

## **Deterioration detection: the Veterinary Early Warning Score**

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### **Scenario**

*Your patient seems quieter than your earlier assessment, however you cannot identify a cause. They are a 5 year old cocker spaniel who has undergone an enterotomy due to a foreign body two days ago, they initially recovered well, however now they seem to be deteriorating. You have previously worked with early identification charts and would like to implement these in your new practice as you believe that they would have been beneficial for this patient, helping you to track their parameters and identify the early stages of their deterioration.*

### **Introduction**

Early identification care sheets have been utilised in human centred medicine to alert the medical team to patients' who are most at risk from deterioration. These systems trigger the implementation of care to prevent worsening of the patient's condition whilst also preventing serious adverse events and human error (Kyriacos, Jelsma and Jordan, 2011). Scoring systems have been created to support this aim, such as the National Early Warning Score system (NEWS2) (NICE 2022).

This feature provides a background on early identification of care, NEWS2 and presents a comparative score system, the Veterinary Early Warning Score (VEWS) and its current use in practice.

### **Background**

Early identification and intervention of care is a common theme throughout the medical world with initiatives demonstrated in paediatrics, maternity, mental health and critical care to name a few. Systems that allow the care team to implement fast and direct care, reducing the requirement for more invasive care later down the line are imperative.

Multiple-parameter or aggregated weighted scoring systems have been created to identify those patients who are deteriorating in hospital. They help to prevent serious adverse events, when human error causes a patient's deterioration to go undetected through infrequent monitoring, misinterpretation of results, delays in seeking assistance or a lack of clinical evidence to support the practitioner's views (Kyriacos, Jelsma and Jordan, 2011). All of which can easily occur when teams are stretched with high patient loads, as seen in the veterinary industry.

Preventing avoidable errors is essential when patient lives are at stake and errors can lead to financial implications, in addition to protecting the mental health of the team who will be left with emotional turmoil, demoralisation and feelings of failure (Kyriacos, Jelsma and Jordan, 2011).

Early warning score systems create an assessment score, utilising commonly recorded physiological measurements in adults, to track deteriorating patients and provide a trigger for enhanced nursing or medical intervention. The aim is to identify patients who are deteriorating, are acutely ill, or are demonstrating clinical signs of sepsis (NICE 2022). The National Early Warning Score system (NEWS2) presented by NICE in 2022 is an example of this.

Respiratory rate, pulse rate, oxygen saturation, systolic blood pressure, consciousness and temperature are all recorded. Each parameter is scored 0-3 with clinical

responses provided for the total score, however, alternative agreements can be made locally. For a score of 0, the patient remains on a routine level of monitoring, whilst a low score, of 1- 4, can result in the nurse increasing the frequency of monitoring or implementing greater clinical care. A low to medium score whereby a 3 is scored in any single parameter, triggers an assessment by a doctor who can also increase frequency of monitoring or request greater clinical care. If the patient scores 5-6, classed as medium, an urgent review by a doctor is required or care may be escalated to a critical care team. Finally, a high risk score of 7 or greater, results in emergency assessment of the patient by the critical care team and in some cases, a transfer to a high dependency unit (NICE 2022).

Whilst human centred nursing tools provide insights, not all evidence within this field is applicable. For example, the commonly recorded parameters and care triggered at each assessment will vary between species, practice resources, patient signalment, character, condition and the owner's wishes. Therefore, a veterinary specific identification system was created.

### **The Veterinary Early Warning Score (VEWS)**

The early warning system presented in this feature, VEWS, was created following a similar care sheet being implemented during the author's maternity care (BAJ). The author identified benefits of this system and wished to implement them in their veterinary nursing practice.

The recommendations provided were first defined through practice protocols and then reviewed and amended following the implementation of VEWS as part of an initial trial in a multidisciplinary referral hospital. A further ten veterinary establishments then expanded the trial, providing a peer review and additional adaptations, prior to its release to 500 practices.

As with human centred care, VEWS is to be used for non-sedated patients to identify those in the early stages of deterioration, requiring intervention. It can be used to provide a second opinion, reassuring the care giver and supporting their subjective assessment, empowering them to raise their concerns to the veterinary surgeon in charge of that patient. Furthermore, in veterinary practice, vital signs are often either plotted on a graph or written on a care sheet, with no parameters to generate an alert, which when busy, may cause a trend of deterioration, to be overlooked

VEWS can also be used to aid student veterinary surgeons and nurses who may have memorised patient parameters without applying the context of the situation to what is considered 'normal'. An example of this being, a bradycardic cat being identified as normal as their heart rate is within the parameters given in a textbook, yet in a stressful environment such as the veterinary practice, it would be expected to be above the normal range.

VEWS incorporates seven core parameters based on Kirby's (Kirby, 2016) rule of 20:

- Respiratory rate
- Respiratory effort
- Pulse rate
- Pulse quality
- Temperature
- Mentation
- Demeanour

With a further three parameters to be recorded for patients on additional monitoring as stipulated by the veterinary surgeon:

- Systolic blood pressure
- Urine output
- Oxygen saturation

Kirby's rule of 20, lists twenty parameters which should be checked daily for patients within an emergency or critical care setting to create differential diagnoses and treatment plans

(Kirby, 2016). These twenty parameters were adapted to the seven core parameters in VEWS, for more frequent monitoring, with the two being used in conjunction for the critically ill patient.

The combination of objective and subjective assessments aim to harness the veterinary surgeons or nurses experience and instincts, whilst balancing them with the patients clinical signs. This combination is particularly important in veterinary patients who often mask signs of illness and have alternate methods of communication which are not always detected.

The parameter ranges within VEWS were created utilising the averages recorded in the veterinary practice. These were then peer reviewed by 15 veterinary professionals of varying qualifications and positions, including veterinary surgeons (general practice and ECC and anaesthesia diploma holders) and veterinary nurses.

Locally, the clinical team can agree upon alternative ranges as appropriate, for example when a lower than average heart rate is expected, whilst still being normal for the patient. This is then recorded on the patients VEWS chart so that all members of the team are aware and can implement care as required.

The NEWS2 utilises software to provide alerts, however, the scoring system presented in this feature makes use of a red, amber, green (RAG) report to notify the user that an intervention may be required. This is in acknowledgment that many practices still use paper based recording systems.

An alert system is particularly important in light of the current workforce crisis (RCVS, 2022), whereby the veterinary teams are stretched and oversights can occur. It is also, again, beneficial for student veterinary surgeons and nurses, who are learning normal parameters, providing them with a prompt to seek a review by a qualified member of the team and empowering them to speak up when they believe there is reason to do so.

VEWS suggests that one amber score requires the implementation of 30 minute observations and that one red or two amber scores requires a clinician to be contacted. However, a set list of interventions following the assessment can also be left to be organised locally and on a patient by patient basis, with additional space left for documentation of this within the chart. For example, in a practice with an critical/intensive care unit, one red score could be used to trigger a patient assessment by the critical care team, whilst two red, may require the patient's transfer to their unit. This would depend on the owners agreement and finances available, but could be discussed alongside the resuscitation protocol, encompassing both early and late deterioration and care.

### **The current use of the Veterinary Early Warning Score**

VEWS is currently being used in a range of practices, with positive feedback.

### **ADD IN QUOTES**

Now that the pilot phase is over, research is required to ensure that multiparameter score systems and VEWS in particular, prevents the deterioration of patients through early intervention, in addition to validating the parameters provided and the suggested protocols. This research should focus on patient outcomes and hospital stays to ensure that the tool is aiding the veterinary team to identify at-risk patients and implementing the correct care. It would be interesting to also explore over-medicalisation of patients and ensure that additional assessments do not exacerbate this phenomenon.

If found to be effective in identifying at-risk patients and improving patient outcomes, then conversion to a digital format would be beneficial to decrease human factors such as oversights, illegible writing and partial completion (NICE 2022).

### **Conclusion and future application**

Early warning score systems have been implemented successfully within the National Health Service, and could be used to identify early deterioration in veterinary patients. VEWS, a veterinary specific early warning score system is a tool for this purpose. Research on the use of VEWS is required in addition to its expansion into other species and more specific conditions.

### **References**

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