnicity as documented in the clinical record. Use the following classifications: NZ European, Māori, Pacific, Asian and Other. Suggested approach: Capture the data on a regular basis in the *ward level audit data collection* and *hospital level dashboard tools*. At the end of every quarter submit the data to the Commission.	
Comment	We recommend that DHBs link the auditing to existing auditing activities. An audit tool and dashboard tools at ward and hospital level have been developed to aid implementation and clinical governance of the recognition and response system. These can be used to store information in advance of submitting to the Commission	

3. Percentage of audited patients that triggered an escalation of care and received the appropriate response to that escalation as per the DHB's agreed escalation pathway (total and by ethnicity).

Definition	An 'audited patient' as above Escalation of care is 'triggered' either by an aggregated early warning score calculated from all seven core vital signs, or from a single significantly abnormal parameter. Any vital sign that falls into a zone indicating significant deviation from the norm (i.e. in the red or blue zones) triggers the action associated with that zone. The action triggering the most senior clinical review should be taken. The 'escalation pathway' specifies the actions to be taken in response to the detection of vital sign parameter abnormalities. The response to each level of clinical risk articulated in the escalation pathway is determined locally in order to reflect available resources and processes of care. An 'appropriate response' is one which aligns with the escalation pathway and includes whether or not the agreed team or individual attended within the agreed timeframes. For patients with more than one escalation in the 24-hour audit period, collect information related to the most recent escalation.
Numerator	Number of escalated patients who were responded to according to the agreed escalation pathways. (This is a 'yes' response to Q5b in the audit tool)
Denominator	Number of patients that reached any of the triggers for escalation in the 24-hour audit period. (This is a 'yes' response to Q5 in the audit tool.)
Calculation	<u>Total:</u> as per measure 2
Collection	Collect data through audit or through electronic vital signs systems as per measure 2. <u>By ethnicity:</u> as per measure 2, where possible.
Comment	Auditors should have sufficient knowledge about the DHBs agreed escalation pathway and policy in order to assess this accurately.

Outcome measures

4. Number of in-hospital cardiopulmonary arrests in adult inpatient wards, units or departments (total and by ethnicity)

Definition	Cardiopulmonary arrests include: • cardiac arrest: absence of pulse, consciousness and respiratory effort, necessitating the commencement of cardiopulmonary resuscitation. • respiratory arrest: absence of respiratory effort and the presence of palpable pulse and measurable blood pressure necessitating the commencement of artificial ventilation (either manual or mechanical).

	Exclusions are areas providing high acuity specialist care, such as intensive care and post anaesthetic recovery; inpatient maternity care and emergency departments.
Numerator	<u>Total</u>: Number of in-hospital cardiopulmonary arrests
Denominator	Not applicable
Collection	This information may be collected prospectively by the response team or retrospectively through switchboard call records. Switchboard calls data may need to be audited to ensure the data are reliable. DHBs are asked to confirm whether this data is prospective or retrospective when they submit the information. <u>Number of patients</u>: All in-hospital cardiopulmonary arrests (check the exclusions and inclusions above) <u>By ethnicity</u>: as per measure 2, where possible. <u>Suggested approach</u>: Capture the data on a monthly basis within the *hospital level dashboard tools*. At the end of every quarter, submit the data to the Commission.
Comment	The Commission has explored the possibility of collecting this data through the National Minimum Dataset (NMDS). However, this data has significant limitations, due to coding issues and difficulties in excluding out of hospital cardiac arrests. We recommend that all in-hospital cardiopulmonary arrests are reviewed using the case note review template (Appendix 2) or local equivalent. The Commission will calculate a rate per 1000 admissions using data from the National Minimum Dataset to ensure consistency.

The following measure provides context to the above outcome measure. International research shows that there is an inverse relationship between the number of rapid response escalations and in-hospital cardiopulmonary arrests in tertiary hospitals. Collecting this information will develop further understanding of this relationship at local and national level.

5. Number of rapid response escalations (total and by ethnicity)	
Definition	A 'rapid response escalation' is an escalation of care to the rapid response team (or equivalent) which has been triggered by an early warning score of 10+, any vital sign in the blue zone, or clinical concern (the 'worried criterion').
Numerator	<u>Total</u>: Number of rapid response escalations.
Denominator	Not applicable – see comment
Collection	This information may be collected through switchboard call records or collected by the response team. <u>By ethnicity</u>: as per measure 2, where possible.

Comment	This measure may be referred to in commentary accompanying the quarterly QSM reports to provide context for changes in the cardiopulmonary arrest outcome measure. The Commission will calculate a rate per 1000 admissions using data from the National Minimum Dataset, to ensure consistency.

Timeline for collection and submission

We have staggered the introduction of the QSM following DHB feedback. The tables below outline the timeline for starting the collection and submission of the QSM data.

Quarter: January - March 2018			
Measures	**Collection period**	**Submission to Commission**	**Public reporting**
Structural	As at 31 March 2018	11 May 2018	June 2018
Outcome	January – March 2018	10 August 2018	September 2018

Quarter: April - June 2018			
Measures	**Collection period**	**Submission to Commission**	**Public reporting**
Structural	As at 30 June 2018	10 August 2018	September 2018
Outcome	April – June 2018	10 August 2018	September 2018
Process	April – June 2018	10 August 2018	September 2018

Subsequent quarterly collection, submission and public reporting will follow the existing QSM timeline.

Submission to the Commission

Project teams will need to liaise with their quality and risk management teams (or equivalent) to identify who will be responsible for collecting and submitting data to the Commission for the first and subsequent collection periods.

Each quarter, DHBs enter the above data using the *QSM submission form* and send to QSM@hqsc.govt.nz . The form includes fields report the above data by ethnic group.

We understand and acknowledge that for some DHBs, it will take more time to start reporting data at ethnicity level; however, we encourage all DHBs to collect and submit this information.

DHBs who are using the *ward level audit data collection* and/or *hospital level dashboard tools* should continue to use these tools and copy the relevant summary data from the *hospital level dashboard tool* at the end of each quarter. See section 2 for more details on these tools.

Section 2: Data to support implementation

Project teams are encouraged to collect, analyse and report data to support implementing improvements to their hospital(s) recognition and response systems. Using this data will help to identify how well changes are being embedded into clinical areas and where further improvement activity is needed. Additionally, it can be used to monitor the impact of these improvement efforts. This data will also allow teams to have a more in-depth understanding of what is influencing the quality and safety marker measures.

Doing auditing also provides a further opportunity for project team members and champions to provide on the spot training and feedback to staff in clinical areas on how they are using the national vital signs chart and local escalation pathways.

Once the recognition and response system is stable and well embedded, the project team and governance group can decide whether the audit frequency and sample size can be reduced.

Auditing will still be required to collect data for the QSM process measures, however this only requires a minimum of 130 audits per quarter across the whole DHB.

Data collection

An audit tool has been developed to aid collection of data on recognition and response systems. Before starting an audit, we recommend that a data collection plan is developed. In particular agreement on the following is needed:

- Sampling: project teams can choose the sampling strategy, but should ensure that the sample is representative of the ward or hospital population.
- Sample size and frequency of data collection: From a quality improvement perspective, we recommend that each clinical area audits 10 patients per week as part of initial implementation. This will give teams sufficient data points in a short period of time to observe a change in the processes and identify further improvement areas.

We recognise that some teams will struggle to achieve the recommended sample size and frequency due to a variety of reasons. Reducing the sample size and time between data collections will reduce the number of data points, and lengthen the period of time that teams can observe a change in processes. However, any auditing needs to be practical for project teams and ward staff. Talk to the Commission's patient deterioration team about alternative approaches.

Data analysis and reporting

The two dashboard tools to aid collection, analysis and reporting of data at ward and hospital level are available on the Commission [website](). They can be used if your organisation doesn't have existing tools to aid collection, analysis and reporting.

- *Hospital level dashboard tool*: This dashboard helps project teams identify how well the recognition and response process is operating at a hospital level as well as individual clinical area level. This dashboard has been created for project

teams, clinical governance groups and other stakeholders. The summary data can be used to fill the *QSM submission form*.

- *Ward level audit data collection tool*: This tool allows collection of data and the creation of an individualised dashboard for each clinical area through automated reports on important process steps.

We suggest that project teams review the data and reports to identify areas for further implementation support in clinical areas. Give staff feedback on the audit in the clinical areas so that they know how they are doing, can celebrate their achievements and engage in the discussion on how improvements can be made.

Regularly share the data with the clinical governance group responsible for patient deterioration. They will be able to review areas for improvement and assist with championing these improvements.

DHBs are not required to provide this data to the Commission. The Commission's patient deterioration programme team can provide additional support to help you use the tools, develop data collection plans, interpret and make sense of what the data is showing.

References

Australian Commission on Safety and Quality in Health Care. 2011. *A guide to support implementation of the national consensus statement: essential elements for recognising and responding to clinical deterioration.* Sydney: Australian Commission on Safety and Quality in Health Care.

Appendix 1: Audit tool

National vital sign chart audit tool
This is available on the patient deterioration guidance and tools **webpage**

Instructions	Patient selection
How to use the audit tool 1. Please circle 'Yes' or 'No' for each question 2. Once the audit is completed, add the total number of 'yes' responses for each question and capture in **No. of Yes responses** column 3. See the operational definitions for detail of what is required for each question	1. Audit 10 patient charts per week 2. Select patients for audit who have been in the ward or unit for a minimum of 24 hours 3. Review the last 24 hours of vital sign charting and associated documentation in the clinical record

If you identify adverse events or near misses that have not been previously reported (e.g. failures to recognise, escalate or respond to deterioration), follow the usual organisational reporting guidelines

Hospital:	
Ward:	
Date:	

Question #	Audit questions / Operational definitions		Patient number → 1	2	3	4	5	6	7	8	9	10	No. of Yes responses
	Recognition												
1	Did the frequency of vital sign monitoring comply with (or exceed the requirements of) current policy?	Current policy refers to the vital sign and early warning score policy applicable to the patient during the period of the audit. This may be determined by the organisational minimum standard, the escalation pathway, specialty, or procedural requirements (e.g. post-operative vital sign policies).	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	
2	Was the core vital sign set completed with the most recent set of vital signs?	The core vital sign set includes all the vital signs required to calculate the early warning score (respiratory rate, oxygen requirement, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness using the AVPU scale).	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	
3	Was the early warning score (EWS) calculated correctly for the most recent set of vital signs?	Circle 'Yes' only if • The total EWS is calculated • The EWS is calculated correctly • Any valid modification is correctly applied in the EWS calculation.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	
4	Were any modifications made to the early warning score triggers? *(if yes, complete questions 4a and 4b)*	Modifications must be documented in the modifications box on the vital sign chart.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	
4a	Was a rationale and duration for the modification documented? *(clinical requirements)*	Circle 'Yes' only if both the rationale and duration for the modification are documented on the chart.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	
4b	Did the person making the modification legibly date and sign it, and record their designation and contact details? *(documentation requirements)*	Circle 'Yes' only if all the documentation requirements are completed (legible date, signature, designation and contact details).	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	

	Escalation and response													
5	Did the patient reach any of the triggers for escalation in the 24-hour audit period?*(If no, audit is complete; if yes, complete questions 5a-c)*	Circle 'Yes' if the patient had a total EWS of 6 or more, or a single parameter trigger in the red or blue zone during the audit period.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No		
5a	Did escalation occur according to the pathway?	If more than one escalation was triggered in the 24-hour audit period, select the most recent for inclusion in the audit. Circle 'No' for any deviation from the agreed escalation pathway.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No		
5b	Did the response occur according to the pathway?	Circle 'Yes' if the responder attended in the time frame specified on the escalation pathway. Circle 'No' for any deviation from the agreed response pathway.	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No		
5c	Did the responder complete documentation requirements (according to local policy)?	Circle 'Yes' only if all documentation requirements are completed according to local policy (for example, this may include documenting an assessment and plan for ongoing care in the clinical record and completing a rapid response call sticker).	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No		

Appendix 2: Case note review template

A retrospective case review is recommended after incidents such as cardiac arrests, patient deaths, unplanned transfers to higher acuity care, or other reported events (SAC 1, 2 and 3) related to failures to recognise or respond to clinical deterioration. Routine case reviews are recommended for a random sample of patients who received a rapid response call (for example, every fifth or tenth call). Other prompts for case note reviews may include complaints from patients or family members about failures to recognise or respond to patient deterioration, or patients identified through chart audit activities where recognition, escalation or response did not occur appropriately.

Documentation from case notes and vital sign charts should be reviewed for at least the 24 hours before the incident occurred. The reviewer needs sufficient clinical expertise and seniority to make a judgement on the appropriateness of the clinical care provided to the patient.

Data and themes from case reviews should be reported for discussion and action by groups such as local quality improvement teams, the recognition and response system clinical governance committee, education and training providers, specialty morbidity and mortality meetings, or grand rounds. Individual cases may be useful as stories to engage clinicians in understanding their role in the recognition and response system, or as teaching tools in scenario-based education.

If case review identifies adverse events that have not been previously reported and/or where an open disclosure process is warranted, the usual organisational reporting guidelines must be followed. If individual performance issues are identified, these must be referred to the appropriate clinical leader for follow up.

This template was informed by the National Confidential Enquiry into Patient Outcome and Death *Time to Intervene* review tool.[1]

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[1] http://www.ncepod.org.uk/2012report1/toolkit/CAP%20Data%20comparison%20tool.pdf

Event type	
Rapid response call	Tick: ☐
Cardiorespiratory arrest (required CPR)	Tick: ☐
Unexpected death (inpatient death in the absence of a 'not for resuscitation' order and a plan to stop all treatments and interventions other than those provided for comfort)	Tick: ☐
Unplanned transfer to higher acuity care	Circle: ICU/CCU/HDU/other hospital
Adverse event	Circle: SAC 1/SAC 2/SAC 3
Other	Specify:
Event details	
Date	__/__/__
Time	24h clock: __:__
Day of week	Circle: Mon/Tue/Wed/Thu/Fri/Sat/Sun
Patient demographics	
Age	Years:
Ethnicity (record all identified ethnicities as per front sheet or NHI database)	Write:
Were cultural services involved in the 24h before the event (for example, a kaumātua)	Circle: Yes/No
Did the patient speak English as a first language?	Circle: Yes/No
If no, was a translator involved in the 24h before the event?	Circle: Yes/No
Did the patient have documented cognitive impairment?	Circle: Dementia/delirium/mental disability
Did the patient have documented chronic mental illness?	Circle: Yes/No
Was the patient in a single room?	Circle: Yes/No
Vital signs chart	
How many sets of vital signs were documented in the 24h before the event?	Number:
Was the core vital sign set documented every time? (Core vital sign set includes respiratory rate, supplemental oxygen requirement, oxygen saturation, blood pressure, heart rate, level of consciousness and temperature)	Circle: Yes/No
Was the early warning score calculated correctly (with or without modification) with every set of vital signs?	Circle: Yes/No
If no – how many sets of vital signs had an incorrectly calculated early warning score?	Number:
What was the highest early warning score in the 24h period?	Number:

Was care escalated in accordance with the escalation pathway every time an early warning score trigger was reached?	Circle: Yes/No
If no – was there a documented reason for not following the escalation pathway?	Circle: Yes/No
If care was escalated in the 24h before the event, was the response: • timely? (per the escalation pathway) • appropriate? (the right responder) • effective? (the interventions, treatments and ongoing plan met the patient's immediate clinical needs and any necessary follow up was provided)	Circle: Yes/No Circle: Yes/No Circle: Yes/No

Limitations of medical treatment

Were any limitations of medical treatment documented prior to the event (for example, 'not for ICU' or 'not for resuscitation')?	Circle: Yes/No
If yes, did care at the time of the event align with the documented limitations?	Circle: Yes/No
If no, were new limitations of medical treatment documented as a result of the event?	Circle: Yes/No

Global review questions

In your opinion, were there warning signs that the patient was at risk of deterioration in the 24h before the event?	Circle: Yes/No
If yes, were these signs: • recognised? • acted on? • communicated to the appropriate seniority of clinician?	Circle: Yes/No Circle: Yes/No Circle: Yes/No
Did the primary medical team review the patient in the 24h before the event?	Circle: Yes/No
If yes, in your opinion, did the plan of care demonstrate: • appropriate recognition of the severity of illness? • an appropriate plan for monitoring the patient? • a clear plan for required interventions and treatments? • appropriate indications for further review?	Circle: Yes/No Circle: Yes/No Circle: Yes/No Circle: Yes/No
Was there documented evidence of patient, family or whānau concern in the 24h before the event?	Circle: Yes/No
If yes, in your opinion, was this concern: • recognised? • acted on? • communicated to the appropriate seniority of clinician?	Circle: Yes/No Circle: Yes/No Circle: Yes/No
In your opinion, was there any system, process, or clinical issue not identified above that contributed to the event? (For example, equipment failure, communication failure, availability of staff)	Specify: