Strategic Healthcare Planning:

Improving Emergency Care Systems with Simulation

The political and public pressure to tackle inadequacies in the delivery of emergency care is mounting daily. Politicians, academics and practitioners are all offering their opinions on causes and improvements – but how can we really know which of these suggestions, or combination of them, is the root of the problem, and what will solve the problems?

Introduction

Emergency care, by its very nature, has a massive variation in range of patients, and the severity of their conditions. Patients first come into contact with the emergency healthcare system through a range of routes. Problems in the ED are often a symptom of the pressures on the overall system, where a peak in demand or a lack of capacity in one service may cause a knock on impact elsewhere. By taking a whole system view to the issue rather than simply trying to optimize a single department, solutions will be more effectively implemented.

The reality is that teams in the healthcare system need to know what will make the greatest impact now, and plan for improvement over the future months and years. So how can they assess the entire system and all of the possible suggestions with so much urgency and pressure?

1 **The Suggestions**

2 **The Problem**

3 **A Solution**

The Suggestions

SIMUL8's Healthcare team has taken part in a full review of the news articles and academic evidence and has provided a brief high-level overview of the competing and complementary theories on how to improve the whole emergency care system. These include:

Patients

- There are too many services to access outside of hospitals
- Patients need help to self-diagnose level of acuity of need
- Services need to be convenient to access
- We need better management of the ageing population who are increasingly living with long term conditions
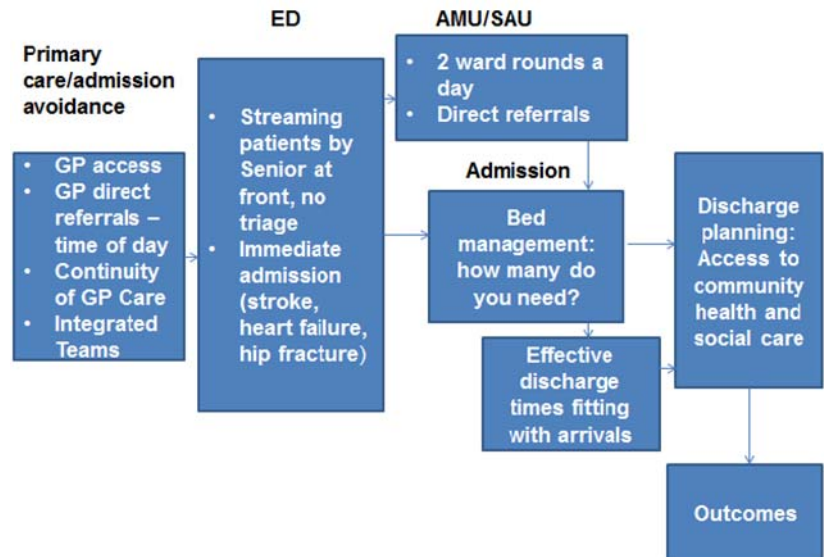

Primary Care

- Increase access to GPs/senior clinician assessment to reduce arrivals to EDs
- Stagger GP referrals
- The time taken for visits and transport arrangements to be made means that patients come into EDs late in the day, already a peak time for arrivals, causing additional strain on the system
- More effective health and social care support in the community could prevent unnecessary ED attendance and admissions for those with long term conditions
- Better end of life care to prevent ED attendance, admissions and death in hospital
- Better management of ambulatory conditions
- More access to expert diagnosis and assessment

Emergency Departments

- Improve the interface with primary care at the entrance of the ED
- Introduce rapid assessment by a senior clinician at the front end of the ED
- Introduce immediate admission of some conditions
    - e.g. stroke, heart failure, hip fracture, frail elderly
- Create a 7 day presence of consultants in emergency medicine
- Improve collaboration with mental health services
- Improve effective identification and treatment of ambulatory care cases

Short-Stay Units

- Increase direct referral by GPs to Specialist Assessment Units or Medical Assessment Units rather than to EDs
- Introduce two ward rounds a day for consultants on AMUs for effective monitoring and quicker discharge to appropriate point of care

Admissions and Bed Management
- Improve management of bed requirements
  - e.g. should care units be divided by specialty or by acuity?
- Reduce length of stay
  - One recommendation suggests that 65% of patients should have less than 2 midnight stays
- Ensure sufficient bed capacity, even if it means empty beds at times

Discharge Process
- Fit discharge times to pattern of ED arrivals to ensure bed availability
- Instigate discharge planning from arrival
  - It's estimated that 20% of ED attendees will need access to community health and social care services on discharge so why not preplan?

7 day working
- This suggestion raises many questions
  - What do we mean by 7 day working?
  - Does it apply to primary care, social care and hospitals?
  - Would that change arrival patterns on a Monday morning as well as length of stay?
  - How much would it affect capacity?
  - Will we need the same numbers of beds for the same group of patients, or would admissions reduce?
  - How much will it impact waiting times?
  - How many additional staff are needed to reduce the "weekend effect"?

The Problem

These are just a few of the current recommendations. So, how does an improvement team in a healthcare system decide which of these solutions, or combination of solutions is going to make the most impact, quickly, based on their local situation? How do they ensure that one solution is not simply going to shift the capacity issues further downstream? Or that the financial and staff implications will simply make the solution non-viable?

What about in the future – will the chosen solution survive the steadily increasing demand on services from an ageing population? And, perhaps most importantly, how do they implement the change in a live system without harming patients and keeping all stakeholders bought in?

A Solution

Other high risk sectors, such as the airline industry, routinely rely on simulation to test operational changes and improve performance and safety. A simulation is an accurate computer model that looks and acts just like your real life process, allowing you to experiment with changes to your emergency care system, without taking the risk of making the changes in real life. You simply implement the proposed solutions in the virtual system, and see where things could be improved.

Because it can manage the complexity of a system like health and social care, including variation in arrivals, patient types, lengths of stay, staff and bed capacities and costs, simulation can provide you with the evidence you need for decisions about which intervention is the most cost effective and can improve the flow and decrease bottlenecks in the system.

Since a simulation builds in real life randomness, you can be sure your model performs just like your actual department. You can try out lots of different ideas quickly - simulating days, weeks or years of your system operations in only seconds using the software.

The results from simulation models can help an improvement team to understand the impacts of a change in waiting times, throughput, costs, and other important measures. In turn, this allows decisions to go beyond the many opinions and expert recommendations found in the news and literature, and to instead be based on evidence and quantifiable results, giving managers confidence in their decisions.

By learning where the 'tipping point' is in your system – the point at which it becomes difficult to return to a normal, efficient way of working – you can identify the symptoms that come before it and bring in contingencies to avoid it. Sometimes the 'common sense' answer proves to be the right choice, but often the solutions that are most effective can be surprising. The expectation could be that more beds are required, when perhaps it's just one extra member of staff on one particular shift that can make a real difference.

For more information about using simulation to improve your emergency care system contact:
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