concluded that RDW and MPV can be helpful for risk stratification of neuropsychosis in carbon monoxide poisoning. This study gives important information on this clinically relevant condition.

A complete blood count is a comparatively routine, cheap, practical and easy examination method that gives important information about inflammation. [2] MPV as a part of platelet function is a commonly used inflammatory marker related to many clinical conditions. [3] In this respect, Coskun et al. [1] have mentioned that demographic, clinical, and laboratory data from the date of presenting to the ED due to CO poisoning, including the COHb, RDW, MPV, neutrophil, lymphocyte and troponin levels, were assessed using review of the hospital's medical records. In accordance with the recent article, [1] MPV and RDW levels were obtained medical records. However, this paremeters can change many conditions. At present, increased MPV levels were observed in coronary artery diseases, atrial fibrillation [4], cerebrovascular disease, peripheral artery disease, stroke, malignancy, inflammatory diseases [5], all of them are strongly correlated with endothelial dysfunction on the basis of inflammation [6]. Also, medications like aspirin, statins that may affect the MPV values should also be reported with medications of the patients. [7] Morever, the authors did not mention about the type of the tube (EDTA or citrate) which contains blood collection material. It is clearly known that MPV levels rise over time in EDTA-anticoagulated samples. The MPV levels increase up to 30% within five minutes of exposure with EDTA and increases further by 10 to 15% over the next two hours with impedance technology. So, the ideal time of MPV measurement is about two hours after blood sample collection in EDTA tube. [7] Also, EDTA generates a small shape change and swelling in platelets, so that the MPV measured in citrated blood can differ from that assessed in EDTA blood of the same donor. [8]

In addition, RDW, another marker of the complete blood count parameters, represents the variability in the red blood cell volume distribution and can be considered an index of heterogeneity in size of circulating erythrocytes. [9] This parameter is readily measured by automated hematology analyzers and reported as a component of complete blood count. [10] RDW has recently been defined to highly correlate with short- and long-term outcomes in different clinical settings. [11] However, RDW may reflect ethnicity, neurohumoral activation, renal dysfunction, thyroid disease, hepatic dysfunction, nutritional deficiencies (i.e. iron, vitamin $B_{12}$, and folic acid), bone marrow dysfunction, inflammatory diseases, chronic or acute systemic inflammation [12], recent transfusion within the past 3 months and use of some medications. Last but not least, it would be better if the authors might define how much time they specified on measuring RDW levels, because of the delaying blood sampling can cause abnormal results in RDW measurements.

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## Letter to the Editor Regarding Article, "Esmolol reduces apoptosis and inflammation in early sepsis rats with abdominal infection"

*Dear editor,*

We have read with interest the article by Lu et al. [1] published in American Journal of Emergency Medicine, and thought that some issues should be addressed.

Lu et al. [1] reported that the rats were randomly divided into a sham-operated control group, sepsis group, antibiotic group and esmolol + antibiotic group. They suggested that sham-operated control group with 5 rats, while experimental group with 10 rats in each group.

After reading this article carefully and consulting some relevant literatures, the purpose of the authors were investigated whether esmolol can alleviate the combined organ dysfunction caused by sepsis. According to Jacquet-Lagrèze et al. [2], we thought that their experimental animals are more suitable to randomly assign to five groups: sham-operated control group, sepsis group and esmolol group, which is further divided into low dosage (L group), medium dosage (M group) and high dosage (H group) esmolol groups. Moreover, to control the unrelated variables, we thought it may be better that the number of animals in their control group is consistent with the experimental group with 10 rats, which is like most experimental studies.

As we all know, the experimental method has great influence on the result. Therefore, although the article has been published for more than one year, in order to improve quality to make it more readable, we propose to correct this error.

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## Emergency physicians can be leaders in clinical innovation: Tips to JumpStart the engine

Emergency physicians are well suited to develop new technologies that improve patient care. In day-to-day practice in the Emergency Department (ED), clinicians face a broad range of time-sensitive medical conditions that overlap multiple specialties and care settings. Emergency Medicine practitioners have demonstrated an innovative mindsets in the past [1,2]. This must grow. One recent study found that of 40 devices being developed by venture capitalists tested by 400 emergency physicians, only one-quarter were thought to actually assist emergency physicians in their workflow and improve patient care [3]. It is imperative that our specialty systematically accelerates participation in technological innovation in order to develop the tools needed to improve patient care.

A journey of a thousand miles begins with the first step. It can be overwhelming to think of what great invention a physician will embark on. Clinical innovation should follow a needs-based innovation approach [4,5]. This simply refers to starting the innovation practice by focusing on a clinical need and not initially focusing on the solution. This allows the investigator to focus on carefully defining the need, including the population affected by the unmet need, and creates a strong foundation on which to brainstorm potential solutions. Emergency Medicine caring for patients across multiple specialties has resulted in numerous innovative devices from our specialty, ranging from nasal atomizers for intranasal medication to new chest tube placement devices.

The objective of problem-based innovation is to develop a very specific problem statement through an iterative process. The overall structure includes what the intended device will do, in what population, and with what expected outcome. A theoretical example would be a patch to monitor fluid overload in heart failure patients. A problem statement for this would be: "To *noninvasively measure extracellular fluid water content* in *patients with heart failure* in order to *decrease hospitalizations*." A very specific problem statement allows the innovators to precisely define the problem to be overcome and start to frame possible solutions.

When you have a clearly identified need and a potential solution, the next step is to develop a prototype. In academics, most universities will have a technology transfer office that can facilitate intellectual property protection for an idea and connections to local resources. One benefit of being part of an academic institution is the ability to develop industry-academic partnerships. Recent articles have highlighted the potential of academic-industry partnerships to accelerate innovation [6-8]. The technology transfer office at each institution can often assist the innovator in deciding the best path to commercialization and can often make introductions to potential partners.

In a non-academic setting, many options exist as well. Having an actual prototype can gain much traction to an idea for an innovator. If one is fortunate to have their own funds or able to obtain a small amount of funding, many engineering firms can be hired to produce a prototype. While this is a great path to device development, it requires capital to support a professional engineering firm. One way to innovate without significant funding is to cultivate strategic relationships. Our group has formed a collaboration with a local graduate biomedical engineering program. This benefits the program and our team as we provide real world clinical insight to the graduate students and their capstone project is dedicated to our project with a deliverable of a basic prototype at the end of the year. These types of relationships require outside-the-box thinking, but result in the ability to move an idea forward without much, if any, funding.

Despite the potential concerns about conflicts of interests, they are highly prevalent in Emergency Medicine. One recent study surveyed academic emergency medicine faculty about this topic. Of the almost 500 responses, over 80% reported some relationship with industry ranging from receiving food to actively consulting [9]. This has been the focus of recent articles in high impact journals [10,11]. Emergency physicians should always be transparent and guidelines have been developed to help with this [12].

Problem-based innovation is focusing on the clinical problems we face daily. This provides a competitive advantage to our innovation efforts. The next step is to form partnerships that can provide engineering support to obtain a prototype. This allows significant advancement of an idea. If we do not actively lead clinical innovation we are likely to end up with devices and technology that do not truly help us provide the best care possible to our patients.

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### Conflict of interest

OHSU, Drs. Sheridan and Hansen have a financial interest in Welch Allyn, Inc. as detailed above. This potential conflict of interest has been reviewed and managed by OHSU.

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