References

1. Ward ST, Mohammed MA, Walt R, et al. An analysis of the learning curve to achieve competency at colonoscopy using the JETS database. *Gut* 2014;63:1746-54.
2. ColonCancerCheck 2010 Program Report. Cancer Care Ontario, 2012. Available: www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=156747
3. Skills Enhancement for Endoscopy. The Canadian Association of Gastroenterology. Available: www.cag-acg.org/skills-enhancement-for-endoscopy.
4. Kaminski MF, Anderson J, Valori R, et al. Leadership training to improve adenoma detection rate in screening colonoscopy: a randomized trial. *Gut* 2015;pii: gutjnl-2014-307503.
5. Baxter NN, Sutradhar R, Forbes SS, et al. Analysis of administrative data finds endoscopist quality measures associated with postcolonoscopy colorectal cancer. *Gastroenterology* 2011;140:65-72.

Current use of live tissue training in trauma: a descriptive systematic review

I was pleased to read the article by da Luz and colleagues (DOI: 10.1503/cjs.014114) addressing the increasingly important and controversial issue of live tissue training (LTT) versus simulation-based medical training. The authors rightly acknowledged that the anatomic differences between animals and humans is a disadvantage of LTT, that LTT does not confer a "clear benefit" in improving providers' self-confidence when performing emergency procedures whereas manikin and patient experience does, and that simulators have been developed that "have already replaced some use of live animals in many areas of trauma training." Yet, da Luz and colleagues concluded that LTT cannot be fully replaced until "more realistic simulators" are developed, a statement not supported by the evidence in the paper or elsewhere.

For instance, a recent Canadian Forces Health Services study found that a human patient simulator is as effective as LTT at teaching traumatic injury management to military medical technicians.[1] Also, researchers at the University of Toronto conducted a study that found simulator-based trauma training was superior to animal-based training and that students and instructors overwhelmingly preferred the simulator-based training. As a result, the researchers ended animal use in their trauma program, stating that they "could not justify identifying animals as the only suitable source for providing the necessary training in [their] ethics application for renewal."[2]

Similarly, last year the United States military found that a human simulator teaches trauma skills as well as LTT and concluded that "if the goal for trainers is to produce individuals with high self-efficacy, artificial simulation is an adequate modality compared with the historical standard of live animal models."[3] In a related commentary, one of the authors noted, "we have entered into an age where artificial simulator models are at least equivalent to, if not superior to, animal models. …. [T]he military should make the move away from all animal simulation when effective equivalent artificial simulators exist for a specific task. For emergency procedures, this day has arrived."[4]

There are ethical, educational and economical advantages to ending LTT in favour of simulators for teaching trauma skills. It's time to follow the evidence where it leads and replace the use of animals in medical training.

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References

1. Savage LE, Tenn C, Vartanian O, et al. A comparison of live tissue training and high-fidelity patient simulator: A pilot study in battlefield trauma training. *J Trauma Acute Care Surg* 2015;79:S157-63.
2. Ali J, Sorvari A, Pandya A. Teaching emergency surgical skills for trauma resuscitation-mechanical simulator versus animal model. *ISRN Emergency Medicine* 2012. [Article ID 259864]
3. Hall AB, Riojas R, Sharon D. Comparison of self-efficacy and its improvement after artificial simulator or live animal model emergency procedure training. *Mil Med* 2014;179:320-3.
4. Hall A. Letters to the editor. Mil Med 2014;179:vii.

Current use of live tissue training in trauma: a descriptive systematic review — author response

We thank Dr. Green for the insightful comments on our manuscript, which reviews the current evidence on the use of live tissue for trauma training.

We agree with Dr. Green that "there are ethical, educational and economic advantages to ending [live tissue training (LTT)] in favour of simulators for teaching trauma skills." We also support the idea that "simulation should replace LTT where it leads the use of animals in medical training." However, the conclusion that simulation is clearly superior to LTT across the spectrum of surgical trauma training based on the current literature may be disputed by some. While less complex surgical procedures conducted in the Advanced Trauma Life Support (ATLS) course[1] were replaced by simulation devices, in the Acute Trauma Operative Management (ATOM)[2] course LTT is still essential for teaching complex surgical procedures and manoeuvres. In the study mentioned in Dr. Green's letter, a pilot randomized controlled trial of simulation and