

Estimated Cost Savings due to the Early Prediction of Anastomotic Leaks (AL) in Gastrointestinal Surgery



Nour Helwa & Manaswi Sharma

Economic Impact of AL

- Anastomotic leakage (AL) is considered the bane of gastrointestinal surgery, and is one of the most feared complications
- AL results in a higher total cost of care** due to prolonged hospitalization, the need for further diagnostic workup, and re-intervention¹
- Early detection and timely therapeutic action are necessary to diminish the postoperative cost associated with AL¹
- Understanding the economic impact of AL serves as an important driver for developing and implementing methods of early AL detection

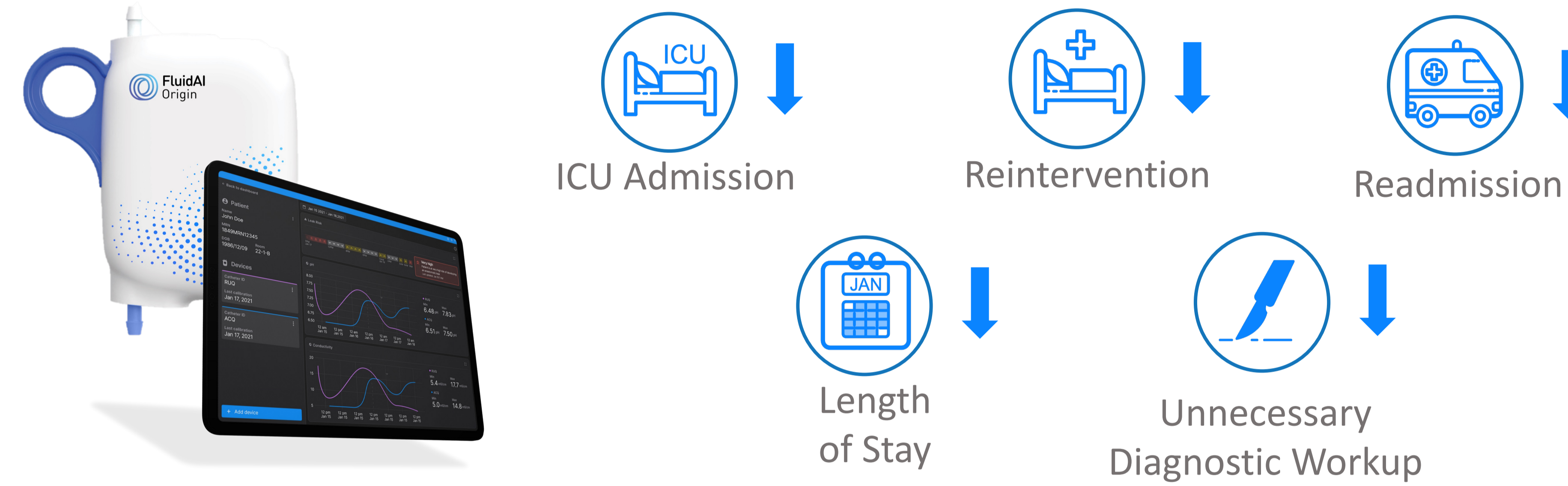
Early Detection of AL

- Molinari et al., Yang et al., and DeArmond et al.* have demonstrated the value of consecutive postoperative pH and electrical conductivity (EC) measurements of abdominal drainage for the early prediction of AL²⁻⁴
- Based on literature, **pH and EC measurements of abdominal drainage can allow for the detection of AL five days prior to the standard of care** on average, with high sensitivity and specificity^{2,3}

Economic Benefit of Early Detection

- In response to the need for effective approaches for the early detection of AL, *FluidAI Medical* focused on developing a solution (*Stream™* Platform) that harnesses the power of pH and EC as biomarkers of AL
- Studies exist reporting on the economic burden of AL, but investigations are needed examining cost savings associated with early detection of AL¹
- This study aims to **estimate potential economic savings associated with the early detection of AL using *Stream™* Platform in gastrointestinal surgery**

Potential Economic Savings Associated with the Early Detection of AL Using *Stream™* Platform

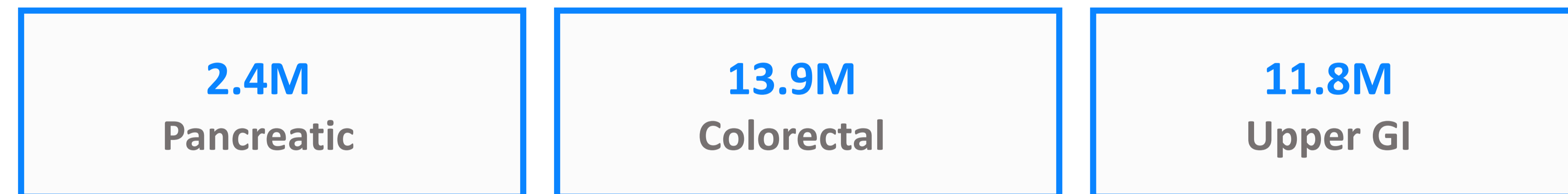


Methods

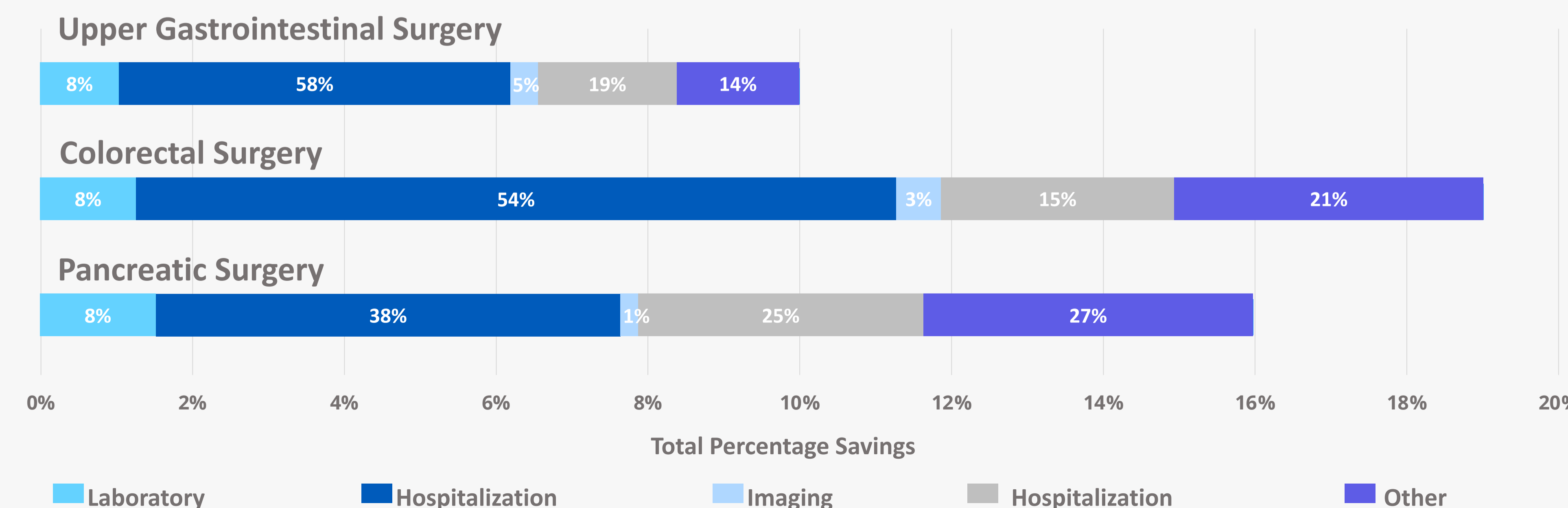
- A survey of the literature was conducted to estimate the average cost of clinically relevant postoperative anastomotic leaks in GI surgery
- Studies reporting on the economic burden of clinical anastomotic leaks by *Hammond et al., Agzarian et al., and Topal et al.* were included^{1,5,6}
- Studies reporting on the early detection of clinical anastomotic leaks using postoperative pH and EC measurements of abdominal drainage by *Molinari et al, Yang et al., and DeArmond et al.* were included²⁻⁴
- The average cost of hospitalization for AL patients was analyzed by department
- Cost per department was recalculated using an adjusted length of stay (LOS) assuming a reduction of 5 postoperative days** to determine the average savings accrued by early detection

Results

Estimated Economic Savings per 1000 Patients Associated with the Early Detection of AL for the Different Gastrointestinal Specialties



Percentage Savings Attributed to Early Leak Detection



Conclusion

- Stream™* Platform is a novel technology that provides continuous bedside monitoring of pH and EC, allowing for early detection of AL following gastrointestinal surgery
- Significant reductions in cost were estimated for early detection of AL in GI Surgery, with reduced LOS being a key driver in the lowered cost**

References

- Hammond, J., Lim, S., Wan, Y., Gao, X., & Patkar, A. (2014). The burden of gastrointestinal anastomotic leaks: an evaluation of clinical and economic outcomes. *Journal of gastrointestinal surgery : official journal of the Society for Surgery of the Alimentary Tract*, 18(6), 1176–1185. <https://doi.org/10.1007/s11605-014-2506-4>
- Molinari, E., Giuliani, T., Andrianello, S., Talamini, A., Tollini, F., Tedesco, P., Pirani, P., Panzeri, F., Sandrini, R., Remo, A., & Laterza, E. (2020). Drain fluid's pH predicts anastomotic leak in colorectal surgery: results of a prospective analysis of 173 patients. *Minerva chirurgica*, 75(1), 30–36. <https://doi.org/10.23736/S0026-4733.19.08018-0>
- Yang, L., Huang, X. E., Xu, L., Zhou, X., Zhou, J. N., Yu, D. S., Li, D. Z., & Guan, X. (2013). Acidic pelvic drainage as a predictive factor for anastomotic leakage after surgery for patients with rectal cancer. *Asian Pacific journal of cancer prevention : APJCP*, 14(9), 5441–5447. <https://doi.org/10.7314/apjcp.2013.14.9.5441>
- DeArmond, D. T., Cline, A. M., & Johnson, S. B. (2010). Anastomotic leak detection by electrolyte electrical resistance. *Journal of investigative surgery : the official journal of the Academy of Surgical Research*, 23(4), 197-203. <https://doi.org/10.3109/08941930903469458>
- Agzarian, J., Visscher, S. L., Knight, A. W., Allen, M. S., Cassivi, S. D., Nichols, F. C., 3rd, Shen, K. R., Wigle, D., & Blackmon, S. H. (2019). The cost burden of clinically significant esophageal anastomotic leaks—a steep price to pay. *The Journal of thoracic and cardiovascular surgery*, 157(5), 2086–2092. <https://doi.org/10.1016/j.jtcvs.2018.10.137>
- Topal, B., Peeters, G., Vandeweyer, H., Aerts, R., & Penninckx, F. (2007). Hospital cost-categories of pancreaticoduodenectomy. *Acta chirurgica Belgica*, 107(4), 373-377. <https://doi.org/10.1080/00015458.2007.11680078>