Probably the best DSS...

The story so far for NHS Scotland National Decision Support
Dr Paul Miller, Clinical Lead SCIMP
Dr Ann Wales
Programme Manager, Knowledge and Decision Support
eHealth (Digital Health and Care) Team
Scottish Government
Guidance on the Implementation of Minimum Pricing for Alcohol

For sellers of alcohol and enforcement authorities in Scotland

https://www.theguardian.com/news/datablog/2012/may/14/scotland-minimum-alcohol-price-effect
Scotland

**Devolved** powers on day to day issues:
- Law & Order
- Health
- Housing
- Education
- Environment
- Farming & Food

**Not devolved:**
- Foreign affairs & defence
- International development
Health and Social Care

The Scottish Government aims to help people to sustain and improve their health, especially in disadvantaged communities, ensuring better, local and faster access to health care.
Expand the use of knowledge mobilisation and decision support tools and services to support frontline practice, self-management and shared decision making.
YOU STRONG LIKE RAMBO LOOK LIKE HERO
BUT YOUR BRAIN JUST LIKE POTATO
頭大無腦 腦大庄草
A National Roadmap for Clinical Decision Support in NHSScotland

- All stages of the patient journey
- Any patient record system
- Multi-channel delivery
- “Once for Scotland”

Decision Support Roadmap, Scottish Government
eHealth, June 2015
Clinicians with CDS available to them are:

- 1.6 times more likely to prescribe the correct medicines or other therapies;
- 1.7 times more likely to order the required diagnostic tests
- 1.6 times more likely to monitor drug effects in line with evidence
- 1.4 times more likely to take appropriate preventative measures.

CDS impact on patient outcomes:

- Trend towards reducing patient mortality.
- Trend toward, higher quality-of-life scores.
- Reduces or prevents adverse events.
- Can improve efficiency and can reduce costs.
- Can improve patient satisfaction.

The Clinical Decision Support Roadmap proposes an architecture for CDS based on a shared knowledge base which supports a range of decision support tools – including mobile apps, websites and links with clinical systems. It also recommends a “system agnostic” common CDS platform which can interact with, and provide decision support scripts to, a range of clinical systems in use across NHSScotland. This open, standards-based architecture underpinned by a common bank of knowledge and decision support rules will help to improve consistency in evidence-based practice and reduce duplication of effort and expenditure.
DSS National Procurement 2016-17

1. A National Strategic Partner
2. Vendor-neutral
3. Open, standards-based architecture
4. NHS Scotland rules authoring
5. Customisable reporting tool
6. Multi-channel delivery
Cambio Healthcare Systems

Cambio CDS

A computerised clinical decision support service combines information that is specific to an individual patient, with regulations based on medical evidence, to provide guidance on compliance or advise on what is the best treatment for the patient.
Computerized clinical decision support could prevent stroke

Of Sweden's 30,000 cases of stroke each year, nearly 20 percent are caused by atrial fibrillation. To combat this, the county council in Östergötland, along with Cambio, have created a computerized clinical decision support, aimed at increasing the prescription of blood-thinning medication, with the hope of preventing many cases of stroke.

Prescribing blood-thinning medication to patients with atrial fibrillation has proved to be an effective way of preventing stroke. Because of this Sweden's National Board of Health and Welfare has said that 80 percent of all patients with atrial fibrillation, and an elevated risk of stroke, should be treated with blood-thinning medications. According to a 2013 study, however, only 42 percent of these patients actually received the recommended treatment. It is a significant undertreatment, and it occurs despite the fact that we have scientific evidence of the benefits of anticoagulant medication, says Magnus Janzon, chief physician at the cardiological clinic in Linköping.

To deal with this issue, Magnus Janzon and his research colleagues at Region Östergötland have developed a new clinical decision support system together with Cambio. The idea behind the system is to gather information from the patients' charts, in order to identify those who run a higher risk of suffering a stroke. By showing the physician that the patient has an elevated risk, and suggesting a treatment through a pop-up window on the computer screen, the hope is that the prescription of anticoagulants will increase and that lives, thereby, will be saved.

We know that out of the approximately 30,000 Swedish stroke cases each year, at least one fifth are caused by atrial fibrillation. That’s 6,000 patients. We could decrease the number of cases significantly by prescribing anticoagulants, says Magnus Janzon.

The clinical decision support system, or CDS, is now the subject of a scientific study being conducted in Östergötland. The county’s health centers have been randomly divided into two groups, that have both received information about the importance of prescribing anticoagulants. One group has also been equipped with the CDS, to see if it helps to increase prescriptions.

The goal of the study, according to Magnus Janzon, is to make sure that the system has the desired effect, before moving forward with a broader implementation. According to Tomas Block, physician and chief medical officer at Cambio, another invaluable benefit of the study is the input they get from the doctors using the system. For Tomas Block this input is critical, because a good user experience, he says, is the difference between a successful and a failed system.
Introducing JSON

RESTful API
GET PUT POST DELETE

HL7® FHIR®

open EHR

Guideline Definition Language (GDL)
Archetype Query Language (AQL)
Archetype Object Model (ADM)
Archetype Definition Language (ADL)

Base Types

Identification
Resource
Definitions
Terminology

Tool Services

Guideline Definition Language (GDL)

Archetype Query Language (AQL)

Demographics
Composition
Data Structures
Versioning
Identification
Base Types

Health Resource APIs
vEHR Services
Knowledge Services
EHR Extract
Entry
Audit
Folder

EHR Med Order
Toprol XL
Rx 50 mg daily

EHR triggers a CDS hook and invokes a remote service.

CDS Services

At each visit, integrating FHIR data as needed.

EHR FHIR Server

CDS Services renders and displays CDS cards.
1 Introduction

1.1 Background

Expressing and sharing computerized clinical decision support (CDS) content across languages and technical platforms has been an evasive goal for a long time. Lack of commonly shared clinical information models and flexible support for various terminology resources have been identified as two main challenges for sharing decision logic across sites.

1.2 Purpose

This document contains the design specifications of the Guideline Definition Language (GDL). GDL is a formal language for expressing decision support logic. It is designed to be agnostic to natural languages and reference terminologies by leveraging the designs of openEHR Reference Model and Archetype Model.
What are the challenges?

- Getting the data!
- Re-provisioning
- Scale and Scope
- Expectations
- User Experience
- Evidenced change
- Costs
- MHRA
Next Steps

• Pilots for Primary Care
• Transformation Priorities
• Design with Cambio support
• Nov 2018
• Build a resource
• Get the data
ARE YOU HAPPY?

YES

NO

CHANGE SOMETHING.

DO YOU WANT TO BE HAPPY?

YES

NO

KEEP DOING WHAT YOU'RE DOING.
Fig. 2.2
The benefits of one standard
EHR 1

EHR 2

EHR 3

OpenEHR

NHS Scotland Decision Support Engine

Or maybe FHIR...
“Data is the center of the universe; applications are ephemeral.”

http://datacentricmanifesto.org/
‘We agree the best way forward for data sharing is through a single platform. Doing this will mean data will be more accessible, connected and useable.

We will begin work now to deliver a Scottish health and care ‘national digital platform’ through which relevant real-time data and information from health and care records, and the tools and services they use, is available to those who need it, when they need, wherever they are, in a secure and safe way.'
NHS Scotland is doing Decision Support, we aim to make it one of the best in the world!
Decision Support Infrastructure: Joined-Up and Standards-Based

Discover

Open Standards – HL-7 FHIR  Open EHR  CDS Hooks  GDL2 ......

Knowledge Base and Repository of Re-usable Components
Content - Algorithms - Calculators....

Quality and Risk Assurance Standards
QMF / MHRA

Build

Create  Re-use and adapt  Identify from external sources