

**Guest Editorial****Eddy – A Hypothetical Model for Comprehending Emergency Medicine Research Themes**Shahan Waheed<sup>1</sup>, Muhammad Akbar Baig<sup>2</sup>, Nazir Najeeb Kapadia<sup>3</sup>, Asad Iqbal Mian<sup>4</sup>**Authors Affiliation**Aga Khan University  
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Karachi, Pakistan<sup>1-4</sup>**Correspondence to**Shahan Waheed  
docshahan83@hotmail.com**ABSTRACT/SUMMARY**

Choosing a research topic during emergency medicine residency for postgraduate trainees has always been a daunting task. The difficulty in choosing a research area can be due to the overlapping themes/clinical spectrum and the wide age range that the emergency medicine

physician sees during his/her clinical practice. In this brief report, we are proposing a model that can be utilized either by the trainees or the postgraduate program of the hospital in order to help them selecting research domains.

**BACKGROUND**

Selecting a domain for emergency care research has always been a daunting task for the busy EM resident due to the broad scope of the field. <sup>(1,2)</sup> The population presenting to the emergency departments diverse and includes the whole human age spectrum, <sup>(3,4)</sup> ranging from neonatal/pediatric to adult/geriatric. Furthermore, some of those patients belong to medically underserved populations, <sup>(5)</sup> resulting in increased severity of acute illnesses/injuries, and exacerbation of chronic illnesses in said populations. <sup>(6,7)</sup> Hence, specialized tools providing guidance on the appropriate selection of research domains, in either the preparatory or the implementation phases, will likely assist in carrying out clinical research.

In this paper, we propose 'Eddy' as a hypothetical model for understanding EM research domains through the utilization of pictorial representations. We also make the case that Eddy can serve as an effective implementation tool for the selection of EM-based research themes.

**THE EDDY**

Eddy, in the English language, refers to a small whirlpool or current in a body of water. <sup>(5)</sup> The attribution of the word Eddy to EM research is based on the principle that the relevant research themes are overlapping; by designating each theme to a core, the EM resident or trainee can select a topic while considering its direct extension into other independent domains. Eddy is particularly relevant to EM research because of overlapping EM-based research domains. Thus, EM trainees/physicians may utilize

this model to narrow down on their final research question of interest.

As shown in the figure, Eddy comprises of six cores, with each representing a separate domain in EM research (Figure 1);

**1. Core Black**

The central core (colored black in the figure) represents the domain 'patient safety/quality improvement' and disaster medicine a research area that forms the basis of practice and improvement of EM care and research. Black symbolizes power; therefore it occupies the central core of our model.

**2. Core Red**

It represents resuscitation research. Red symbolizes energy and is thus selected for resuscitation, as a reminder for the imperativeness of uninterrupted blood and oxygen supplies to vital organs. As resuscitation represents an essential practice of EM and its research, it occupies the second core domain right next to the center.

**3. Core Yellow**

The next core is yellow and is chosen as the color indicates vigor and innovativeness. It thus focuses on research-based on organ systems. Since individual organ systems (namely; cardiovascular, gastrointestinal, genitourinary system, etc) can become involved in resuscitation, that domain is positioned right after the red core.

**4. Core Green**

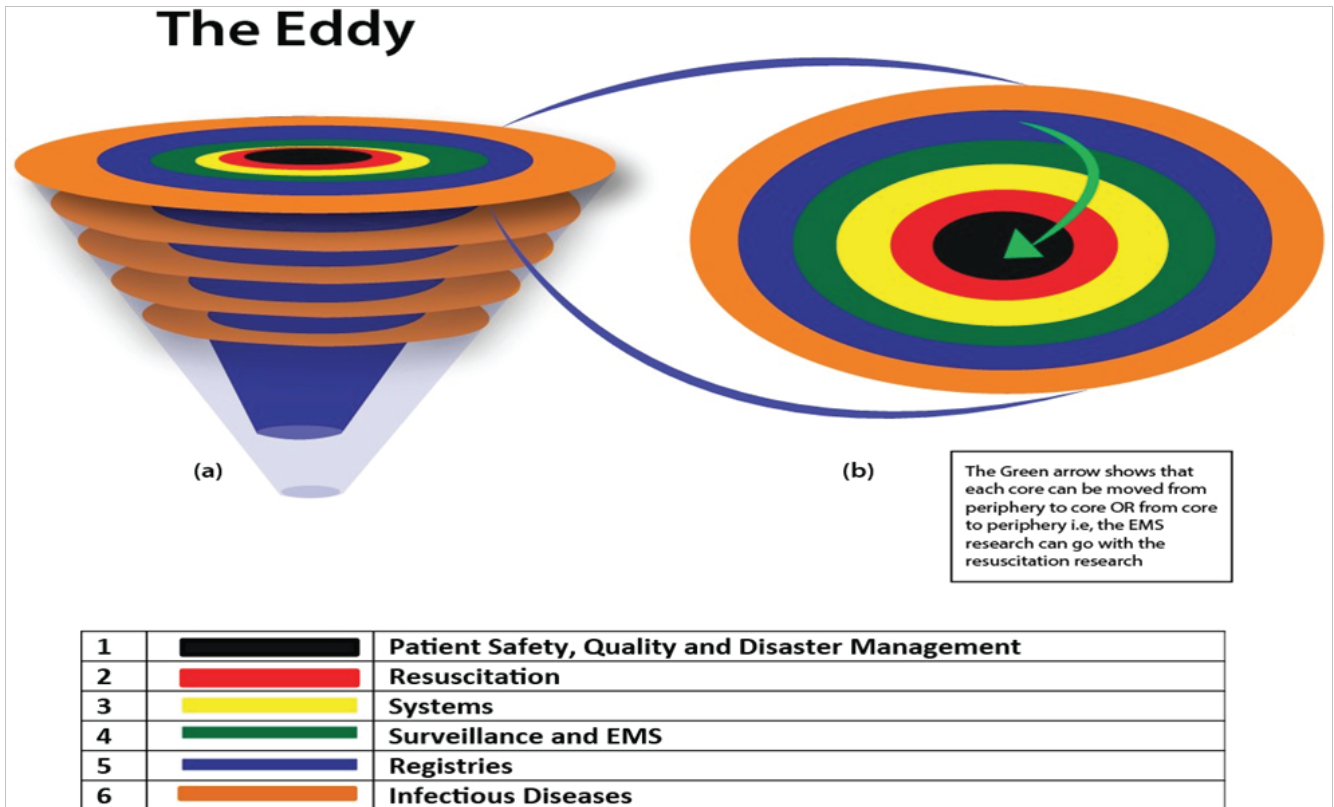
The core that comes next is green, a color symbolizing welfare, and optimism. This

core (domain) represents hospital EM services and surveillance.

**5. Core Orange**

It is colored to denote creativity, and in terms of research

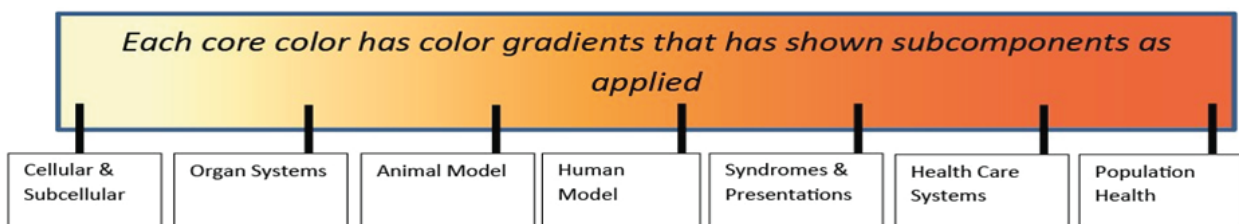
domains it is meant to represent registries. This is an important area for EM research as registries may lead to unexplored areas for future research. Following orange is the blue core, a color that symbolizes depth.



**Figure 1: The Eddy:**

(a) represents the lateral view of the 'Eddy' model. The orange color represents the outer core of the eddy whereas the top lid is showing the inner cores of the model. The lateral aspect of Eddy demonstrates the funneling concept. The slope of the funnel reinforces the need to implement a smoother and sliding approach while moving from one core to the next. The large black arrow further shows the 6 cores of the Eddy.

(b) The top lid of the 'Eddy'. The grey arrow encircling the six cores shows the overlapping areas of each domain and one can move from one core to another.



**Figure 2: The Gradient:**

It shows the outer orange core and depicts that each color filled in 'Eddy' is in a gradient manner that represents the area of research from the basic cellular and subcellular levels progressing to population health with the increasing hue of the color.

## 6. Core Blue

The blue core represents research based on a plethora of infectious diseases.

Each of the colored cores described above is further divided using a color-code gradient from a darker to a lighter shade called “The Gradient” (Figure 2). As shown in figure 2, the gradient indicates that each research domain or core may be investigated from a basic cellular level (shown as a lighter shade on the gradient) to a broader public health level (shown as a darker shade on the same color gradient).

The circular arrangement of the model depicts that any research domain can overlap with another, and thus it can be used bi-directionally in a spiral fashion as indicated by the arrow in the figure1 (as one example). The figure also indicates how the different, yet overlapping, research areas in our model can be broadened depending on research question(s) of interest and available resources.

The lateral aspect of Eddy demonstrates the funneling concept. The slope of the funnel reinforces the need to implement a smoother and sliding approach while moving from one core to the next. I visualized in 3D, the differently colored zones of the cores encompassing the funnel, visible both inside and outside. Using the visual metaphor of a funnel essentially provides a conceptual imprint through means of a simple, low-content interface. Moreover, the ‘Eddy’ moniker with its associated logo potentially creates branding for exploiting marketing strategies in order to heighten memorability. The tool with its underlying concepts has the potential to enhance awareness and recall capacity. Hence, its utility may be augmented while selecting a research theme during tenure of a busy EM residency. In order to check our model applicability as per the published literature we have applied Eddy on to the published articles from different EM journals and shown its position on the Eddy core as shown in table 1.

Sr#	Journal	Year	Authors	Title	Eddy Model (color)	Gradient
1	Annals of Emergency Medicine	2019	Edward C. Jauch, Christine A. Holmstedt	Fast Protocol for Treating Acute Ischemic Stroke by Emergency Physicians: What Took So Long?	Yellow	Human model, syndrome/presentation, organ systems
2	American Journal of Emergency Medicine	2019	Jacklyn M. Engelbart, Anne Zepeski, et al.	Safety and effectiveness of Factor Eight Inhibitor Bypassing Activity for direct oral anticoagulant-related hemorrhage reversal	Black	Health care system, population health, organ system, syndrome and presentations
3	Emergency Medicine Journal	2018	Harris T, Coats TJ, et al.	Fluid therapy in the emergency department: an expert practice review.	Red	Human model, cell sub cellular, organ system
4	European Journal of Emergency Medicine	2018	Rodolfo Romero Pareja, Rafael Castro Delgado, et al.	Pre-hospital triage for mass casualty incidents using the META method for early surgical assessment: retrospective validation of a hospital trauma registry	Green & Blue	Health Care systems, Human model, population health
5	BMC Emergency Medicine	2018	Muna Al Jalaf, Hanan Fadali, et al.	Methicillin resistant <i>Staphylococcus Aureus</i> in emergency department patients in the United Arab Emirates	Orange	Syndrome presentation, population health, health care system & organ system

**Table 1: Articles selected from emergency medicine journals and its incorporation in the Eddy model**

Although we have not studied the true capability of the model in real-time, we believe that Eddy can greatly assist end-users to select EM-centric research themes/topics of real-world significance and relevance.

### CONCLUSION

The 'Eddy process' will likely supersede the traditional approach of selecting research topics through extensive literature searches, without the end-user understanding specific research domains. However, it is important to keep in mind that regardless of our attempts to keep Eddy simple, our intention is not to trivialize the situation; for instance, it is important to acknowledge the complexity inherent in selecting specific study designs. Therefore, one still has to grasp research basics and concepts depending on one's particular domain/area or theme of interest. Finally, we conclude that our proposed model, although relatively simple at present, may require modifications for continuous improvement and further sophistication.

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