“Royal Colleges 3.0”

or

Who’s going to build the missing NHS tech infrastructure?

https://bit.ly/mbrewired22

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THE BIG PROBLEM

We are spending ever **increasing** amounts of effort to achieve ever **decreasing** amounts of progress in digital. End user systems lack essential clinical features.

‘Transformation’ is stalled because of the high cost and low yield of poor quality systems

Lack of infrastructure (APIs and other web services) impedes progress.

The ‘ecosystem’ has failed, because everyone wants to be the lion.

Nobody wants to be beetles, trees and compost.

We need to rethink...

What do I mean by Infrastructure?

Modular, reusable, integratable tools

Functionality for clinical users which is ubiquitous and therefore becomes reliably present for end-users.

Commoditised (and thereby affordable) innovation

an example from the real tech world is Google Maps

What is a Royal College?

Independent medical bodies with special status:

Have statutory rights to grant qualifications (eg MRCGP)

Set standards for practitioners and practice

Have a remit to uphold high **quality** of practice

Charitable status is common

('Royal' part applies generally only in the Commonwealth, but the concept of a medical College with these functions is international)

Royal Colleges 1.0

Face to face committees

Paper publications - journals and guidance

In-person conferences

Royal Colleges 2.0

2000 - present

Colleges now all have a website (although some were slow)

Guidance documents are now downloadable as a PDF

Digital publications and journals

Conferences with online options

Online collaboration for guideline development

Royal Colleges 3.0

2020 - future

Everything Colleges 1.0 and 2.0 could do

Plus developing software - **‘Best Practice as Code’**

Guidance embeddable in clinical systems

Validated clinically and technically by peer review

Why would Colleges do this?

Colleges will become obsolete over the next 10-15 years if they don't.

Colleges are in an unique position to set such standards, only a few other organisations could do so.

It is an opportunity to regain some clinical control and set standards in the 'Wild West' of healthcare tech.

Move towards a the Margunn Aanestad **Modular Cultivational** approach to digital transformation

Ever increasing costs of Digital

Currently if we want a feature we ask the EPR supplier to add it.

However with hundreds of EPRs in the NHS we **cannot afford** to pay again and again for **each** feature to be implemented in **each** EPR

This model is already a proven failure - we know as clinicians that generally the EPR features we want are not consistently available

And in the future we'll need EPRs that can handle much more - genomics, proteomics, and precision medicine.

Quality and safety

Royal Colleges are one of a very small number of organisations trusted to set standards in their area of medical expertise.

They are uniquely positioned to develop clinically safe and assured software.

‘Deterministic’ algorithms like clinical decision support.

Artificial intelligence - ethics, regulation and independent validation.

Data driven technologies - delivering statistical models to clinical end-users (eg surgical morbidity predictors).

What is an API?

- API = **Application Programming Interface**
- Also known as a “Web Service”
- It is a way for a computer program to ‘talk’ to another computer program
- It’s how your Alexa works

How does Alexa get the weather?

```
"location": {
  "name": "London",
  "country": "United Kingdom",
  "region": "City of London, Greater London",
  "lat": "51.517",
  "lon": "-0.106",
  "timezone_id": "Europe/London",
  "localtime": "2021-06-15 21:50",
  "localtime_epoch": 1623793800,
  "utc_offset": "1.0"
},
"current": {
  "observation_time": "08:50 PM",
  "temperature": 18,
  "weather_code": 113,
  "weather_icons": [
    "https://assets.weatherstack.com/images/wsymbols01_png_64/wsymbol_0008_clear_sky_night.png
  ],
  "weather_descriptions": [
    "Clear"
  ],
```


Alexa: HTTP GET the weather

The problem of building Uber

Uber is a popular taxi and ridesharing app.

To build Uber, you need:

- Mapping for the **whole world**
- An SMS text sending system (globally)
- A payment system (credit card system)

And you need **all of this** before you can launch and have your first customer!

The problem of building Uber

- Luckily, Uber didn't need to build **any** of this infrastructure themselves
- Because they are provided as Web Services, otherwise known as APIs
- Uber could focus on building the 'special sauce' of the product, not the infrastructure

The problem of building Uber

Google Maps for their global mapping and geolocation information

The problem of building Uber

Twilio for sending text messages

The problem of building Uber

Braintree for processing credit card payments

The problem of building Uber

Without the use of infrastructural APIs, Uber could not *possibly* have raised funding from venture capital backers to build their product

Why tell you all this?

Because progress *cannot* happen until we realise the lack of infrastructural components is what is holding us back.

Public utilities and APIs

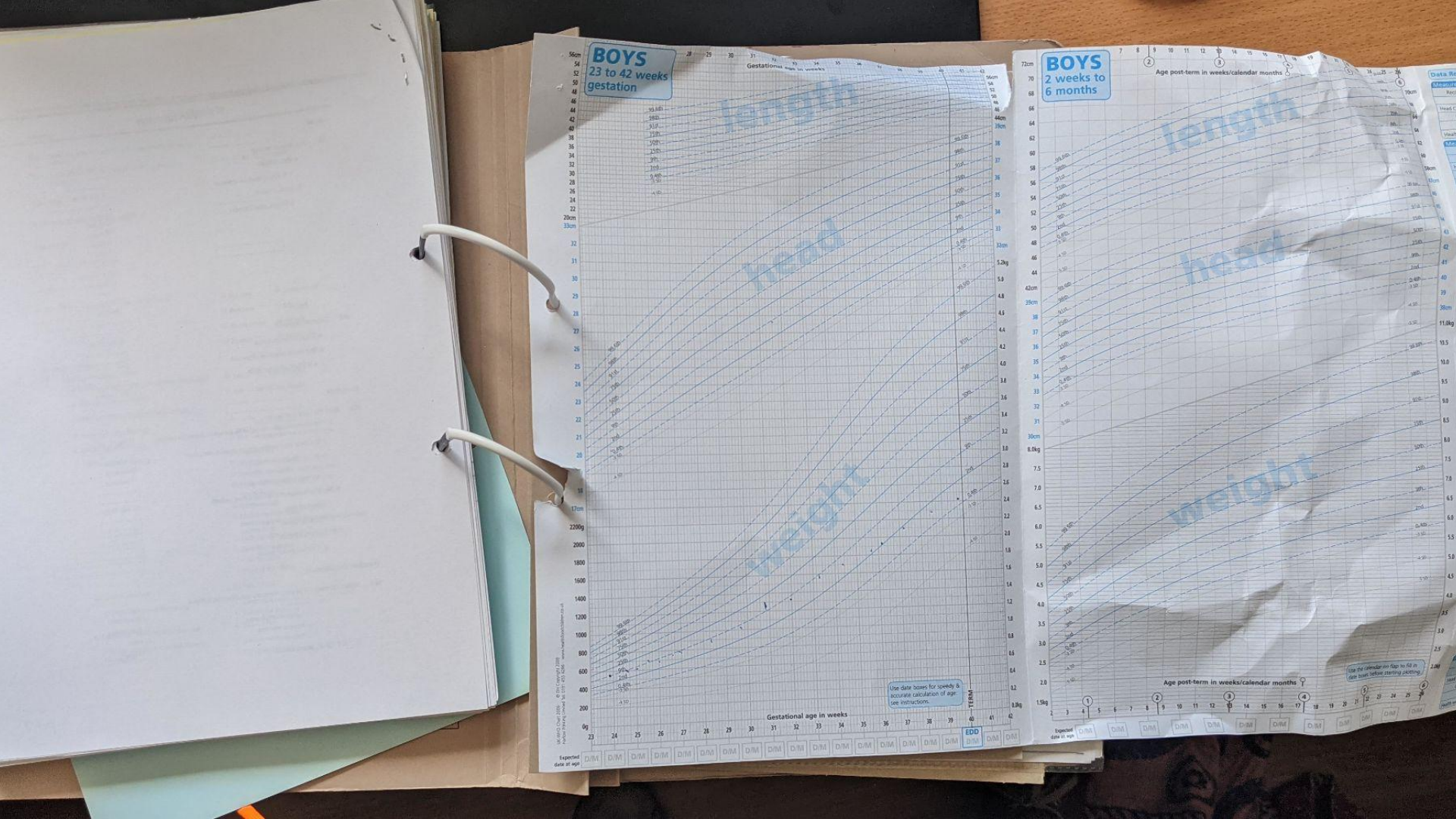
APIs are the **public utility infrastructure** of the web, like the ‘railroad tracks’, ‘National Grid’, or ‘water mains’ that constitute physical infrastructure of countries

Service Providers take something that was previously hard to do (or impossible), and make it easier

Public Utilities, APIs, and platforms

Public utilities (and APIs) **enable innovation**:

- you can’t build a train until there are tracks
- you can’t sell fridges until there’s reliable mains electricity
- You can’t make satnav without GPS satellites
- you can’t make mobile apps until there are smartphone platforms to put them on


BOYS
23 to 42 weeks gestation
Gestational age in weeks
length
head
weight
Gestational age in weeks
TERM
EDD
BOYS
2 weeks to 6 months
Age post-term in weeks/calendar months
length
head
weight
Age post-term in weeks/calendar months


My personal child
health record

The problem of Digital Growth Charts

The mathematics behind growth charts is complex

To implement, you need:

- Technical programming skills
- Clinical paediatrics knowledge
- Health Informatics knowledge
- Statistical expertise

This makes growth charts expensive for EPR vendors to implement.

The problem of Digital Growth Charts

Very few implementations of digital growth charts exist

GP systems do not have them

Most hospital systems do not have them

User is expected to do work that the computer **could** do!

Start Cons

Clinical

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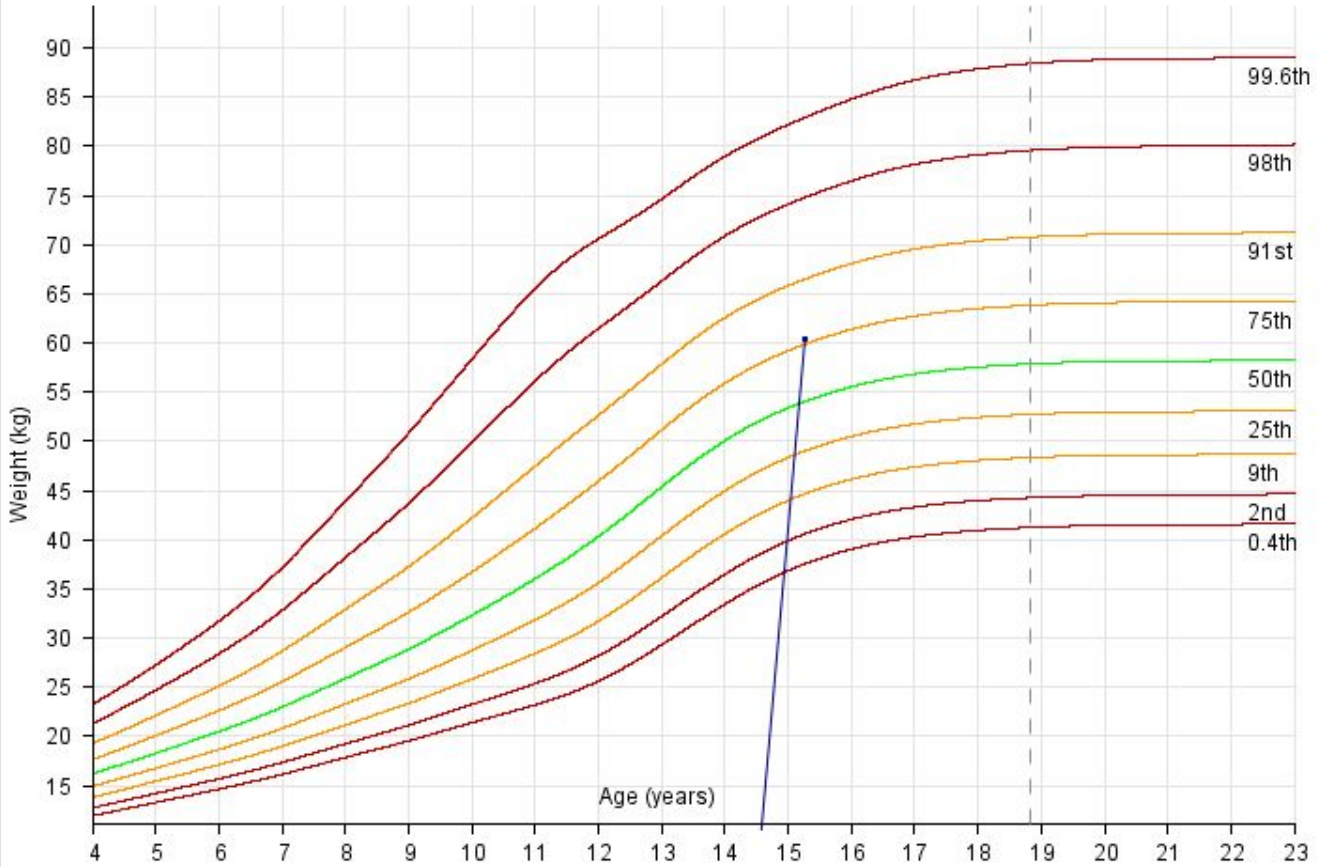
- BMI
  - Age 0-1 UK 90
  - Age 1-4 UK 90
  - Age 4-23 UK 90
- Head Circumference
  - Age 0-1 UK 90
  - Age 1-4 UK 90
  - Age 4-16 UK 90
- Height
  - Age 0-1 UK 90
  - Age 1-4 UK 90
  - Age 4-23 UK 90
- Weight
  - Age 0-1 UK 90
  - Age 1-4 UK 90
  - Age 4-23 UK 90

Children born before May 11th 2009 should be plotted against the old UK 90 charts. Children born after 11th May 2009 should be plotted against the new UK-WHO charts until the age of 4. After age 4 the UK 90 charts should be used.



pharmacy

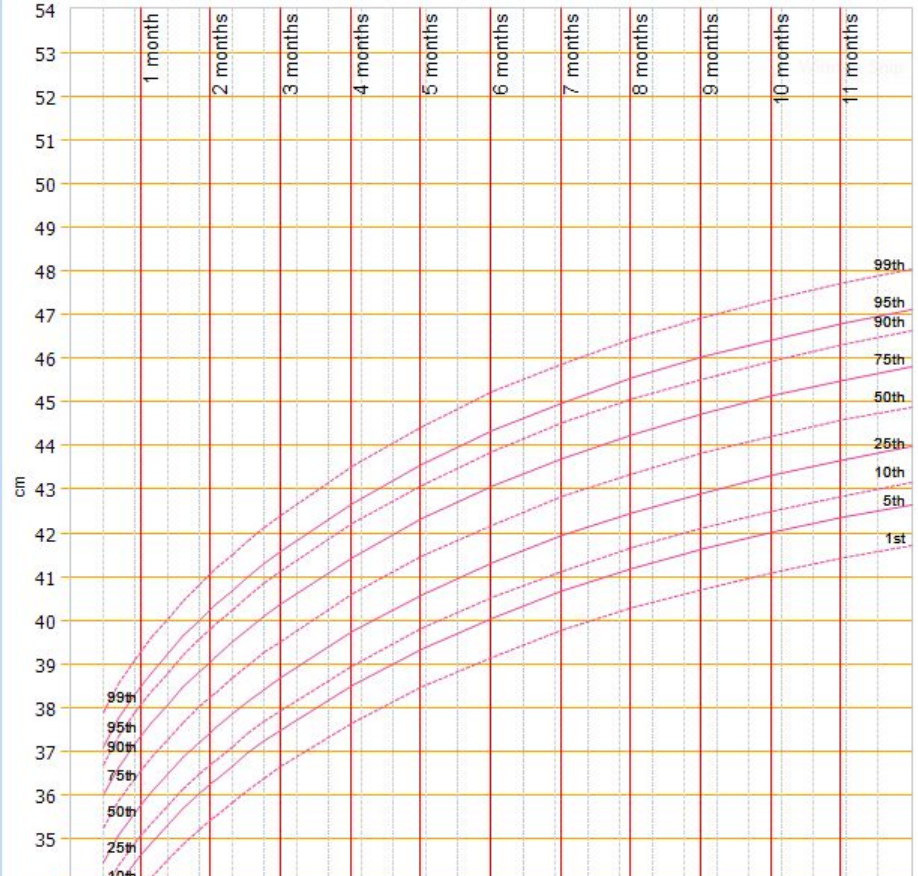
!!
2
1

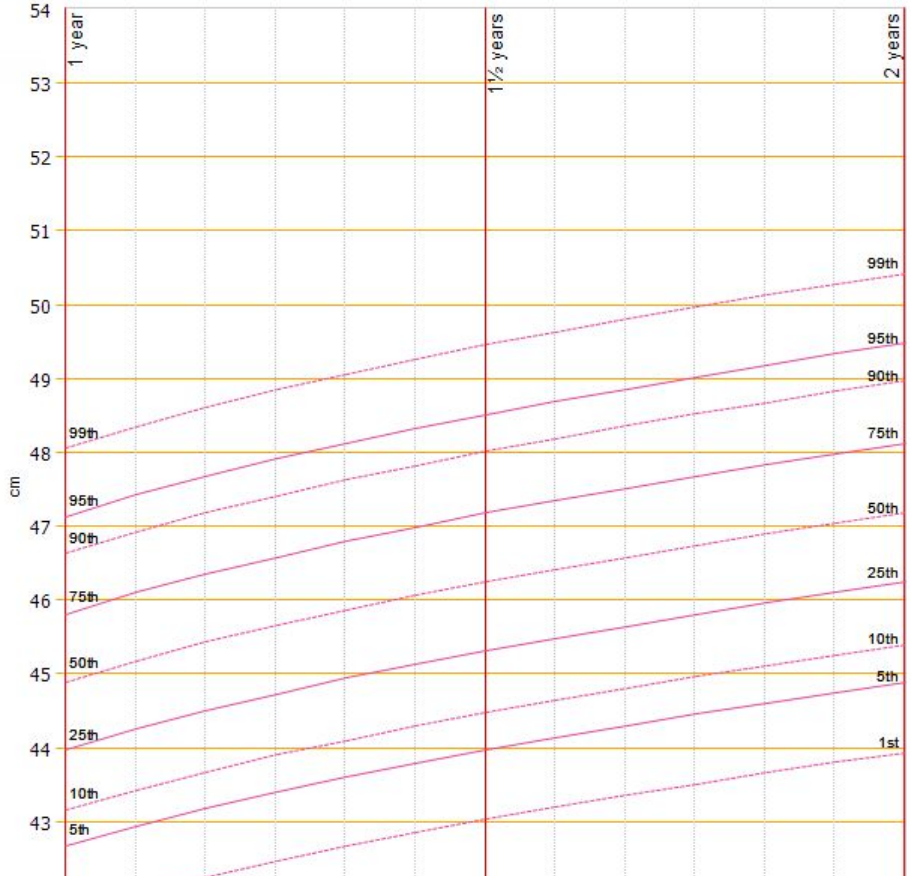
Deceased TEST, Pat (Mrs) Born: 12-Mar-1945 (-16508d - age at death) Gender: Female NHS No.: NHS236 Usual GP: DISLEY, Rachel (Dr) CP

Length/Height

Weight

Head circumference





growth.rcpch.ac.uk

Making the APIs Sustainable

In order to be sustainable in the long term, the RCPCH needs to have a clear business model behind the API web service, to enable:

- further development and updates
- new API endpoints
- revenue generation for the College's investment
- growing the RCPCH's tech team
- wider dissemination of the **idea** of "Best Practice As A Service" to other Colleges and orgs

This is pioneering work

- No other Royal College I’m aware of has ventured into provision of web services.
- Providing **Best Practice As A Service** is “Royal Colleges 3.0”... (1.0 paper documents, 2.0 PDF downloads)
- This is the future of development and distribution of clinical professional standards

More stuff!

- These slides are at
- Our RCPCH GitHub organisation and all our code is at https://github.com/rcpch
- Contact RCPCH with enquiries about the API on commercial@rcpch.ac.uk
- Talk to me on Twitter @marcus_baw