

Challenges and Strategies to Mitigate the Impacts of Climate Disasters on Oncology Treatments: Lessons Learned from the May 2024 Flood in Rio Grande do Sul

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Desafios e Estratégias para Mitigar os Impactos dos Desastres Climáticos nos Tratamentos Oncológicos: Aprendizados da Enchente de Maio de 2024 no Rio Grande do Sul

Desafíos y Estrategias para Mitigar los Impactos de los Desastres Climáticos en los Tratamientos Oncológicos: Aprendiendo de la Inundación de Mayo de 2024 en Río Grande del Sur

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In its broad definition, health is physical, mental and social well-being directly affected by either natural or human-induced environmental factors¹. Due to global warming impacts², the toll of waves of extreme heat, droughts, floods, cyclones or forest fires on the environment is substantial, a serious concern in Brazil^{2,3}.

In May 2024, the State of Rio Grande do Sul (RS) suffered the worst flood ever of its history with 182 deaths in 470 municipalities leaving more than 629 thousand individuals homeless⁴. In Porto Alegre and in the Metropolitan Region, the flood blocked the main access roads, airports and bus terminals, in addition to nearly full shutdown of drinking water and power supply. High and low complexity private and public health institutions suffered a heavy blow due to the high level of water eventually leading to mass evacuation or insufficient basic supplies to continue operating.

As emphasized by the American Society of Clinical Oncology (ASCO)⁵, situations of crisis affect patients in treatment of severe non-communicable diseases (NCD) such as cancer, as they demand continuous access to health services. Damages to local infrastructure cause logistic shortages of inputs, interruption of exams, consultations and diagnoses, difficulties of transportation services to reach health facilities and insufficient number of oncology professionals to provide health care safely, further increasing long-term morbimortality^{6,7}. In the context of the calamity in the South of Brazil, these challenges put health system under scrutiny to continue attending to oncologic patients.

Based on the four stages of humanitarian disasters management – mitigation, preparedness, response, and recovery^{8,9} – experiences and literature information on continuation of cancer treatments and oncologic clinical research after health services providing care to nearly one thousand oncologic patients were impacted by the flood are shared herein. The main workforce for continued care involved management of supply chain, care processes and assertive communication. Ideally, previously assigned skilled professionals, including backups, with updated contingency plans, should be in place and followed by emergency crisis committees with 2-24 hours response time for decision-taking⁹.

During the mitigation and preparedness phases, actions should be focused on establishing a temporary venue for oncologic treatment if the original facility becomes non-accessible¹⁰. Temporary permits can be issued to other venues requiring relocation of pharmacy and other services, mainly those related to space dimensions, sewage utilities or equipment⁸. The local access should be strategic with feasible access routes for patients, health professionals and transportation of pharmacy supplies⁸.

In the response phase, a provisory supply chain of oncologic basic inputs of medications and medical material with dispensation of oral and injectable medications should be determined. The transference of inventory from the affected area to a safer area should be performed by a pharmacist-led team through adjusted transportation means – in the State of Rio Grande do Sul, voluntary and army-provided boats were utilized – to avoid losses and ensure the continuation of the treatments in face of unforeseen consumption oscillations and possible disruptions of safety stock¹¹.

Narrow contact among the hospital affected, vendors and suppliers is essential to know promptly what are the inputs available at the region and supply capacity⁸. Medications should be transferred to a venue with electricity supply backup as power generators⁸. Whether humidity is unable to be controlled with dehumidifiers or air-conditioners, the use of granular calcium chloride at the storage can help keep the level of humidity within acceptable parameters.

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Yet, other hospitals and distributors of medication in non-affected areas in the State were important partners to store and decentralize the inventory.

There is no list of oncologic basic essential medicines as the national list of essential medicines (Rename, from the Portuguese “*Relação Nacional de Medicamentos Essenciais*”) or the World Health Organization (WHO) Essential Medicine List for humanitarian emergencies¹². To circumvent disruption risks, it is suggested that the medicine list that the oncology service has in place takes into consideration in advance, besides the therapeutic criticality in the classification XYZ, the risk of disruption and complexity of logistic operation (LO), mapping the current demand, suppliers’ delivery time and geographic organization, avoiding concentration of LO for the majority of supplies by a single vendor¹².

Decentralization of preparation of infusion therapies from the administration site is a clever strategy to prevent overloading the demand of other active health services in the affected region. The daily preparation of oncologic drugs occurred in unaffected partner hospitals and the transportation routes to the new site were organized according to the profile of each drug, with spill kit, evaluation of climatic conditions and optimizing the patients’ agenda to avoid losses and wastes. Only patients in critical clinical conditions with severe prognosis have been transferred to other sites able to provide full care.

Furthermore, in drug logistic operations, attention should be given to receiving donations of supplies. Sanitary rigor and pharmacovigilance practices should guide and avoid receiving fake medicines, unregistered medicines in Brazil, close to expiry date/expired medicines, damaged or from suspicious origin¹³. Failing to anticipate risks associated with irrational donations can result in financial and ethical liabilities even greater than having to deal with problems due to drug shortages^{14,15}.

Healthcare processes should be redesigned to offer patient the best journey within the conditions adapted to the calamity scenario. Full assistance by the complete multidisciplinary team was essential to provide patient-centered care. Due to the vulnerability conditions, the mobilization of nutritionists, psychologists and social workers increased. In addition, the healthcare team should make assessments when defining new cycles of oncologic treatment without previous exams for dosage adjustment to avoid therapeutic toxicity in patients losing weight.

Administrative and care records should be kept within confidentiality standards, despite unavailable institutional electronic systems. Electronic spreadsheets can be used for inventory tracking and follow-up, for example. Prescriptions, medical records or medications labels can be done manually. Telemedicine must be adopted since transportation of health professionals and patients is temporarily suspended¹⁶, creating remote and in-person groups of administrative and healthcare teams.

Communication should be effective with patients of the affected service. At the beginning of the flood, social media was utilized strategically to disseminate information of interruption of services and new venues to receive patients⁸. Many organs, among them ASCO⁵ stated that these tools facilitate communication in humanitarian disasters. Patients were contacted by telephone soon after a new venue was determined, prioritizing those whose treatment was delayed. In this case, the existence and the adaptation of multidisciplinary rounds were crucial to facilitate the operation, evaluating the patient schedule 24 hours before the visit according to the availability of supplies.

In addition to the effects on oncologic assistance, the climate crisis can potentially impact clinical research in different ways due to difficulties of enrollment and access to the study sites in the affected areas. Investigational products and clinical trial materials demand specific and strict temperature controls and disruption of the supply chain can interrupt the continuity of the study. Investigators may have to deal with ethical dilemmas due to change of social status of potential study populations until then invulnerable. Participants prior and new health problems can escalate, affecting the patients’ well-being, possibly leading to higher abandonment rates and/or reduced eligibility. Health services can be overloaded in the long-term due to climate-induced health problems such as respiratory diseases caused by air pollution or heat-related diseases, reducing the resources assigned to clinical trials.

The recovery phase of health services will occur concomitantly with the provisory care, and robust, resilient, flexible and regionally contingency plans are fundamental¹⁷. The climate crisis impact will continue demanding dynamic and flexible strategies to reach their goals and overcome the challenges imposed within a changing environment. The best initiative to construct actions to overcome disasters is and will be collaborative work among health professionals from all services.

REFERENCES

1. Ministério da Saúde (BR) [Internet]. Brasília, DF: MS; 2000. Saúde Ambiental. [acesso 2024 ago 20]. Disponível em: <https://www.gov.br/saude/pt-br/composicao/svsa/saude-ambiental>



2. Intergovernmental Panel on Climate Change. *Climate change 2022: impacts, adaptation and vulnerability*. Cambridge: Cambridge University Press; 2022. doi: <https://doi.org/10.1017/9781009325844>
3. National Geographic [Internet]. Burbank: National Geographic; 1996-2015. Redação National Geographic Brasil. O que são eventos climáticos extremos e por que eles são tão perigosos? 2024 maio 10. [Acesso ago 29]. Disponível em: <https://www.nationalgeographicbrasil.com/meio-ambiente/2024/05/o-que-sao-eventos-climaticos-extremos-e-por-que-eles-sao-tao-perigosos>
4. G1. Enchentes no RS: total de mortos e desaparecidos. G1, Rio Grande do Sul, 2024 jul 2 [acesso 2024 ago 20]. Disponível em: <https://g1.globo.com/rs/rio-grande-dosul/noticia/2024/07/02/enchentes-no-rs-total-de-mortos-e-desaparecidos.ghtml>
5. Bernicker E, Averbuch SD, Edge S, et al. Climate change and cancer care: a policy statement from ASCO. *JCO Oncol Pract*. 2024;20(2):178-186. doi: <https://doi.org/10.1200/op.23.00637>
6. Lynch KA, Merdjanoff AA. Impact of disasters on older adult cancer outcomes: a scoping review. *JCO Glob Oncol*. 2023;9:e2200374. doi: <https://www.doi.org.br/10.1200/GO.22.00374>
7. Man RXG, Lack DA, Wyatt CE, et al. The effect of natural disasters on cancer care: a systematic review. *Lancet Oncol*. 2018;19(9):e482-e499. doi: [https://doi.org/10.1016/s1470-2045\(18\)30412-1](https://doi.org/10.1016/s1470-2045(18)30412-1)
8. International Pharmaceutical Federation. *Responding to disasters: guidelines for pharmacy 2016*. Hague: International Pharmaceutical Federation; 2016.
9. Negi S. Humanitarian logistics challenges in disaster relief operations: a humanitarian organizations' perspective. *J Transp Supply Chain Manag*. 2022;16:691. doi: <https://doi.org/10.4102/jtscm.v16i0.691>
10. Lotfi T, Bou-Karroum L, Darzi A, et al. Coordinating the provision of health services in humanitarian crises: a systematic review of suggested models. *PLoS Curr*. 2016;8. doi: <https://doi.org/10.1371%2Fcurrents.dis.95e78d5a93bbf99fca68be64826575fa>
11. Kovács G, Falagara Sigala I. Lessons learned from humanitarian logistics to manage supply chain disruptions. *J Supply Chain Manag*. 2021;57(1):41-9. doi: <https://doi.org/10.1111/jscm.12253>
12. Perlino C, Daniel H, Cadwallader AB. Which drugs should be on the essential medicines list? *AMA J Ethics*. 2024;26(4):282-8. doi: <https://doi.org/10.1001/amajethics.2024.282>
13. Dolinskaya I, Besiou M, Guerrero-Garcia S. Humanitarian medical supply chain in disaster response. *J Humanit Logist Supply Chain Manag*. 2018;8(2):199-226. doi: <http://dx.doi.org/10.1108/JHLSCM-01-2018-0002>
14. World Health Organization. *Guidelines for medicine donations* [Internet]. 3 ed. Geneva: World health organization; 2011. [acesso 2024 ago 29]. Disponível em <https://www.who.int/publications/i/item/9789241501989>
15. Rasheed H, Nawaz HA, Rao AZ, et al. Role of pharmacists in responding to humanitarian crisis. *Enc Pharm Pract Clini Pharm*. 2019;317-24. doi: <https://doi.org/10.1016%2FB978-0-12-812735-3.00358-7>
16. Salehinejad S, Jannati N, Sarabi RE, et al. Use of telemedicine and e-health in disasters: a systematic review. *J Emerg Pract Trauma*. 2021;7(1):56-62. doi: <https://doi.org/10.34172/jept.2020.34>
17. Toner E, Schoch-Spana M, Waldhorn R, et al. *Framework for healthcare disaster resilience: a view to the future* [Internet]. Baltimore: JHU; 2018. [acesso 2024 ago 29]. Disponível em: <https://www.alnap.org/help-library/framework-for-healthcare-disasterresilience-a-view-to-the-future>

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