SACT

Systemic Anti-Cancer Therapy Chemotherapy Dataset

It's good, it really works and it's not just for cancer !

NCIN
national cancer intelligence network
Using information to improve quality & choice

Try it, point your smartphone or iPad at **www.chemodataset.nhs.uk/demo**

What is it ?

The SACT system takes data from multiple, disconnected and fragmented sources, checks it and then merges it together to form an overall picture of a patient's treatments for a time period.
The software is generic so it doesn't matter what the data is about as long as there are links between the items; it is already being used in other systems such as the Cancer Drugs Fund.

For chemotherapy we collect 42 data items about :-

Patient
NHS Number, Gender, Age, Weight, General Health, Co-morbidity

Hospital + Consultant
Where, Who, Speciality

Tumour + Diagnosis
ICD Code, Morphology, Intent of Treatment

Regimen
Name, Start Date

Cycle
Number planned, Health at start, Weight at start

Drugs
Names, Dose, Where, When

Outcome
Stopped early, treatment result (sometimes, sadly) Date of Death

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The data can come from more than one place, at different times and in multiple formats

From a user's Excel file → Secure N3 connection

Entered manually on-screen

Direct from hospital ePrescribing System → SACT server

From a smartphone or tablet app

The data is* split up into individual fields, each of which is checked each against a suite of validation rules which are easy to update without programming.

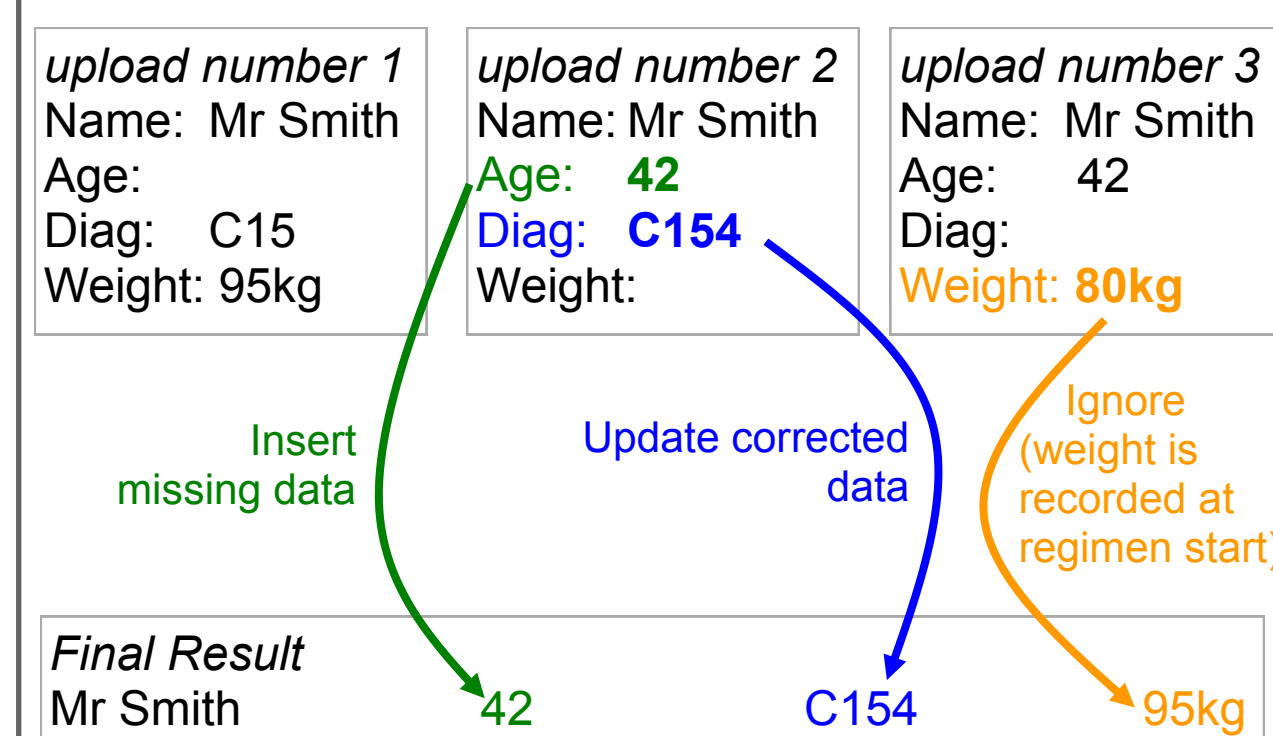| Rule Type	Used On	Rule
Valid Name (lookup)	Regimen	in OPCS list
Pattern (regex)	Postcode	correct format
Type and Length	Age	number <= 3 digits
Special Check	NHS Number	valid (mod11)

If a rule is broken it results in a warning which can be corrected later, but ...

If the error is serious (eg the field is mandated for collection but is missing) the whole patient record is rejected.

The user can then upload corrections or reject the whole file and try again.

Finally the fields are merged back together to form an up-to-date picture of the patients treatments.

A set of hierarchical merge rules ensures that missing data is inserted, corrected data is updated and out-of-date data is ignored.
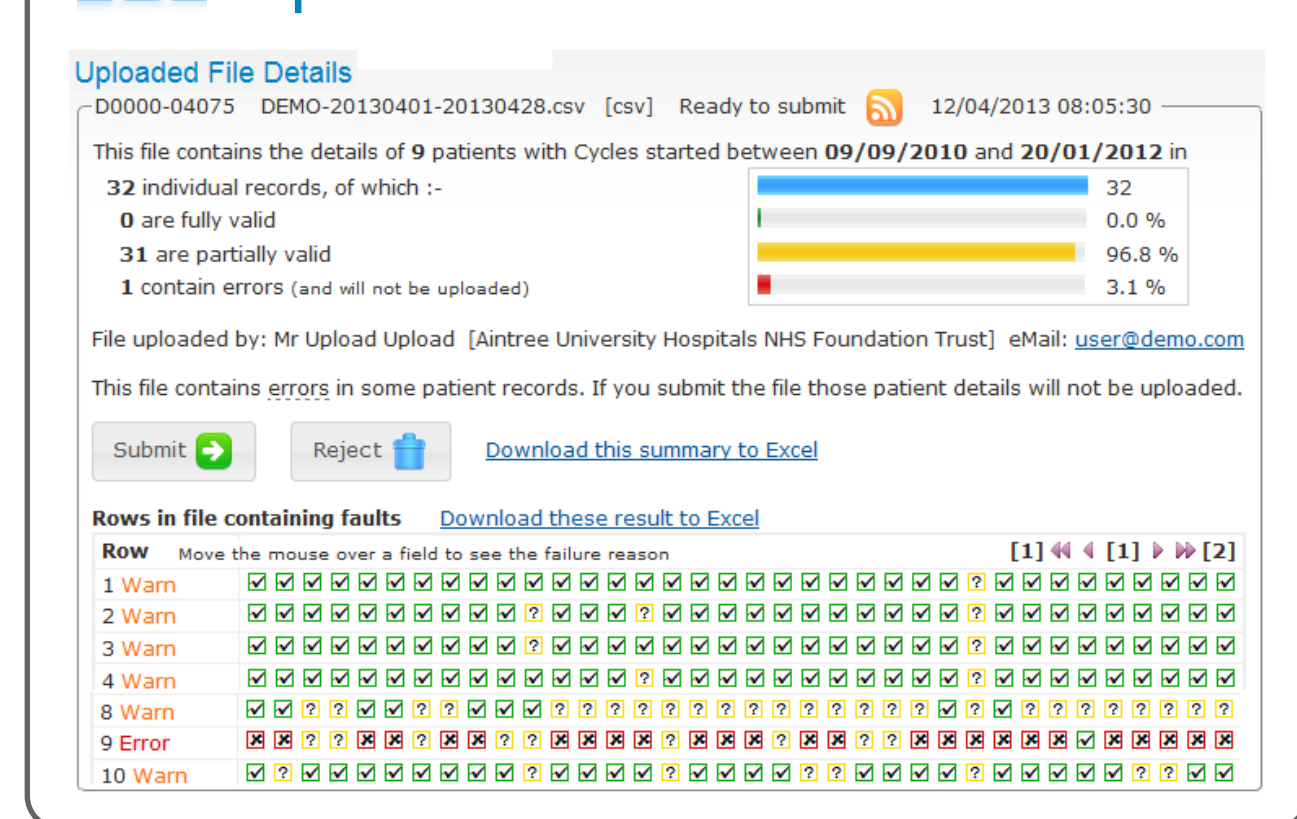
upload number 1
Name: Mr Smith
Age:
Diag: C15
Weight: 95kg

upload number 2
Name: Mr Smith
Age: **42**
Diag: **C154**
Weight:

upload number 3
Name: Mr Smith
Age: 42
Diag:
Weight: **80kg**

Insert missing data
Update corrected data
Ignore (weight is recorded at regimen start)

Final Result
Mr Smith   42   C154   95kg
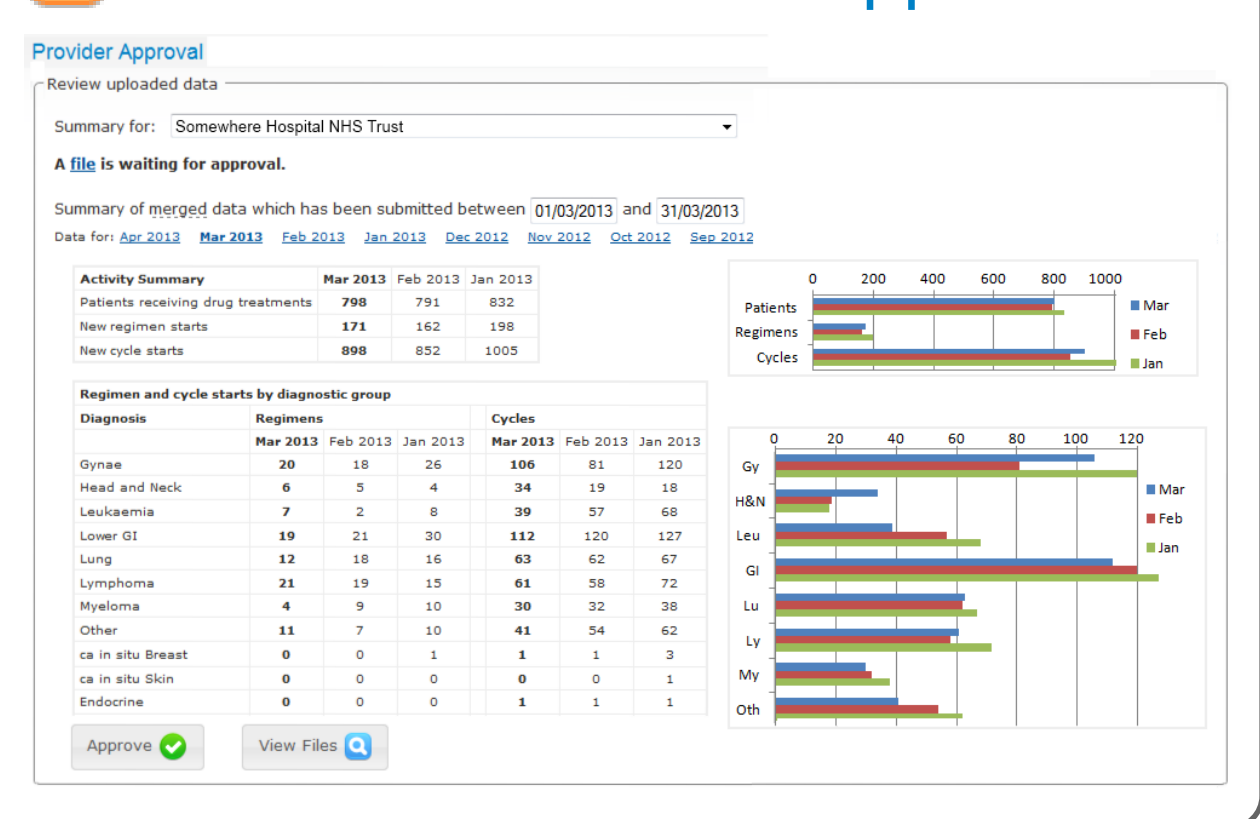
How do we collect the data?

The system is easy to use with a drag and drop interface. Each hospital uploads ▮▮▮ their data at the start of the month which gives them time to fix any data errors before it is submitted ➡
Once the data is uploaded and merged 🔶 we ask the clinicians to approve ✅ the results to make sure it accurately reflects their hospitals treatments.
Finally our clinical experts review the whole country's data to make sure it is valid 📋 before it is released for analysis 🔍 or for linking to other datasets.

At each stage we get the people who actually own the data to validate that what has been processed is correct. This self-checking leads to faster overall processing and a 'leaner' process flow.
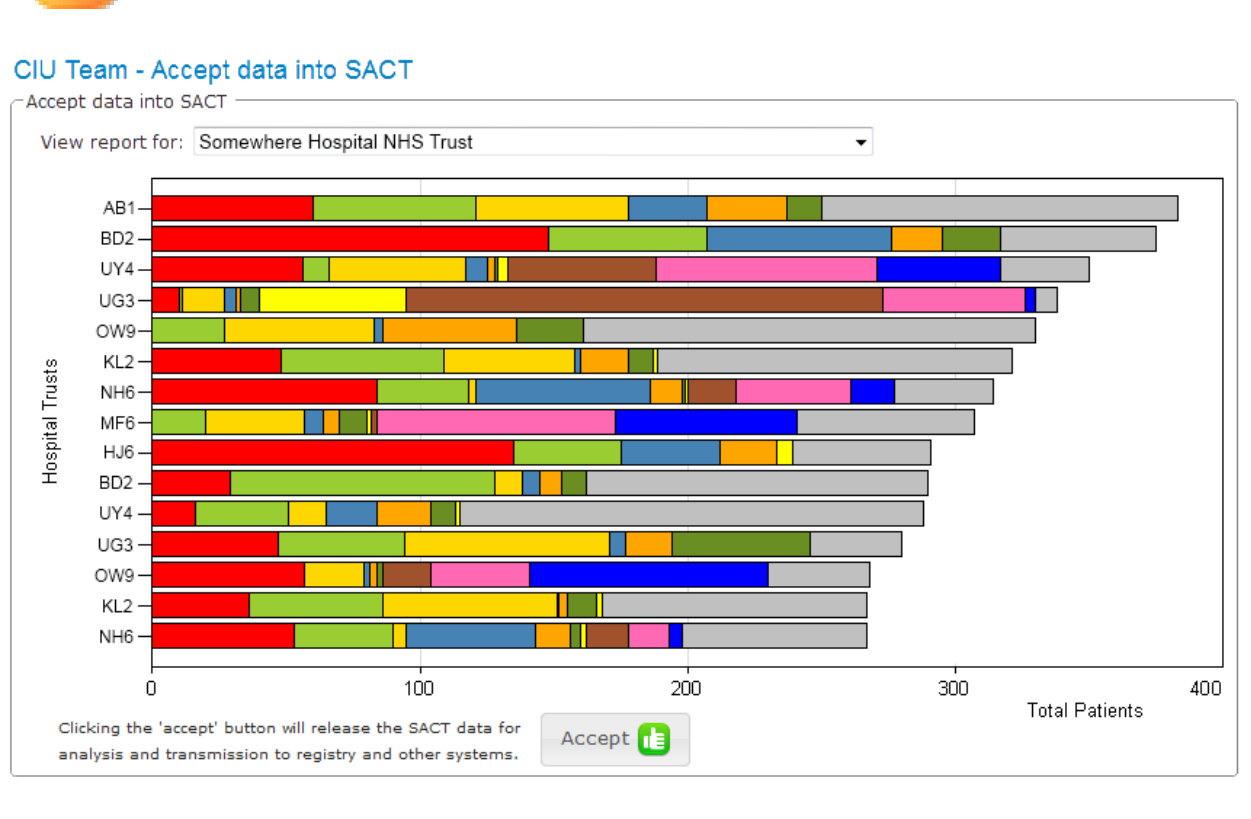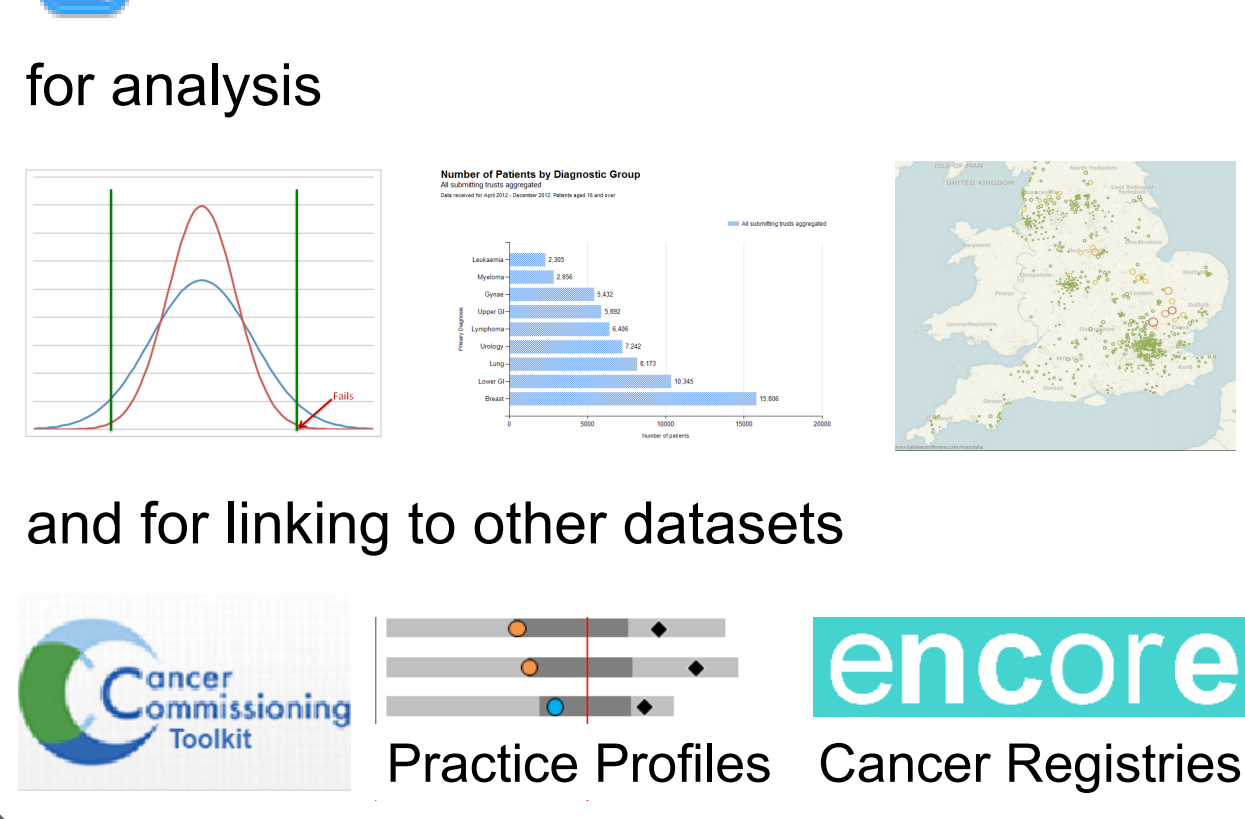
▮▮▮ **Upload and check**

🔶 **Clinician review and approval**

🔶 **Combine all data and validate**

🔍 **Release the data**

for analysis

and for linking to other datasets

Cancer Commissioning Toolkit   Practice Profiles   Cancer Registries   **encore**

Why is it good?

The raw numbers are pretty impressive; in the first year 127 hospitals out of 152 submitted their data each month, we have data on 100,000 individual patients spread across 3 million records.
They are being treated for over 450 different tumour sites (diagnosis C-codes) and we can already see that hospitals treat patients with different drug regimens for the same diagnosis.
We have enough data to start to perform formal research on the 'body surface area' of real cancer patients, which affects drug dosage, comparing it with the healthy population (see poster #26).
SACT is also *very* fast which helps keep the data relevant - data files are uploaded and checked within 15 seconds and the whole country's chemotherapy data is merged together in 15 minutes.

But it is so much more than that ... the whole project has worked well and been a success because :-

Clinically led with relevant data

Every item of data in the dataset has been rigorously vetted by the NCIN clinical panel and the NHS Information Standards Board to make sure it is relevant to patient treatment and care.

The reports which we produce focus on areas that our clinical panel tell us will lead directly to improvements in patient outcomes.

This helps us engage with the hospital staff to explain why it is worth collecting the data.

Agile working team

The programming team, analysts, helpdesk and trainers have worked closely together to implement the system and we continue to respond quickly to queries from our users.

We are supported in this by a management structure which removes barriers and empowers us to concentrate on making the system better.

And we know that the system we have produced will make a positive difference to the treatment of cancer patients undergoing chemotherapy.

Technology sweet spot

In the last few years many different computer technologies have converged to make producing software reasonably easy. This allows us to concentrate on solving business problems rather than fighting the code or reinventing the wheel.

For example to get all of a computer's CPUs to work together on a complex calculation we can now use a single line of code.

`Parallel.ForEach()`
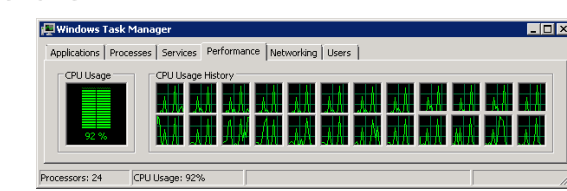
People like using it

"The portal is very easy to use and the instant data check is very impressive. It is the best data portal I have ever used due to the quality of the feedback on errors." - *information analyst*

"The SACT helpdesk has been very helpful in resolving problems, and communication from the national team is really helpful and supportive. It's the most efficiently run national dataset in operation." - *cancer manager*

What else could we use it for ?

The core code is generic, it doesn't know about chemotherapy or cancer so it can be repurposed to gather data in many other areas of healthcare :-

Cancer Drugs Fund

The SACT codebase is being used by the Cancer Drugs Fund to monitor the 'non-NICE' list of drugs given to patients.

The CDF Portal was implemented and made live in 3 months.

It has already collected details of 3000 patient and treatment records.

Collect and analyse later

The SACT codebase makes collecting data easy and many small individual entries can be collated together over time to build a picture of a patients illness and treatments from different clinics.

For example, diabetes has many associated conditions such as eyesight and foot care problems which develop over the longer term. SACT could collect this data for eventual analysis or even be configured to send it to an analysis system when an event is triggered (eg a patient is prescribed a particular medicine).

Process and act now

SACT is very fast and can process data in real time across different departments.

We can use this speed to directly improve the care of patients :-

For example it would be good to know up-to-date details about people who have been screened in a clinic following an invitation, especially if they are recalled after a positive test and are in need of treatment, but haven't yet been seen by a hospital consultant.

Your thoughts?

The SACT system now comes under the umbrella of Public Health England, so we can share successful projects across the new Intelligence Networks and help fulfil the PHE priorities of reducing preventable deaths and protecting the country's health.

If you have any ideas for where a SACT style data collection system could be used in your area of work please do let us know.

email: ciu@sph.nhs.uk or 01865 334770

SPH Solutions for Public Health   **ciu** Chemotherapy Intelligence Unit   **National Cancer Action Team** Part of the National Cancer Programme   **NHS**

* Yea, sorry about that analysts ... 'All your base are belong to us' :-)   All words (and blame) are attributable to Steve, who like to thank Sir CS   SJ/SW   and BG   *in memory of Janet*