High Engineering Readability Learning Lab (HELL): Designing more reliable care at critical primary care junctures

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Background and Motivations
• EHRL was established in 2015 through a new AHRQ patient safety learning lab program to promote research, learning, and collaboration in new approaches to safety.
• Progress designing safer healthcare processes often elusive, especially where coordination challenges exist.
• A need exists to experiment with new approaches and collaborations to achieve greater and more generalizable breakthroughs.
• In EHRL, four health systems, teams of clinicians, systems engineers, and organizational experts apply a common design roadmap to range of problems for which primary-specialty collaboration creates safety challenges: (1) specialty referrals, (2) periphereic care, (3) opioid management, (4) home health care.
• EHRL uses systems, organizations, and safety theory and methods from industries and highly reliable enterprises.

Objectives
1. Foster redesign and learning ecosystem that blends systems engineering, organizational, and patient safety methods.
2. Support health systems applying these methods to understand, design, and spread safety innovations.
3. Assess impact on patient outcomes, engagement, and confidence in their safety.

Methods
• Teams are supported by weekly faculty coaching, alternating half-day learning sessions, and 4-month activity periods, and bimonthly reflection activities and feedback, as well as efforts to study lessons learned about usability, implementation, barriers, and dynamics enabling and limiting these approaches
• Program evaluation uses mixed methods: data analysis, staff surveys, semi-structured interviews, and ethnographic observations during team meetings and learning sessions.
• Project-specific evaluation focused on key indicators for each project and utilization, cost, and quality outcomes

Approach to Patient Engagement
• EHRL project teams engage patients intermittently or consistently, via surveys and as sounding boards, advisors, and team members
• Engaging patients has changed team approach to collecting data, understanding of impact of processes on patients, communicating with patients about processes, and modifying process, in one case focusing work on patient-provider communication and trust
• Cross-team patient conversation empower and enhance patients who participate
• Team member describes patients as the “ultimate disruptor”

Team Learning Process
• EHRL project teams experience external challenges.
• Teams learn to overcome constraints using various intro team tactics
• The constraint management process, in combination with inter-team learning, is key to teams’ successfully advancing the innovation cycle.

Conclusions and References
• Embedding engineering into safety projects has potential to help drive complex system understanding and breakthrough improvement
• Approach presents challenges of working across organizations, cultures and professions.

References
• Bargal, B., Beeneja, J. et al. Use of Systems-Therapeutic Process Analysis to Design Safer Opioid Prescribing Processes. Accepted for publishing in IIE Transactions on Occupational Ergonomics and Human Factors
• Terras A, Cohn C, Understansing Translations From Hospitalism to Home Care: An Industrial and Systems Engineering Approach. Working paper to be submitted to Journal of General Internal Medicine
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Fig 1: Understanding current processes. Example of risk stratified asthma toxicity tests at Brigham & Women’s Hospital using multipad device. Upper left: review of post procedure vital signs. Upper right: review of post procedure vital signs. Lower left: joint review of lab results and vital signs. Lower right: joint review of lab results and vital signs.


Fig 3: Designing solutions: example for primary hospital home communication of Missouri Aveus Hospital using Functional Analysis Resoponse Method (FARIM)


Supplementary Information

Appendix A: Project A. Patient Advocacy.

Appendix B: Project B. Prescription Errors.

Appendix C: Project C. Hospital Home Care.

Appendix D: Project D. Hospital Home Care.

Appendix E: Project E. Hospital Home Care.

Appendix F: Project F. Hospital Home Care.

Appendix G: Project G. Hospital Home Care.

Appendix H: Project H. Hospital Home Care.

Appendix I: Project I. Hospital Home Care.

Appendix J: Project J. Hospital Home Care.

Appendix K: Project K. Hospital Home Care.

Appendix L: Project L. Hospital Home Care.

Appendix M: Project M. Hospital Home Care.

Appendix N: Project N. Hospital Home Care.

Appendix O: Project O. Hospital Home Care.

Appendix P: Project P. Hospital Home Care.

Appendix Q: Project Q. Hospital Home Care.

Appendix R: Project R. Hospital Home Care.

Appendix S: Project S. Hospital Home Care.

Appendix T: Project T. Hospital Home Care.

Appendix U: Project U. Hospital Home Care.

Appendix V: Project V. Hospital Home Care.

Appendix W: Project W. Hospital Home Care.

Appendix X: Project X. Hospital Home Care.

Appendix Y: Project Y. Hospital Home Care.

Appendix Z: Project Z. Hospital Home Care.

Team Innovation cycle

Team Tactics for overcoming project constraints

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