

Military Medicine

Letter in response to: Kim M, Torrie I, Poisson R, Withers N, Bjarnason S, DaLuz LT, Pannell D, Beckett A, Tien HC. The value of live tissue training for combat casualty care: A survey of Canadian combat medics with battlefield experience in Afghanistan.

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4 We thank Kim and colleagues for their study of the perceived value of live tissue training (LTT)
5 on animals versus training on human patient simulators (HPS) in preparing combat medics for
6 battlefield trauma care. However, their recommendation to continue support for LTT in military
7 medical training is based on outdated literature, a study sample size that is too small to be
8 credible, and a disproportionate reliance solely on medics' emotive preference for a certain
9 training modality without a critical assessment of how such training affects clinical outcomes.
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13 This is despite an abundance of peer-reviewed evidence from military studies that clearly
14 demonstrates that HPS training methods teach trauma care skills as well as or better than LTT
15 while also being more cost-effective. Based on fiscal, logistical and pedagogical benefits offered
16 by human simulation technology, in 2017 the U.S. Coast Guard replaced LTT with HPS training
17 methods, and as Kim and colleagues note nearly 80 percent of NATO nations do not use animals
18 for their military trauma training courses.
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21 There are four significant methodological problems with Kim and colleagues' study:
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24 First, the authors developed a statistic based on an inadequate subgroup sample size. The authors
25 highlighted a specific subgroup of their study population who were deployed before the
26 incorporation of LTT into their pre-deployment training in 2007 but subsequently received LTT
27 and later deployed again, noting that "94% felt that LTT should be included with human patient
28 simulation as part of future pre-deployment training." While this figure seems high, Kim and
29 colleagues later wrote that, "A total of only 7 individuals ... completed HPS training only on an
30 earlier deployment before later undergoing LTT as part of a later deployment." A statistic of
31 94% LTT favorability based on a subgroup population of 7 individuals is not reflective of a
32 larger trend.
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36 Second, the authors demonstrated a lack of familiarity with existing literature on this topic. They
37 stated, "The primary strength of this study is the focus on the value of LTT as perceived by
38 medics who actually had to use that training in real combat. To the best of our knowledge, no
39 other published study addresses this question so specifically." However, a 2015 study published
40 by the U.S. Naval Health Research Center analyzed this very issue by researching two trauma
41 training methods for Navy corpsmen who had 4.3 mean deployments – specifically LTT and
42 "highly realistic training," that latter of which involved pyrotechnics, battlefield special effects,
43 combat wound effects, and professional actors wearing a surgical "cut suit" that allowed
44 corpsmen to safely practice hemorrhagic control and needle thoracentesis among other surgical
45 procedures. These U.S. Navy researchers found that, "Highly realistic training was rated [by
46 study participants] as more beneficial than live tissue training for the development of advanced
47 corpsman skills," and corpsmen preferred "highly realistic training" over LTT for building
48 confidence to provide trauma care in the field and for improving deployment readiness by
49 margins of 1.3 to 1 and 2.4 to 1, respectively.
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55 Third, Kim and colleagues attributed validity to study participants' reported heightened realism
56 and stress during LTT when in fact this is not borne out in quantitative data. The authors stated
57 that "unique to this survey is the qualitative data describing the reasons why these individuals
58 favor LTT so strongly," namely that, "Witnessing bleeding and injuries in live tissue appears to
59 convey a level of stress and urgency to trainees that is not as present with HPSs." However,
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4 Vartanian and colleagues published a study in *Military Psychology* in March 2017 that compared
5 LTT versus simulation-based training (SIM) in a Tactical Medicine (TACMED) course attended
6 by members of the Canadian Armed Forces. Vartanian and colleagues obtained quantitative
7 results of self-reported State-Trait Anxiety Inventory (STAI) and biological measures of stress
8 including salivary cortisol and dehydroepiandrosterone (DHEA) that indicated “SIM and [LTT]
9 do not exert varying effects on stress ...” and “the present findings do not support the argument
10 that SIM or LT exerts a greater level of stress during training and thereby more closely resembles
11 the higher stress level encountered in the battlefield.”
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15 Fourth, to buttress their argument, Kim and colleagues relied on a 2011 study on LTT without
16 acknowledging that the same author of that report later concluded that HPS can replace LTT.
17 Specifically, Kim and colleagues cited Hall’s 2011 study in *The American Surgeon* to counter
18 the finding in a 2005 study published by Bower and colleagues in *Studies in Health Technology
19 and Informatics* that found trainees’ surgical site selection and technique improved more for
20 those trained via HPS compared to LTT. Kim and colleagues did not cite Hall and colleagues’
21 2014 study in *Military Medicine* that stated “artificial simulator and live animal training produce
22 equivalent levels of self-efficacy after initial training,” and “if the goal for trainers is to produce
23 individuals with high self-efficacy, artificial simulation is an adequate modality compared with
24 the historical standard of live animal models.” In this same issue, Hall also published a letter to
25 the editor that Kim and colleagues did not reference, noting, “We have entered into an age where
26 artificial simulator models are at least equivalent to, if not superior to, animal models. ... [T]he
27 military should make the move away from all animal simulation when effective equivalent
28 artificial simulators exist for a specific task. For emergency procedures, this day has arrived.”
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33 As Hall mentioned in his letter to the editor, “[T]he reason animal training has lasted as long as it
34 has is because of a general bias that equates emotional experience with improved skill training.”
35 When objectively looking at the breadth of literature on this topic, it is clear that LTT is
36 “outdated” – as the U.S. Defense Health Agency declared earlier this year – and the evidence
37 clearly favors the equivalency or superiority of HPS compared to LTT. It is with this in mind that
38 we hope military leaders will continue to phase out LTT and transition entirely to HPS training
39 methods.
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43 (References available from the author)
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