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## Brief Report

# A COVID-19 Deterioration Report: The Nurse Practitioner's Perspective

Catherine Stevens, Mary Ann T. Donohue-Ryan



## Introduction

The first patient diagnosed with SARS-CoV-2 (COVID-19) was admitted to our community hospital in northern New Jersey on March 9, 2020. By April 1, the vast majority of our total inpatient census was critically ill with the coronavirus, and we began experiencing the severe impact of the pandemic that has been described as nightmarish.<sup>1</sup> A small, nonteaching hospital within a large 5-hospital system, our capacity for caring for the massive influx of critically ill patients was quickly challenged and demanded much clinical, operational, and supply chain flexibility. Therefore, we had to be extremely creative in our plan to provide a high degree of clinical oversight to our patients, for their signs of rapid deterioration that could accurately predict worsening outcomes.<sup>2</sup> In China, the case-fatality rate among those who were critically ill was 49% or higher.<sup>3</sup> The case-fatality rate is defined “as the ratio of deaths occurring from a specific cause to the total number of cases due to the same cause and signifies the lethal effect of a cause or disease” (p. 1).<sup>4</sup> In the United States, in mid-March 2020, the case fatality rate was 2.2%; in New Jersey, 16,000 deaths had occurred thus far due to COVID-19,<sup>5</sup> with our long-term care facilities particularly hard hit, making clinical recognition an “all-in” organizational imperative. Additionally, as a nonteaching community hospital without a full complement of residents and academic fellows to assist in surveillance, we innovated together to create a detailed Deterioration Report that guided our physician, physician assistant, and advanced practice nurse providers in their day-to-day clinical decision-making at the height of the pandemic's appearance in our region.

## Background and Significance

At first, we knew little of the clinical manifestations of SARS-CoV-2 other than its respiratory presentation, and with an understanding that scientific knowledge in this area is constantly emerging, we immediately adhered to the isolation standard of care. With personal protective equipment (PPE) as a precious commodity, we relied very closely, even more than usual, on laboratory data as the means by which we continuously assessed our patients. Moreover, patients with COVID-19 tend to deteriorate to sudden critical illness, called a “worrying trend,” by one author,<sup>6</sup> a distressing feature that was validated by our clinical teams in daily anecdotal evidence and by the grim presence of refrigerated morgue trucks stationed outside our hospital.

Over a period of a few short weeks, the medical center's overall acuity increased, in that care for the COVID-19 patients expanded from 1 critical care unit to all inpatient units that were now

designed to be COVID-19-capable. The PACU became the so-called clean (non-COVID-19) ICU, and the former Mother-Baby Unit (MBU) became the non-COVID-19 medical-surgical unit (functions of our MBU were absorbed to 2 of larger hospitals within the system). Over time, our scientific knowledge about the coronavirus expanded along with the rest of the region, so our early intervention strategy of intubation alone transitioned to the adoption of high-flow oxygenation with proning, a practice endorsed by the literature.<sup>7</sup> This shift in treatment approach clearly underscored the need for immediate recognition of the patient's potential for deterioration. Another reality was the growing critical shortage of mechanical ventilators, which was becoming more acute and reported in the national media.<sup>8</sup> During a normal busy influenza/pneumonia season, our hospital utilizes an average of 8 ventilators per day, yet at the height of COVID-19 in our region, utilization peaked at 30 per day. Therefore, we worked strenuously to mitigate intubation in our patients and to reserve scarce equipment, ICU beds, and critical care staffing resources for those patients with immediate ventilator needs, particularly in the emergency department.

## Development of the Deterioration Report

The Deterioration Report was developed by 2 nursing clinical educators, the palliative care nurse practitioner, the medical director of the emergency department, a nephrologist, and chair to the department of medicine—all charged by the chief nursing and operations officer to create a mechanism that would aid in the early detection and escalation of care, as appropriate. Consistent with the emerging literature,<sup>9,10</sup> each patient diagnosed with COVID-19 or patients with a presumptive diagnosis were assessed for their current and previous oxygen needs by oxygen saturations, oxygen delivery methods, C-reactive protein (CRP), and ferritin levels, and whether the lab values had either increased or decreased. A section for notes described any special issues, conditions, status as a long-term care facility resident, and whether the patient had been intubated or was successfully extubated. The original report also included creatinine and troponin, but we soon realized that these lab values had negligible impact on the patient's risk for deterioration, and furthermore, SARS-CoV-2 is not a known cardiotoxic virus.<sup>11</sup>

Our team stratified patients determined to be at risk for clinical deterioration by color, with *red* being high risk, *orange* intermediate risk, and *yellow* low risk. *White* was used to identify patients who are classified with a do-not-resuscitate or do-not-intubate order. As

**Table**  
Color Acuity Scale

Yellow—caution; patient is at low risk for clinical deterioration	Oxygen saturation levels are >92% Requires an oxygen modality of nasal cannula Requires up to 5 L of oxygen
Orange—patient is at moderate risk for deterioration	Oxygen modality includes a venti-mask, non–rebreather or nasal cannula May be weaning from high flow to either nasal cannula or non–rebreather Requires >5 L of oxygen Increased C-reactive protein (CRP) and/or ferritin levels
Red—patient is at high risk for deterioration	Requires immediate high flow or high FIO <sub>2</sub> oxygen concentration Clinical condition is determined to be unstable CRP and/or ferritin levels continue to trend upward

the report progressed, *green* was added to denote patient status as a new admission. Patients were designated a color/level based on oxygen need (i.e., change in oxygen delivery from a nasal cannula to a venti-mask), increase in CRP or ferritin. Patients on high-flow remain as *red* status, until they are able to be weaned off to a non–rebreather mask or nasal cannula (see [Table](#)).

### Functionality of the COVID-19 Deterioration Report

Two nursing clinical educators interrogated the electronic medical records of COVID-19 patients as well as those under investigation awaiting test results, at least twice a day and issued the Deterioration Report accordingly. Providers were thus able to focus on the higher risk patients identified on each shift, prioritize care based on the presenting clinical data elements and communicate effectively with the members of the interdisciplinary care team. For example, several locum tenens advanced practice nurses and a physician assistant conducted surveillance rounds on all the inpatient units 24/7 and were then able to prioritize monitoring of the inflammatory markers (CRP and ferritin) and assure that daily drawing of critical labs occurred in a timely manner. Reviewing the code status of patients was another important function cued by the report, so that provider orders for life-sustaining treatment (POLST) status or the patient's written advance directive already in place, would then be readily integrated into the patient's plan of care. This allowed the palliative care advanced practice nurses to focus discussions with the patient's family or surrogate, establish realistic goals of care, and initiate advanced care planning.

### Preserving Resources, Energy, and Time

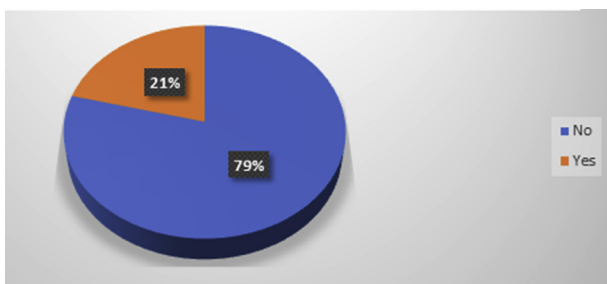
As the pandemic's effects continued, the hospital's supply chain was challenged, along with the entire region of the country. The COVID-19 Deterioration Report enabled closer monitoring of oxygen levels, awareness of oxygen delivery method, and detection of subtle changes

in both. Ensuring patients received high flow oxygen and proning to prevent and/or forestall intubation allowed for the maximum preservation of what continued to be, scarce resources in the form of equipment, staffing, and critical care rooms.

In summary, reviewing all patients that are confirmed as either COVID-19–positive or a patient under investigation and stratifying their clinical outcomes saved time and energy—and patient's lives. Knowing which patients required immediate attention and a higher degree of surveillance enabled the providers to prioritize face-to-face clinical assessments and validate lab data as opposed to ploughing through reams of reports at undetermined or even random times of the day or when the majority of operational or clinical leaders may not be present. As nurse practitioners lead and participate in interdisciplinary teams that innovate to identify and initiate lifesaving measures, collaboration is key to success.<sup>12</sup> There is an appreciation for each profession's area of expertise that, when blended into a functional team approach, results in maximum outcomes for the patient.<sup>13</sup> Potential for early intervention and improvement in the patient's overall condition, leading to successful discharge and return to the community were all associated with the implementation of the COVID-19 Deterioration Report. Success was evidenced by the sustained increase of patients who avoided intubation and were instead treated with high-flow oxygenation with proning (see [Figure](#)).

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**Figure.** Percent of high-flow patients intubated in April and May 2020.

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Catherine Stevens, DNP, APN, is a palliative care nurse practitioner at Chilton Medical Center Atlantic Health System, Pompton Plains, NJ. She can be contacted at [catherine\\_stevens@atlanticehealth.org](mailto:catherine_stevens@atlanticehealth.org). Mary Ann T. Donohue-Ryan, PhD, APN, PMH-CNS, is an executive leadership consultant at Chilton Medical Center Atlantic Health System, Pompton Plains, NJ.

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