Actionable Patient Safety Solutions™ (APSS™):
Rapid Response Teams

How to use this guide
This APSS provides evidence-based actions and resources for executives, leaders, clinicians, and performance improvement specialists. This document is intended to be used as a guide for healthcare organizations to examine their own workflows, identify practice gaps, and implement improvements. In it, you'll find:

Best Practice Summary: A high level summary of evidence-based, clinical best practices. (page 2)

Executive Summary: Executives should understand the breadth of the problem and its clinical and financial implications. (page 3)

Leadership Checklist: This section is for senior leaders to understand common patient safety problems and their implications related to rapid response teams. Most preventable medical harm occurs due to system defects rather than individual mistakes. Leaders can use this checklist to assess whether best practices are being followed and whether action is needed in their organization around rapid response teams. (page 3)

Clinical Workflow: This section includes more specific information about rapid response teams across the continuum of care. Leaders should include the people doing the work in improving the work. This section outlines what should be happening on the frontline. Clinicians can use this section to inform leaders whether there are gaps and variations in current processes. This is presented as an infographic that can be used for display in a clinical area. (page 5)

Education for Patients and Family Members: This section outlines what frontline healthcare professionals should be teaching patients and family members about rapid response teams. Clinicians can inform leaders whether there are gaps and variations in the current educational processes. (page 5)

Performance Improvement Plan: If it has been determined that there are gaps in current practice, this section can be used by organizational teams to guide them through an improvement project. (page 6)

What We Know about Rapid Response Teams: This section provides additional detailed information about rapid response teams. (page 9)

Resources: This section includes helpful links to free resources from other groups working to improve patient safety. (page 11)

Endnotes: This section includes the conflict of interest statement, workgroup member list, and references. (page 12)

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Patient Safety
MOVEMENT

Best Practice Summary

Monitoring for Deterioration:

☐ Assess for trends in deterioration from documentation, EHR data, physical assessments, continuous monitoring, etc.

☐ Calculate degree of illness based on National Early Warning Score on continuous basis.

☐ Consult provider, additional nursing resources and respiratory care practitioners as per organizational escalation policy for concerns related to patient clinical status and/or patient or family member concern.

Calling a Rapid Response:

RRTs may be called due to one or more of the following:

☐ Based on clinician concern for patient clinical status (may result before or after consultation with additional clinicians per organizational escalation policy)

☐ Based on concern of colleague

☐ Based on concern of patient or family concern

☐ Recognize early warning signs of deterioration and initiate a rapid response call based on an Early Warning System algorithm or organizationally-defined calling criteria. Broad calling criteria could include those recommended in NEWS, 2017.

☐ May be triggered by a clinical alarm or automated system

Initiation of Care:

☐ Wait with the patient for the RRT to arrive. Perform interventions within the scope of practice while waiting. Perform an effective hand-off according to the organizationally-defined method of communication (e.g., SBAR).

☐ Perform interventions as necessary upon arrival of the RRT.

☐ If it is decided that the patient will remain on the unit, implement next steps accordingly and ensure this is communicated to the next shift and to the patient and family members. If the patient is being transferred, facilitate the transfer to the receiving unit and ensure this is communicated to the receiving unit and to the patient and family members. See Hand-Off Communication APSS for checklists to consider standardizing for post-RRT hand-offs.

☐ Debrief with the team, discussing what went well, what didn't go well, and what could be improved. The "team" should include anyone involved in the response, including the person that called for help.

☐ Document interventions, debrief points, and next steps appropriately in the EHR. Enter data in the quality improvement system. Include issues identified during the activation, such as system failures or missing equipment.

Executive Summary

The Problem

Hospital Rapid Response Teams (RRTs) (sometimes referred to as "medical emergency teams") are intended to prevent "failure to rescue" of patients suffering physiologic deterioration. While the implementation of Rapid Response Teams has proven extraordinarily effective for patient outcomes, these teams are only useful if they are leveraged. Delays in recognition of deterioration and activation of RRTs can compromise early intervention by Rapid Response Teams (Solomon et al., 2016; AHRQ, 2019).

The Cost

Patients often exhibit signs of deterioration long before going into cardiac arrest or experiencing irreversible damage. Delays in recognition of the deteriorating patient can increase morbidity, mortality, likelihood of transfer to the ICU, and length of stay (Barwise et al., 2016; Xu et al., 2018). Institutions in both high and low income countries that have successfully adopted implementation of rapid response teams have witnessed a decrease in mortality and cardiopulmonary arrest ("code blue") (Maharaj et al., 2015; Rashid et al., 2014; Sung Ko et al., 2020; Bellomo et al., 2004; DeVita et al., 2004).

The Solution

Many healthcare organizations have successfully implemented and sustained improvements by using RRTs. This document provides a blueprint that outlines the actionable steps organizations should take to successfully implement and sustain rapid response teams and summarizes the available evidence-based practice protocols. This document is revised annually and is always available free of charge on our website.

Leadership Checklist

Use this checklist as a guide to determine whether current evidence-based guidelines are being followed in your organization:

Optimize a culture of safety for Rapid Response Team use.

☐ Establish a culture that promotes use of the rapid response system to promote optimal patient care. Reinforce that the use of these systems supports the 'speak up' culture.

☐ Provide means by which patients and family members can activate rapid response teams.

☐ Simplify the activation procedure (e.g., one standard number to call for emergency assistance), standardize hand-off processes (e.g., checklist for reporting and receiving emergency information), and provide notification to the team in a unique but consistent fashion (e.g., emergency tones/announcements/text pages).

☐ Consider providing patients and family members with their own Plan of Care to track signs, symptoms, and potential deterioration, and educate them on how to call for help. See Education for Patients and Family Members.

☐ Examine staff workload that may compromise recognition of deterioration. Work to mitigate actions and tasks that take up time unnecessarily in workers' schedules.

Standardize expectations and share across the organization.

☐ Ensure that calling criteria, early warning sign detection, and the activation protocols are

embedded into clinical workflows, whether electronic or paper.

- ☐ Establish criteria for transfer to higher acuity care.
- ☐ Standardize checklists for RRTs for hand-offs upon arrival and post-intervention. See Hand-Off Communication APSS for specific checklist examples.
- ☐ Devise structured documentation tools, clarify roles for and methods of documenting assessments and plans in the medical record following the activation of an RRT, and standardize process review for quality improvement.

Set actionable alarms and indicators for activating the Rapid Response Team.

- ☐ Where resources allow, create automated alarms and decision support routines based on meaningful data (e.g., continuous vital sign monitoring, early warning score systems, etc).
- ☐ Define alarm threshold criteria to balance between alarm fatigue and early detection.
- ☐ Survey staff members to gather baseline data about their perceptions of alarms and alarm management.
- ☐ Thoroughly consider the risk and benefit of multiple sets of calling criteria based on setting (e.g., ICU versus non-ICU calling criteria).
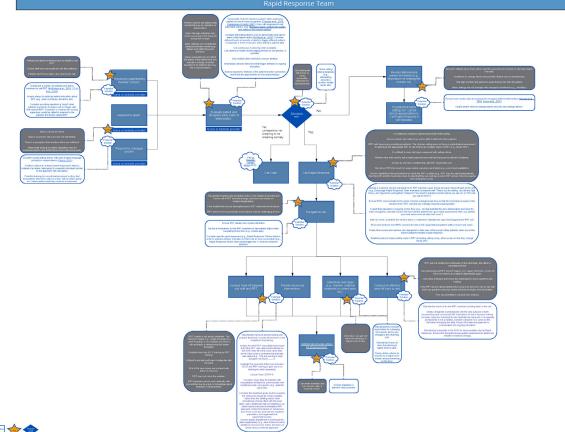
Conduct formal and informal ongoing education.

- ☐ Ensure adequate training and documentation of detection and response competencies and skills.
- ☐ Set up teams with debriefing strategies and expect that those involved in the rapid response debrief after each RRT activation.
- ☐ Use various forms of education to meet the needs of the adult learners. Consider simulation to enhance the learning experience.
- ☐ Sustain improvements through competency checks, regular training/practice, huddles/debriefs, leadership succession, simulation, using data to inform automation. Include information from quality reviews such as "good catches" and "missed opportunities".

Use metrics and feedback to inform changes.

- ☐ Ensure the post-RRT activation documentation form captures all relevant information for both patient care and quality improvement (e.g., activation triggers, drug interventions, non-drug interventions, outcome, and debrief prompts). Set up systems to track and trend the data and share feedback for improvement.
- ☐ Measure and report rapid response team use monthly (number of rapid response calls/1,000 discharges in a given period of time). Note relationships between rapid response team use and clinical outcomes. Routinely reassess outcomes (Subbe et al., 2019; Peberdy et al., 2007).
- ☐ Debrief on a regular basis to solicit team feedback about barriers to sustained compliance. Adjust the plan quickly and nimbly as needed.
- ☐ Use Rapid Response Team data to inform upstream changes to prevent the initial deterioation (e.g., patient placement and staff education) (Litvak & Pronovost, 2010).
- ☐ Ensure that leaders have a simple process to oversee early detection, activation, calling criteria, and response improvement work while also considering how it aligns with other initiatives across the organization.

Clinical Workflow

Examples of the clinical workflow, typical gaps, and potential solutions. Click here to expand.

Education for Patients and Family Members

The outline below illustrates all of the information that should be conveyed to the patient and family members by someone on the care team in a consistent and understandable manner.

Patients and family members should understand:

- Signs and symptoms they should watch out for that may indicate deterioration
- The relationship between deterioration and Rapid Response
- The purpose of a Rapid Response Team
- That they can call a Rapid Response wherever they are on the hospital property (e.g., cafeteria)
- That they cannot call a Rapid Response if they are not on the hospital property. Be sure to provide the appropriate number to call if there are concerns post-discharge.
- When they should call a Rapid Response
- How they can call a Rapid Response
- What they can expect after a Rapid Response

Consider providing patients and family members with their own Plan of Care to track signs, symptoms, and potential deterioration. See blank version here.

Performance Improvement Plan

Follow this checklist to improve performance and move your organization toward eliminating the harm and death associated with unplanned extubation:

☐ **Gather the right project team.** Be sure to involve the right people on the team. You'll want two teams: an oversight team that is broad in scope, has 10-15 members, and includes the executive sponsor to validate outcomes, remove barriers, and facilitate spread. The actual project team consists of 5-7 representatives who are most impacted by the process. Whether a discipline should be on the advisory team or the project team depends upon the needs of the organization. Patients and family members should be involved in all improvement projects, as there are many ways they can contribute to safer care.

> **Complete this Lean Improvement Activity:**
> Conduct a SIPOC analysis to understand the current state and scope of the problem. A SIPOC is a lean improvement tool that helps leaders to carefully consider everyone who may be touched by a process, and therefore, should have input on future process design.

POTENTIAL RAPID RESPONSE IMPROVEMENT TEAM MEMBERS	
• Admitting and registration staff	• Frontline nurses
• Administrators	• Nurse educators
• Patients and family members	• Cardiac arrest resuscitation team members
• Quality and safety specialists	• Risk management personnel
• Charge nurse from each unit	• IT team members, data analysts, and EHR specialists
• Physicians	• Palliative care and hospice specialists
• Advanced practice nurses	• Phlebotomy and diagnostic imaging support
• Respiratory therapists	• Paramedics
• Pharmacists	

Table 1: Understanding the necessary disciplines for establishment and maintenance of a rapid response team

☐ **Understand what is currently happening and why.** RReviewing objective data and trends is a good place to start to understand the current state, and teams should spend a good amount of time analyzing data (and validating the sources), but the most important action here is to *go to the point of care and observe*. Even if team members work in the area daily, examining existing processes from every angle is generally an eye-opening experience. The team should ask questions of the frontline during the observations that allow them to understand each step in the process and identify the people, supplies, or other resources needed to improve patient outcomes.

> Create a process map once the workflows are well understood that illustrates each step and the best practice gaps the team has identified (IHI, 2015). Brainstorm with the advisory team to understand why the gaps exist, using whichever root cause analysis tool your organization is accustomed to (IHI, 2019). Review the map with the advisory team and invite the frontline to validate accuracy.

RAPID RESPONSE PROCESSES TO CONSIDER ASSESSING

- Alarm settings and responses to alarms
- Hand-off the shift before a Rapid Response was called (e.g., whether or not clinical deterioration was communicated during the hand-off)
- Use of the escalation criteria before calling a full Rapid Response (e.g., what are the steps available to frontline clinicians before calling a Rapid Response)
- Prompt for activating the RRT
- Those calling rapid responses
- Use of transit time to discuss with team members (e.g., elevator time)

- Interventions performed by the rapid response team
- Team cohesion
- Hand-off from activator to responder
- Post-resuscitation care
- Hand-off to the receiving nurse or unit
- Debrief
- Documentation in the EMR
- Data collection and analysis

Table 2: Consider assessing these processes to understand where the barriers contributing to ineffective response or activation may be in your organization

☐ **Prioritize the gaps to be addressed and develop an action plan.** Consider the cost effectiveness, time, potential outcomes, and realistic possibilities of each gap identified. Determine which gaps are priorities of focus for the organization. Be sure that the advisory team supports moving forward with the project plan so they can continue to remove barriers. Design a performance improvement project based on an identified gap. Consider piloting the process improvement project on a defined area of focus such as a physical location (e.g., nursing unit) and/or population (e.g., patients, family members, clinical staff) over a defined period of time prior to expanding to the entire organization.

The action plan should include the following:
- Assess the ability of the culture to change and adopt appropriate strategies
- Revise policies and procedures
- Redesign forms and electronic record pages
- Clarify patient and family education sources and content
- Create a plan for changing documentation forms and systems
- Develop the communication plan
- Design the education plan
- Clarify how and when people will be held accountable

TYPICAL GAPS IDENTIFIED IN RAPID RESPONSE PROCESSES

- Lack of actionable alarms
- Inappropriate alarms
- Inadequate/inappropriate monitoring
- Fear of calling a RRT
- Variable judgment among staff members
- Inadequate escalation criteria prior to calling a full RRT
- Unclear calling criteria or calling criteria that is not easily accessible
- Lack of role clarity and team cohesion
- Poor identification of a RRT leader
- Inconsistency in RRT membership

- Improper training and expertise of rapid response team members
- No ICU beds available or long periods of time to stabilize and move patient to ICU
- Patients and family members do not understand their role in reporting deterioration and/or how to report deterioration
- Intervention time may be delayed due to waiting for the complete team
- Unclear, variable hand-off to receiving unit or team member
- Poor documentation during and after a Rapid Response

Table 3: By identifying the gaps in the rapid response process, organizations can tailor their project improvement efforts more effectively

☐ **Evaluate outcomes, celebrate wins, and adjust the plan when necessary.** Measure both process and outcome metrics. Outcome metrics include the rates outlined in the leadership checklist. Process metrics will depend upon the workflow you are trying to improve and are generally expressed in terms of compliance with workflow changes. Compare your outcomes against other related metrics your organization is tracking.

Routinely review all metrics and trends with both the advisory and project teams and discuss what is going well and what is not. Identify barriers to completion of action plans, and adjust the plan if necessary. Once you have the desired outcomes in the trial area, consider spreading to other areas (IHI, 2006).

It is important to be nimble and move quickly to keep team momentum going, and so that people can see the results of their labor. At the same time, don't move so quickly that you don't consider the larger, organizational ramifications of a change in your plan. Be sure to have a good understanding of the other, similar improvement projects that are taking place so that your efforts are not duplicated or inefficient.

Read this paper from the Institute for Healthcare Improvement to understand how small local steps

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RAPID RESPONSE TEAM METRICS TO CONSIDER ASSESSING

Structural measures:
- Does the organization have afferent, efferent, administrative, and quality improvement limbs?
- Are patients and family members able to activate a RRT?

Process measures:
- RRT calls made by staff and the type of staff calling Rapid Response (e.g., clinical versus non-clinical)
- RRT calls made through automatic triggers in the EHR
- RRT calls made by patients and family members
- Accessibility of information related to patient's wishes (e.g., DNR, living will, code status, etc)
- Breaches in local escalation criteria
- Timeliness of response
- Use of reversal agents
- Documentation of early warning signs
- Use of a standardized communication tool (e.g., SBAR, checklist, etc)
- Vital signs measured 24 hours prior to RRT activation
- Patient discharge from the PACU within the 24 hours prior to a RRT activation
- Administration of sedation or anesthesia within the 24 hours prior to a RRT activation
- Timeliness of critical interventions
- Transfers to ICU versus staying on the unit
- Time to transfer a patient to the ICU compared to outcomes of the patient

Outcome measures:
- Utilization of Rapid Response
- Cardiac arrests on the wards
- Codes per discharges
- Codes outside of ICU

- ICU transfers
- Length of stay
- Patient and family satisfaction

After each debrief, consider:
- Who called the response team?
- What criteria were used?
- How quickly did the response team respond?
- Who responded to the activation?
- What was done for the patient?
- What were the top reasons the team was activated?
- What were the observations of the patient and family prior to activation of the RRT?
- Early Warning Score

Table 4: Consider evaluating related metrics to better understand antimicrobial stewardship presence and contributing factors

What We Know About Rapid Response Teams

In the past, it has not been uncommon for nurses to suspect patient deterioration but be unable to call for a second opinion for fear of "bothering" another team member. Under these circumstances, patients would often deteriorate when early intervention could have improved their outcomes. Rapid response teams can change the dynamic and reinforce the effectiveness of collaboration and teamwork for patient care.

When a rapid response team is deployed, the patient becomes the focus of an interdisciplinary conversation about immediate necessary interventions and changes needed to the plan of care. Rapid response teams are characterized by identification of patient risk, notification of responders, rapid intervention, and audit of system performance (Bellomo, 2018). A key distinction of rapid response teams is early deployment for prevention, rather than deployment for treatment or reactive intervention. As such, it is important to monitor patient vital signs and other risk criteria for deterioration frequently so that rapid response teams can be activated as soon as needed.

The Clinical Evidence for Rapid Response Teams

It has been shown that a well-organized rapid response team is associated with improved outcomes due to early intervention.

Clinical outcomes before and after the implementation of a medical emergency team, data from Bellomo and colleagues (2003), table from AHRQ's TeamSTEPPS

	BEFORE	AFTER
Number of cardiac arrests	63	22
Deaths from cardiac arrest	37	16
Number of days in the ICU post arrest	163	33
Number of days in the hospital after arrest	1363	159
Inpatient deaths	302	222

Other institutions that have successfully adopted implementation of rapid response

teams witnessed:

- 50% reduction in non-ICU arrests (Buist et al., 2002)
- 58% reduction in post-operative emergency ICU transfers and 37% reduction in deaths (Bellomo et al., 2004)
- 17% decrease in cardiopulmonary arrest (DeVita et al., 2004).

Components Involved in Rapid Response Teams

The rapid response team is not just the responding team itself. There are multiple components involved in its incorporation into the hospital system:

- The frontline staff have the responsibility of determining when it is appropriate to call the rapid response team. This includes rapid response team calling criteria and a mechanism to initiate the call itself.
- Patients and families usually know the patient's condition and should be able to active a rapid response frontline staff are not available or not responding to concerns.
- The rapid response team itself must respond to the call.
- The performance review team must review all calls and subsequent patient outcomes to determine gaps and opportunities for improvement.
- The administrative group must optimize resources and implement policy changes.

Effective rapid response programs include:

- Administrative oversight of all aspects of the program, with a goal of reducing non-ICU morbidity and mortality.
- Means for detecting deterioration and calling for critical care-trained help. This includes a combination of the following:
  o Mechanisms for patient- and family-activated rapid response.
  o Dedicated training of bedside nurses in the early recognition and response to deteriorating patients.
  o Designation and training of a specialized response team that includes a critical care nurse and respiratory therapist as well as access to a critical care physician.
  o Development of monitoring practices and protocols and establishment of calling criteria. These may include vital sign thresholds or patterns, scoring systems (e.g., NEWS, PEWS), predictive algorithms and computer models, and provider/patient/ family concerns.
  o Creation of a safety culture that supports any and all calls for additional help.
- Appropriate data collection and analysis efforts that seek to understand local epidemiology of deterioration, follow patterns and trends, adjust detection and response efforts to meet patient needs, and establish appropriate training programs.

The introduction of a rapid response team at the University of California San Diego was associated with a change in in-hospital mortality from 2.12% to 1.74% in four years (Davis et al., 2015).

Establishing Call Criteria and Detection Triggers

Each organization will need to establish a consistent policy to refine calling criteria. While detection tools used to trigger rapid response teams will be fairly similar across institutions, there are some nuances warranted by the specific facility. Criteria for response team activation

should be clearly defined and publicized. Activation criteria or triggers may include:

- Alarm triggers based on vitals
- Early Warning Scores and other physiologic scoring systems
- Software applications running predictive algorithms
- Laboratory assessments
- Clinical judgment of care team members
- Judgment of organizational staff
- Concern from patient and/or family members

Resources
Resources for Rapid Response Team improvement

- NSW Health Observation Charts
- JAMA Study Notes Effectiveness of Rapid Response Teams
- National Early Warning Score (NEWS)
- Quality metrics for the evaluation of Rapid Response Systems: Proceedings from the third international consensus conference on Rapid Response Systems
- Reducing Cardiac Arrests with a Rapid Response Team
- Pursuing Perfection: Report from Tallahassee on Reducing Mortality
- Building Rapid Response Teams
- Rapid Response Teams: Reducing Codes and Raising Morale
- Rapid Response Teams: Heading Off Medical Crises at Baptist Memorial Hospital-Memphis
- RN/RT Rapid Response Team at Maine Medical Center
- Deploying a Medical Emergency Team
- Quality metrics for the evaluation of Rapid Response Systems: Proceedings from the third international consensus conference on Rapid Response Systems
- AHRQ: TeamSTEPPS for Rapid Response Systems
- AARC: Rapid Response Teams list of resources, including videos, articles, and news
- IHI: Early Warning Systems: The Next Level of Rapid Response
- Quality Metrics for the Evaluation of Rapid Response Teams
- Managing Deteriorating Patients
- HI: How to Guide: Deploying Rapid Response Teams
- Overcoming Barriers Impeding Nurse Activation of Rapid Response Teams
- Taking alarm management from concept to reality: A step by step guide
- Textbook of rapid response systems: concept and implementation
- "Identifying the hospitalised patient in crisis"--a consensus conference on the afferent limb of rapid response systems
- Medical-Surgical Nurses' Experiences of Calling a Rapid Response Team in a Hospital Setting: A Literature Review

Endnotes

Conflicts of Interest Disclosure

The Patient Safety Movement Foundation partners with as many stakeholders as possible to focus on how to address patient safety challenges. The recommendations in the APSS are developed by workgroups that may include patient safety experts, healthcare technology professionals, hospital leaders, patient advocates, and medical technology industry volunteers. Workgroup members are required to disclose any potential conflicts of interest.

Workgroup

Co-Chairs

Jacinda Bunch	University of Iowa
Daniel Davis	Air Methods Corporation
Helen Haskell	Mothers Against Medical Error

Current Members

Ernesto Arriaga Morales	Hospital San Angel Inn Sur
Steven Barker	Patient Safety Movement Foundation; Masimo
Anganette Cisneros	University of California, Irvine
Dan Cole	University of California, Los Angeles
Richard Dutton	US Anesthesia Partners
Michele Holt	University of Florida, Jacksonville
Ariana Longley	Patient Safety Movement Foundation
Olivia Lounsbury	Patient Safety Movement Foundation
Donna Prosser	Patient Safety Movement Foundation
Josiah Huse	Patient Safety Movement Foundation
Robert Kelly	Children's Hospital of Orange County; University of California, Irvine
Sarah Knowles	University Hospitals Cleveland Medical Center
Ed Salazar	Patient Advocate
Kimberly Won	Chapman University

Metrics Integrity

Robin Betts	Kaiser Permanente, Northern California Region

Previous Members

This list represents all contributors to this document since inception of the Actionable Patient Safety Solutions

Chantelle Dron	Windsor Severance Fire Rescue
Jeff Dunn	Redivus Health
Dana Edelson	University of Chicago
Michel Bennett	Patient Safety Movement Foundation (formerly)
Bill Honigman	Hoag Health

Douglas Kupas   Geisinger Health System

Brenna Lawrence   University of California, San Diego

Jacob Lopez   Patient Safety Movement Foundation (formerly)

Christine Raup   Geisinger Health System

Melanie Roberts   University of Colorado

Frank Sebat   Kritikus Foundation

Rebecca Sell   University of California, San Diego

Tyler Vadeboncoeur   Mayo Clinic

Praveen Venkatagiri   Ovum Hospitals

Sheri Villanuev   University of California, San Diego

Fiona Winterbottom   Ochsner

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