Hampshire Hospitals NHS
NHS Foundation Trust

USING TEXT ANALYTICS TO IMPROVE THE BOTTOM LINE

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Agenda

- About HHFT
- Text Analytics – The new world
- Text Analytics and NHS Coding
- Predicted benefits
- Future plans

Our organisation

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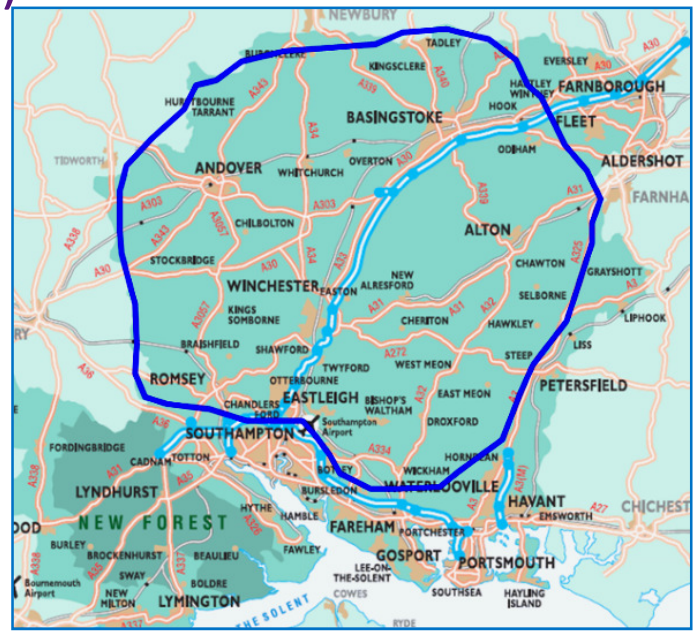
- One hospital service across multiple localities
- Delivering services as close to peoples' homes as possible
  - Three hospitals (BNH, RHCH, AWMH)
  - Community hospitals
  - GP surgeries
  - Locality facilities
- 500,000 Outpatient Appointments
- 800 Inpatient beds
- Turnover £300m+
- Looking to build new Critical Treatment Hospital



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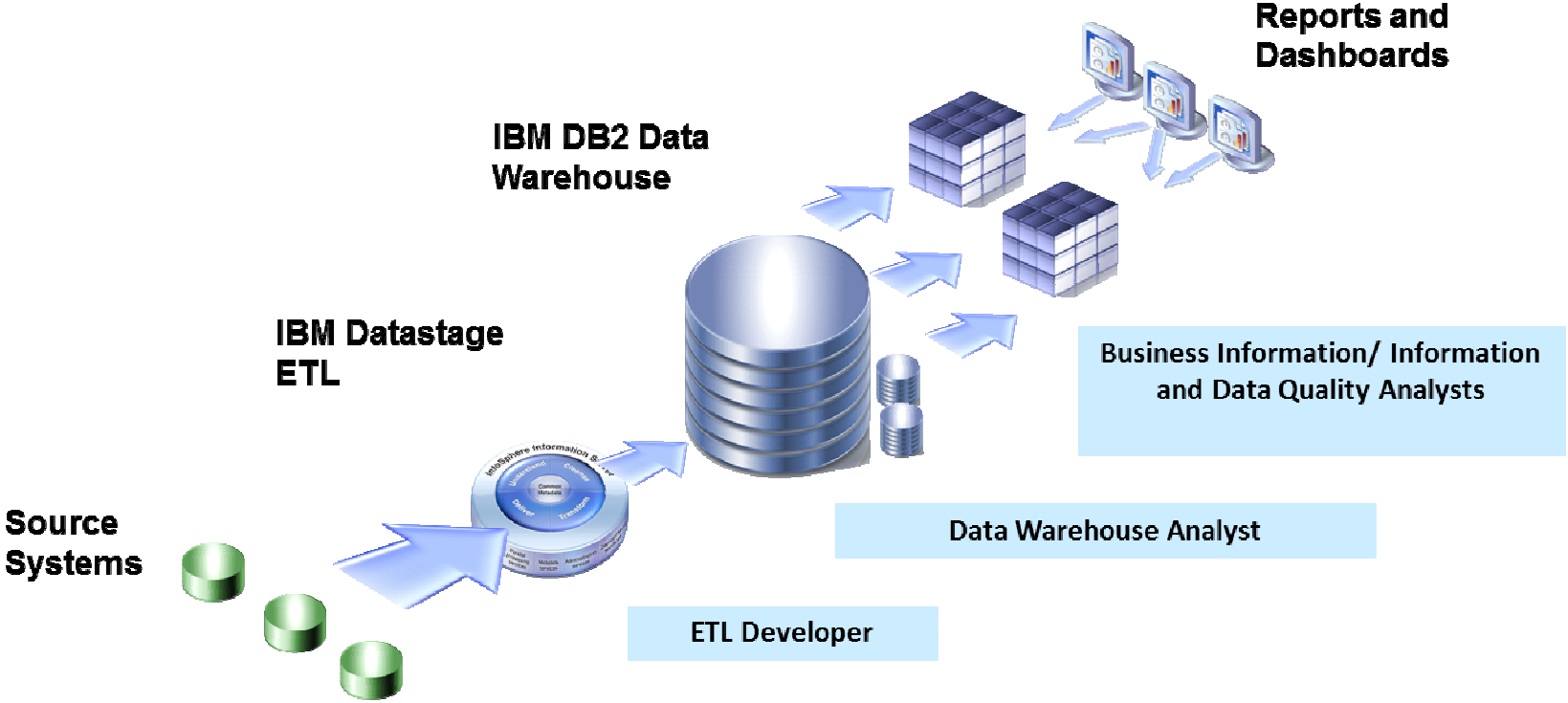
HHFT Architecture



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ED Dashboard

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NHS

Reset ED Dashboard | ED Attendances | ED 4 Hour Performance | ED Scorecard

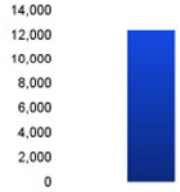
Jun 2014 | All Patient Types | All Arrival Modes | All Attendance Categories | All Attendance Disposals | All Age Groups on Arrival | All Sites

ED Dashboard

Attendances

Rolling 13 Month Trend

12,359



Conversion to Inpatients

2,123 Admitted
12,359 Attendances
17.2%

Rolling 13 Month Trend

Waiting Times

Average Wait Times

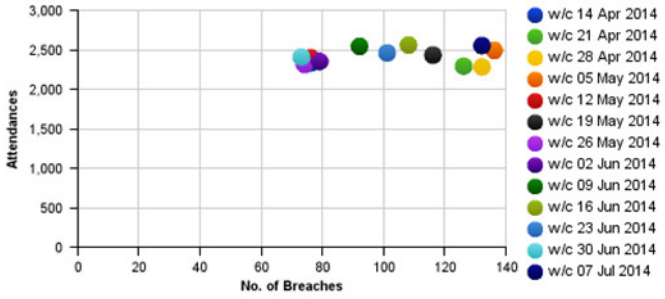
Time in ED	Average Wait: Arrival to Treatment	Average Wait: Arrival to Conclusion
0 to 1 Hour	0h 21m	0h 32m
1 to 2 Hours	0h 53m	1h 29m
2 to 3 Hours	1h 18m	2h 31m
4 Hours +	1h 52m	5h 54m

4 Hour Performance

12,359 Total LOS
453 > 4 Hours
96.3%

Rolling 13 Month Trend

4 Hour Breaches Rolling 13 Week Trend



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What Is Text Analytics?

…turning unstructured clinical information into actionable insights

…finding nuggets of insight in text data that will improve our services

From Wikipedia:

… a set of linguistic, statistical, and machine learning techniques that model and structure the information content of textual sources for business intelligence, exploratory data analysis, research, or investigation

Text Analytics

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- The most explosive data growth is coming from the messiest sources – natural language text, images, videos, audio and sensors that are often in unpredictable environments. This data is expected to grow by 800 percent over the next five years.
- In order to arrive at the depth of understanding, accuracy, and transparency they need from their analytics environments, healthcare organizations will need to integrate unstructured data into this analysis. IDC Health Industry Insights
  June 2012

Why is analytics becoming even more important now?

- Much more clinical and operational data is being created and captured because of the use of EPR technology (structured)

- Much more unstructured data is being captured and stored because of the shift to Paperless NHS as well as using single EPR to access all systems, handover notes, discharge summaries, patient experience

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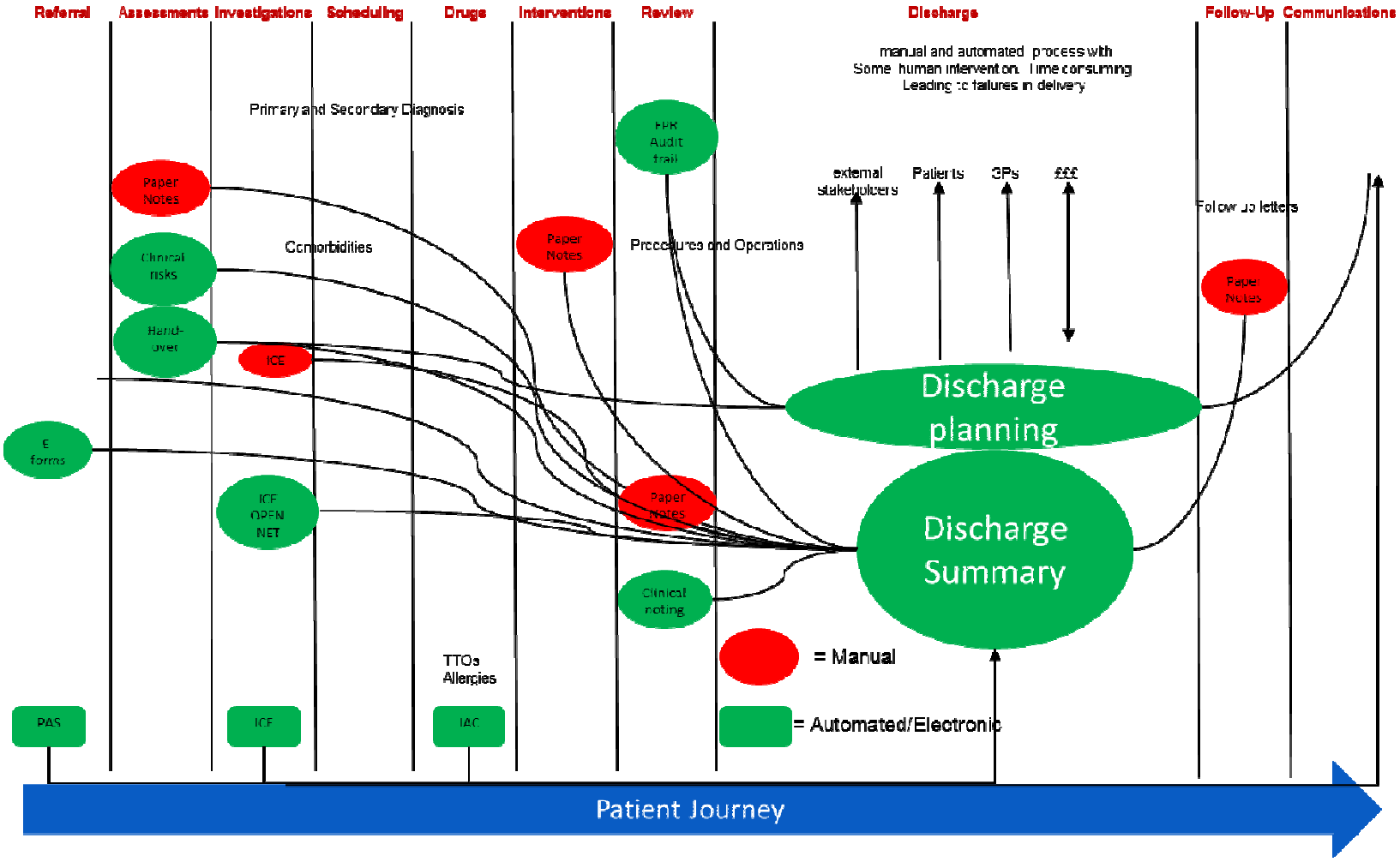
Current state 2014



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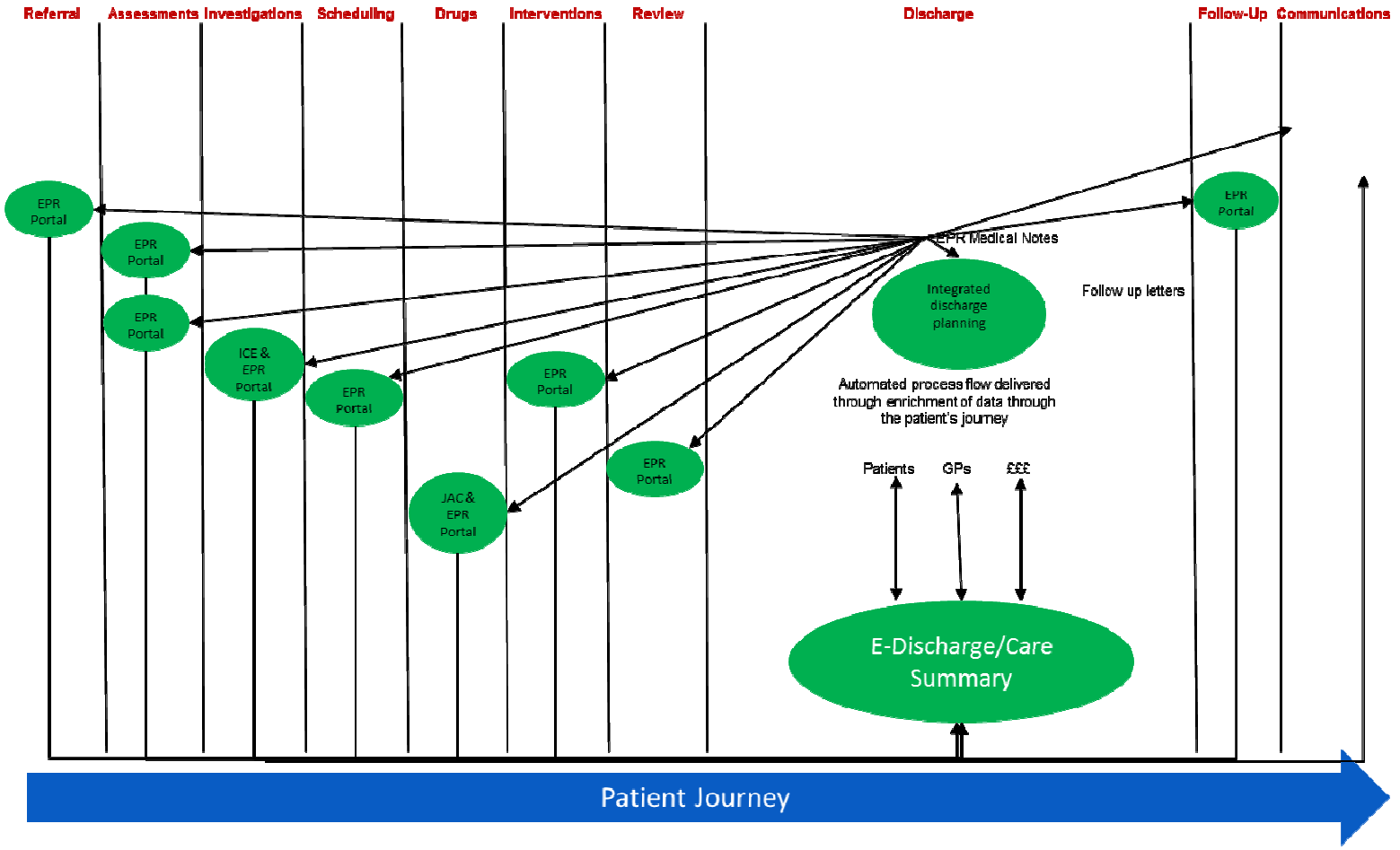
2015-18 Paperless through EPR



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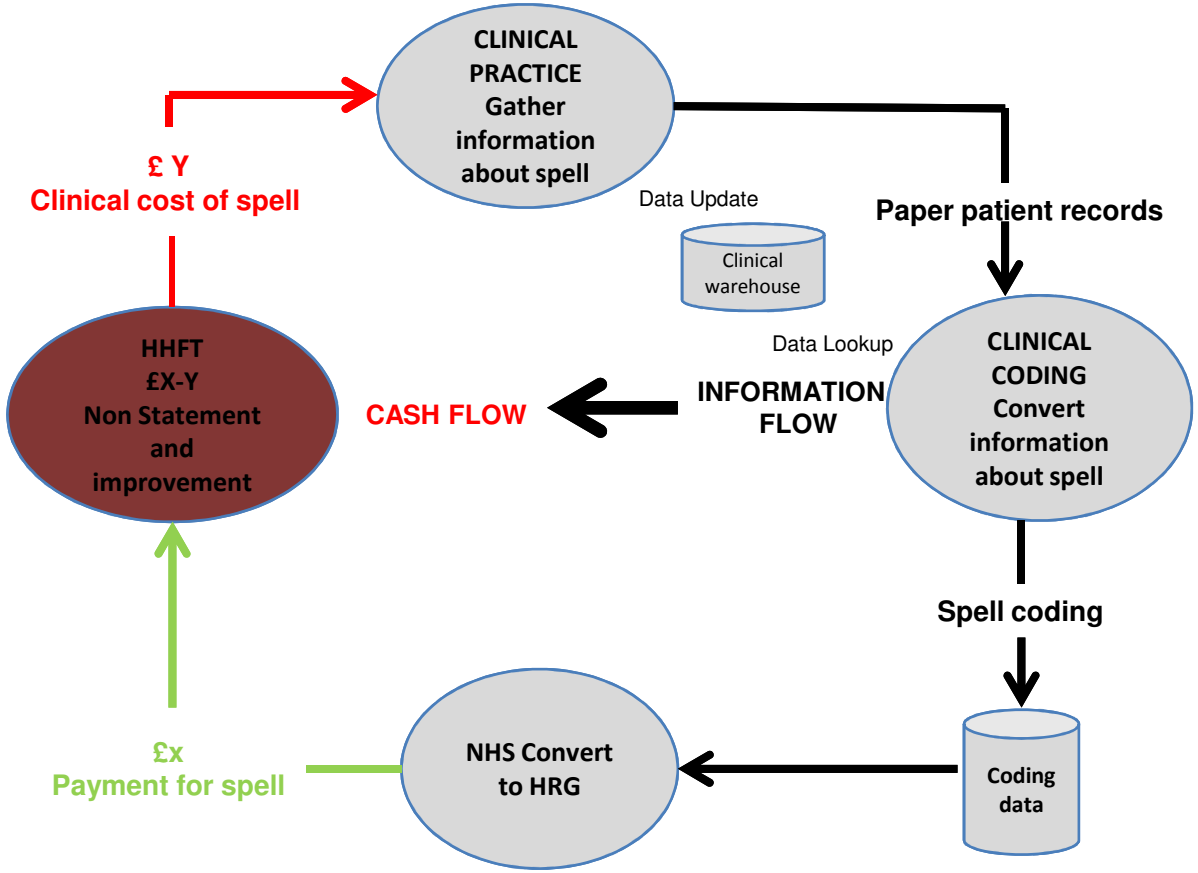
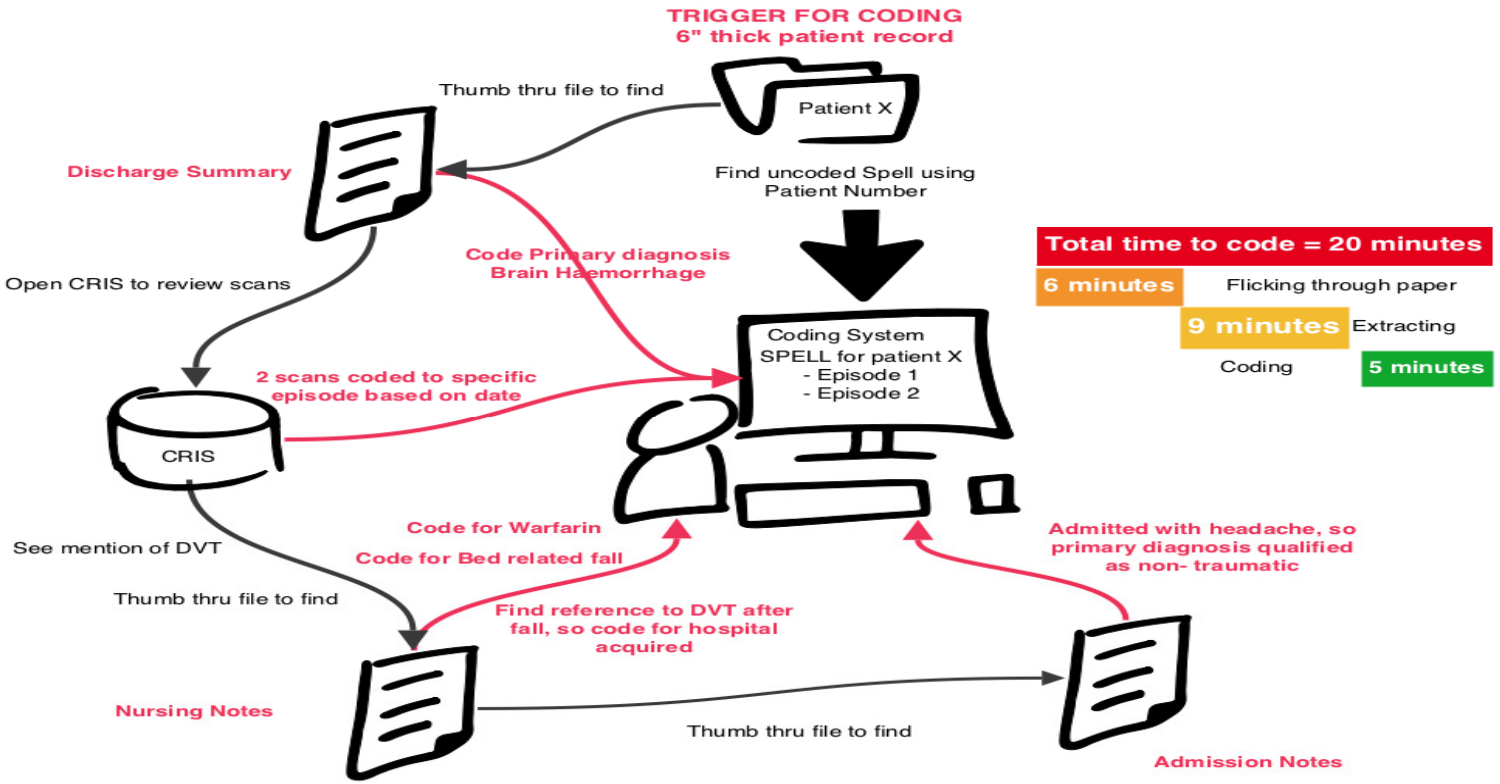
Clinical Coding and its role within the Trust



- HRG payments are calculated to cover the cost of clinical practice, the overheads of facilities and utilities with some margin for investment in improvement programs
- Where coding is based on incomplete or poorly recorded clinical records, the Trust may not recover all available revenues, starving the Trust of funds for improvement, and potentially impacting clinical budgets
- Incomplete or inaccurate coding affects everyone who analyses this data, from HHFT strategists to W.H.O


TRIGGER FOR CODING
6" thick patient record
Thumb thru file to find
Patient X
Discharge Summary
Find uncoded Spell using Patient Number
Code Primary diagnosis Brain Haemorrhage
Open CRIS to review scans
Coding System
SPELL for patient X
- Episode 1
- Episode 2
2 scans coded to specific episode based on date
CRIS
Code for Warfarin
Code for Bed related fall
See mention of DVT
Thumb thru file to find
Find reference to DVT after fall, so code for hospital acquired
Admitted with headache, so primary diagnosis qualified as non- traumatic
Nursing Notes
Thumb thru file to find
Admission Notes
Total time to code = 20 minutes
6 minutes
Flicking through paper
9 minutes
Extracting
Coding
5 minutes

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Electronic Patient Record

Situation	Decreased mobility, increased urinary frequency
Background	Lymphoma, asthma, htn, Type 2 dm
Assessment	LA qds poc
Care **Recommendation**	Self-caring and mobile
Medical **Recommendation**	Continue antibiotics, stop smoking

There are many SBARR records for each patient spell
Typically one record is made per patient per shift.

Proof of Concept Objective

- To determine if Text Analytics technology applied to EPR records could add value to the medical coding process.
- Could co-morbidities be automatically identified ?
- How accurate would these be compared to manual approaches ?
- How suitable is the data in the EPR for coding purposes ?
- What insight can be gained into the general applicability of Text Analytics technology to the trust?

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Proof of Concept Exercise

- 141,595 SBARR records analysed covering a 71 day period.
- The records comprised 22,126 individual patient episodes
- Attempted to automatically identify the following co-morbidities.
  - *Asthma*
  - *COPD*
  - *COPD*
  - *Diabetes Type I*
  - *Diabetes Type II*
  - *Diabetes Unspecified*
  - *Hypertension*
  - *Pulmonary Hypertension*
  - *Smoker*
  - *Ex-smoker*
- Attempted to identify where any high cost drugs were used.

POC Result

- Yes we think so…..
  - More accurate clinical coding
  - Less need to chase paper through automation
  - 10% of co-morbidities seen in EPR- not in Case notes
  - Flexible, can search for any concepts

Challenges

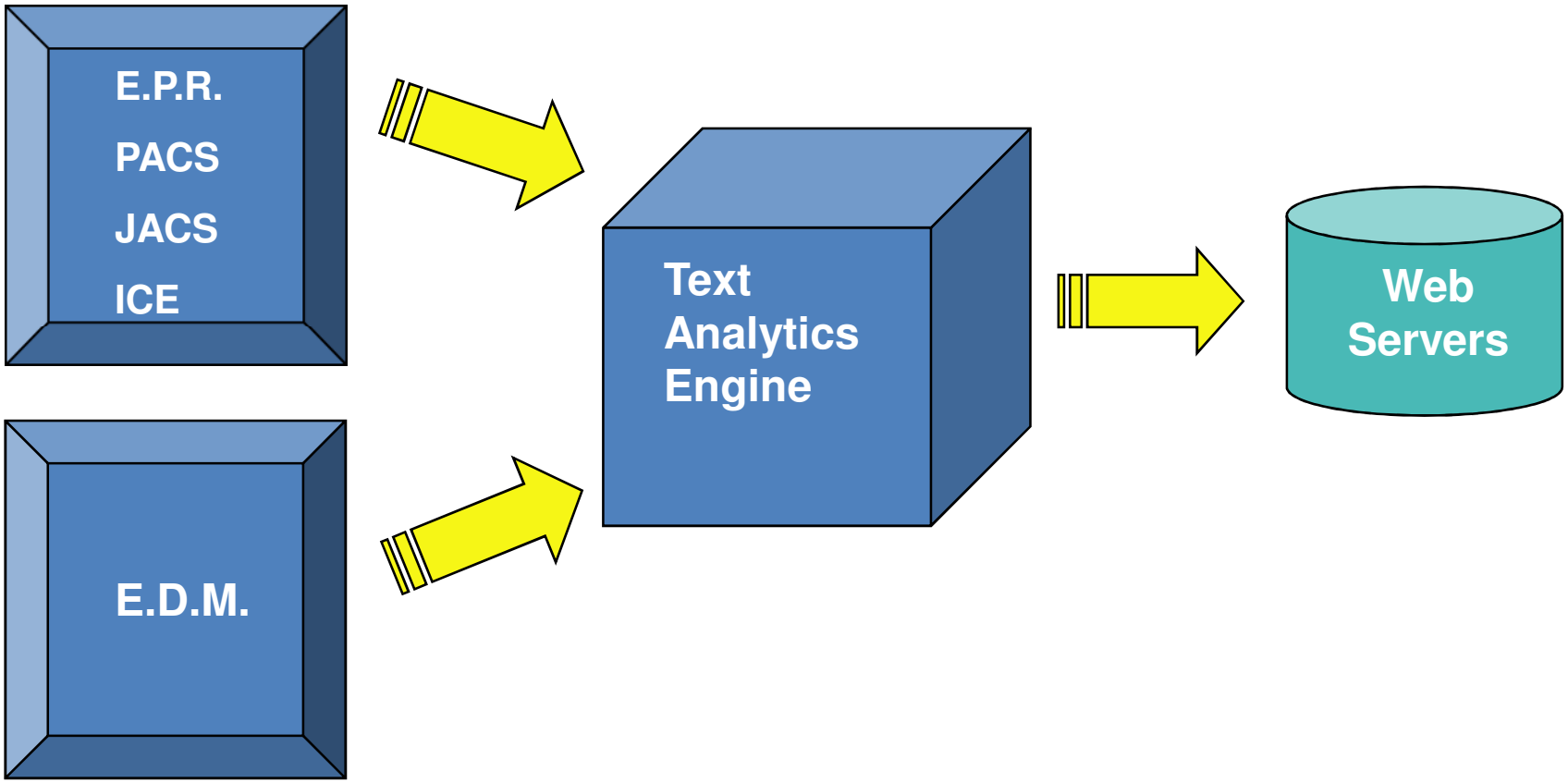
- Identify Type I, Type II and unspecified type diabetes from the multitude of combinations of words and grammar used.
- Variants of words for diabetes seen in the records

diab	diabectic	diabete	t1dm
diabetec	diabeteic	diabetes	idd
diabetic	diabetics	diabeties	dmt2
diabetis	diabtes	diabtetic	niddm
dm	dmt1	iddm	t2dm

Text Analytics Production Solution

- To be able to reduce the time of data collection by 50% by using Text Analytics solution (from 15mins to 7.5mins per episode)
- To improve quality of coding by increasing the amount and quality of clinical information
- To optimise Trust income through improved quality of coded data – monthly internal audits within “fix-freeze regime”. Opportunity of £300k+ p.a identified in benchmarking.
- Integrated ICD-10 web based dictionary

Architecture



Benefits

- Enable coders to quick access to relevant clinical information – powerful engine to capture information from relevant applications spell based
- Timely coding – up to 72 hours after discharge c.f 10 days behind
- Ability to easy access to patient's medical history – co-morbidities, continuity of treatment (chemotherapy patients, pain clinic, rheumatology)
- Avoiding of ambiguity of clinicians' handwriting
- Developing and improvement of "coder-clinician" collaboration
- Allowing as regular quality self control as internal audits
- Supports optimization of coding data through value of clinical information – quality of Dr Foster data
- Identify HCD (High Cost Drugs) – generic v trade names

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Going forward

- Using Text Analytics for Patient Relationship Management
- More sources of data
- Alignment with Paperless journey
- Considering IBM Blue
- Rollout Cognos mobile solutions