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**EDUCATIONAL AND INCLUSIVE MODELS
IN DISASTER MEDICINE: PREPARATION
FOR THE THERAPY OF CARDIOVASCULAR
COMPLICATIONS IN PATIENTS
WITH NEUROCOGNITIVE DISORDERS**

Chemerys Yu. O.

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INTRODUCTION

In contemporary healthcare, disaster medicine is no longer understood solely as a field concerned with large-scale trauma, mass casualties, or emergency evacuation under extreme circumstances. Its scope has expanded significantly and now includes the organization of rapid, safe, and clinically adequate care for highly vulnerable categories of patients whose health status may deteriorate sharply in crisis settings even in the absence of direct physical injury¹. Among such groups, patients with neurocognitive disorders occupy a particularly important place. In emergency contexts, humanitarian crises, military threats, forced displacement, infrastructure collapse, or other disaster-related conditions, they often become one of the least visible yet most medically fragile categories of patients. Their vulnerability is determined not only by the underlying neurological or cognitive impairment itself, but also by the fact that these disorders complicate communication, delay recognition of symptoms, disrupt adherence to treatment, and make interaction with the healthcare system far more difficult at precisely the moment when speed and clarity are most needed².

This problem becomes especially significant when viewed through the lens of cardiovascular complications. In disaster and crisis medicine, cardiovascular instability is among the most common and clinically dangerous pathways of deterioration. Acute stress, interruption of chronic treatment, dehydration, lack

¹ Lamberti-Castronuovo A., Valente M., Barone-Adesi F., Hubloue I., Ragazzoni L. Primary health care disaster preparedness: A review of the literature and the proposal of a new framework. *International Journal of Disaster Risk Reduction*. 2022. Vol. 83. Art. 103278. DOI: 10.1016/j.ijdr.2022.103278.

² Brown L. M., Young S. G., Hicken B. L. Dementia severity associated with increased risk of potentially preventable readmissions during home health care. *BMC Geriatrics*. 2025. Vol. 25. Art. 271. DOI: 10.1186/s12877-025-05793-8.

of sleep, disorientation, emotional overload, pain, reduced access to medication, and delayed monitoring may all contribute to destabilization of the cardiovascular system. In patients with neurocognitive disorders, these risks become even more pronounced because the usual mechanisms of history taking, symptom reporting, decision-making, and therapeutic cooperation may be impaired. Such patients may not be able to describe chest pain adequately, may fail to communicate dyspnea, may not understand instructions regarding medication, or may react to deterioration with behavioral agitation, apathy, confusion, or withdrawal rather than with clear clinical complaint. As a result, cardiovascular complications may remain unrecognized for longer, be interpreted incorrectly, or be treated too late³.

At the same time, the challenge is not purely clinical. It lies equally in the preparedness of the healthcare system and its personnel. Disaster medicine traditionally relies on speed, standardization, triage logic, algorithm-based action, and prioritization under conditions of limited resources. These principles remain essential. However, in relation to patients with neurocognitive disorders, they are often insufficient if they are applied without adaptation. A patient who cannot answer clearly, who becomes disoriented in a noisy environment, who does not tolerate sensory overload, or who is unable to follow even simple therapeutic instructions may not fit into a standard emergency pathway without significant risk of clinical error. For this reason, the question today is not only whether medical personnel know how to treat cardiovascular complications in principle, but whether they are prepared to do so in an inclusive, communicatively adapted, and cognitively sensitive manner under conditions of disaster and instability.

In this context, the concept of educational and inclusive models in disaster medicine acquires particular relevance. Such models should not be interpreted as an auxiliary humanitarian addition to “real” emergency training. On the contrary, they represent a necessary extension of professional competence. They are aimed at preparing healthcare workers to combine protocol-based clinical precision with flexible communication, ethical sensitivity, situational awareness, and the ability to work effectively with patients whose cognitive functioning limits their participation in the usual format of emergency care. In other words, inclusiveness in disaster medicine is not simply a matter of social fairness. It is directly related to patient safety, diagnostic accuracy, therapeutic continuity, and the prevention of avoidable complications⁴.

³ Sampson E. L., Blanchard M. R., Jones L., Tookman A., King M. Dementia in the acute hospital: prospective cohort study of prevalence and mortality. *The British Journal of Psychiatry*. 2009. Vol. 195, No. 1. P. 61–66. DOI: 10.1192/bjp.bp.108.055335.

⁴ Werner N. E., Stanislawski B., Marx K. A., et al. Getting what they need when they need it: challenges in sharing information for persons living with dementia transitioning from hospital to skilled nursing facility. *Journal of the American Medical Directors Association*. 2020. Vol. 21, No. 10. P. 1534–1543. DOI: 10.1016/j.jamda.2020.02.019.

Patients with neurocognitive disorders constitute a heterogeneous clinical category, and this heterogeneity further complicates their management in emergency settings. The group includes individuals with dementia, delirium-prone conditions, intellectual disability, acquired cognitive impairment after stroke or traumatic brain injury, neurodegenerative disease, developmental disorders, and mixed neurological and psychiatric presentations. Each of these conditions may influence the patient's capacity to orient themselves in a crisis, understand instructions, report symptoms, cooperate with examination, tolerate treatment procedures, and maintain continuity of medication. From the perspective of disaster medicine, this means that one cannot rely solely on generalized emergency algorithms designed for an "average" patient. The response must take into account the possibility that the patient's behavior, silence, agitation, or apparent non-compliance may actually be the expression of cognitive vulnerability rather than unwillingness to cooperate.

The relevance of this issue is further intensified by the fact that patients with neurocognitive disorders frequently already live with chronic cardiovascular disease or an elevated cardiovascular risk profile. Arterial hypertension, ischemic heart disease, heart failure, arrhythmias, cerebrovascular disease, metabolic syndromes, autonomic dysregulation, and medication-related complications are not uncommon in this population⁵. Under stable conditions, these risks may remain partially controlled through regular monitoring, structured routines, caregiver support, and long-term treatment. Under disaster conditions, however, this stability may rapidly collapse. Medication regimens may be interrupted, caregivers may be unavailable, the environment may become disorienting, access to physicians may be delayed, and early signs of deterioration may be missed. In such circumstances, even a moderate cardiovascular disorder may progress into a serious complication if the patient's cognitive status is not adequately taken into account.

Another important dimension of the problem is the communicative and ethical complexity of care. In disaster settings, medical staff often work under pressure, with time constraints, fragmented information, and competing priorities. Yet precisely in such conditions, patients with neurocognitive disorders require more—not less—attention to communication, environment, and interaction⁶. They may need simplified explanations, slower pacing, repetition of instructions, support from a family member or caregiver, reduction of sensory overload, and

⁵ Idiaquez J., Roman G. C. Autonomic dysfunction in neurodegenerative dementias. *Journal of the Neurological Sciences*. 2011;305(1–2):22–27. DOI: 10.1016/j.jns.2011.02.033.

⁶ Carpenter CR, Leggett J, Bellolio F, GEAR 2.0-ADC Network. Emergency Department Communication in persons Living With Dementia and Care Partners: A Scoping Review. *J Am Med Dir Assoc*. 2022 Vol.23(8)..P.15-1313. doi: 10.1016/j.jamda.2022.02.024.

careful interpretation of non-verbal signs of distress. If these needs are ignored, the quality of cardiovascular care may decline dramatically. Symptoms may be overlooked, behavioral reactions may be mistaken for psychiatric disturbance alone, and therapeutic measures may be compromised by misunderstanding, resistance, or fear. Therefore, educational preparedness for disaster medicine must include training not only in emergency treatment algorithms, but also in inclusive communication and cognitively adapted clinical interaction.

It is precisely here that the educational dimension of the problem becomes central. A healthcare system cannot become genuinely prepared for vulnerable patients in crisis conditions if its professionals are trained only for technically straightforward or cognitively uncomplicated cases. Training for disaster medicine must include simulation of complex communication, case-based scenarios involving patients with neurocognitive impairment, interdisciplinary collaboration, and ethical reflection on how to preserve patient dignity under urgent conditions. Such preparation should enable clinicians to recognize when standard approaches are insufficient, to adjust their interaction without losing diagnostic clarity, and to make safe therapeutic decisions when the patient cannot participate in a fully conventional way. Educational and inclusive models are therefore not merely pedagogical innovations; they are preventive instruments against clinical misjudgment and delayed response.

For these reasons, the issue of preparation for the therapy of cardiovascular complications in patients with neurocognitive disorders should be approached as a multidimensional problem at the intersection of disaster medicine, internal medicine, cardiology, neurology, medical education, communication science, and inclusive healthcare organization. Its scientific and practical significance lies in the fact that it challenges a purely protocol-based understanding of emergency care and calls for a broader model of competence—one that includes clinical skill, cognitive sensitivity, interdisciplinary thinking, and adaptive communication⁷. Such a model is particularly important in modern crisis conditions, where the effectiveness of care depends not only on medical technology or pharmacological intervention, but also on whether the healthcare professional can correctly understand and support a vulnerable patient in a destabilized environment.

Thus, the relevance of this topic is determined by several interrelated factors: the growing importance of disaster medicine in contemporary crisis realities; the high vulnerability of patients with neurocognitive disorders in emergency settings; the increased likelihood of cardiovascular destabilization in conditions

⁷ Nijsskens C, Henstra M, Rhodius-Meester H. Cardiovascular Risk Management in Persons with Dementia. *J Alzheimers Dis*. 2023. Vol. 93 P.:879-889. doi: 10.3233/JAD-230019.

of stress, disruption, and treatment discontinuity; and the insufficiency of conventional emergency training when it is not adapted to the needs of cognitively vulnerable patients. In this regard, the development and theoretical substantiation of educational and inclusive models in disaster medicine become a necessary step toward safer, more accurate, and more humane management of cardiovascular complications in this population.

1. Theoretical and Methodological Foundations of Educational and Inclusive Models in Disaster Medicine in the Context of Managing Patients with Neurocognitive Disorders

In contemporary medicine, disaster response can no longer be interpreted only as a highly technical system focused on triage, evacuation, resuscitation, and the rapid stabilization of acute injury⁸. Although these components remain essential, modern disaster medicine increasingly confronts a broader and more complex reality: the need to deliver clinically adequate care to patients whose vulnerability is not determined solely by physical trauma, but also by cognitive, communicative, behavioral, and psychosocial factors. This is especially true for patients with neurocognitive disorders, who often become disproportionately exposed to harm in crisis settings. In such patients, medical risk is shaped not only by the underlying disease process, but also by the interaction between cognitive impairment and the destabilized environment of disaster conditions. For this reason, the theoretical and methodological foundations of disaster medicine must be expanded to include educational and inclusive models capable of preparing professionals for work with cognitively vulnerable patients under conditions of urgency, uncertainty, and limited resources⁹.

Traditionally, disaster medicine has been built around principles of standardization, speed, algorithmic action, prioritization, and efficiency. These principles arose from the objective need to provide care in situations where time is compressed, the burden of illness is high, and resources may be insufficient. In many contexts, such an approach is clinically justified and necessary. However, when applied without adaptation to patients with neurocognitive disorders, it may reveal important limitations. A standard emergency pathway assumes, implicitly or explicitly, that the patient can communicate symptoms in a relatively coherent way, understand instructions, tolerate environmental overload, cooperate with examination, and maintain at least basic participation

⁸ P. Phattharapornjaroen, A. Khorram-Manesh, G. Taşkiran Eskici, People as frontliners in the management of disasters and public health emergencies[J]. *AIMS Public Health*, 2026, Vol. 13(1): 240-272. doi: 10.3934/publichealth.2026014

⁹ Burke RV, Cadet J, Quintanilla NA. Updated Core Competencies for Disaster Medicine and Public Health. *JAMA Netw Open*. 2026 Vol. (2). P.2560176. doi: 10.1001/jamanetworkopen.2025.60176.

in decision-making and treatment. Yet patients with dementia, delirium-prone conditions, intellectual disability, post-stroke cognitive impairment, traumatic brain injury, or other neurocognitive syndromes often cannot function within these assumptions. As a result, a model designed for clinical efficiency may paradoxically produce diagnostic distortion, therapeutic delay, or exclusion from adequate care¹⁰.

This observation leads to a fundamental theoretical shift. The problem is not that such patients are “outside” the logic of disaster medicine, but that disaster medicine itself must be conceptually broadened if it is to remain clinically relevant. Educational and inclusive models become necessary precisely because vulnerability in disaster conditions is multidimensional. It is not enough to know how to identify a cardiovascular emergency in the abstract; the clinician must also know how to recognize it in a patient who may be confused, disoriented, unable to describe symptoms, behaviorally agitated, apathetic, fearful, or completely dependent on the interpretation of others. In this sense, inclusiveness should not be understood merely as a social ideal or an ethical aspiration external to emergency medicine. It must be recognized as a condition of clinical validity. If the structure of training does not prepare professionals for patients who differ cognitively and behaviorally from the assumed norm, then the system remains incomplete at its core.

From a methodological standpoint, this requires moving beyond a narrow biomedical reduction of the problem. Neurocognitive disorders cannot be treated solely as diagnostic labels added to a patient chart. They influence perception, memory, speech, comprehension, behavior, emotional regulation, and capacity for cooperation¹¹. In disaster conditions, where even cognitively intact patients may experience confusion and stress, these impairments become even more clinically significant. Thus, the management of such patients demands an approach that is simultaneously medical, communicative, ethical, and organizational. This is why the theoretical basis of the present chapter rests on an interdisciplinary perspective. Disaster medicine, internal medicine, cardiology, neurology, psychiatry, clinical psychology, rehabilitation, ethics, and medical education all contribute important elements to understanding how care should be structured for this population.

A central methodological principle in this context is the recognition of heterogeneity among patients with neurocognitive disorders. It would be

¹⁰ Lee S, Howard MA 3rd, Han JH. Delirium and Delirium Prevention in the Emergency Department. *Clin Geriatr Med*. 2023 Vol. 39(4). P:535-551. doi: 10.1016/j.cger.2023.05.006.

¹¹ Scott M. Optimal Emergency Department Care Practices for Persons Living With Dementia: A Scoping Review, *Journal of the American Medical Directors Association*. 2022. Vol. 23, Issue 8, P.1314.e1-1314.e29. <https://doi.org/10.1016/j.jamda.2022.05.024>.

a serious oversimplification to speak of them as a single, uniform category. The clinical and communicative profile of a patient with mild cognitive decline differs substantially from that of a patient with advanced dementia, delirium, frontal lobe dysfunction, severe intellectual disability, or post-traumatic cognitive impairment¹². Some patients remain partially oriented and able to cooperate if information is presented clearly and calmly. Others may become rapidly overwhelmed by noise, unfamiliar surroundings, or repeated questioning. Some can report pain but not chronology. Others cannot verbalize symptoms at all and manifest deterioration only through behavior, facial expression, refusal, passivity, or agitation. Therefore, an inclusive model in disaster medicine must be based not on generalized assumptions, but on the ability of professionals to perceive cognitive diversity and adjust the format of care accordingly.

Within this framework, the concept of an educational and inclusive model requires clarification. In the context of disaster medicine, such a model may be understood as a system of professional preparation that integrates emergency clinical protocols with adaptive communication, cognitive sensitivity, ethical awareness, and practical readiness to work with patients whose neurocognitive status limits their participation in standard clinical interaction. This is not simply a pedagogical refinement of existing curricula. It is a structural response to the gap between conventional emergency training and the realities of cognitively vulnerable patients in crisis situations. The purpose of such a model is not to replace biomedical competence, but to deepen it by ensuring that clinical knowledge remains usable when the patient does not fit the assumptions of the usual emergency scenario.

An important element of this model is the distinction between equality and adequacy in care. Disaster medicine often operates under the principle that all patients should be assessed rapidly according to standardized criteria. In formal terms, this may appear fair. Yet in practice, identical treatment of patients with profoundly different cognitive capacities may produce unequal outcomes¹³. A patient who cannot understand questions, who misinterprets instructions, or who reacts with fear to the emergency setting may require a different tempo, a modified sequence of interaction, simplified language, non-verbal support, or the involvement of a caregiver or accompanying person. Without these adaptations, the apparent equality of procedure results in inequality of access and reduced safety. Thus, inclusiveness in disaster medicine should be understood as the capacity to preserve clinical fairness through adaptation rather than through rigid uniformity.

¹² Sachdev, P., Blacker, D., Blazer, D., Classifying neurocognitive disorders: the DSM-5 approach. *Nature Reviews Neurology*, 2014. Vol.10(11), P.634-642.. <http://dx.doi.org/10.1038/nrneurol.2014.181>

¹³ Stimpson JP, Rashed AL, Pandya J, Health equity in the wake of disasters and extreme weather: evidence from an umbrella review. *Health Aff Sch*. 2025 Vol. 11. P. 207. doi: 10.1093/haschl/qxaf207.

This brings into focus another methodological principle: the relationship between standardization and flexibility. Disaster medicine cannot function without standardized protocols. Protocols protect against chaos, reduce dangerous variability, and support coordinated action under pressure. However, protocols alone do not guarantee adequacy when the patient's clinical presentation is altered by neurocognitive impairment¹⁴. A cognitively vulnerable patient may not present symptoms in the expected form; may not tolerate the usual pace of assessment; may not comply with treatment in a predictable way; or may require others to assist in clarifying history and prior therapy. Therefore, a theoretically sound educational model must prepare clinicians to use protocols intelligently rather than mechanically. Flexibility in this sense is not deviation from professional discipline, but an advanced form of competence grounded in accurate interpretation of real clinical conditions.

The significance of this issue becomes even more apparent in relation to cardiovascular complications. Cardiovascular instability in disaster settings may develop rapidly under the influence of acute stress, treatment interruption, pain, dehydration, infection, autonomic dysregulation, emotional overload, or worsening of chronic disease.¹⁵ Yet in patients with neurocognitive disorders, the early signs of deterioration may be obscured. Chest discomfort may not be described clearly. Dyspnea may be expressed as anxiety or restlessness. Weakness, confusion, or falls may be interpreted as neurological symptoms alone rather than as possible manifestations of circulatory decompensation. In such cases, the clinician's failure is not merely one of observation; it often reflects insufficient preparation to interpret cardiovascular risk within the behavioral and cognitive profile of the patient. This is precisely why the theoretical foundation of disaster medicine must include the premise that cognitive vulnerability changes the form in which clinical urgency may appear.

Another methodological aspect concerns the role of environment. Neurocognitive impairment does not manifest in a vacuum. Its clinical expression is shaped by surroundings. Noise, crowding, bright light, rapid transitions, repeated questions, unfamiliar faces, physical discomfort, and the absence of orienting cues may intensify confusion and behavioral dysregulation. Disaster medicine, by its nature, often creates such environments. Thus, the patient's condition cannot be understood solely through disease-centered variables. The care environment itself may worsen cognitive function and

¹⁴ Wurmb TE, Schade J, Schröder SJ Adjustment of medical standards in disaster, crises and war: a scoping review of the literature. *BMJ Public Health*. 2024 Vol.4. P:e001408. doi: 10.1136/bmjph-2024-001408.

¹⁵ Khemani P, Mehdirad AA. Cardiovascular Disorders Mediated by Autonomic Nervous System Dysfunction. *Cardiol Rev*. 2020 Vol.28. P:65-72. doi: 10.1097/CRD.0000000000000280.

thereby increase clinical risk. An inclusive model must therefore train professionals not only to react to symptoms, but also to understand how crisis settings amplify cognitive and cardiovascular vulnerability. This awareness has direct implications for assessment, communication, triage, and treatment planning.

The educational consequences of these theoretical positions are substantial. If disaster medicine is to become genuinely prepared for patients with neurocognitive disorders, training cannot remain limited to technical emergency skills alone. It must include case-based analysis of atypical presentations, simulation of communication under cognitive impairment, recognition of non-verbal distress, interpretation of behavior as a possible clinical sign, and structured strategies for involving caregivers when appropriate¹⁶. Educational preparation must also cultivate tolerance for ambiguity, because patients with neurocognitive disorders often present in ways that are incomplete, fragmented, or misleading if viewed through a purely standard lens. The clinician must learn to think in layered terms: to ask not only “What is the emergency?” but also “How is this patient able—or unable—to show it?”

Ethical preparation is equally important within this framework. In disaster conditions, the pressure to move quickly may unintentionally encourage depersonalization. Patients with neurocognitive disorders are particularly vulnerable to this risk because they may appear passive, disorganized, difficult to interview, or dependent on others. Yet precisely in such circumstances, the preservation of dignity becomes a crucial component of competent care. Ethical sensitivity does not slow down emergency medicine; rather, it protects against avoidable error and unjust exclusion. A patient who is treated respectfully, addressed calmly, and approached in a way that reduces fear may become more cooperative, more stable, and easier to assess. Thus, ethics and effectiveness should not be placed in opposition¹⁷. Within educational and inclusive models, they form part of the same clinical logic.

It is also necessary to emphasize that educational inclusiveness in disaster medicine concerns not only physicians, but the whole team. Nurses, paramedics, emergency coordinators, triage staff, reception personnel, psychologists, social workers, and rehabilitation specialists all contribute to the patient’s pathway through crisis care. If only one part of the system understands the needs of cognitively vulnerable patients while the rest

¹⁶ Giuseppe Bellelli, Alessandro Morandi, Validation of the 4AT, a new instrument for rapid delirium screening: a study in 234 hospitalised older people, *Age and Ageing*, Volume 43, Issue 4, July 2014, Pages 496–502, <https://doi.org/10.1093/ageing/afu021>

¹⁷ Butcher L. Caring for patients with dementia in the acute care setting. *Nursing Standard*. 2018;32(20):41–49. DOI: 10.7748/ns.2018.e10809.

remains rigid or uninformed, accessibility and safety remain fragile. Therefore, a methodological model of preparedness must be team-based and organizational, not merely individual. It must assume that inclusive competence is a collective property of the healthcare system and not just a personal virtue of one particularly sensitive clinician.

A further theoretical principle concerns continuity. Disaster medicine is often imagined as focused on the immediate moment of emergency intervention. Yet for patients with neurocognitive disorders, the therapeutic process rarely begins and ends with one isolated episode¹⁸. Their cardiovascular stability often depends on medication continuity, caregiver support, familiar routines, and ongoing observation. Crisis conditions disrupt these protective structures. Accordingly, an inclusive model of disaster medicine should not view the patient only as an acute case to be stabilized and transferred. It should also recognize the importance of continuity: what treatment the patient was receiving before the crisis, what support systems have been interrupted, who can provide reliable information, what barriers may affect adherence after intervention, and how communication can be preserved across levels of care. In this sense, educational models must prepare clinicians not just for emergency action, but for transition-sensitive thinking.

Taken together, these considerations allow us to formulate the core theoretical position of this chapter: educational and inclusive models in disaster medicine are necessary because patients with neurocognitive disorders experience risk not only from disease, but from the mismatch between their cognitive capacities and the assumptions of conventional emergency care. Such models are grounded in the recognition that clinical safety depends on more than protocol knowledge. It also depends on the ability to adapt communication, interpret altered presentations, preserve dignity, manage environmental stressors, coordinate team-based support, and integrate biomedical decision-making with cognitive sensitivity. In the context of cardiovascular complications, this becomes especially important, since delay, misinterpretation, or therapeutic non-cooperation may lead to rapid and serious deterioration.

Thus, the theoretical and methodological foundations of educational and inclusive models in disaster medicine rest on several interconnected propositions. First, disaster medicine must be understood as responsible not only for rapid intervention, but also for clinically adequate care of cognitively vulnerable patients under crisis conditions. Second, neurocognitive disorders significantly modify the presentation, recognition, and management of cardiovascular

¹⁸ O'Brien R., Goldberg S. E., Pilnick A., et al. Negotiating refusal in the acute hospital setting. *Age and Ageing*. 2020; Vol. 49(6) P.:1020–1026. DOI: 10.1093/ageing/afaa122.

complications¹⁹. Third, inclusiveness in this field is not a supplementary ethical gesture, but a condition of diagnostic accuracy, therapeutic safety, and equitable care. Fourth, professional preparation must balance standardization with flexibility and combine protocol-based knowledge with communication skills, ethical awareness, and interdisciplinary competence. Fifth, the educational model must be team-based, environmentally aware, and oriented toward continuity as well as acute response. Only within such a framework can disaster medicine become truly prepared to respond to the needs of patients with neurocognitive disorders and to provide safe, effective, and humane therapy for cardiovascular complications in situations of crisis and instability.

2. Clinical Features of Cardiovascular Complications and Therapeutic Care in Patients with Neurocognitive Disorders under Disaster and Crisis Conditions

The clinical management of cardiovascular complications in patients with neurocognitive disorders under disaster and crisis conditions requires a substantially broader interpretive and therapeutic framework than that used in standard emergency care. In ordinary clinical settings, recognition of cardiovascular instability often relies on a relatively clear sequence: the patient reports symptoms, the clinician collects history, evaluates hemodynamic parameters, correlates complaints with known disease, and initiates treatment based on established protocols. In patients with neurocognitive disorders, especially in unstable or extreme environments, this sequence is frequently disrupted. Symptom reporting may be incomplete or absent, history taking may be unreliable, behavioral manifestations may obscure somatic deterioration, and adherence to even urgent therapeutic instructions may be compromised²⁰. Under such circumstances, cardiovascular care becomes not only a matter of clinical knowledge, but also of diagnostic interpretation under cognitive uncertainty.

One of the principal clinical problems lies in the altered presentation of cardiovascular deterioration. Patients with neurocognitive disorders do not always express acute circulatory distress in ways that match the usual expectations of emergency medicine. Chest pain may not be verbalized clearly, may be described in nonspecific terms, or may not be mentioned at all. Dyspnea may manifest as agitation, confusion, withdrawal, or apparent behavioral

¹⁹ Hwang U, Carpenter C, Dresden S, The Geriatric Emergency Care Applied Research (GEAR) network approach: a protocol to advance stakeholder consensus and research priorities in geriatrics and dementia care in the emergency department. *BMJ Open*. 2022 Vol.22. P:e060974. doi: 10.1136/bmjopen-2022-060974.

²⁰ Limpawattana P, Phungoen P, Mitsungrern T, Atypical presentations of older adults at the emergency department and associated factors. *Arch Gerontol Geriatr*. 2016.Vol. 62. P:97-102. doi: 10.1016/j.archger.2015.08.016.

instability. General weakness may be interpreted as cognitive fatigue rather than circulatory compromise²¹. Collapse, drowsiness, reduced responsiveness, or sudden disorientation may initially appear neurologically driven while, in fact, they may coexist with hypotension, arrhythmia, acute decompensated heart failure, myocardial ischemia, or other cardiovascular disturbances. In disaster conditions, where assessment is already pressured by time, environmental noise, fragmented information, and resource constraints, such atypical or muted presentation increases the risk of delayed recognition.

This difficulty becomes particularly relevant in patients with pre-existing dementia, post-stroke cognitive impairment, delirium susceptibility, intellectual disability, traumatic brain injury, or chronic neurodegenerative conditions. In these individuals, the cognitive threshold for accurately perceiving, organizing, and communicating bodily symptoms may already be reduced under stable circumstances. Crisis settings intensify this problem. Fear, sensory overload, displacement, interruption of routine, fatigue, dehydration, pain, and emotional distress may worsen confusion and further decrease the patient's ability to communicate internal symptoms. As a result, clinicians may receive only fragments of the clinical picture and may be forced to interpret cardiovascular risk through indirect signs rather than direct complaint. This makes observational skill and clinical suspicion particularly important.

Another key issue is the interaction between neurocognitive disorders and chronic cardiovascular disease. A considerable proportion of patients with neurocognitive impairment already live with hypertension, ischemic heart disease, atrial fibrillation or other rhythm disorders, chronic heart failure, cerebrovascular insufficiency, diabetes-related vascular disease, or complex polypharmacy affecting circulatory stability²². These conditions may remain partially compensated in ordinary life through medication routines, caregiver support, regular follow-up, and familiar environmental structure. Disaster situations frequently disrupt all of these stabilizing mechanisms. Medications may be lost, delayed, or taken incorrectly. Caregivers may be absent or overwhelmed. Access to drinking water, food, sleep, rest, and thermal comfort may be impaired. Patients may wander, become disoriented, refuse medication, or fail to understand what has changed. In such conditions, even chronic cardiovascular disease that was previously controlled may deteriorate rapidly.

²¹ Fick D. M., Steis M. R., Waller J. L., Inouye S. K. Delirium superimposed on dementia is associated with prolonged length of stay and poor outcomes in hospitalized older adults. *Journal of Hospital Medicine*. 2013. Vol. 8(9). P:500–505. DOI: 10.1002/jhm.2064.

²² Idiaquez J., Roman G. C. Autonomic dysfunction in neurodegenerative dementias. *Journal of the Neurological Sciences*. 2011 Vol. 305(1–2). P:22–27. DOI: 10.1016/j.jns.2011.02.033.

Acute stress plays a particularly important role in this process. Disaster medicine repeatedly demonstrates that psychological and physiological stress can exert a powerful destabilizing effect on the cardiovascular system. Increased sympathetic activation, surges in blood pressure, tachycardia, endothelial strain, arrhythmogenic vulnerability, and aggravation of myocardial oxygen imbalance may all occur under conditions of acute threat and loss of control. In patients with neurocognitive disorders, stress is often amplified by disorientation and inability to contextualize events. A person who does not understand where they are, why they have been moved, who the surrounding people are, or what is happening to their body may experience intense autonomic activation without being able to communicate fear in an organized way. This may contribute to hypertensive crises, rhythm instability, worsening ischemia, acute heart failure exacerbation, or cerebrovascular decompensation, especially in those with pre-existing vascular fragility.

Therapeutic care in such patients is also complicated by impaired adherence and limited cooperation. Cardiovascular treatment often depends on precise timing, repeated monitoring, understanding of instructions, and the patient's capacity to tolerate interventions ranging from medication administration to oxygen therapy, blood pressure control, fluid correction, electrocardiographic monitoring, or transfer for more advanced care²³. Patients with neurocognitive disorders may resist unfamiliar procedures, remove monitoring devices, refuse tablets, become frightened by masks or equipment, misinterpret the intentions of staff, or become behaviorally dysregulated when touched or hurried. In some cases, the apparent "non-cooperation" of the patient is in fact a sign of fear, cognitive overload, pain, or misunderstanding. If this is not recognized, therapeutic decisions may become ineffective or even unsafe.

A further challenge concerns differential interpretation of behavioral symptoms. Under crisis conditions, altered behavior in a cognitively vulnerable patient may easily be attributed to the pre-existing neurocognitive disorder itself. Restlessness may be dismissed as dementia-related agitation, confusion as baseline cognitive decline, passivity as chronic impairment, and verbal incoherence as a non-specific neurological feature. Yet these same behaviors may accompany acute cardiovascular deterioration, hypoperfusion, arrhythmia, hypoxia, medication-related hypotension, hypertensive encephalopathy, or heart failure-associated cerebral dysfunction. The clinical task is therefore not simply to identify whether the patient is cognitively impaired, but to determine whether

²³ Parsons C., Johnston S., Mathie E., Baron N., Machen I., Amador S., Goodman C. Potentially inappropriate prescribing in older people with dementia in care homes: a retrospective analysis. *Drugs & Aging*. 2012. Vol. 29(2). P.:143–155. DOI: 10.2165/11598560-000000000-00000.

the current behavior reflects the patient's baseline or signals new physiological decompensation. This distinction is often difficult, particularly when collateral history is unavailable, but it is essential for safe treatment.

The role of collateral information becomes especially important in this context. In many patients with neurocognitive disorders, reliable assessment of cardiovascular complications depends heavily on external sources: family members, caregivers, nursing staff, accompanying persons, medical records, medication packaging, or previous treatment summaries. These sources may clarify the patient's baseline cognitive state, usual functional level, cardiovascular diagnoses, medication regimen, prior episodes of instability, allergies, swallowing difficulties, history of falls, arrhythmias, blood pressure variability, or behavioral responses to medical interventions. In disaster conditions, however, such information is often missing or incomplete²⁴. This informational fragmentation creates an additional clinical burden. The physician is then required to assess a medically fragile patient with limited verbal contribution, limited history, and heightened environmental stress. This is precisely why preparedness for such cases must be built not only around protocol memory, but around clinically trained adaptability.

Among the most important cardiovascular complications in this population are hypertensive crises and severe blood pressure variability. Patients with neurocognitive disorders often have difficulty maintaining consistent medication intake, and in crisis settings this problem becomes more severe. Missed antihypertensive drugs, emotional distress, dehydration, pain, and environmental chaos may provoke dangerous surges in blood pressure²⁵. At the same time, some patients may experience hypotension due to poor intake, sepsis, medication errors, overheating, prolonged immobility, or inappropriate continuation of usual therapy under changed physiological conditions. Both extremes may be difficult to detect early when the patient cannot report dizziness, headache, visual symptoms, weakness, or chest discomfort clearly. The clinical presentation may instead involve sudden confusion, lethargy, instability when standing, falls, or unexplained agitation.

Arrhythmias represent another major concern. Patients with pre-existing atrial fibrillation, conduction abnormalities, electrolyte disturbances, autonomic dysfunction, or polypharmacy are particularly vulnerable during disasters. Sleep deprivation, emotional shock, dehydration, missed medication, fever, infection,

²⁴ Fitzpatrick D, Doyle K, Finn G, Gallagher P. The collateral history: an overlooked core clinical skill. *Eur Geriatr Med*. 2020. Vol.11(6) P.:1003-1007. doi: 10.1007/s41999-020-00367-2.

²⁵ Mahinrad S, Bennett DA, Sorond FA, Gorelick PB. Blood pressure variability, dementia, and role of antihypertensive medications in older adults. *Alzheimers Dement*. 2023 Vol.19(7) P.:2966-2974. doi: 10.1002/alz.12935.

or metabolic imbalance may precipitate or worsen rhythm disturbances ²⁶. Yet recognition again becomes difficult when palpitations are not reported, when the patient is unable to describe syncope or near-syncope coherently, or when recurrent episodes are interpreted only through behavioral change. In some patients, the first visible sign may be a fall, sudden confusion, collapse, decreased responsiveness, or a transient neurological event. The treating team must therefore remain alert to the possibility that cardiac rhythm instability may present through indirect and apparently non-cardiac manifestations.

Heart failure decompensation is similarly important in this group. Patients with limited mobility, chronic vascular disease, renal impairment, cognitive decline, and poor adherence may decompensate quickly under disaster conditions. Increased salt intake from emergency food, missed diuretics, fluid imbalance, infection, stress, and delayed assessment can all worsen congestion and circulatory strain. Yet the patient may not describe orthopnea, edema, exertional intolerance, or early dyspnea with clarity. Instead, there may be reduced activity, refusal to lie flat, sleep disturbance, anxious behavior, rapid fatigue, or nonspecific distress. In a crowded or unstable emergency environment, such signs may be overlooked unless clinical staff have been trained to interpret them in context. The therapeutic implications are considerable, since delayed recognition of decompensated heart failure can quickly escalate the severity of intervention required.

Cerebrovascular instability must also be considered, particularly in patients with mixed vascular and neurocognitive pathology. Disaster conditions may increase the risk of stroke recurrence, transient ischemic episodes, hypertensive encephalopathy, or perfusion-related deterioration in patients with prior cerebrovascular disease²⁷. The challenge here is that new neurological symptoms may be difficult to distinguish from baseline cognitive impairment. A patient with pre-existing speech disturbance, slowed processing, gait instability, or memory loss may develop new vascular injury without immediate recognition, especially when the care environment is chaotic. Conversely, cardiovascular instability may provoke transient cognitive worsening without a new structural brain event. This overlap between vascular neurology and cognitive disorder complicates both diagnosis and immediate treatment decisions.

Medication management in these circumstances is one of the most difficult therapeutic domains. Patients with neurocognitive disorders may already be

²⁶ Ruangritchankul S, Peel NM, Hanjani LS, Gray LC. Drug related problems in older adults living with dementia. *PLoS One*. 2020. Vol.31. P:e0236830. doi: 10.1371/journal.pone.0236830. PMID: 32735592;

²⁷ Fisher M, Vasilevko V, Cribbs DH. Mixed cerebrovascular disease and the future of stroke prevention. *Transl Stroke Res*. 2012 Vol. 3(Suppl 1) P:39-51. doi: 10.1007/s12975-012-0185-6.

taking multiple drugs, including antihypertensives, anticoagulants, antiplatelets, antiarrhythmics, diuretics, sedatives, neuropsychiatric medications, or antiepileptics. During crisis situations, medication continuity is often broken, dosages may be uncertain, pill boxes may be unavailable, and patient self-report may be unreliable. There is therefore a real risk of both undertreatment and harmful duplication. In some cases, medications essential to cardiovascular stability are omitted; in others, drugs are administered without adequate knowledge of baseline regimen, interactions, or swallowing ability. The therapeutic burden is further increased when the patient is unable to explain what was last taken or why a given drug had previously caused problems.

A particularly sensitive issue is the balance between calming the patient and preserving cardiovascular safety. In cognitively vulnerable patients who are agitated, fearful, or behaviorally dysregulated, clinicians may feel pressure to use sedating measures to facilitate examination or treatment. Yet in patients with cardiovascular instability, excessive sedation may worsen hypotension, respiratory compromise, delirium, or hemodynamic unpredictability. On the other hand, leaving severe agitation untreated may increase sympathetic stress, blood pressure surges, oxygen demand, and risk of arrhythmia or ischemia. This creates a complex therapeutic dilemma in which clinical judgment must be both cautious and individualized. The problem cannot be solved by a rigid rule; it requires awareness of the patient's cognitive state, cardiovascular fragility, environmental triggers, and the goals of immediate care.

The environment itself remains a therapeutic factor. Noise, crowding, abrupt movement, repeated staff changes, bright lights, long waiting, cold exposure, and lack of familiar support can all worsen confusion and behavioral instability in patients with neurocognitive disorders. This in turn makes cardiovascular management more difficult by increasing stress reactivity, complicating monitoring, and reducing cooperation²⁸. A patient who becomes frightened and resistive during a blood pressure check, ECG placement, or medication administration may not be “difficult” in a personal sense; rather, the environment may be exacerbating both cognitive and cardiovascular strain. Therefore, even under disaster conditions, small measures that improve predictability and reduce overstimulation may have direct clinical benefits.

Therapeutic care in this population must therefore be understood as a layered process. It involves standard cardiovascular assessment and treatment, but also modified observation, context-sensitive interpretation of symptoms, careful use of collateral information, adjustment of communication, protection

²⁸ Bonfichi, A.; Ceresa, I.F.; Piccioni, A.; Zanza, C.; Longhitano, Y.; Boudi, Z.; Esposito, C.; Savioli, G. A Lethal Combination of Delirium and Overcrowding in the Emergency Department. *J. Clin. Med.* 2023, Vol.12, 6587. <https://doi.org/10.3390/jcm12206587>

from environmental overload, and vigilance regarding medication continuity and behavioral change. The clinician must ask not only what cardiovascular complication may be present, but how that complication is being masked, transformed, or intensified by the patient's neurocognitive condition and the surrounding crisis environment. Without this broader frame, treatment remains incomplete.

Importantly, this does not mean that emergency cardiovascular therapy should become uncertain or overly individualized at the expense of safety. On the contrary, the point is that safety itself depends on recognizing that standard presentation cannot be assumed. Protocol-based treatment remains essential, but it must be applied in a cognitively informed way. Early ECG, hemodynamic monitoring, symptom interpretation, evaluation of hydration status, review of medication history, observation of behavior, and rapid consideration of baseline cognitive function must all be integrated into the therapeutic process. In patients with neurocognitive disorders, failure to do so may not simply reduce comfort; it may delay life-saving care.

Thus, the clinical features of cardiovascular complications and therapeutic care in patients with neurocognitive disorders under disaster and crisis conditions are defined by several interacting factors. First, these patients often present with atypical, incomplete, or behaviorally mediated signs of cardiovascular instability. Second, pre-existing chronic cardiovascular disease and neurocognitive impairment frequently coexist, creating a background of heightened vulnerability²⁹. Third, disaster conditions amplify risk through stress, environmental disorganization, treatment disruption, dehydration, and loss of routine. Fourth, therapeutic care is complicated by impaired adherence, limited communication, fragmented history, and difficulties in balancing behavioral management with hemodynamic safety. Fifth, successful treatment requires not only cardiovascular competence in the narrow sense, but also cognitively sensitive clinical reasoning. It is precisely this complexity that justifies the need for specialized educational and inclusive preparation of medical professionals, which becomes the central subject of the following chapter.

3. Educational, Communicative, and Inclusive Organizational Mechanisms for Training Medical Professionals to Work with Patients with Neurocognitive Disorders in Disaster Medicine

The effective management of patients with neurocognitive disorders in disaster medicine depends not only on clinical protocols or pharmacological

²⁹ Jamil Y, Krishnaswami A, Orkaby AR, Stimmel M, Brown Iv CH, Mecca AP, Forman DE, Rich MW, Nanna MG, Damluji AA. The Impact of Cognitive Impairment on Cardiovascular Disease. *J Am Coll Cardiol*. 2025 Vol. 1;85(25)P.:2472-2491. doi: 10.1016/j.jacc.2025.04.057.

readiness, but also on the structure of professional training that precedes real emergency action. When cardiovascular complications develop in cognitively vulnerable patients under crisis conditions, the decisive factor is often not whether a formal treatment algorithm exists, but whether the medical professional has been prepared to recognize deterioration in a patient who may be confused, disoriented, frightened, behaviorally unstable, unable to provide reliable history, or incapable of following ordinary therapeutic instructions³⁰. For this reason, educational, communicative, and inclusive organizational mechanisms must be regarded as integral elements of disaster medicine rather than supplementary innovations. They shape the practical capacity of the system to translate medical knowledge into safe and adequate care for vulnerable patients.

A central educational challenge lies in the fact that conventional emergency training has historically prioritized speed, decisiveness, triage logic, technical procedure, and protocol-based action. These priorities are justified by the realities of disaster response. Yet when training is built exclusively around cognitively intact or behaviorally straightforward patient scenarios, it leaves a critical gap. In real crisis conditions, many patients do not present in a standardized way. Those with neurocognitive disorders may blur the line between neurological and cardiovascular symptoms, may react to intervention with fear or agitation, may require information to be simplified and repeated, and may communicate distress through behavior rather than through coherent verbal complaint. Educational systems that fail to simulate such realities risk producing professionals who are highly skilled in technical emergency response but insufficiently prepared for one of the most clinically fragile groups they will encounter.

For this reason, one of the core mechanisms of preparedness is the development of educational models that explicitly incorporate cognitive vulnerability into disaster medicine curricula. Such models should not frame patients with neurocognitive disorders as marginal or exceptional cases. Rather, they should normalize their presence within emergency training and present their management as part of standard professional competence. This requires an expansion of what counts as disaster readiness³¹. Readiness must include not only knowledge of cardiovascular emergencies, evacuation logistics, and acute stabilization, but also the ability to assess risk when communication is impaired, to interpret behavioral change as a possible medical sign, and to maintain therapeutic structure in the presence of confusion or reduced cooperation.

³⁰ Nijsskens C, Henstra M, Rhodius-Meester H. Cardiovascular Risk Management in Persons with Dementia. *J Alzheimers Dis.* 2023; Vol. 93(3). P:879-889. doi: 10.3233/JAD-230019.

³¹ Başer A, Sofuoğlu Z. The impact of a disaster medicine clinical training program on medical students' disaster literacy. *PeerJ* 2025. Vol. 13: P. e18800 <https://doi.org/10.7717/peerj.18800>

Simulation-based education is especially important in this context. Traditional lecture-based teaching can convey theoretical principles, but it cannot fully prepare professionals for the complexity of emergency interaction with a cognitively vulnerable patient. Simulation allows trainees to encounter the dynamic difficulties that arise in practice: fragmented history, contradictory responses, inability to follow commands, sudden agitation, sensory overload, caregiver distress, and the need to continue cardiovascular assessment under conditions of uncertainty. Well-designed simulation scenarios can train not only diagnostic reasoning, but also pacing, tone of communication, prioritization, de-escalation, and flexible adaptation of emergency routines. Such training is particularly valuable because it creates a safe space in which professionals can learn to respond to complexity without compromising patient dignity or clinical accuracy.

Case-based learning provides another essential mechanism. Disaster medicine often teaches through generalized protocols, but patients with neurocognitive disorders require clinicians to think contextually. Case-based education can help trainees understand how cardiovascular complications may present differently in a patient with dementia than in a patient with intellectual disability, how missed medication may affect a post-stroke patient living in unstable conditions, or how agitation in a disoriented patient may mask arrhythmia, hypoxia, or hypertensive crisis. These cases should be structured not as abstract theoretical problems, but as multidimensional clinical narratives in which the medical, communicative, ethical, and organizational aspects of care are interconnected. In this way, the learner develops not only knowledge, but clinical imagination—the ability to perceive what may be hidden beneath atypical presentation.

An equally important mechanism is interdisciplinary education. The management of cardiovascular complications in patients with neurocognitive disorders cannot be adequately taught within one narrow professional silo. Disaster medicine intersects here with internal medicine, cardiology, neurology, psychiatry, emergency nursing, rehabilitation, clinical psychology, ethics, and healthcare organization. Training programs should therefore include interdisciplinary modules or co-taught components that expose professionals to the multiple dimensions of these patients' needs³². A cardiologist may bring expertise in acute hemodynamic instability, a neurologist in baseline cognitive profiles and neurovascular risk, a psychiatrist or psychologist in behavioral interpretation and de-escalation, a rehabilitation specialist in functional needs

³² Hattori Y, Hiramatsu M, Isowa T, Kitagawa A, Tsujikawa M. The Impact of Cognitive Impairment on Disaster Preparedness: A Cross-sectional Study of Older Adults over the Age of 75 Requiring Special Care in Japan. *J Gerontol Soc Work*. 2022 Vol. 65(5) P.:562-579. doi: 10.1080/01634372.2021.2004568.

and environmental adaptation, and a disaster medicine specialist in triage logic and crisis logistics. The integration of these perspectives helps prevent the overly narrow framing of the patient as either “cardiac,” “neurological,” or “behavioral,” and instead promotes a more accurate and clinically useful understanding of overlapping vulnerability.

Communication training should occupy a central place within this educational model. In disaster settings, clinicians often rely on compressed exchanges, rapid questioning, and directive instruction. While this may be effective in many emergencies, it is often insufficient or counterproductive for patients with neurocognitive disorders. Training should therefore include methods of simplified explanation, repetition without frustration, pacing that allows processing time, use of orienting language, reduction of unnecessary verbal complexity, and recognition of non-verbal signs of fear, pain, or misunderstanding. Professionals must learn how to preserve clarity without becoming authoritarian, and how to maintain control of the clinical situation without escalating distress. Communication in this sense is not separate from emergency treatment; it is one of the tools through which treatment becomes possible.

The role of caregivers and accompanying persons must also be integrated into training. In many cases, patients with neurocognitive disorders cannot be fully understood or safely treated without collateral input from those who know their baseline condition, medication routine, usual behavior, triggers of stress, and communicative style. Yet the involvement of caregivers is not always straightforward. They may be distressed, fatigued, poorly informed, or themselves affected by crisis. Educational preparation should therefore teach professionals how to work constructively with caregivers: how to obtain essential information quickly, how to distinguish useful collateral history from emotionally charged speculation, how to preserve the patient’s own dignity and presence in conversation, and how to use caregiver support without surrendering clinical judgment. This triadic communication model—professional, patient, and caregiver—requires specific training if it is to function effectively in emergency settings.

Inclusive organizational mechanisms are no less important than individual educational preparation. Even well-trained professionals may be unable to deliver adequate care if the organizational structure of disaster response assumes a uniform patient pathway that does not accommodate cognitive vulnerability. For this reason, training should include not only interpersonal competence, but organizational awareness³³. Medical professionals need to understand how

³³ Park EY. Factors Affecting Disaster or Emergency Coping Skills in People with Intellectual Disabilities. *Behav Sci (Basel)*. 2023 Vol. 8;13(12) P:1018. doi: 10.3390/bs13121018.

triage spaces, waiting areas, monitoring zones, transfer routines, and team communication systems may either support or undermine the stability of patients with neurocognitive disorders. A noisy, chaotic, brightly lit, overcrowded environment may intensify confusion and behavioral distress, which in turn complicates cardiovascular assessment and treatment. Conversely, even within constrained conditions, small organizational adaptations—clear orientation cues, predictable sequencing of steps, minimization of unnecessary staff turnover, reduced sensory burden where possible, and continuity in communication—may improve clinical cooperation and reduce risk.

This implies that inclusive disaster preparedness must be team-based rather than individualistic. One highly competent clinician cannot compensate for a system in which triage personnel, nurses, transport teams, and administrative coordinators are unprepared for cognitively vulnerable patients. Therefore, educational mechanisms should extend across professional roles. Nurses and paramedics need training in recognizing behavior as a possible sign of physiological deterioration. Administrative or triage staff need basic awareness of how to reduce confusion and direct communication appropriately. Team leaders need to understand when a patient's inability to comply is clinically meaningful rather than merely inconvenient. Inclusive competence, in this sense, should be seen as a property of the whole emergency response structure and not only of the most experienced physician.

Ethical training is also indispensable. In disaster medicine, the pressure of urgency can unintentionally normalize depersonalization. Patients who are confused, repetitive, emotionally dysregulated, or unable to cooperate may be viewed primarily as obstacles to efficient workflow. Yet such a stance not only threatens dignity; it also undermines care quality³⁴. A patient who is hurried, ignored, restrained unnecessarily, spoken about as if absent, or treated as a behavioral problem rather than as a medically vulnerable person is less likely to stabilize, less likely to cooperate, and more likely to experience worsening fear or physiological stress. Ethical preparation must therefore be practical rather than merely declarative. It should teach clinicians how respect, calmness, and preservation of personhood function as components of effective emergency care, especially when dealing with cardiovascular risk under cognitive vulnerability.

A particularly important educational mechanism is the training of adaptive clinical judgment. Disaster medicine often emphasizes rapid decision-making, but in the context of neurocognitive disorders, speed must be paired with

³⁴ Sarani M, Safi-Keykaleh M, Safarpour H, Honarvar MR, Kalteh E, Jahangiri K. Tractor Ambulance: An Initiative of Emergency Medical Services Response to the Flood of Golestan, Iran in 2019. *Disaster Medicine and Public Health Preparedness*. 2022; Vol. 16(4):P. 1695-1697. doi:10.1017/dmp.2021.22

interpretive depth. Professionals need to learn how to distinguish baseline impairment from acute change, how to decide when agitation may signal hypoxia or pain rather than purely psychiatric disturbance, how to assess the reliability of fragmented history, and how to apply cardiovascular protocols when the patient's cooperation is limited. This type of judgment cannot be acquired through memorization alone. It requires repeated exposure to complex scenarios, guided reflection, and supervised discussion of uncertainty. In other words, inclusive readiness depends not only on what the trainee knows, but on how they have been taught to think.

Reflective practice should therefore be included in training systems. After simulation, case discussion, or real clinical events, teams should be encouraged to analyze not only what treatment was given, but how the patient's cognitive condition affected assessment, where communication succeeded or failed, what organizational barriers appeared, and how dignity was preserved or compromised. Reflection of this kind strengthens professional maturity and prevents the repetition of hidden errors. It also helps clinicians move beyond the unproductive language of "difficult patient" toward a more accurate understanding of difficult interactional and systemic conditions³⁵.

Another major mechanism concerns continuity of training across stages of professional development. Inclusive preparation for disaster medicine should not be limited to isolated workshops or optional modules. It should begin during undergraduate or early professional education, continue in specialty and postgraduate training, and be reinforced through continuing professional development. The needs of patients with neurocognitive disorders are too clinically significant to be treated as a niche interest. Instead, they should form part of the broader culture of emergency and disaster care. Professionals must repeatedly encounter the message that inclusive practice is not the opposite of urgent medicine, but one of the ways in which urgent medicine becomes more accurate and safe.

From an organizational standpoint, protocols themselves should be accompanied by inclusive guidance. This does not mean creating entirely separate emergency systems for patients with neurocognitive disorders. Rather, it means embedding prompts and adaptations into existing structures. For example, triage pathways may include prompts to consider baseline cognition, medication dependence, caregiver availability, and altered symptom expression. Cardiovascular emergency checklists may remind staff that chest pain may be absent or poorly described and that new confusion or agitation may

³⁵ Poranen A. Human errors in emergency medical services: a qualitative analysis of contributing factors. *Scandinavian Journal of Trauma Resuscitation and Emergency Medicine*. 2024. Vol. 32(1). <https://doi.org/10.1186/s13049-024-01253-7>

represent systemic instability. Transfer and monitoring procedures may include instructions on how to orient the patient briefly and how to involve a familiar person where feasible. When such adaptations are built into organizational tools, inclusiveness becomes operational rather than rhetorical.

The value of these mechanisms becomes especially clear when one considers their preventive dimension. Educational and inclusive preparation does not merely improve the patient experience. It reduces the likelihood of clinical misinterpretation, delayed treatment, medication error, avoidable restraint, unnecessary escalation, and fragmentation of care. In patients with neurocognitive disorders, these failures may quickly translate into worsening cardiovascular instability, prolonged hospitalization, increased mortality, or irreversible functional decline³⁶. Therefore, inclusive training should be viewed not as an optional enhancement but as a form of preventive medicine within disaster response itself.

Ultimately, the educational, communicative, and inclusive organizational mechanisms described here converge toward one central proposition: effective disaster medicine requires a model of professional preparation capable of addressing human variability under crisis. Patients with neurocognitive disorders do not challenge disaster medicine because they fall outside clinical logic; they challenge it because they reveal the limits of a model built too narrowly around the cognitively typical patient. Training systems must respond to this by cultivating professionals who can combine cardiovascular expertise with communication skill, ethical stability, interdisciplinary awareness, and organizational adaptability. Only such preparation allows disaster medicine to function as both an emergency discipline and an inclusive clinical practice³⁷.

Thus, the preparation of medical professionals for work with patients with neurocognitive disorders in disaster medicine must rely on several interconnected mechanisms: simulation-based and case-based learning, interdisciplinary education, communication training, structured involvement of caregivers, team-based competence, ethical preparation, reflective practice, continuity of professional development, and inclusive organizational adaptation of protocols and clinical environments. Together, these mechanisms form the practical foundation of an educational and inclusive model capable of improving the therapy of cardiovascular complications in cognitively vulnerable patients under disaster and crisis conditions.

³⁶ Fasnacht JS, Wuest AS, Berres M, et al. Conversion between the Montreal Cognitive Assessment and the Mini-Mental Status Examination. *J Am Geriatr Soc.* 2023;Vol. 71(3). P.:869-879. doi:10.1111/jgs.18124

³⁷ Cikes, M, Planinc, I, Claggett, B. et al. Atrial Fibrillation in Heart Failure With Preserved Ejection Fraction: The PARAGON-HF Trial. *J Am Coll Cardiol HF.* 2022 May, 10 (5) 336–346. <https://doi.org/10.1016/j.jchf.2022.01.018>

CONCLUSIONS

The analysis carried out in this study demonstrates that patients with neurocognitive disorders constitute one of the most clinically vulnerable groups in disaster and crisis medicine, particularly in relation to cardiovascular complications. Their vulnerability is determined not only by the presence of cognitive impairment itself, but also by the interaction between neurocognitive deficits and the destabilizing conditions of disasters, emergencies, displacement, and disrupted healthcare continuity. Under such circumstances, the risk of cardiovascular deterioration increases significantly because symptom recognition, communication, adherence to treatment, and clinical cooperation are often impaired at precisely the moment when rapid and accurate intervention is most necessary.

It has been established that cardiovascular complications in patients with neurocognitive disorders often present in an atypical, incomplete, or behaviorally mediated manner. Chest pain, dyspnea, weakness, rhythm disturbance, circulatory instability, or worsening chronic cardiac disease may be masked by confusion, agitation, withdrawal, disorientation, refusal of care, or inability to verbalize symptoms clearly. This significantly complicates diagnosis and therapy in disaster settings, where clinical assessment is already challenged by time pressure, environmental overload, fragmented information, and limited resources. Accordingly, the management of such patients requires not only knowledge of cardiovascular protocols, but also the ability to interpret altered presentation through a cognitively informed clinical perspective.

The study further shows that standard emergency algorithms, while indispensable, are not always sufficient when applied without adaptation to cognitively vulnerable patients. Patients with neurocognitive disorders frequently do not fit the implicit assumptions of conventional disaster medicine, which often presumes a patient capable of coherent communication, predictable cooperation, and basic participation in treatment decisions. In reality, these assumptions may fail in situations of dementia, intellectual disability, post-stroke cognitive decline, delirium-prone states, or other forms of neurocognitive impairment. For this reason, inclusive adaptation should be understood not as a deviation from professional emergency standards, but as a condition of their adequate and safe application.

A central conclusion of the chapter is that educational and inclusive models in disaster medicine are essential for preparing healthcare professionals to manage cardiovascular complications in this patient group. Such models must combine protocol-based emergency competence with communication skills, ethical sensitivity, environmental awareness, and the ability to work effectively under cognitive uncertainty. The study substantiates that simulation-based

learning, case-oriented training, interdisciplinary education, caregiver-informed communication, reflective practice, and team-based organizational preparation are key mechanisms for developing this form of readiness. These mechanisms do not weaken emergency medicine; on the contrary, they strengthen its diagnostic precision, therapeutic safety, and human relevance.

It has also been demonstrated that the environment and organization of care play a major role in the stability of patients with neurocognitive disorders. Noise, unpredictability, sensory overload, rapid transitions, fragmented communication, and lack of continuity may intensify confusion, behavioral dysregulation, and cardiovascular stress. Therefore, inclusive organizational mechanisms—such as adapted triage pathways, clearer communication routines, continuity of staff interaction where possible, attention to caregivers, and reduced environmental overload—should be considered clinically meaningful rather than merely supportive. In disaster medicine, the structure of care itself can either aggravate or reduce medical risk.

Thus, the article confirms that the therapy of cardiovascular complications in patients with neurocognitive disorders under disaster conditions must be approached as an interdisciplinary, educational, and organizational problem in addition to a strictly therapeutic one. Effective response depends on the integration of cardiological knowledge, disaster readiness, cognitive sensitivity, inclusive communication, and ethically grounded professional behavior. The practical significance of this study lies in the possibility of using its provisions for the modernization of disaster medicine curricula, the improvement of emergency preparedness training, the development of simulation and interdisciplinary educational programs, and the incorporation of inclusive principles into clinical protocols for vulnerable patient populations. In this way, educational and inclusive models may serve not only as tools of better professional training, but also as instruments of safer and more humane cardiovascular care in times of crisis.

SUMMARY

The article examines educational and inclusive models in disaster medicine as a necessary framework for preparing medical professionals to manage cardiovascular complications in patients with neurocognitive disorders. It is substantiated that this category of patients represents one of the most vulnerable groups in disaster and crisis settings, since cognitive impairment significantly complicates symptom recognition, communication, therapeutic cooperation, and continuity of care. The study shows that cardiovascular complications in such patients often present in an atypical, incomplete, or behaviorally mediated manner, which increases the risk of delayed diagnosis and inadequate treatment under conditions of urgency, environmental overload, and fragmented

medical information. Particular attention is paid to the fact that conventional emergency algorithms, while clinically essential, may be insufficient when applied without adaptation to patients who are unable to participate in standard forms of interaction and decision-making. The article emphasizes that inclusive preparedness in disaster medicine should be understood not as an auxiliary ethical addition, but as a condition of diagnostic accuracy, patient safety, and effective therapeutic response. It is argued that educational models for this field must combine protocol-based cardiovascular competence with simulation-based learning, case-oriented training, adaptive communication skills, interdisciplinary cooperation, ethical sensitivity, and organizational awareness. The study also highlights the importance of inclusive organizational mechanisms, including cognitively sensitive triage, caregiver-informed interaction, reduction of environmental overload, and continuity of communication within emergency care teams. It is concluded that the modernization of disaster medicine requires the integration of educational and inclusive approaches into clinical training and emergency preparedness systems in order to provide safer, more accurate, and more humane cardiovascular care for patients with neurocognitive disorders under crisis conditions.

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