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Pan American Health Organization
World Health Organization
REGIONAL OFFICE FOR THE Americas

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Algorithms for the Clinical Management of Dengue Patients

Regional Arboviral Disease Program

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Introduction

Dengue is an infectious disease caused by a flavivirus called dengue virus (DENV), which has four known distinct serotypes (DENV-1, DENV-2, DENV-3, and DENV-4). This disease represents a threat to global public health, with an estimated 390 million infections occurring annually. In the Americas, dengue is the most common arboviral disease. Since its reintroduction in the early 1980s, the number of cases has increased exponentially, with epidemics occurring every three to five years. The most recent epidemic, with more than 3.1 million cases, was reported in 2019 and has continued into 2020, with 1.7 million cases (3,677 of them severe) and 613 deaths as of mid-June. The four DENV serotypes are circulating in the Americas and in many countries they are occurring simultaneously, thus increasing the risk of epidemics and serious forms of the disease.

Added to the complex situation that dengue represents in the Americas is the simultaneous circulation of two other arboviral diseases: chikungunya and Zika. These arboviral diseases can cause infections with clinical manifestations very similar to those caused by DENV, which makes a correct clinical diagnosis difficult and results in the improper clinical management of cases. To address this situation, the Pan American Health Organization/World Health Organization (PAHO/WHO) has developed and published materials on the diagnosis and clinical management of dengue and other arboviral diseases. The most recent are *Dengue: guidelines for patient care in the Region of the Americas, 2nd edition,* and the *Tool for the diagnosis and care of patients with suspected arboviral diseases*. It should also be noted that work is currently underway on the first edition of *Guidelines for the care of patients with arboviral diseases in the Region of the Americas*, which should be published by the end of 2020.

This document gives the user summary information on the *clinical management of suspected dengue cases,* which is fully illustrated in tables and algorithms. The objective is to provide a quick reference guide on the definition of a suspected case of dengue, its severity, clinical management according to intervention groups, and criteria for the hospitalization and discharge of dengue patients. This document is intended to give the health workers responsible for treating dengue cases an additional tool for proper patient management, in order to prevent deaths caused by this disease.

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Methodology

The information contained in this document is based on the publications *Dengue: guidelines for patient care in the Region of the Americas* (second edition) and the *Tool for the diagnosis and care of patients with suspected arboviral diseases*, both produced by PAHO. It includes up-to-date information on the criteria for hospitalizing dengue patients and the use of metamizole to control fever in these cases. This information was updated based on the results of a systematic review and meta-analysis conducted by PAHO in 2019, as part of the GRADE methodology for developing the first edition of the *Guidelines for the care of patients with arboviral diseases in the Region of the Americas.* The work was carried out in three virtual meetings held in June 2020.

Working group: The preparation and review of this document was the responsibility of the technical staff of the PAHO/WHO Regional Arboviral Disease Program and clinicians in the Americas who are members of PAHO's international technical group of experts on arboviral disease (international GT-arbovirus).

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Acknowledgements

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The review and final editing of this document was the responsibility of Dr. Gamaliel Gutiérrez at PAHO/WHO.

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Abbreviations and Acronyms

DENV	Dengue virus
DNWS	Dengue without warning signs
DWWS	Dengue with warning signs
g	Gram / grams
GT-arbovirus	Technical group of experts on arboviral disease
h	Hour / hours
ICU	Intensive care unit
IV	Intravenous
kg	Kilogram / kilograms
mg	Milligram / milligrams
min	Minute / minutes
ml	Milliliter / milliliters
NSS	Normal saline solution
PAHO	Pan American Health Organization
PO	Orally
SD	Severe dengue
WHO	World Health Organization

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Definition of a Suspected Dengue Case

A person who lives in or has traveled to areas with dengue transmission in the last 14 days and presents acute fever, usually from 2 to 7 days duration, and two or more of the following manifestations: nausea/vomiting, rash, headache/retro-orbital pain, myalgia and arthralgia, petechiae or positive tourniquet test (+), leukopenia, with or without any warning sign or sign of severity.

Any child who resides or has traveled in the last 14 days to an area with dengue transmission that presents acute fever, usually from 2 to 7 days duration, with no apparent focus of infection, is also considered a suspected case.

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Classification of Dengue Severity

Dengue without warning signs (DNWS)	Dengue with warning signs (DWWS)	Severe dengue (SD)
Person who lives or has traveled to areas with dengue transmission in the last 14 days and presents fever, usually of 2 to 7 days duration, and at least 2 of the following criteria: 1. Nausea / vomiting 2. Exanthema 3. Headache / retro-orbital pain 4. Myalgia / arthralgia 5. Petechiae or tourniquet test (+) 6. Leukopenia	Every dengue case that, near and preferably at defervescence, presents one or more of the following signs: 1. Intense abdominal pain or tenderness 2. Persistent vomiting 3. Fluid accumulation 4. Mucosal bleed 5. Lethargy/restlessness 6. Postural hypotension (lipothymia) 7. Liver enlargement >2 cm 8. Progressive increase in hematocrit	Every dengue case that has one or more of the following manifestations: 1. Shock or respiratory distress due to severe plasma leakage. 2. Severe bleeding: based on evaluation by the attending physician 3. Severe organ involvement (liver impairment, myocarditis, etc.)
	Requires strict monitoring and immediate medical intervention	
First level Ambulatory management	**Admit to hospital or dengue units**	**Hospitalize in ICU**

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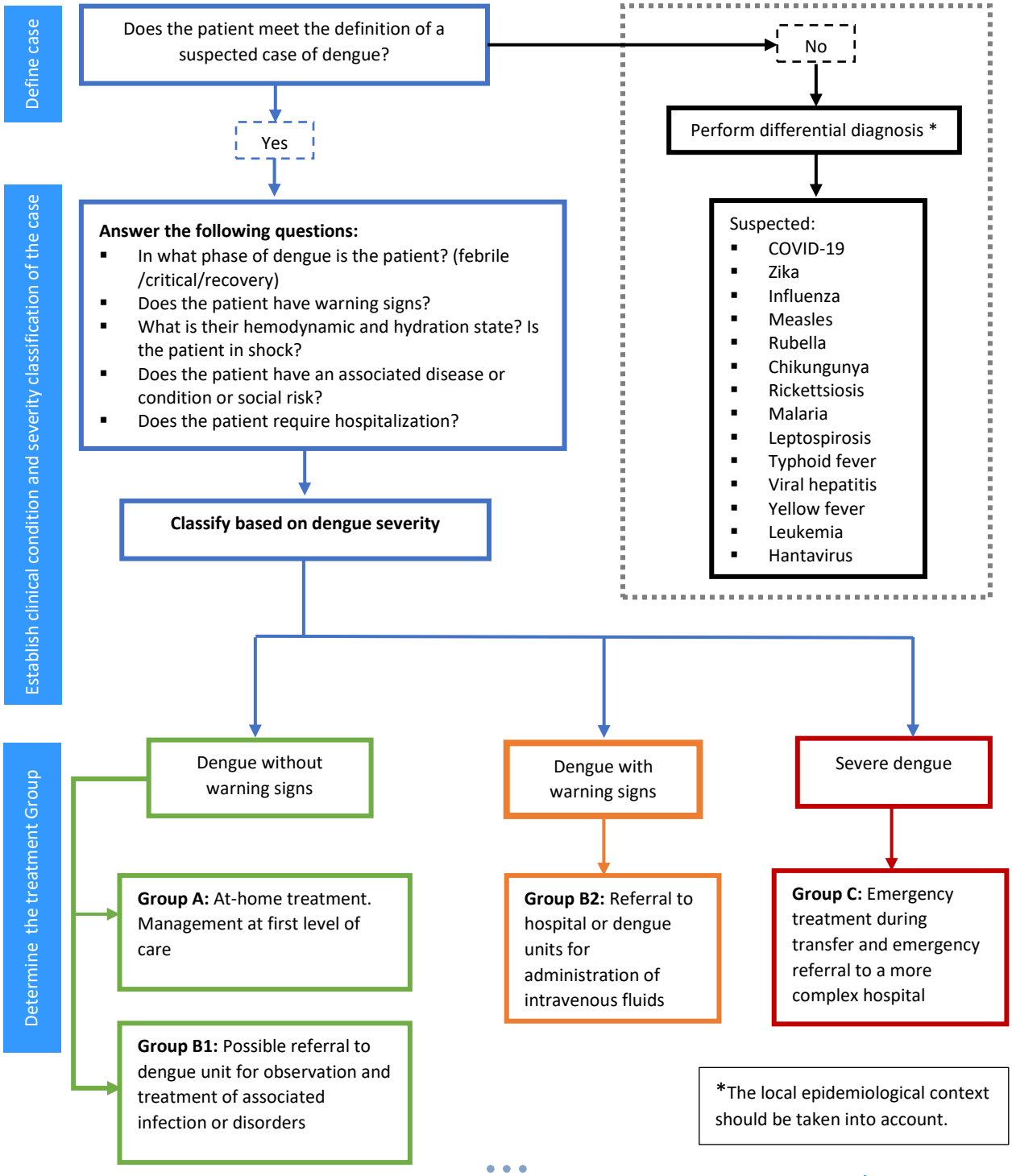
Algorithm for the Treatment of Suspected Cases of Dengue



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Intervention Groups

	Group A	Group B1	Group B2	Group C
Severity classification	Dengue without warning signs (DNWS)	Dengue without warning signs (DNWS)	Dengue with warning signs (DWWS)	Severe dengue (SD)
Group criteria	Tolerate sufficient volumes of oral fluids Urinate at least once every 6 hours No associated diseases or conditions, or social risk	Presence of associated diseases or conditions: ▪ Pregnancy ▪ ≤ 1 years old ▪ ≥ 65 years old ▪ Morbid obesity ▪ Hypertension ▪ Diabetes mellitus ▪ Asthma ▪ Renal damage ▪ Hemolytic diseases ▪ Chronic hepatomegaly ▪ Peptic ulcer disease or gastritis of any etiology ▪ Being treated with anticoagulants ▪ Other or, Presence of social risk: ▪ The patient lives alone or far from where they can receive medical care ▪ Does not have transportation ▪ Lives in extreme poverty	Every dengue case that, near and preferably at defervescence, presents one or more of the following signs: 1. Intense abdominal pain or tenderness 2. Persistent vomiting 3. Fluid accumulation 4. Mucosal bleed 5. Lethargy/restlessness 6. Postural hypotension (lipothymia) 7. Liver enlargement >2 cm 8. Progressive increase in hematocrit	Every dengue case that has one or more of the following manifestations: • Shock or respiratory distress due to severe plasma leakage. • Severe bleeding: based on evaluation by the attending physician • Severe organ involvement (liver impairment, myocarditis, etc.)
Management level of care	First level. At-home treatment	Possible referral to hospital or dengue units. Requires observation and treatment of their associated infection or condition.	Hospital or dengue units. Requires IV fluid administration.	Intensive Care Unit. Requires emergency treatment

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Criteria for the Hospitalization of Dengue Patients

The following hospitalization criteria are based on a systematic review and meta-analysis conducted in 2019. A total of 217 studies were identified that included 237,191 patients with a dengue diagnosis in whom the relationship between different potential prognostic factors and progression to severe disease was evaluated.

Criteria for the hospitalization of dengue patients
Patients with dengue and any of the following symptoms should be hospitalized: • Dengue with warning signs • Severe dengue • Intolerance to oral administration of fluids • Respiratory distress • Narrowed pulse pressure • Prolonged capillary perfusion (more than 2 seconds) • Hypotension • Acute renal failure • Pregnancy • Coagulopathy
Additional considerations: Other factors that may determine the need to hospitalize dengue patients include the presence of comorbidities, very young and very old age, social and/or environmental conditions. The decision to admit patients with these conditions should be individualized.

Criteria for the Discharge of Dengue Patients

Criteria for discharge of dengue patients	
Clinical criteria	• Absence of fever for 48 hours without administration of antipyretics • Improvement of clinical status (general well-being, good appetite, normal hemodynamic status, normal or increased diuresis, no respiratory distress or evidence of bleeding)
Laboratory criteria	• Increasing trend for platelet count • Stable hematocrit, without intravenous fluids

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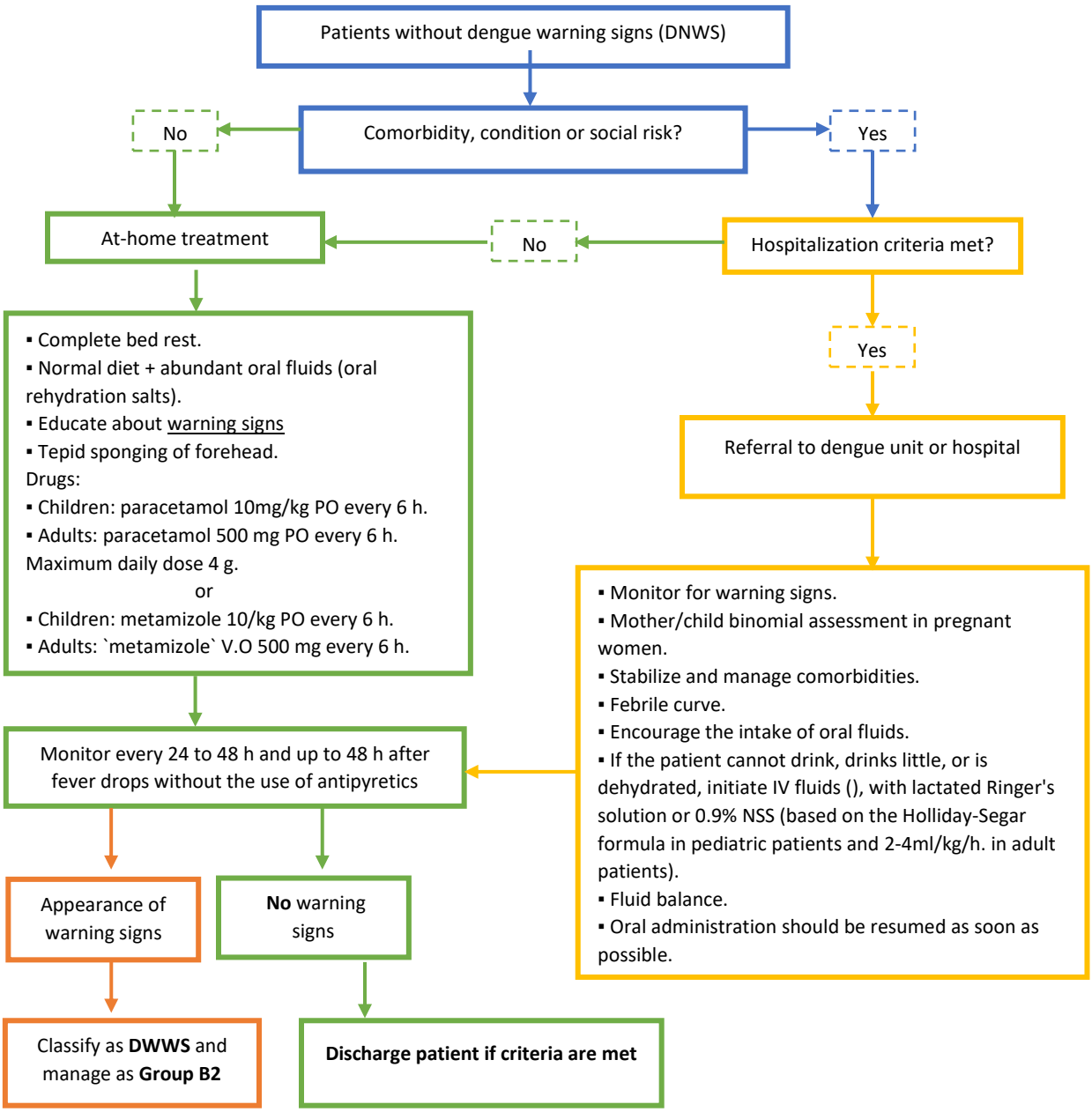
Algorithm for the Management of Dengue Patients Without Warning Signs (DNWS) – Groups A and B1



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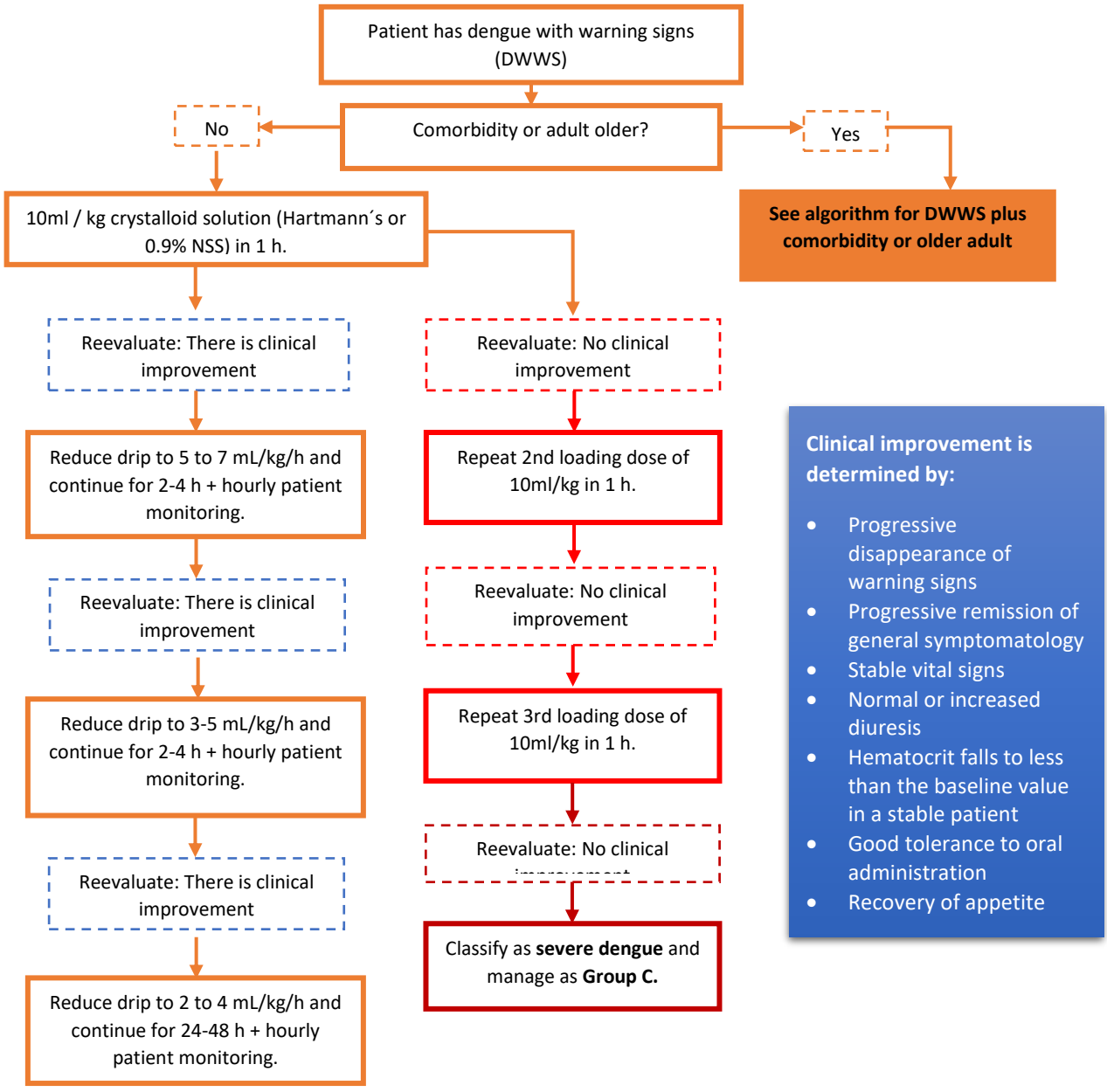
Algorithm for Intravenous Fluid Management in Dengue Patients with Warning Signs (DWWS) – Group B2



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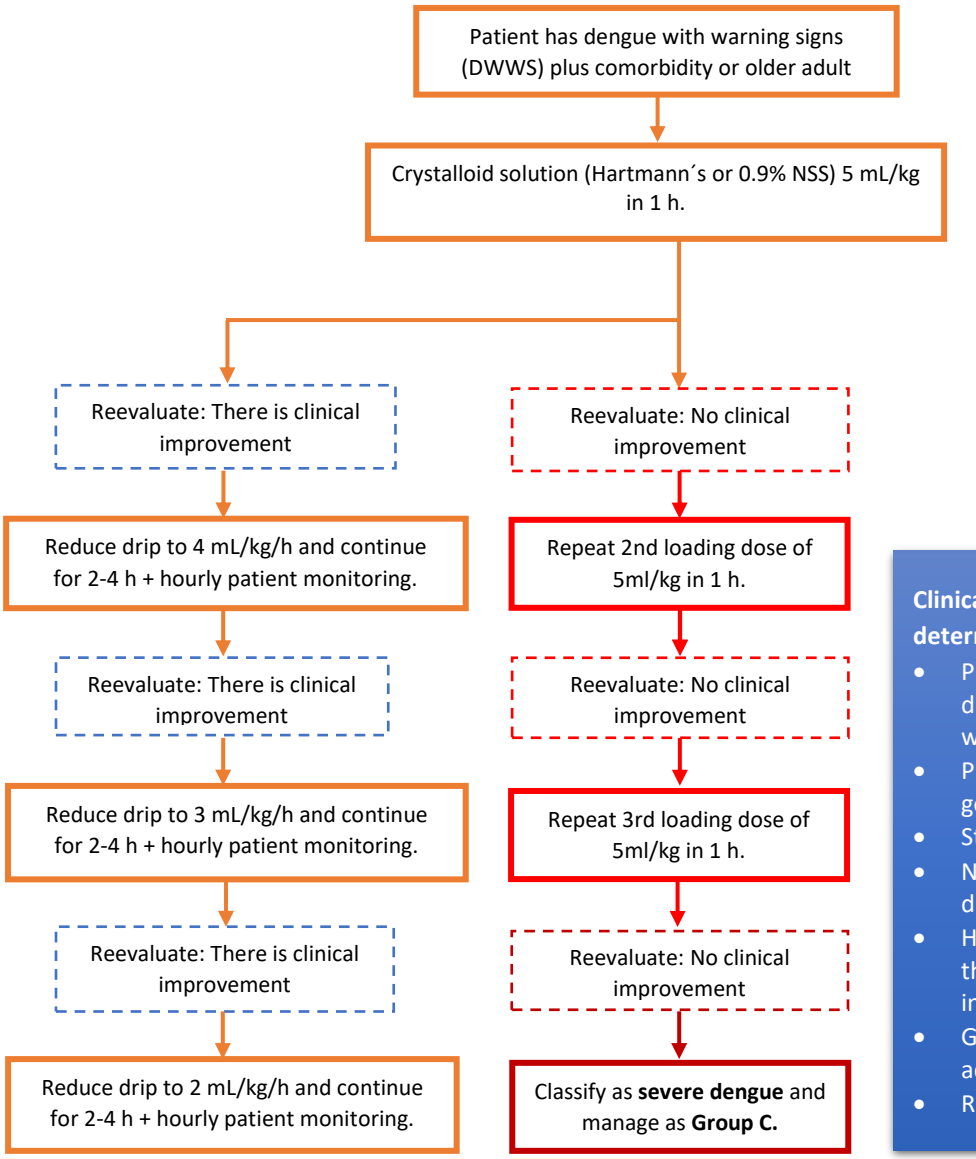
Algorithm for Intravenous Fluid Management in Patients with DWWS plus Comorbidity or Older Adult – Group B2



Clinical improvement is determined by:

- Progressive disappearance of warning signs
- Progressive remission of general symptomatology
- Stable vital signs
- Normal or increased diuresis
- Hematocrit falls to less than the baseline value in a stable patient
- Good tolerance to oral administration
- Recovery of appetite

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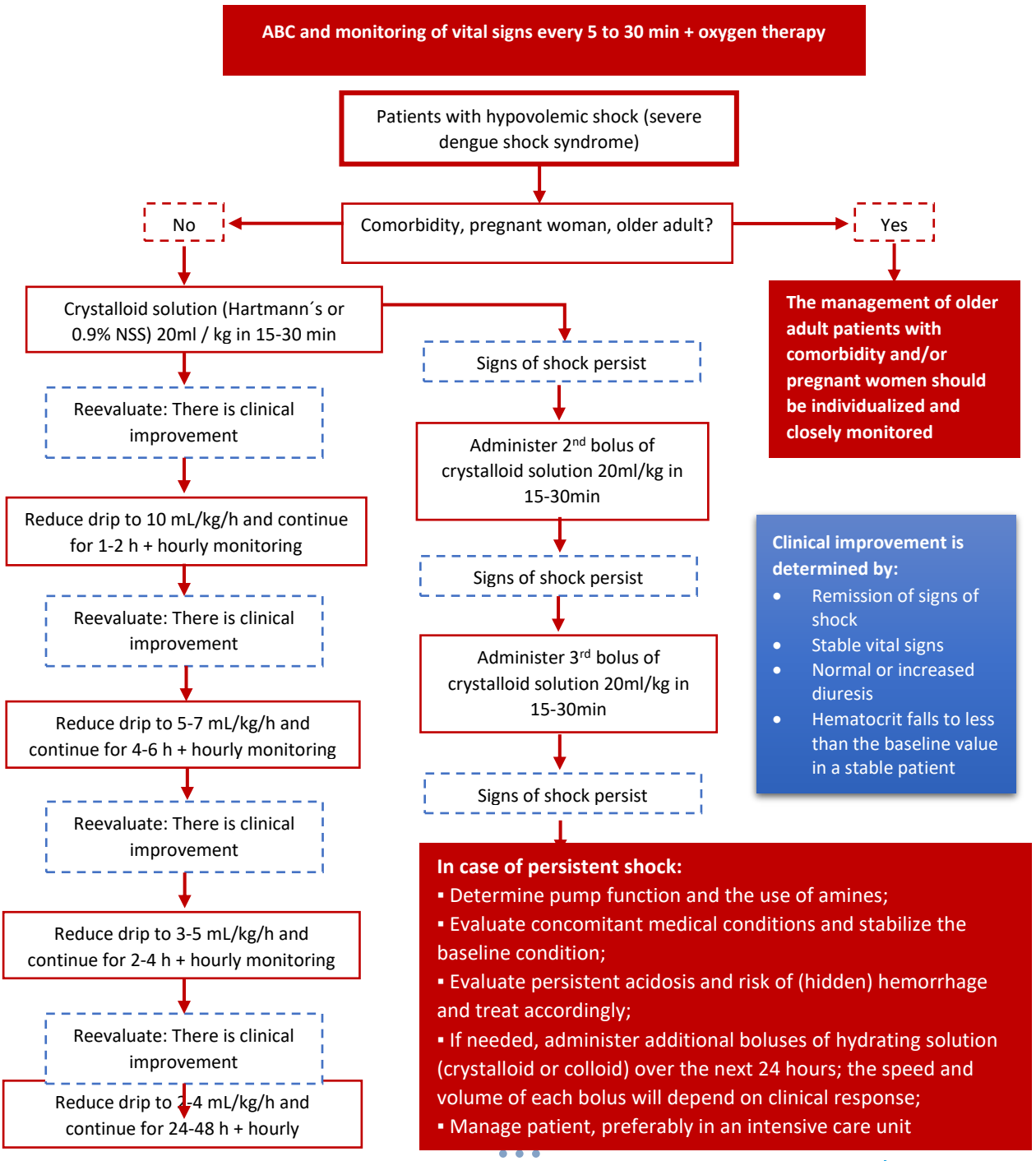
Algorithm for Intravenous Fluid Management in Patients with Hypovolemic Shock (Severe Dengue Shock Syndrome) – Group C



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References

1. Pan American Health Organization. Dengue: guidelines for patient care in the Region of the Americas. 2nd edition. Available at: https://iris.paho.org/handle/10665.2/31207

2. Pan American Health Organization. Tool for the diagnosis and care of patients with suspected arboviral diseases. Available at: https://iris.paho.org/handle/10665.2/33895

3. World Health Organization. Dengue: guidelines for diagnosis, treatment, prevention and control. New edition 2009. Geneva, WHO; 2009. Available at: https://www.who.int/neglected_diseases/resources/9789241547871/en/

4. Pan American Health Organization. Integrated Management Strategy for Dengue Prevention and Control in the Region of the Americas. Washington, D.C.: PAHO; 2018. Available at: https://iris.paho.org/handle/10665.2/34860

5. Pan American Health Organization. Integrated Management Strategy for Arboviral Disease Prevention and Control in the Americas. Washington, D.C.: PAHO; 2020. Available at: https://iris.paho.org/handle/10665.2/52492

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