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The DNR Order: What Does it Mean?

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Abstract: As medical science continues to advance, patients nowadays with progressive cardiopulmonary diseases live to older ages. However, they too will eventually reach their unsustainable physiological limit and many die in poor health and discomfort prior to their demise. Regrettably many physicians have not kept pace in dealing with the inevitable end-of-life issues, along with modern technological developments. Without proper guidance, ill-informed patients often face unnecessary anxiety, receive futile resuscitation at the expense of their dignity and public cost which has and will become increasingly overwhelming according to our current demographic trends. In any health care reform, experts often suggest that difficult questions will have to be asked but the solutions are at least partly in the logistical details. From time to time, we see an isolated “Do Not Resuscitate” or DNR order in the chart, which is not always followed by thoughtful discussion on the boundary of care, either simultaneously or known to be followed up soon. This paper attempts to begin asking some of these difficult questions, point out the fallacies of this order and expose the weaknesses in the present state of entitlement by public demand if physicians retreats more from the discussion. The solution does not lie in asking the questions but in changing the practice pattern in real life on a continuous basis, hopefully to be eventually accepted by most, if not all.

Keywords: cardiopulmonary disease, critical care, end of life issues, epidemiology trends, ethics, health care policy, level of care, public health economics

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Preamble

Over the last century, great discoveries have been made in medical sciences. Thanks to the advances in therapy and improvements in public health policies, many of us are now living longer and better. However, the final stage of our lives has also become more heterogeneous and complicated, pending on the different clinical scenarios.

Figure 1 shows the four potential clinical courses among aging patients in the modern era for our present discussion. It serves to illustrate the proposed concepts below. Pathway A shows a group of patients, whose illnesses are terminal or rapidly approaching terminal at the time of diagnosis, such as metastatic or end stage cancer. Unfortunately there are no easy treatment options and they succumb to their illnesses

quickly. Pathway C shows a group of patients who have slowly progressive diseases and suffer from considerable morbidity due to their underlying problems, such as dementia or osteoarthritis but do not yet have serious cardiopulmonary dysfunction. With good nursing or home care, they worsen gradually until their very advanced age, unless or until they begin to suffer from repeated pneumonia, febrile episodes or eating problems.¹ Pathway D is the idealized scenario in which patients are managed well as out-patients but eventually meet their ultimate fate rather abruptly at the end without much lingering. Finally, Pathway B represents a group of patients who suffer from significant cardiopulmonary diseases, either directly or indirectly as a result of other common illness such

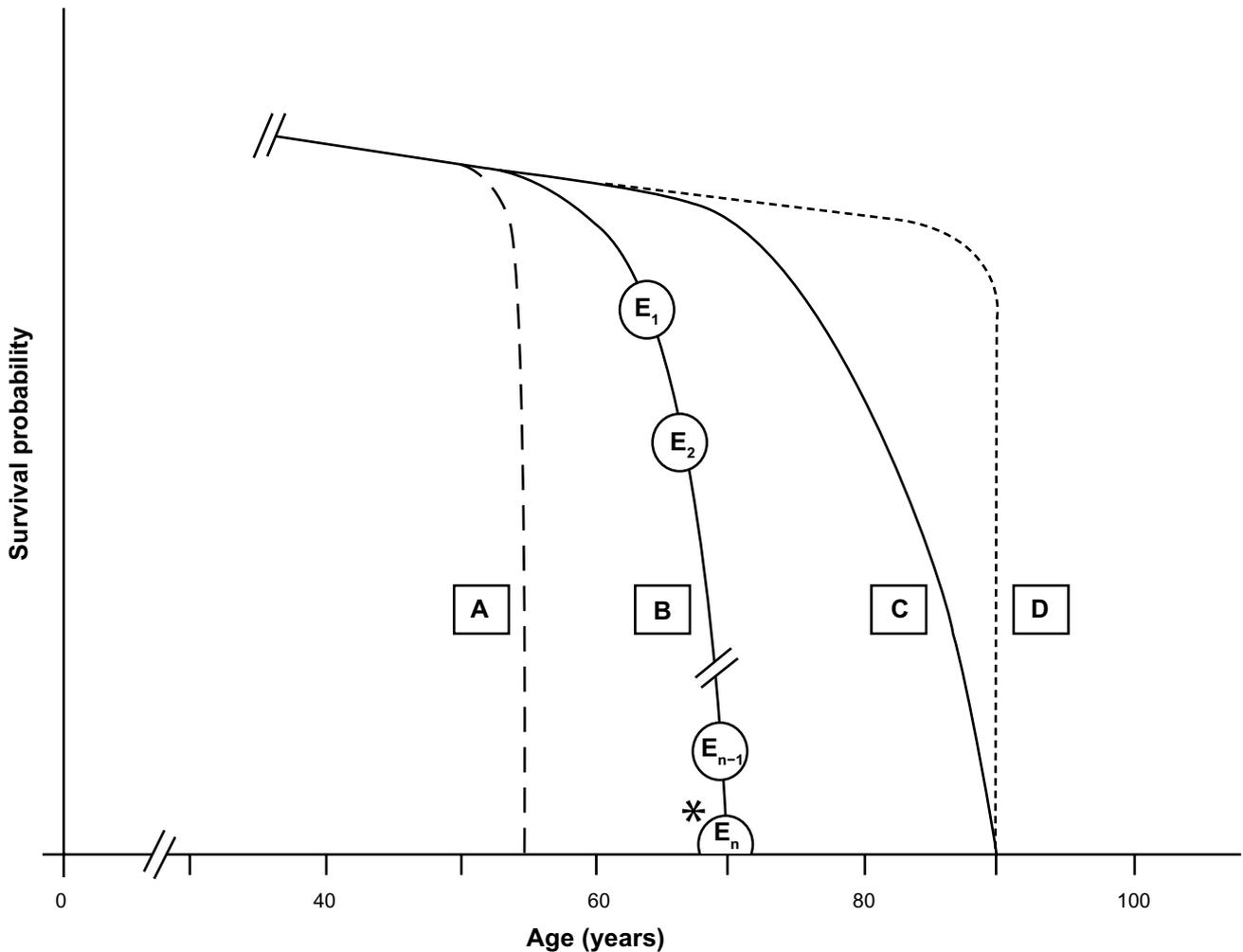


Figure 1. The general pathways of clinical course in the aging population. Pathway A represents rapid deterioration, as in metastatic cancer. Pathway B represents progressive deterioration associated with intermittent exacerbations, e.g. with major cardiopulmonary illnesses. Pathway C represents slow deterioration with reasonable preservation of cardiopulmonary function. Pathway D represents idealized scenario.

*Signifies the situation in which efforts to define boundary of care should be made proactively. $E_1, E_2, \dots, E_{N-1}, E_N$ denotes episodes of exacerbation and hospitalizations, with the final one E_N resulting in death.



as diabetes. They are often hospitalized for each episode of exacerbations ($E_1, E_2, \dots, E_{N-1}, E_N$), and eventually the slope of their deterioration compares closely with those in Pathway A and deviates more and more from those in Pathway C. It is this last pathway B that is the focus of our discussion.

Generally speaking, Pathway A becomes rarer over time and medico-ethical issues are more straightforward due to the limited therapeutic options. These patients have a rapidly downhill course, in which prognosis is generally well defined in both the short and intermediate term by the nature of the illness. The ongoing quality of life is essentially one of rapid deterioration with suffering. In this case, discussion on future boundary of care is less complicated from both the physician's and patient's point of view and the "Do Not Resuscitate" or DNR order for cardio-pulmonary arrest, along with boundary of care, can be agreed upon more readily with good acceptance on both sides.

Pathway C becomes more common as we all get older. These patients' activity is limited and their many body functions becoming gradually more dependent, resulting in hardship not only to themselves but to the responsible family members as well. In here, family members, who bear more immediate responsibilities and witness the relentless downhill course towards severe disability, are also more likely to accept the regrettable outcome. Consequently, they do not necessarily insist on recurrent hospital admissions or burdensome interventions as they develop rational expectation through experience and understand more about complications that can cause pain.¹ If the patients stay in nursing homes or hospice,² boundary of care is usually defined with the help of the attending physicians there, hopefully with good communications and in accordance to the policy in these institutions. The care cost, though cheaper than hospitalization, is often borne or supplemented by themselves or family, which may have some impact on the associated moral hazards.

Pathway D is an ideal that the public hopes for, as physicians strive for better chronic care but it exists infrequently.

So the discussion brings us back to Pathway B, in which the patient population included here is expanding more quickly than the others, mainly due to improved out-patient cares and in-patient

therapies. This is a sound accomplishment that should be congratulated but has become increasingly expensive and futile towards the end. In the meantime, their age, population number, body mass index, the cost of technology and frequencies of acute hospitalization continue to grow.³ Consistent with the Pareto Principle,⁴ (Fig. 2), the recent financial data indicate that 20% of the health care cost can easily cover 80% or more of the general population but it is the remaining 20% or fewer patients, many in Pathway B, that requires over 80% of the budget. In United States, the top 1% patient with the highest expenditure accounted for about 27% of total dollars⁵ and the numbers have remained skewed.^{6,7} The point here is not to propose draconian measures to limit care but to examine the use of health care dollars more carefully or at least to avoid misusing them in ways that may not even be welcomed. Proper use of ICU is different from rationing.⁸ Examples of patients in this category include many of those who have severe chronic obstructive lung diseases (COPD Gold classification D), severe heart failure (NYHA IV), patients with end stage renal failure and co-morbidities (Dialysis dependent and limb amputations from peripheral vascular diseases) or some others of progressive and irreversible nature. Objective data, such as pulmonary function tests,^{9,10} ventricular ejection fraction or NYHA classification,¹¹ nature of strokes^{12,13} or extent of peripheral artery diseases^{14,15} etc. are useful guides to alert for appropriate end of life discussions.

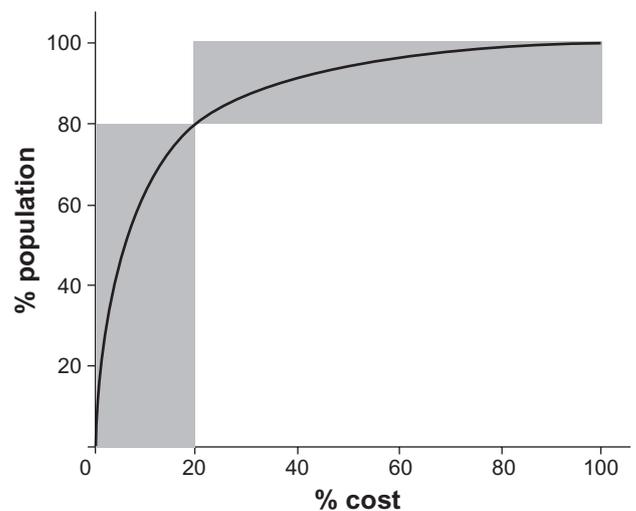


Figure 2. Pareto principle. 20% of patients consume approximately 80% of health care cost.



For numerous reasons, perhaps due to uncertainty in physician's mind, insistence on beneficence or everyone's anxiety to confront the unpleasant, the focus of therapy is more on optimization, which is entirely appropriate but the discussion on end of life issues is regularly omitted. The key is to discuss these issues on focused patient populations proactively and avoid that final and fatal exacerbation (E_N) inside ICU.¹⁶ As we move down Pathway B (Fig. 1), the inconvenient truth is that the likelihood of gaining time in lifespan becomes increasingly remote while the expenditure goes up exponentially. Some measures of surveillance in cost-effectiveness analysis are justified for reference in public policy¹⁷ without being maligned politically. The entitlement of people in end stage Pathway B to have a trial of survival by CPR followed by ICU admission before dying is now more commonly accepted and has become increasingly expected in the last decade, while success rate does not change and many more become institutionalized afterwards.¹⁸ This trend represents an evolving but definite cultural shift. Undisciplined use of health care resources will fundamentally change the agenda of the society for everyone. In order to have a properly functioning health care system, the weight of clinical judgment to limit futile care must increase proportionally with worsening prognosis, based on composite evaluation of all the clinical problems.

In this analysis, I propose that the DNR order, when prescribed alone without much deliberation for patients with advanced illnesses, rarely applies in the real world scenarios. It is actually quite counter-productive and often leads to last minute confusions. This isolated order gives the responsible physician a false sense of resolution when it is actually not yet achieved but creates misunderstanding among

colleagues instead. Regrettably, the outcome of these discussions with the high risk groups, if any, has become increasingly common with the confusing conclusion that that if the patient's heart should stop suddenly or unexpectedly, there will be no cardiopulmonary resuscitation (DNR) but otherwise everything else will be done.

Why is the DNR Order Impractical?

Post cardiac arrest is only one of the many scenarios in which patients will be admitted to ICU, thus the DNR order does not address many other scenarios for admission. DNR order alone without elaborating on the level of care covers rarely the common clinical pathways.

To illustrate this point, consider a high risk patient population from a game theory standpoint with very severe COPD.¹⁹ This example is chosen to illustrate the general argument but the principle can be applied for many other cardiopulmonary diseases. Using figures seen sometimes in this clinical setting (Fig. 3),^{20,21} assume 70% of them are designated either by planning or default for full code which includes ICU admission (Group 1), 10% are designated for DNR but including ICU admission (Group 2) and 20% for DNR and no ICU admission (Group 3), we can then examine the impact of a singular DNR order.

In Group 1 (Fig. 4), assuming that the probability of sudden cardiac arrest is 10% in one year and its associated mortality rate from CPR is 80%, the death rate accounted for under this circumstance in this very sick subgroup is $70\% \times 10\% \times 80\% = 5.6\%$. In Group 2 (Fig. 5), if the probability of sudden cardiac arrest remains at 10% and its associated mortality is now 100% because of the DNR order, the same death rate in this subgroup is $10\% \times 10\% \times 100\% = 1.0\%$. In Group 3 (Fig. 6), again if the probability of sudden

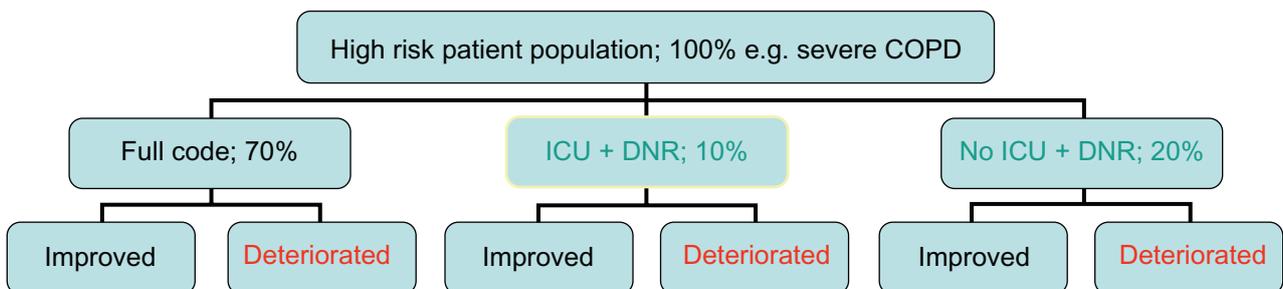


Figure 3. Description on three different clinical scenarios in a theoretical high risk patient population. Group 1 represents patients with full code. Group 2 represents patients with DNR and ICU admission. Group 3 represents patients with DNR and no ICU admission. The percentages of patients in these subgroups are estimated for discussion only.

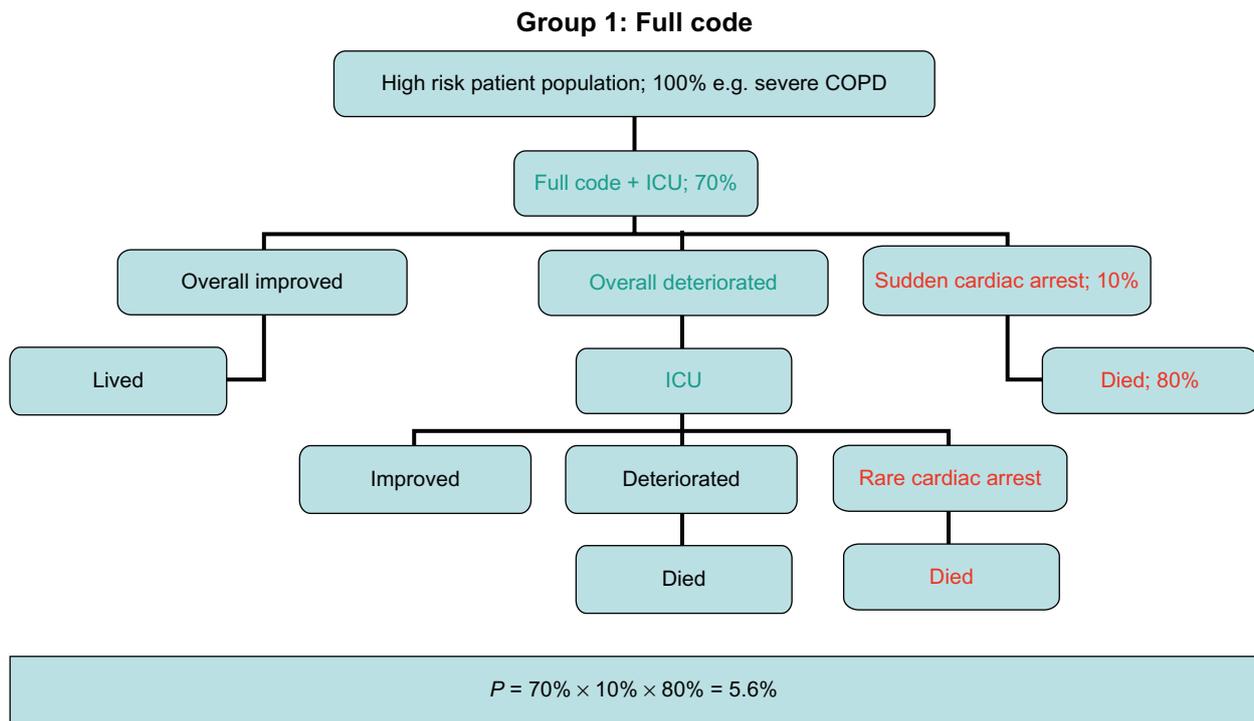


Figure 4. Clinical scenario of patients in Group 1, in full code which includes ICU admission. P denotes probability of death from sudden cardiac arrest.

cardiac arrest is 10% and the mortality is 100% due to DNR order, the corresponding death rate will then be $20\% \times 10\% \times 100\% = 2.0\%$. Thus, the total death rate from sudden cardiac arrest is 8.6% prior to ICU admission and the death rate in which the DNR order actually applies its effect is only about 3.0% of total. On the other hand, a good portion of Group 1 and 2 (adding up to 80% of all patients) will be admitted to ICU for presumably mechanical ventilation and vasopressors as they approach the end of life (Fig. 3), presumably more than $5.6\% + 1.0\% = 6.6\%$ among them will die after prolonged weaning or soon afterwards. Thus from the probability standpoint, DNR alone is hardly a decision of significant impact. Those who survive the prolonged ICU stay will unlikely live long as E_{N-1} and E_N become very close and the line between them is essentially in a vertical slope (Fig. 2). Often over 50% of life time health expenditure per patient is incurred in the last 6 months.

As the pressure for ICU admission mounts for these end stage patients due to their increasing number while more and more patient undergo CPR and futile ICU admissions due to our unwillingness to deal with end of life issues, it is a reasonable to express a concern that the number of patients in Group 1

(full code) and Group 2 (DNR but everything else is done) will disproportionately increase in the future rather those in Group 3 (DNR and no ICU) where many should properly belong. Some argue that our current paradigm on CPR needs examination and suggest that we should re-consider its status as a universal default,²² with or without prior consent.²³

Most of the time when the patients get worse in the ward, say pneumonia, their impending cardiopulmonary arrest is pre-empted by intubation or vasopressor support, prior to or during ICU admission. This development may well be entirely appropriate in some cases as long as it is clearly defined beforehand. Thus, the DNR order taken in isolation for sudden and rare cardiac arrest does not meaningfully advance the overall understanding of the medico-ethical situation because such events are clearly in the minority. On the other hand, if in the view of the physician, that the patient's ICU admission will be futile, the boundary of care must be addressed along the way, instead of just ordering DNR before the patient unfortunately deteriorates to a critical level. The point here is not to argue about whether any specific patient should or should not be cared for in the ICU but on the relative uselessness of an isolated DNR order without discussing the boundary of care to ICU, one way or

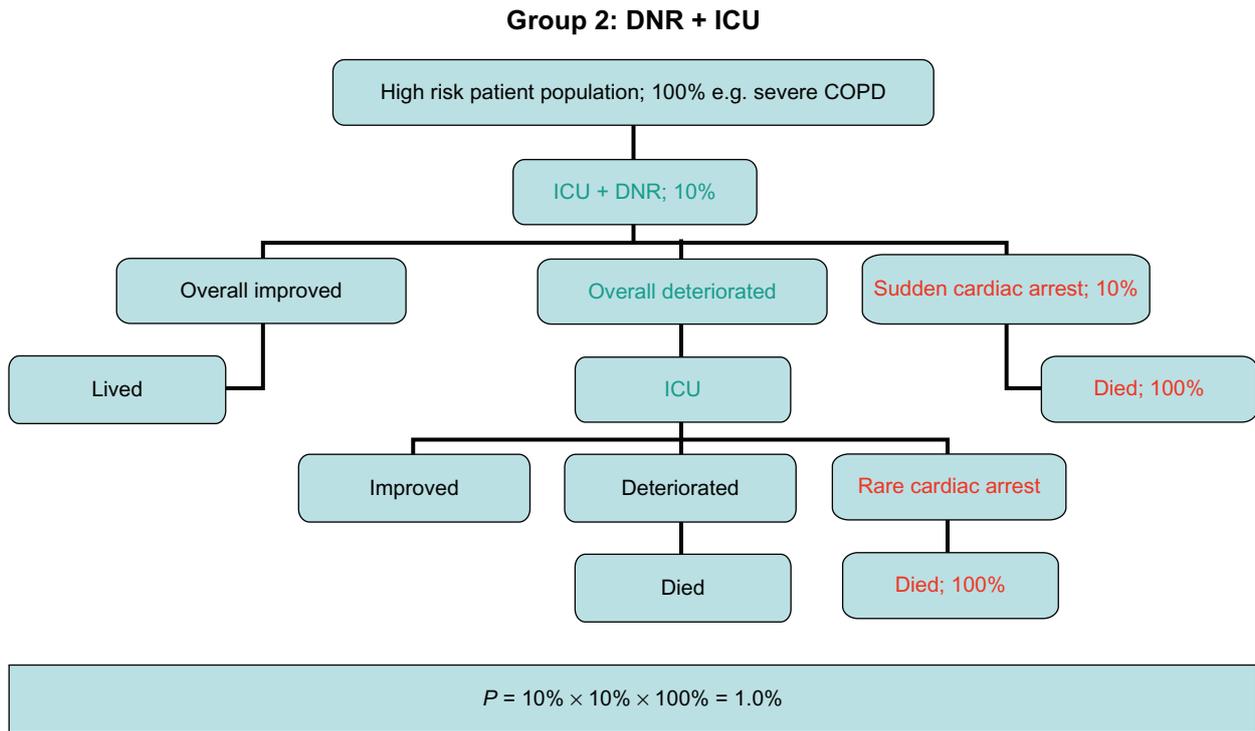


Figure 5. Clinical scenario of patients in Group 2, DNR but ICU admission not clarified. *P* denotes probability of death from sudden cardiac arrest.

another. Taken alone, the effort is half-done. Perhaps some physicians who engage in the laudable goal of appealing for better health care funding should also pay some attention to more self-examination within the profession on this task.²⁴

Why is a DNR Order Potentially Counterproductive?

Most patients and their family member understand that if someone, who is already seriously ill under Pathway B, suffers a sudden cardiopulmonary arrest, his

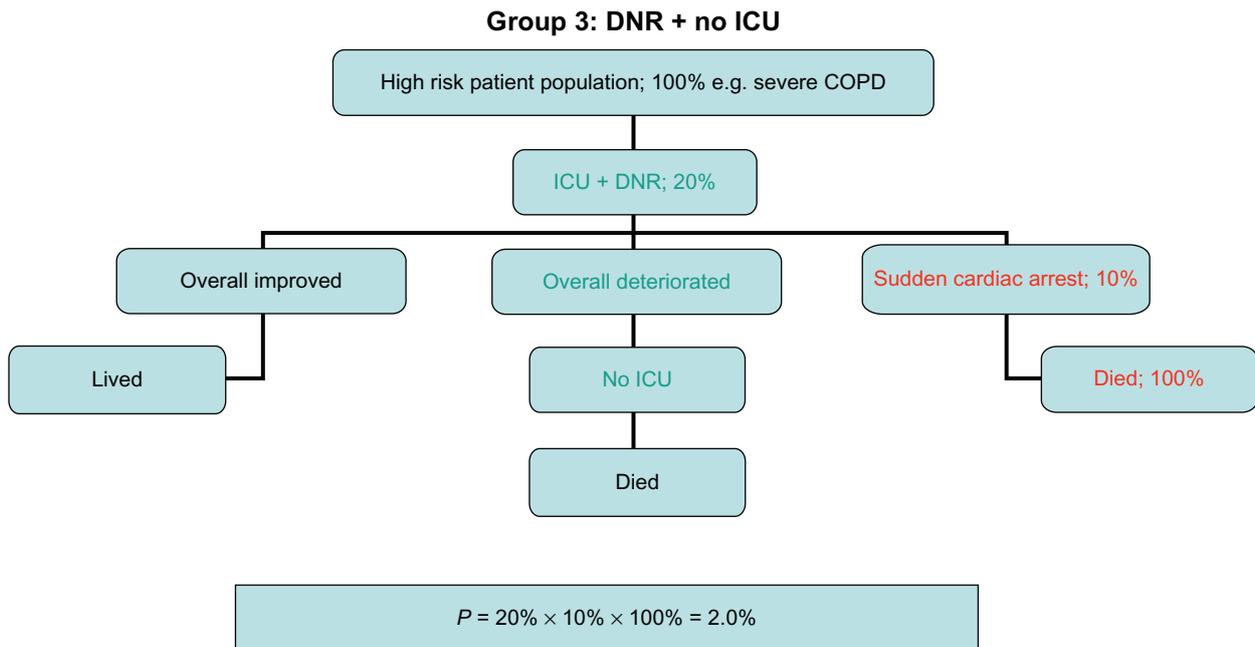


Figure 6. Clinical scenario of patients in Group 3, DNR and no ICU admission. *P* denotes probability of death from sudden cardiac arrest.



or her chance of survival under that circumstance, is small. Given that premise, they find it easier to accept DNR order and avoid the indignities that usually come with the brutal resuscitation in the last minutes. The real challenge is to address also the boundary of care by physicians to the patient or the surrogate decision maker besides this scenario of unexpected cardiac arrest. The DNR order is sometimes necessarily the first step in a continuing dialogue but it must be emphasised to the patient or family that more discussions are needed as the situation develops. It is certainly not the end with a sigh of relief by all. Clearly the worst outcome of any discomfort on both sides is to avoid discussing it altogether and leave it to someone else, including the most junior resident or the ICU service in the last minutes. Perhaps the second worst scenario is to address only the DNR for unexpected arrests but leave open the boundary of care unmentioned or unresolved without a truly comprehensive talk and documenting it, thus leaving room for misinterpretation or retrospective over-ruling by others. In issuing the DNR alone, it gives the appearance of dealing with a potentially difficult medico-ethical issue without truly addressing it. A false sense of resolution is achieved as it indicates some efforts, though somewhat irrelevant from the probability standpoint, have been made. Therefore, such DNR order may have the potential consequence of impeding further discussion by the physician or the colleagues, with some pretence that good understanding has been obtained.

Notwithstanding the rarity of sudden cardiopulmonary arrest, nurses who are usually the first to witness a patient in this dismal state, often find the order “DNR but otherwise everything else done” awkward to interpret. They are understandably uncomfortable in deciding, often alone in these life and death moments, not to call for help while physicians are far away from the immediate scene. Without good communication or clear documentation in chart, retrospective rebukes from family or colleagues with 20/20 hindsight can result in very real career consequences if they are to rely entirely on a non-descript line on the order sheet, which is not that uncommon. Even if this strange order is justified, there is always the moral duty in the profession which requires explanation and documentations on the rationale. Any order that is inherently ambiguous

and loaded with serious implications will not be met with acceptance and good compliance. At its worst, it is self-defeating.

Dealing with the boundary of care, such as ICU admission, is difficult and unpleasant because it may lead to confrontation in some situations and go counter to the traditional culture in medicine where physicians advocate to the fullest extent for our patients. Passive inaction will not expose oneself to anger, frustrations, errors or accusations. In the extreme case, lawsuits and disciplinary actions may result, even if it only goes as far as the hearing stage.²⁵ “The nature of bad news infects the teller”. This is why this important topic is often neglected.

How is the DNR Order So Often Misinterpreted?

DNR, which stands for Do Not Resuscitate, is a misnomer. Presumably it means that treatment efforts that go beyond the ward level care, such as intubation, ventilation or vasopressor support etc., will not be provided. To the laymen, it is often unclear as to whether it also means Do Not Treat, unless this is explicitly clarified in good communications. If not done well, they may think that oxygen, intravenous fluid, antibiotics etc. are part of the “resuscitation” and their loved one will not receive them. While these patients should continue to be treated aggressively in the ward, until and unless they become terminally ill in discomfort, many junior house staff and some nurses, to a surprising degree, consider the DNR order is a sign for palliation and may consciously or subconsciously begin to change their attitude of care.²⁶ From these observations, it is perhaps why some senior physicians insist that the DNR order should never be written because it compromises patient care in the ward. As a result, code blue is called with the involvement of the entire ICU team 24 hours a day and only at the last minutes that it is cancelled. Needless to say, this creates considerable stress among the staff and waste of health care resources without good justification. Finally, while some want to privately interpret DNR as no admission to intensive care unit, many family members consider it otherwise and accept this order in its narrowest sense if and when sudden cardiac arrest occurs. Misunderstanding on the scope of treatment can also occur when patients are handed over to changing services.



What are the Suggestions?

1. DNR order should not stand alone and should always be followed by level of care order after specifically addressing the issue with the patient or surrogate decision maker, particularly for those with advanced and progressive cardiopulmonary diseases.
2. It must be emphasised that whatever the level of care may be, full care in ward must be carried out and cannot be misconstrued to be palliative until the senior physician and family come to that firm understanding.
3. Senior physicians should examine their own pattern of practice and take more direct ownership in medico-ethical issues. While many physicians have done a good job in this area, some do not and few cynics actually avoid it. If the responsibility is to be delegated, they should follow up and engage personally one way or another, rather than walking away entirely because the residents are interested to deal with it. This kind of personal effort has also its inherent educational value. While most medical schools have recognized the teaching of medico-ethical issues during the student years, the lack of regular teaching in this area at the post-graduate level by the bedside nullifies the earlier efforts and perpetuates the problem.
4. Every hospital should appoint a body of senior physicians, preferably with background in cardiopulmonary diseases, to be quickly available for consultation and support when needed. While professional ethicists can provide guiding principles inside seminar rooms, it is ultimately the physicians who are willing and able to make specific judgment and decide orders on the chart from their clinical background. Ethics committee that does not provide useful and timely support to the stakeholders cannot justify its existence.
5. Palliative care consultation should be made more available to appropriate patients to alleviate the anxiety of future events. However, physicians and house staff should continue to engage actively afterwards in the communication instead of wholesale delegation to the others.
6. For clearly defined patient populations, physicians should be supported by a specific fee schedule for the effort and subsequent documentation in the chart with regard to discussions about the boundary of

care. Some forms of public electronic registry can be helpful in order to be relevant in short notice.

Concluding Remarks

When a patient becomes very difficult to care for in the ward, a decision will have to be made on the next step. If it is, in the view of the attending physician, that patient care is futile for ICU admission, either vigorous medical care in ward with boundary defined or palliative care will then be appropriate. This step can be aided by consulting others. On the other hand, if the patient may improve with better nursing ratio in the ICU, the same patient may be admitted there, with agreement by all, for better care or monitoring, even without the intention to intubate etc. Thus, when the pressure increases, it is a stronger signal to define the boundary of care along with the DNR order. Once the proactive discussion is done, with the conclusion one way or another, the fear of litigation resolves if all sides agree. If not, most hospitals have established processes for resolution, such as seeking second opinions, transfer to another hospital, mediation, spiritual assistance, involvement of patient risk manager from administration, notification of in-junction and finally legal actions. A more uniform approach will result in justice for all patients. No doubt this is also more energy consuming. For those hospitals that are not yet prepared, it's time to begin.

So the next time when you write a singular DNR order but promise to do everything else, think of the order's lack of relevance in real world scenarios, think of its potential confusion to the nurses and house staff, think of its negative impact on bringing up the medico-ethical issue again by someone else with your promise. As a result of this kind of questionable order, the precious critical care facilities may be used inappropriately, both before and after admission there. Or it may even be unwanted if patients have been given the opportunity to have better understanding under your guidance. Personal belief by some physicians to preserve life at all cost and all time should not be imposed unilaterally to patients without legitimate dialogue.

The content of this essay represents my opinions alone and does not reflect on any associated institutions.



Key Points

- DNR order should always be followed by level of care order
- DNR order alone covers only very occasional clinical scenarios
- DNR order alone can impede further discussion on medico-ethical issues
- DNR order alone is sometimes misinterpreted as palliative
- Current model on critical care utilization is not sustainable in present epidemiological trend and economic climate
- Hospitals should have effective ethics committee staffed by clinical experts

Disclosure

This manuscript has been read and approved by the author. This paper is unique and is not under consideration by any other publication and has not been published elsewhere. The author and peer reviewers of this paper report no conflicts of interest. The author confirms that they have permission to reproduce any copyrighted material.

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