ABSTRACT

Biostatisticians routinely perform important work in analyzing healthcare data and creating predictive models. Although this work often leads to publications in medical research journals, the findings seldom lead to improved, sustainable health outcomes. When findings are applied, average lag time from discovery to practice is 17 years. To overcome these problems we created a Learning Healthcare System Platform.

Using this infrastructure, we successfully completed several large randomized pragramatic trials of:

1) daily chlorhexidine bathing of ICU patients (n=9,340);
2) a comparison of 0.9% saline vs. balanced fluids (n=29,149);
3) the effectiveness of a post-discharge phone call on hospital readmissions (n=2,738).

We have also tested whether real-time predictive models incorporated into the electronic health record can be used to focus prevention and improve outcomes in randomized controlled trials.

We have demonstrated that it is possible to implement rigorous, randomized controlled trials in a hospital setting. As well as describing the infrastructure and processes, we discuss the initial concerns, previous obsticles, and the remaining challenges.

The Importance of Leading with Statistics

1. Be realistic about how hard it will be to use AI in healthcare.
2. Address the many concerns about using AI in healthcare.
3. Improve the level of teamwork among groups that do not normally work together.
4. Help all involved become comfortable with randomization.
5. Focus on improving health outcomes that are important to patients.
6. Change the financial and career promotion incentives in healthcare and the AI industry to be aligned with using AI to improve health outcomes.
7. Keep an open mind to various AI techniques and avoid falling in love with one method.
8. Raise the bar with rigorous evaluations regarding what is a successful implementation of AI.
9. Hire excellent project managers to create forward progress and avoid Brownian motion that can stall these projects.
10. Put the scientists in front and have marketing and sales people limit their claims to what researchers have proven - tone down the hype.

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