Q&A Session from Diabetes SBRI Launch Event 17.08.2020

Why do some people with diabetes develop chronic problems and others don't?

There are certain risk factors in diabetes-related complications such as:

- Suboptimal blood sugar control
- Duration of diabetes
- Lifestyle factors e.g. Smoking, blood pressure, cholesterol

However it is still not known why some develop ulcers and some don't. The hope is that AI solutions might be able to address this, looking at personalised medicine and individualised risk.

What datasets will be made available for the Diabetes Foot Challenge?

For all challenges this will be done regionally rather than nationally as this is a simpler process.

This will focus on prevention of disease rather than management, and use early stage longitudinal data which can help with prediction of who is most likely to develop an ulcer and how to intervene. The issues to be addressed include:

- Smoking
- Diabetes control
- Prescription data
- Patient education

Mainly secondary care type databases will be used, such as SCI-Diabetes which contains longitudinal data for all patients in every Scottish Health Board. This can be linked into Trakcare (an electronic patient portal for inpatients) and SCI Store data.

It will also be possible to look at x-rays - each Health Board in Scotland has a separate imaging department and these are not linked across the country.

The plan is to create a secure analytical platform to be accessed via a Safehaven, which would give access to the necessary databases.

The overall aim is to take people's data and feed it back to them in a meaningful, personalised way so they can use it to manage their condition/prevent deterioration.

How are high-risk diabetes foot patients managed?

This is done via a traffic light system developed by the Scottish Diabetes Foot Action Group which looks at people with more than one risk factor present for ulceration e.g. loss of sensation, callous, deformity, previous ulcer, etc. The largest ulcer risk is having had a previous ulcer.

It is recommended that they are looked after by specialist podiatrists to try and stay in remission, stop re-ulceration and try to reduce both minor and major amputations. They will be kept on the appropriate medication and encouraged re lifestyle factors such as stopping smoking.

There will be a great deal of contact with other teams such as vascular and orthotics for input re: offloading (and the use of insoles or footwear).

Part of the management is developing rapport with patients to ensure they are engaged, keeping appointments and undertaking education.

The main aims are to:

- Predict who will reach the stage of ulceration/amputation.
- Establish what common features in their history could help to predict this earlier.
- Pull all risk factors together to see at which point one becomes more important than another, and for how long has that risk factor been present.

Which datasets will be made available for the Inpatient Management Challenge?

- Bedside capillary glucose measurements
- Biochemistry results for inpatients
- SCI-Diabetes

What are the main prescribing errors in hospitals?

The majority are medications that have not been adjusted appropriately for the change in clinical condition that caused the hospital admission. In addition, if the clinical condition changes once in hospital, the medication will need to be adjusted again.

Why do hospital prescribing errors occur?

- Hospital wards and clinical areas are very busy and hectic environments.

- The admission process is often fast-moving.

- There can be a knowledge gap and lack of confidence in non-specialist clinicians especially around the use of insulin.

What has already been tried to address hospital prescribing errors?

- Online education
- Face-to-face education
- Professional education

However, it is often difficult to replicate what happens in a learning/teaching environment in a real-life, busy, clinical situation where clinicians may be under pressure to resolve several challenges at once.

What is a "Good Diabetes Day"?

This is a national measurement used in audits where blood glucose is between 4 – 11 mmol/L. It is a marker of how well blood glucose is being controlled.

Medication and self-administration – will solutions cover all patients and medications or only insulin and those self-administering?

The majority of patients with diabetes in hospital do not self-administer but have their insulin administered by a health care professional (HCP). There is a role for self administration as HCPs need to find out what patients usually do at home, but this is then taken over by the HCP while in hospital.

One of the biggest errors in hospital is the omission of insulin in type 1 diabetes which should be avoided as it causes ketoacidosis. This is something we would like to learn to address.

Applicants may wish to read the National Diabetes Inpatient Audit which was carried out in England and Wales and has a lot of granularity. Phase 1 might address some of these points (e.g. avoiding insulin omission in those with type 1 diabetes). https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-inpatient-audit/2018

Are solutions for the Inpatient Management challenge for Type 1 or Type 2 diabetes?

Solutions are sought for all types of diabetes.

Osteoporosis challenge: Are there any large-scale MRI/PET CT data for cohorts of patients with diabetes-associated fracture?

No. NHSGGC has a database called GISMO which contains all patients with fractures and there is also a database of all patients with diabetes in Scotland, so it will be possible to cross reference these to filter which people with fracture also have diabetes.

There is data of images of MR and CT which could be cross referenced once subsets of patients have been narrowed down. However there is no existing data cohort at present.

Osteoporosis challenge: Is it possible to give the numbers of patients it would be applicable to?

This challenge only included identification of cases and not risk stratification as it was thought this would be too big and complex a problem to solve.

In Clyde region, around 4000 patients per year are generated via the trauma list, of which around 2000 recommendations are generated to GPs.

From the radiology excel spreadsheets, numbers are varied however:-

- In winter: around 500 patients per week due to falls, but less in other seasons

- NHS Clyde has around 25% of the population of NHS Greater Glasgow, and Greater Glasgow is around 25% of the Scottish population.

It is imagined that the solution to the osteoporosis challenge may be a combination of image analysis, text mining and assessment of other risk factors for osteoporosis.

Osteoporosis challenge: Could hardware innovation be an alternative to DEXA?

This would be outwith the scope of the SBRI remit.

How are patient IDs used in Scotland?

All Scottish patients have a community health index number or CHI. This is a unique identifier used across all Scottish Health Boards and increasingly in social care too. Its use allows linkage across many different systems.

A CHI scanned in an inpatient setting will be the same CHI used on Trak, SCI Diabetes and other systems. It allows a unified approach to identifying individuals.

What if a company has already done work with algorithms?

This should be stated in the application form to demonstrate what experience you have, how this can be built on to address the current challenge and how it would inform Phase 1.

When will companies get access to the data?

Only those companies who are successful in securing a contract for Phase 1 will be granted access to the data and this will happen only once the contract has been issued, not before.