Social Innovation Competitor #2

EDASH

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Video: https://w21cinnovationacademy.com/competitors/#Competitor2

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EDASH is a software application for Emergency Departments which utilizes existing IT infrastructure, a host of collected clinical metrics, and operational time-stamps to monitor Emergency Department overcrowding in real-time and over historical time-windows. Through the monitoring of wait times at each stage of patient processing, EDASH aims to pinpoint the cause and contribution of each unique source of delay, and provide corresponding information to preemptively prevent compounding ED resource backlogs.The initial prototype was developed with data from Foothills Medical Centre as mobile accessible Quality Improvement technology, designed with the aim to empower nursing managers and physician leaders to act on bottlenecks from any location and at any time.

With over 11 million ED visits in Canada in 2017, and a 17% increase in ED length-of-stay comparative to 5 years ago (CIHI 2016-2017). Increasing emergency department utilization in light an aging Canadian population and confounded access to primary care is further limiting access to Emergency Department care. Access-blocked EDs have been clearly linked to increased patient morbidity and mortality as well as other adverse outcomes such as delays to timely therapies, inadequate pain management, discharge home of patients who are at risk of demise or revisit and admission and EMS offload delay.

A fundamental problem that exists in current ED operations in Canada and internationally is that managers lack the ability to “diagnose” the extent to which a myriad of measurable and inter-connected factors contribute to access-block in real-time. Similarly, from a resource planning perspective ED design and the matching of capacity to demand can be but is rarely informed by reliable and cumulative data. Department backlogs in a complex operational environment e.g. insufficient number or activity of ED physicians, lack of evaluation and treatment spaces, suboptimal stretcher utilization, labs and diagnostic imaging tests (delayed turnaround times) and access to specialist and admitting consultant physicians are just some of the bottlenecks that can place the waiting patient at high risk. Efficient and deliberate allocation of Emergency Department resources is contingent on the ability of ED managers to identify specific bottlenecks, both in terms of impact and timing in a useful and actionable manner, allowing the re-organization or activation of resources that can mitigate Emergency Department wait-times. With this in mind the application is designed to monitor absolute backlogs but also to utilize machine learning techniques for systems analysis by monitoring wait-times and clinical data for each patient between each stage of processing in order to pinpoint areas of delay and hence detect to what extent these stages are contributing to overall delay. Currently using operational and clinical data from AHS, we’re working towards the development of a predictive machine learning model that can help in detecting key factors along with their influence on access-block at the current time and the for next few hours. With an approach of conducting trend analysis, using neural networks and regression analysis as a starting point, on the data collected. As we move towards a self adaptive model; to allow for readjusting weight when inaccurate predictions are made. Concurrently we’ve just completed a first round of consultation (Initial surveys and interview follow-ups) with physicians and nurses in Ontario and Alberta for human factors design of the application to best serve clinicians and managers who would use the application.

Emergency Departments predominantly use experiential on-the-ground evidence of backlogs and measurements of total length-of-stay as well as wait-times till Physician assessment to monitor overcrowding. However, what is largely missing is an application which can capture the complexity of factors contributing to backlogs and not only pinpoint specifically where they are happening at a given point in time but also predict where they may occur in the following hours. A precision tool which utilizes machine learning for predictive analysis be immensely helpful and is not currently available on the market.