

Social Innovation Competitor #1

DEcision Support Tool IN Endovascular therapy (DESTINE)

Presented by Jennifer van Zelm

Video: <https://w21cinnovationacademy.com/competitors/#Competitor1>

Authors: Jennifer van Zelm, Dr. Jessalyn Holodinsky, PhD, Dr. Noreen Kamal, PhD

DESTINE Health Inc. has created an innovative decision support tool used by healthcare administrators/system planners in order to create and optimize transport protocols for acute stroke patients. The tool is a cloud-based software, which is regionally customized to each healthcare jurisdiction's unique geography and hospital treatment capabilities and efficiency. The output of the tool is a colour-coded map which displays the best transport plan (first hospital destination) for patients with suspected severe stroke, in order to optimize patient outcomes on a population level.

Fast treatment of acute ischemic stroke is essential for disability-free survival. Standard treatment has been the use of intravenous alteplase (a clot busting medication). However, endovascular therapy (EVT) has been proven more effective for some patients. Both treatments are highly time sensitive. This leads to two potential transportation options: 1) transport to the nearest centre for alteplase followed by transfer to an EVT-capable centre (drip and ship); or 2) direct transport to an EVT centre (potentially bypassing a closer hospital) for both treatments (mothership). The best option is multi-factorial and highly context specific. A decision support tool is needed.

DESTINE's software is based on a proprietary algorithm developed through years of peer-reviewed research performed in the Departments of Clinical Neurosciences and Community Health Sciences at the University of Calgary. In order to determine whether drip and ship or mothership is predicted to result in the best patient outcomes a conditional probability model was generated. The model was developed using clinical trial data on ischemic stroke treatment and the relationship between time from stroke onset to treatment and patient outcomes. Time from onset to treatment is a function of geography (where is the patient? How far away are they from the different hospitals around them? What is the transfer time between hospitals?) and hospital treatment efficiency (how long does it take from hospital arrival to treatment initiation? If a transfer is required how long does it take to initiate transfer?). Additionally, as ischemic stroke cannot be definitively diagnosed in the field, the most probable diagnosis of the patient based on the signs and symptoms recorded by EMS along with treatment and transport options for other potential diagnoses must be considered as well. This modelling framework has been published in high impact peer reviewed journals and continues to be iterated on with our learnings from each new client[1-3] The DESTINE software has been used successfully in 5 countries across the globe (USA, Sweden, Northern Ireland, Japan, and Germany) and case studies of its use have also been published.[4-6] Links to publications:

- 1: <https://jamanetwork.com/journals/jamaneurology/article-abstract/2698434>
- 2: <http://stroke.ahajournals.org/content/early/2016/11/29/STROKEAHA.116.014306>
- 3: <http://stroke.ahajournals.org/content/48/3/791/tab-article-info>
- 4: <https://www.frontiersin.org/articles/10.3389/fneur.2019.00694/full>

5: <https://doi.org/10.1080/24725579.2018.1501623>

6: <http://journals.sagepub.com/doi/abs/10.1177/2396987318759362>

We were first to both the academic and industry markets with our research/product. There are other apps out there which help find the fastest route to the nearest hospital for time critical patients but there are no other products which take into account the biology of the disease at play in order to make decisions on the BEST first destination for a stroke patient.