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Transforming Data into Actionable Intelligence: Health and Social Care
NHS National Services Scotland

• NHS National Services Scotland delivers services critical to frontline patient care and in support of the efficient and effective operation of NHS Scotland (www.nhsnss.org)

• Our services:
  – Blood, Tissues & Cells (Scottish National Blood Transfusion Service)
  – Information Technology
  – Central Legal Office
  – Practitioner & Counter Fraud Services
  – Procurement, Commissioning & Facilities
  – Public Health and Intelligence (PHI) = ISD + HPS

ISD provides a range of information, statistical services and advice that support the NHS, its partners and wider public sector

HPS provides services and information on infections, immunisations, blood borne viruses, travel health, & public health
Every week in Scotland data are collected on around:

- 1,000 Births
- 15,000 Out of Hours attendances
- 20,000 Screened for cancer
- 30,000 Hospital discharges
- 30,000 A&E attendances
- 40,000 NHS eye exams & tests
- 90,000 NHS dental treatments
- 200,000 Outpatient clinic attendances
- 500,000 GP practice consultations
- 2,000,000 Drugs dispensed
Most of our data sets offer 100% coverage
Traditionally, mainly central government, health (NHS management), publications

Public accountability – Parliamentary Questions, FOIs, regulatory bodies

Gradual expansion to other stakeholders, accelerated in recent years

Some examples:

- Wider ‘health’- clinicians/practitioners, other national/local health orgs
- social care
- Wider public (and other) bodies – Local Authorities, Community Planning Partnerships, Third Sector
- Research – eDRIS/Farr
‘Actionable intelligence’ - #1

Creating greater value for customers

Our direction of travel
‘Actionable intelligence’ - #2a

Analytic capabilities

- Descriptive Analytics: What happened?
- Diagnostic Analytics: Why did it happen?
- Predictive Analytics: What will happen?
- Prescriptive Analytics: What’s the best outcome and how can we make it happen?

Value vs. Level of sophistication:
- Information: Hindsight
- Insight:
- Optimisation: Foresight
SPARRA - Scottish Patients at Risk of Readmission & Admission - quantifies risk in coming year.

SPARRA scores (%) calculated monthly for approx 4.2 million patients (80% of population).

Maximise value of anticipatory care by targeting patients most likely to benefit from interventions (medium-high risk).

First, stratify the population; SPARRA stratifies on basis of risk of hospital admission.

SPARRA helps identify patients who may benefit from preventative approach & to ensure that patients are known to the relevant services.
Re-admission risk factors and data sets

Hospitalisation (3 years)

Psychiatric Admission (3 years)

Outpatient (1 year)

Emergency Department (1 year)

Prescribing (1 year)

Outcome Year (1 year)

What age is the patient?

How many outpatient appointments?

How many prescriptions?

How many previous emergency admissions has the patient had?

Any A&E attendances in the past year?

Any prescriptions for e.g. dementia drugs? Or substance dependence?

Any previous admissions for a long term condition (such as epilepsy?)

Any recent admissions to a psychiatric unit?
Logistic Regression is used to find straight lines of best fit through all of the variables to produce “coefficients”.

An individual’s value for each variable used in the SPARRA model is multiplied by the coefficients and the sum of all these are converted (using something called the logit link...hence logistic regression) to get a value between 0 – 1.
Emergency hospital admissions rate for patients aged 75+

‘Actionable intelligence’ - #2e
LIST - Local Intelligence Support Team

Supporting Health and Social Integration Across Scotland

https://youtu.be/YIVxjAm7vi0
‘Actionable intelligence’ - #4

MHAIST – mental health access

MHAIST team comprises;

ISD
• Local based analysts x 10
• Central analysts x 4
• Data management x 2
• Clinical lead x 1

HIS
• Clinical leads x 2
• Improvement advisors x 2
• Programme support staff x 2

1 x analyst supporting Distress Brief Intervention pilot work till 2020 based in Lanarkshire.
Comparative information to help review, monitor and plan services and support quality improvement.

Provides NHS managers and clinicians with comparative and benchmarking information to help service planning and delivery.

Information at NHS Board, hospital & specialty. Drill down, incl. to individual level (approved access) Scottish and English health benchmarking data.
### ‘Actionable intelligence’ - #5b

### ‘Discovery’ – tool / service

**Level 1 Efficiency Overview - Residence**

<table>
<thead>
<tr>
<th>Target</th>
<th>Discovery Efficiency Overview Residence Indicators</th>
<th>Selected</th>
<th>Peer</th>
<th>Board</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;E – 4 hour target</td>
<td></td>
<td>94.3%</td>
<td>93.5%</td>
<td>108.96</td>
<td>87.62</td>
</tr>
<tr>
<td>Admissions - Elective Admission Rate</td>
<td></td>
<td>114.82</td>
<td>97.25</td>
<td>87.44</td>
<td>85.18</td>
</tr>
<tr>
<td>Admissions - Elective Bed Day Rate</td>
<td></td>
<td>87.35</td>
<td>85.75</td>
<td>99.14</td>
<td>81.89</td>
</tr>
<tr>
<td>Admissions - Emergency Admission Rate</td>
<td></td>
<td>105.81</td>
<td>95.59</td>
<td>583.84</td>
<td>576.72</td>
</tr>
<tr>
<td>Admissions - Emergency Bed Day Rate</td>
<td></td>
<td>613.18</td>
<td>634.51</td>
<td>246.33</td>
<td>261.38</td>
</tr>
<tr>
<td>New Outpatients - Did Not Attend</td>
<td></td>
<td>10.3%</td>
<td>10.9%</td>
<td>9.5%</td>
<td>9.6%</td>
</tr>
<tr>
<td>New Outpatients - Referral Rates</td>
<td></td>
<td>247.40</td>
<td>267.36</td>
<td>24.63</td>
<td>261.38</td>
</tr>
<tr>
<td>Percentage of mothers recorded as screened for alcohol use at booking</td>
<td></td>
<td>80.1%</td>
<td>63.1%</td>
<td>90.1%</td>
<td>95.3%</td>
</tr>
<tr>
<td>Percentage of pregnant women identified as current smokers at booking</td>
<td></td>
<td>0.6%</td>
<td>0.8%</td>
<td>0.7%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Potentially Preventable Admissions (PPA) - bed days</td>
<td></td>
<td>16.5%</td>
<td>15.3%</td>
<td>15.1%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Potentially Preventable Admissions (PPA) - emergency admissions (sp)</td>
<td></td>
<td>99.21</td>
<td>102.22</td>
<td>91.56</td>
<td>89.71</td>
</tr>
<tr>
<td>Prescribing Primary Care Cost per 1,000 patients per day</td>
<td></td>
<td>17.11</td>
<td>15.30</td>
<td>15.52</td>
<td>13.07</td>
</tr>
<tr>
<td>Return Outpatients - Did Not Attend</td>
<td></td>
<td>519.55</td>
<td>491.42</td>
<td>519.08</td>
<td>470.29</td>
</tr>
<tr>
<td>Return to New Outpatient Ratio</td>
<td></td>
<td>5.2%</td>
<td>8.4%</td>
<td>5.2%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

**Trend**

- Interquartile range
- Statistical test
Long term conditions (Diabetes - Stroke)

This page shows long term condition figures for the last eight alphabetically listed indicators. Shown are crude prevalence rates (per 100 registered patients). Prevalence for Clusters, Health & Social Care Partnerships, Health Boards and Scotland are expressed as the average prevalence for all the GP Practices within the geographical area.

On each page in the top right hand there are buttons that take you to other indicators (Arrow icon), back to the home page (House icon), allow you to e-mail ISD about any...
LIST

some words from our staff

https://youtu.be/3fmpEQUATyQ
‘Actionable intelligence’ - #7b

NSS Local Intelligence Support Team

- Exceeding expectations
- Improving local and national intelligence
- Innovative approaches and solutions
- Embedded within Partnerships and Local Authorities
- Identifying specific needs in relation to local and national priorities
Transforming Data into Actionable Intelligence: Health and Social Care

INTERMISSION
Number of Monthly Emergency Bed Days in Acute Specialties for People of All Ages Living in Partnership X

- **Bed Days**
- **Planned Trajectory**

**Example:**
- Helping Integration Authorities estimate future needs
example:
exploratory Tableau / motion chart
LIST

‘Our Stories’ – Releasing Time To Care

https://youtu.be/u_yOnj8ZQJQ
Example:
exploratory health & social care ‘pathways’ analysis
LIST met with the organisations to review and assess the data they held.

**PROJECT PATHWAY**

1. **Source third sector data to use**
   - PKAVS Identified third sector organisations to participate in the Pilot study

2. **ISD check quality of demographic data and permissions**

3. **ISD to set permissions from H&SCP to access public data**
   - Ensure appropriate governance in place to share and use data for linkage

4. **Work stalled: mental health is a ‘sensitive area’ so permission tricky. Also capacity limited**

5. **To see if can work through social care system ‘SWIFT’. ISD continue to help projects with data clean up and permissions**

6. **ISD to set permissions from H&SCP to access public data**
   - CHI (Community Health Index) seeding of these data

7. **ESS facilitate meeting of third and public agencies at locality level to share and discuss pathways**
   - Analysis and outputs

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**NSS** Local Intelligence Support Team

**ISD** – Information Services (NHS)

**ESS** – Evaluation Services Scotland
LIST – ‘Our Stories’ – Accident & Emergency

https://youtu.be/DBYlJkBqGxg
‘Actionable intelligence’ - #14

Understanding Emergency Care in NHSScotland
When do patients attend Emergency Departments?
Data for year ending 31st March 2016

During week days, there are two peaks in patients’ arrival times:
- Late morning, largely due to older patients
- Early evening for children and young adults

Fewest patients arrive at Emergency Departments between 5 and 6am

From 7am the number of patients arriving at Emergency Departments starts to rise sharply

Day & time of arrival at emergency departments for capacity and resilience planning
LIST

Some words from our local partners

https://youtu.be/M5zj644Kvfw
Open data on the public sector official statistics platform www.statistics.gov.scot
Prescribing open data on the ISD website
http://www.isdscotland.org/Health-Topics/Prescribing-and-Medicines/
The new NHS open data platform - Currently undergoing IT resilience testing before go-live

The amount of data that the public sector holds is continually growing. The data held will allow the delivery of personalised services (e.g. health and social care) to non-personal information (e.g. environmental data). This data has value for the organisation collecting and holding it but there is potential to add value by making appropriate data available to others to reuse. We call this making data "open".
Four major programmes:

**Health and Social Care integration**
“Optimising and joining up balanced health and care services, whether provided by NHS Scotland, local government or the third and independent sectors”

**The National Clinical Strategy**
“Strengthen primary and community care, improve secondary and acute care focus on realistic medicine”

**Public Health Improvement**
“Create a clear set of national public health priorities for Scotland as a whole and streamline the current public health landscape”

**NHS Board Review**
“Review the functions of existing national NHS Boards to explore the scope for more effective and consistent delivery of national services and the support provided to local health and social care systems for service delivery at regional level”
Questions

http://www.isdscotland.org/About-ISD/Contacts/