Department of Health & Social Care

Breaking it up: our approach to RAP

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RSS International Conference 2025

(the LEGO one)

Content

My RAP journey:

- Where it all started (reproducible)
- Breaking it up – within a project (readable)
- Breaking it up – across projects (reusable)
- DHSC RAP products

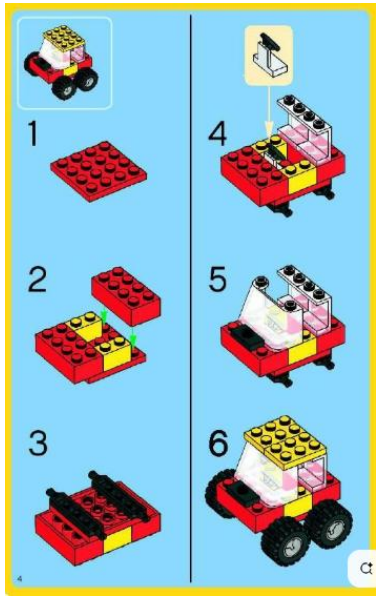
Before we start - LEGO

LEGO's success is less about the end product and more about the process of getting there

Choose chaos ….

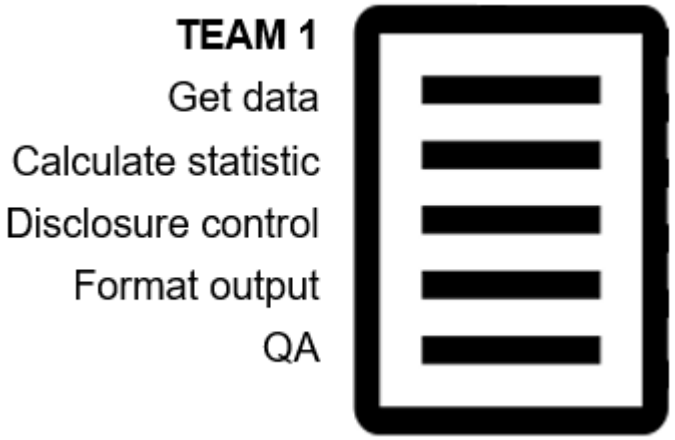
Dump code into one long script

….or choose order

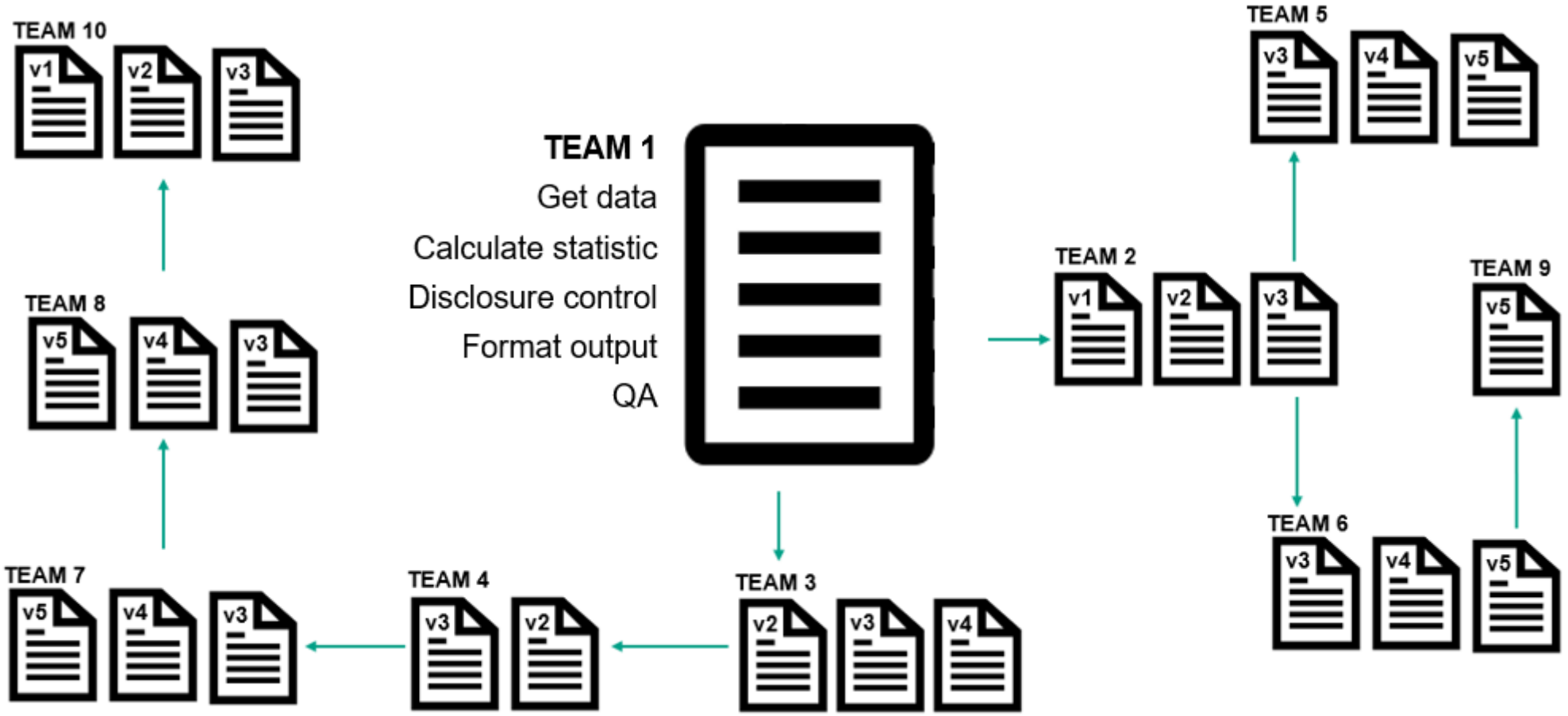


Break complex code up into manageable steps

Where it all started – the beginnings of RAP

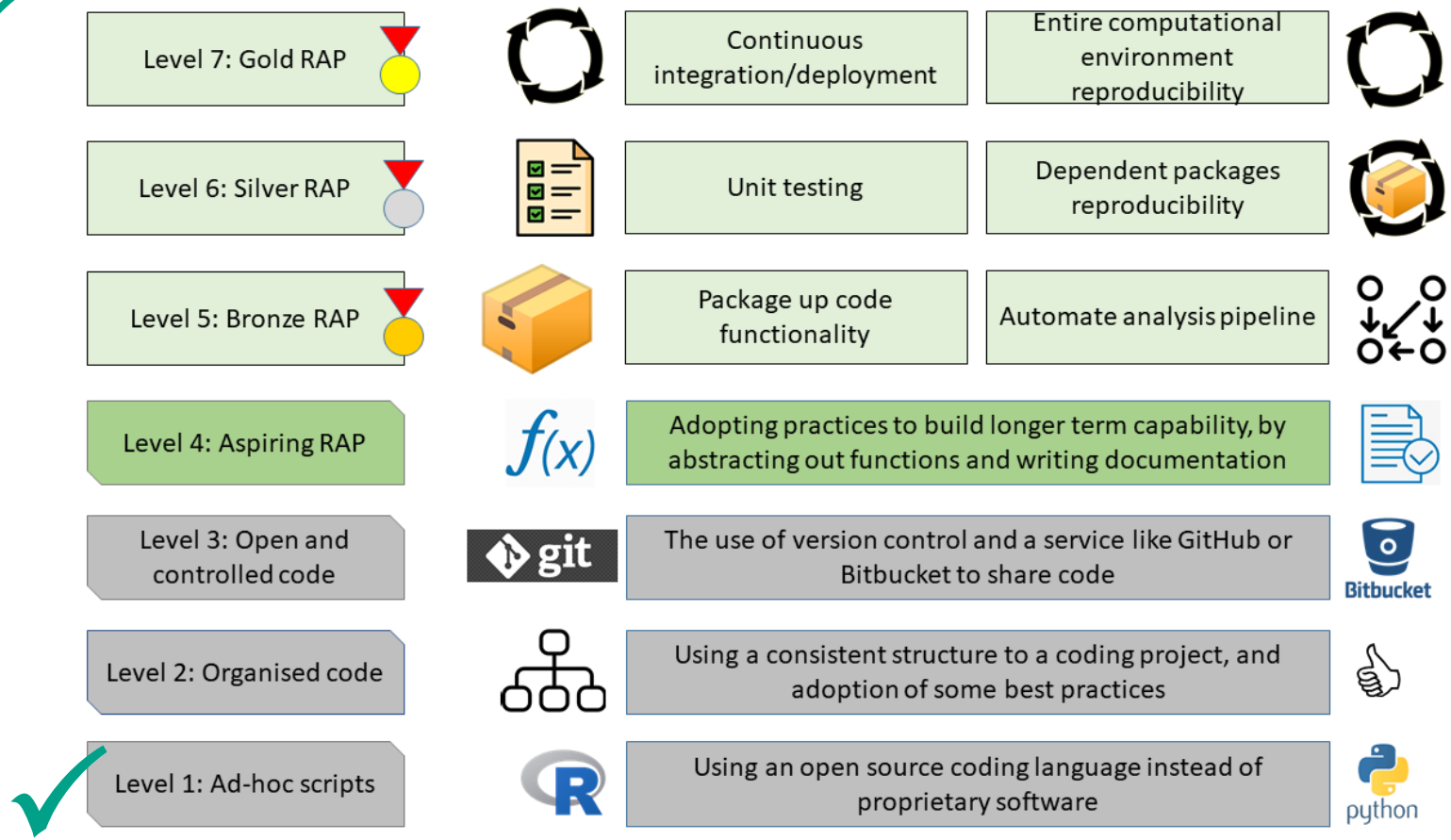


Where it all started – the beginnings of RAP



Code maturity – the RAP wish list

- [x] Reproducible
- [ ] Readable
- [ ] Reusable
- [ ] Transparent
- [ ] De-duplicated
- [ ] Consistent
- [ ] Robust
- [ ] Efficient
- [ ] Maintainable
- [ ] Shareable

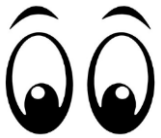


Source: Jamie Lendrum, Defence Science and Technology Laboratory, GDS Slack

Code maturity – why its important

- [x] Reproducible
- [ ] Readable
- [ ] Reusable
- [ ] Transparent
- [ ] De-duplicated
- [ ] Consistent
- [ ] Robust
- [ ] Efficient
- [ ] Maintainable
- [ ] Shareable

Who's looking at your code?



- QA
- Collaborators
- Bug fixes
- Team turnover
- Evolving products
- Reruns
- Re-purposing

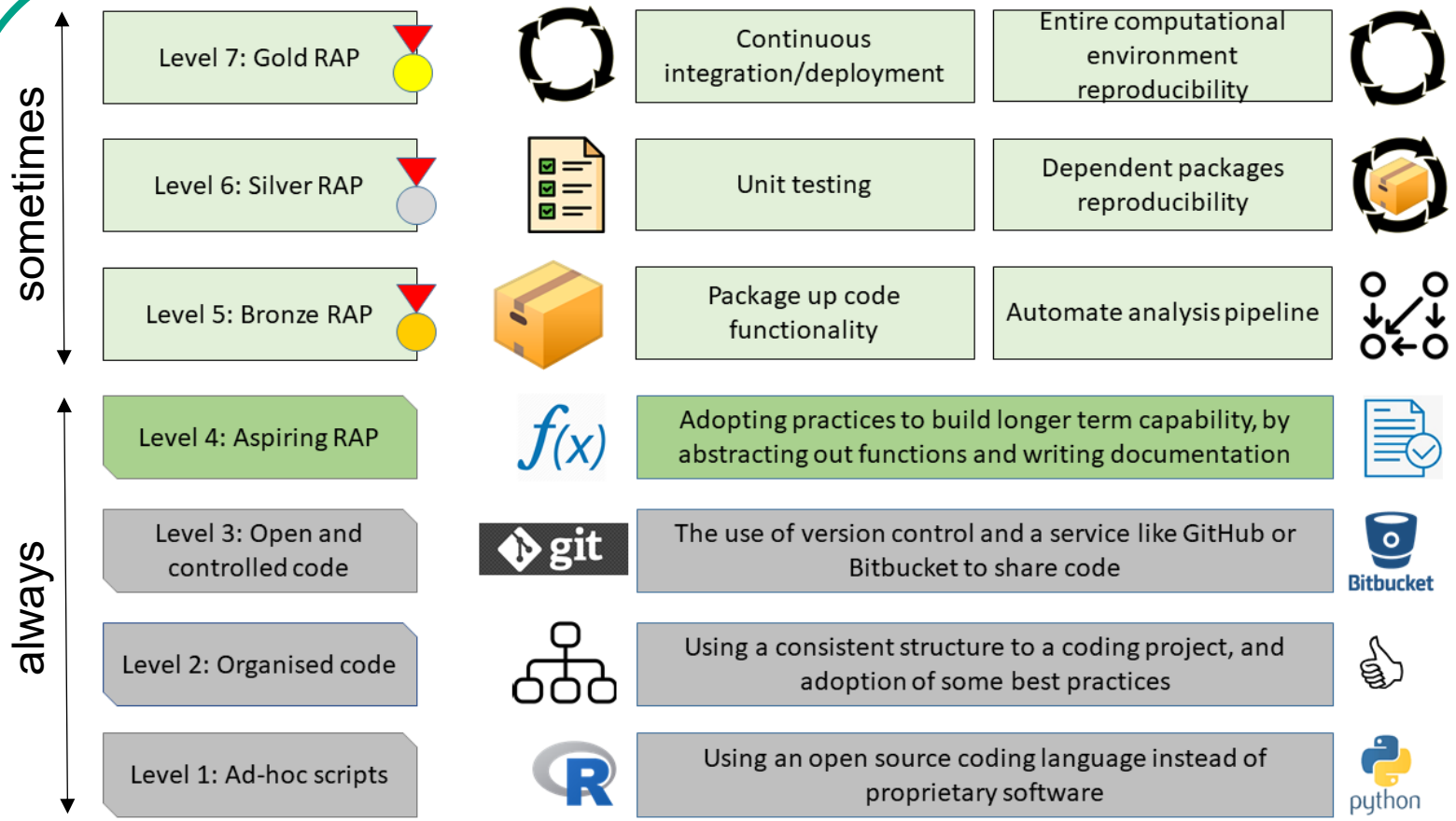
Products evolve

Improve

Repurpose

Code maturity – achieving the RAP wish list

- ☑ Reproducible
- ☑ Readable
- ☑ Reusable
- ☑ Transparent
- ☑ De-duplicated
- ☑ Consistent
- ☑ Robust
- ☑ Efficient
- ☑ Maintainable
- ☑ Shareable



Source: Jamie Lendrum DSTL, GDS Slack

Breaking it up – within a project: modular code

Modular design

Functions

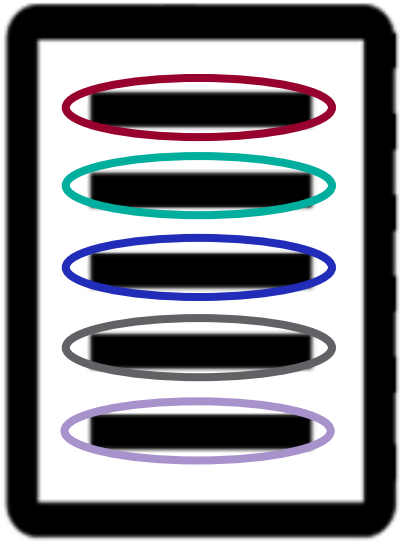
- De-duplicated
- Maintainable
- Consistent

Repos, folders, files

- Readable
- Transparent
- Reusable
- Maintainable

Divide scripts

> My code gets some data, calculates a statistic and applies disclosure control. Then it formats the output and runs some QA sense checks



Breaking it up – within a project: packaged code

Packaged code

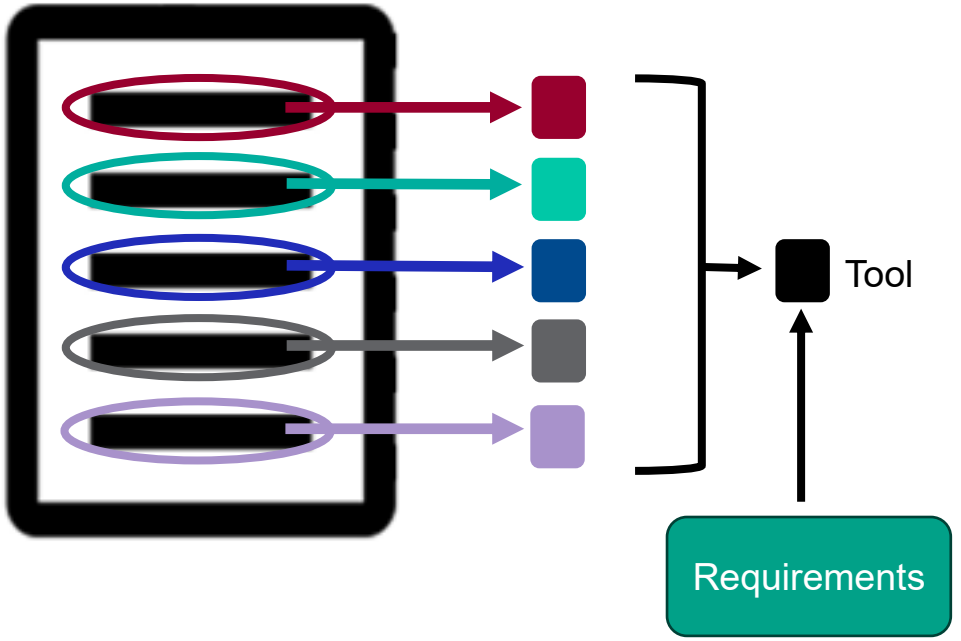
- Robust
- Reliable
- Shareable

Divide scripts

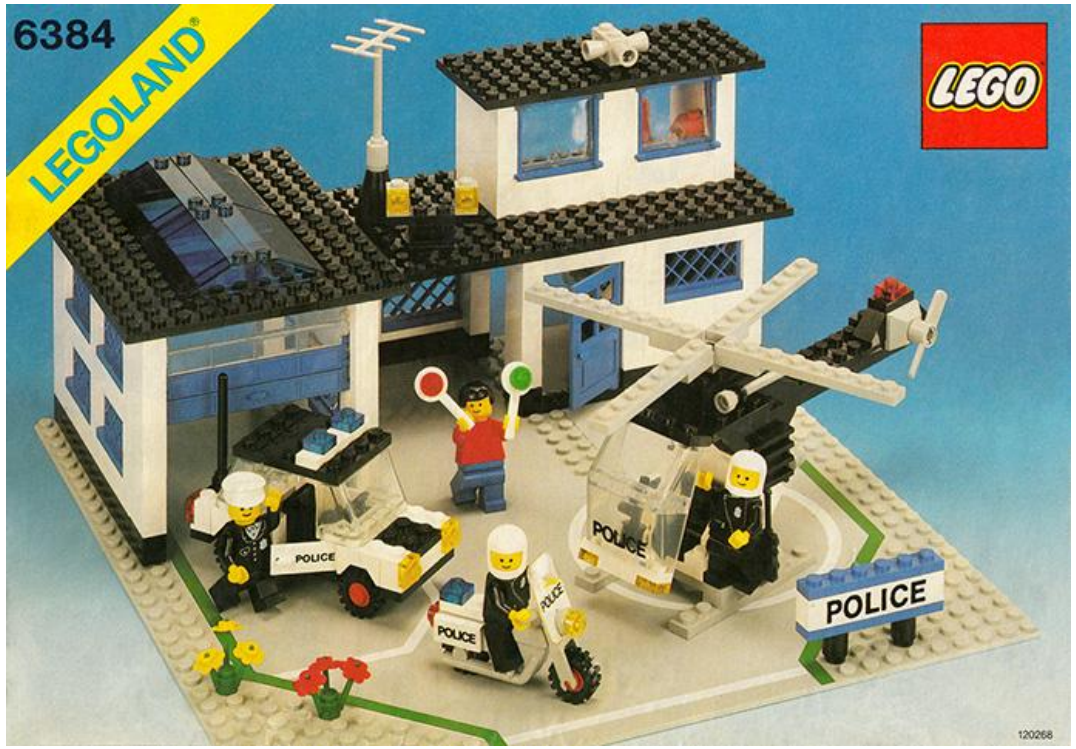
R packages

1 package per task + wrapper

> My code gets some data, calculates a statistic and applies disclosure control. Then it formats the output and runs some QA sense checks



Spot the difference

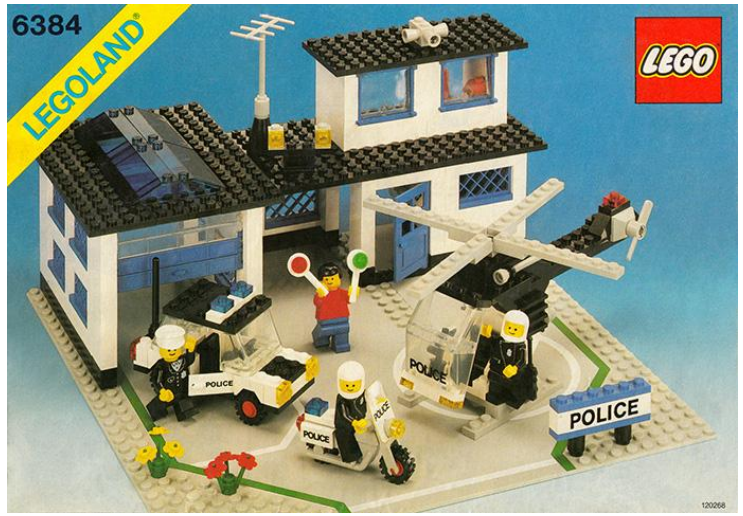


Spot the difference – customer perspective

Kiran: LEGO customer

Differences
colour of bricks
vehicles
greenery
purpose

Spot the difference – developer perspective



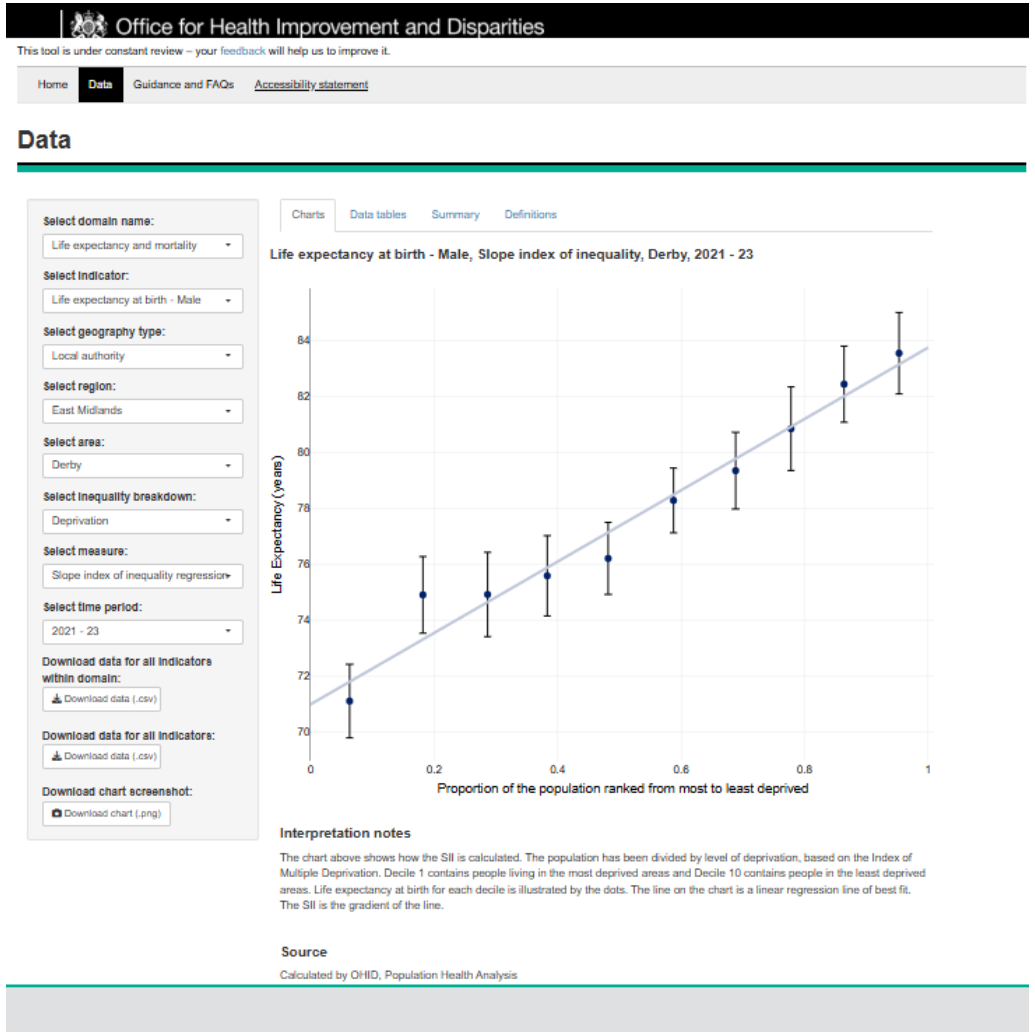
Kiran: LEGO customer

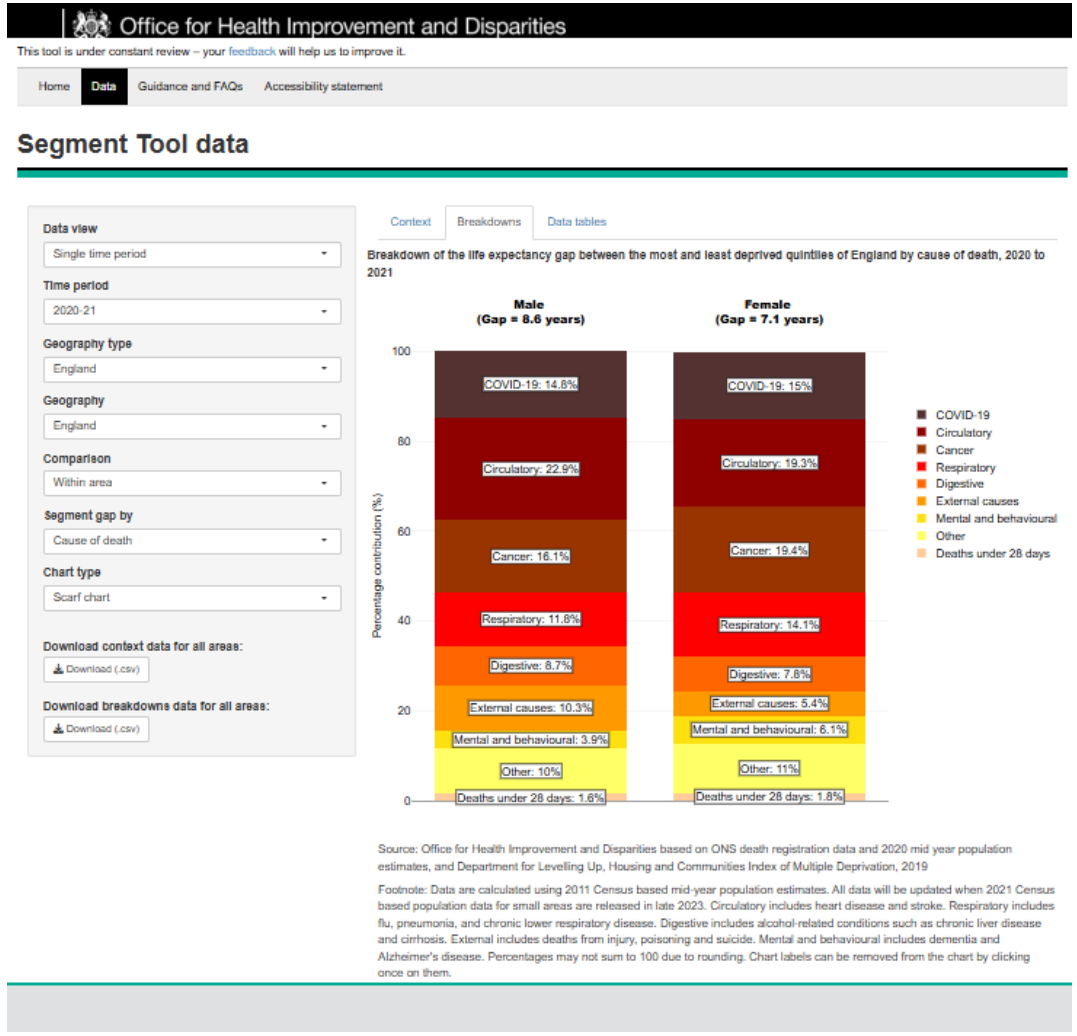
Ed: LEGO developer

Differences
purpose
colour of bricks
vehicles
greenery

Similarities
use LEGO system
modular building
base board
characters

Breaking it up – across projects



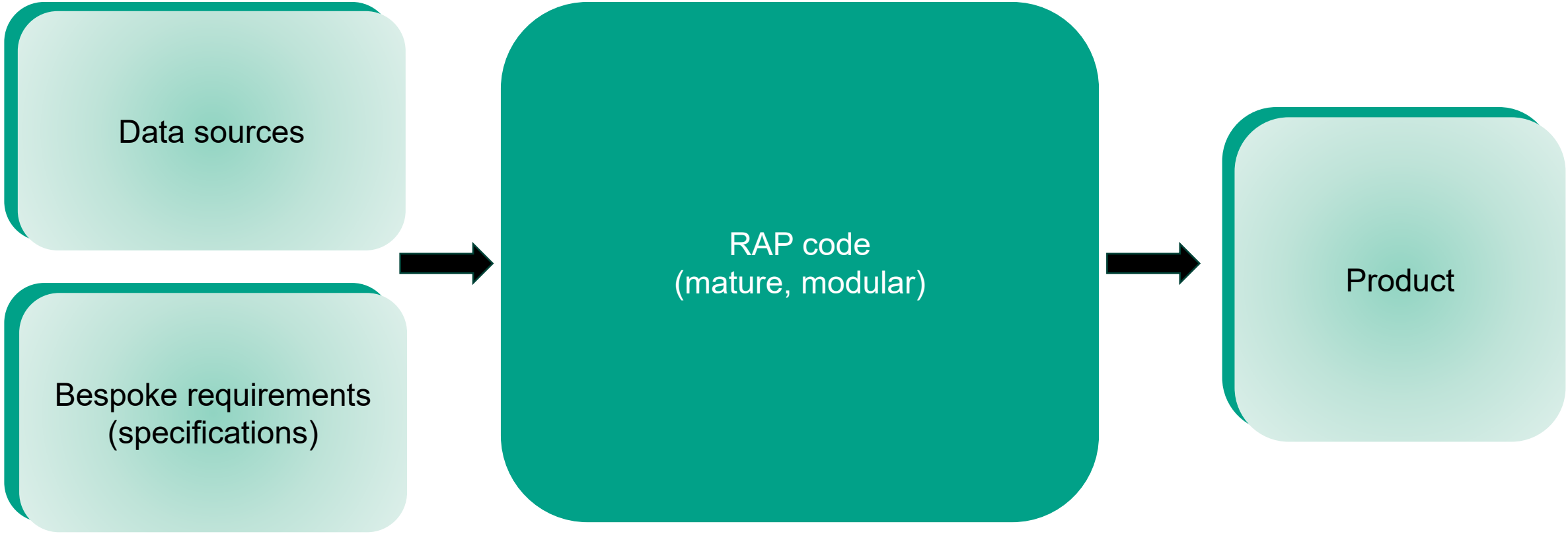


Breaking it up – across projects

Inputs specify requirements for the ‘different’ parts of the product

Standard code builds the ‘similar’ parts of the product, using the inputs provided

Result = similar end product with bespoke elements



Summary

The product is complex, but the steps to create it can be simple

Break it up – modular design within projects:

- Write re-usable code as functions
- Split complex code into multiple scripts
- Organise related scripts into modules
- Organise and document modules as packages

Break it up – reusability across projects

- Code generic parts once and reuse
- Code bespoke elements as user inputs or separate modules

Useful references

Quality assurance of code for analysis and research (the Duck Book, ONS)

DHSC RAP Projects

Centralised Indicator Automation (internal)

Reproducible process for generating indicator data to upload into Fingertips, used as an example in earlier slides.

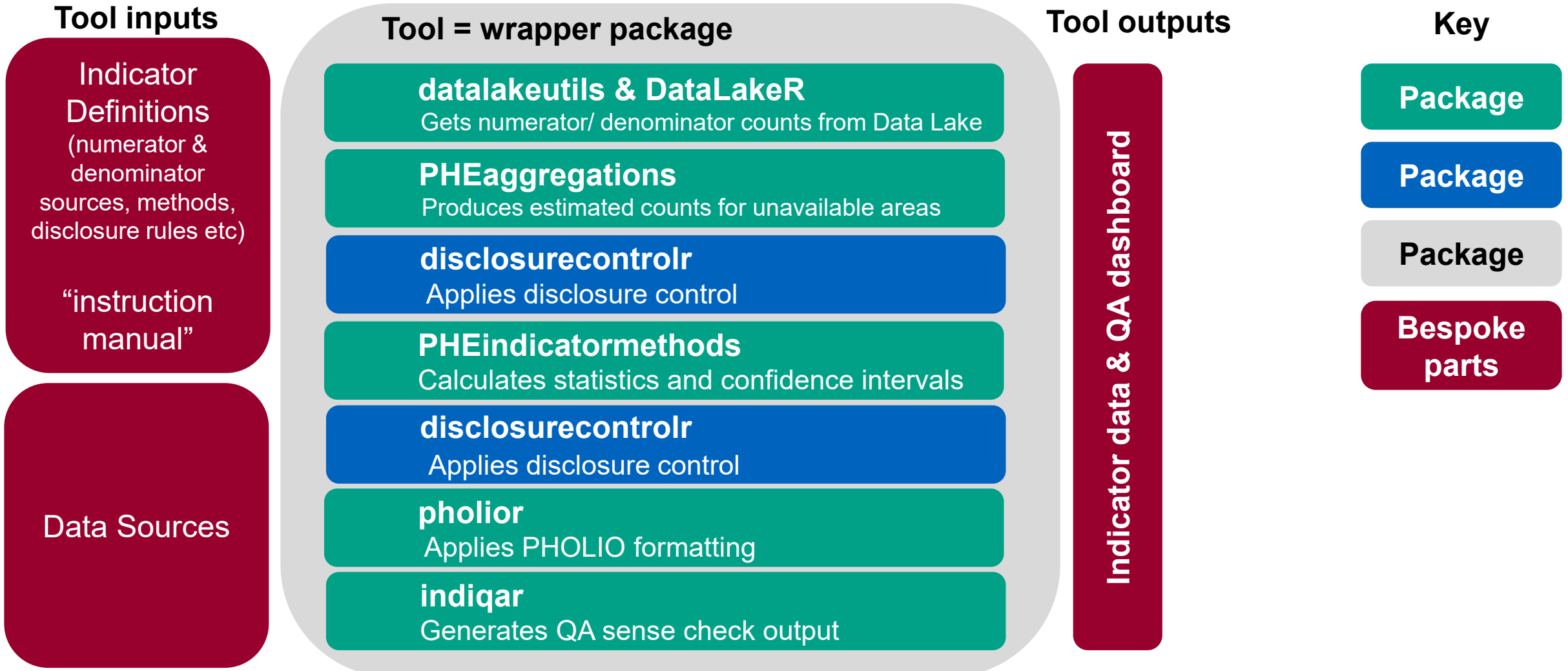
Health trends and variation in England 2025: A Chief Medical Officer Report (due for release)

Slide pack containing interactive contents pages, data visuals, text narrative and source reference links. We are packaging up and genericising this code so it can be used for other projects.

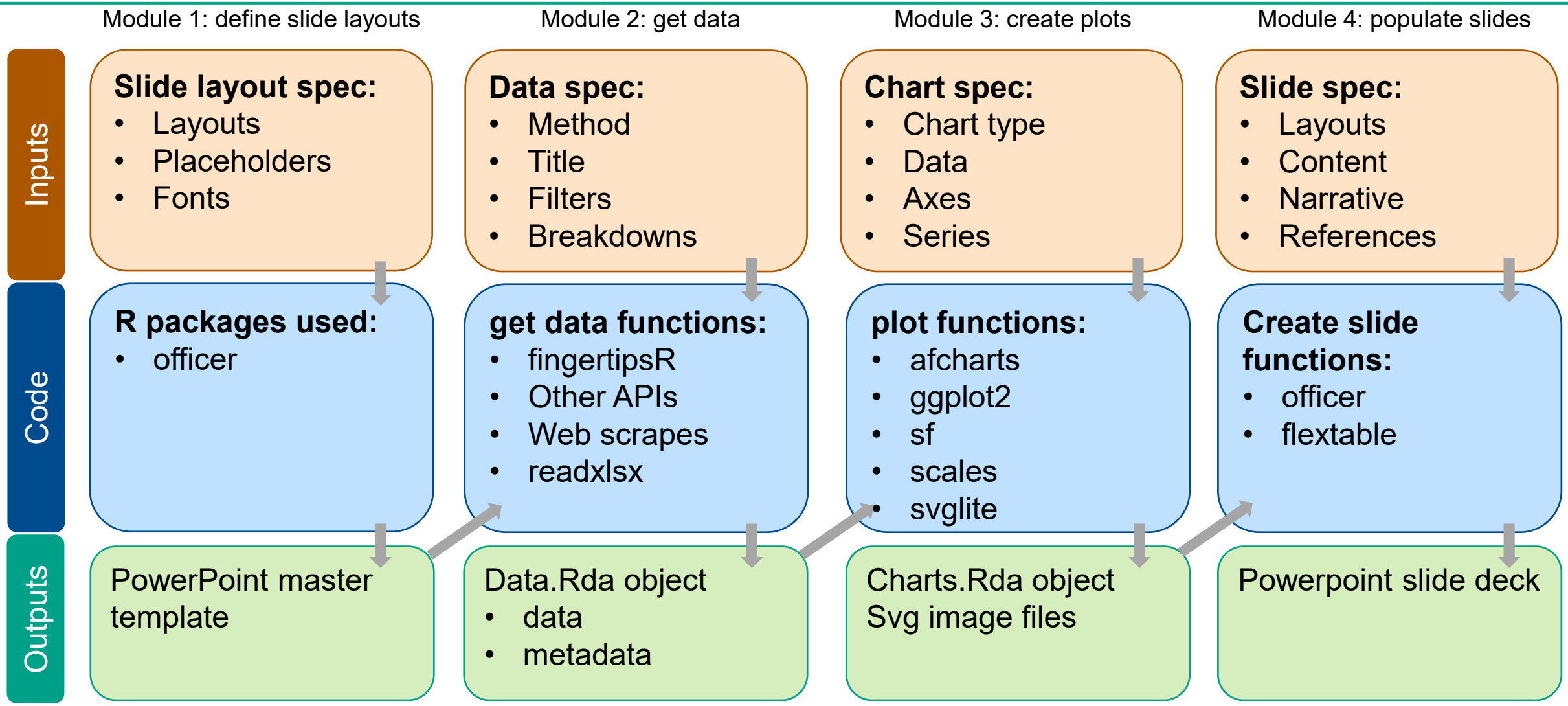
Health trends in England (public)

Quarto dashboard summarising key information about health of people in England and how it has changed over time.

Centralised Indicator Automation

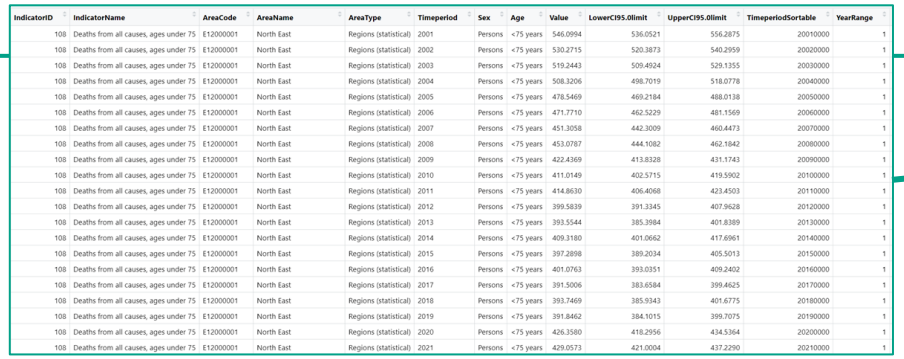


Health trends and variation in England 2025 (CMO report)

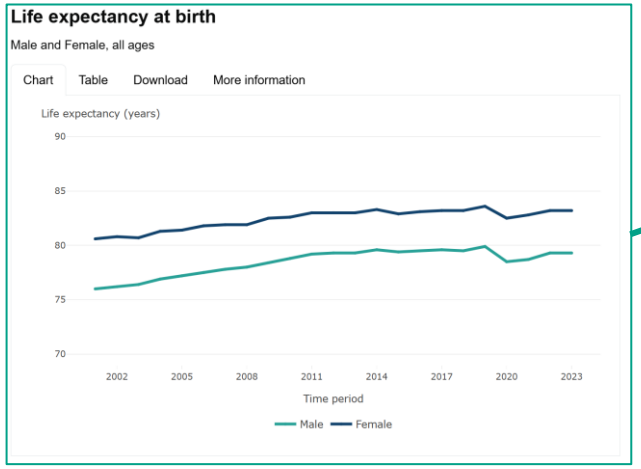


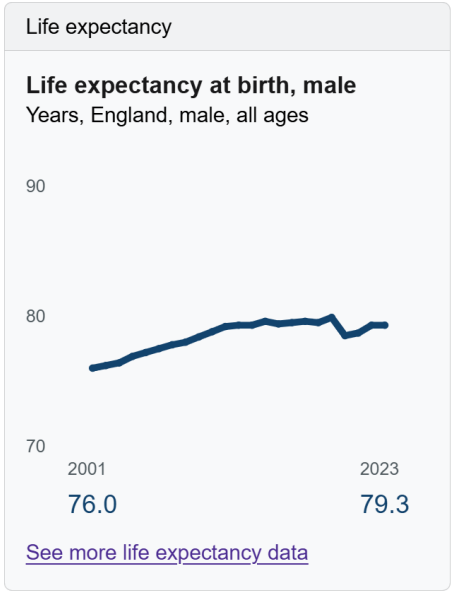
Health trends in England

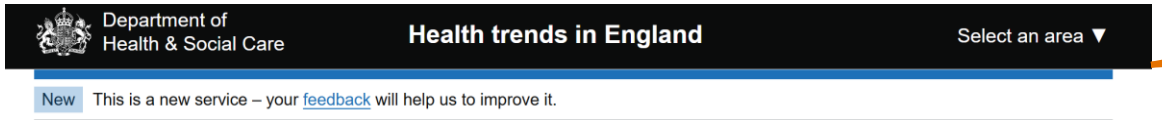
R functions
QMD pages
Styling



IndicatorID	IndicatorName	AreaCode	AreaName	AreaType	Timeperiod	Sex	Age	Value	LowerCI95.0limit	UpperCI95.0limit	TimeperiodSortable	YearRange
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2001	Persons	<75 years	546.0994	536.0521	556.2875	20010000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2002	Persons	<75 years	530.2715	520.3873	540.2959	20020000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2003	Persons	<75 years	519.2443	509.4924	529.1355	20030000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2004	Persons	<75 years	508.3206	498.7019	518.0778	20040000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2005	Persons	<75 years	478.5469	469.2184	488.0138	20050000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2006	Persons	<75 years	471.7710	462.5229	481.1569	20060000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2007	Persons	<75 years	451.3058	442.3009	460.4473	20070000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2008	Persons	<75 years	453.0787	444.1082	462.1842	20080000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2009	Persons	<75 years	422.4369	413.8328	431.1743	20090000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2010	Persons	<75 years	411.0149	402.5715	419.5902	20100000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2011	Persons	<75 years	414.8630	406.4068	423.4503	20110000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2012	Persons	<75 years	399.5839	391.3345	407.9628	20120000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2013	Persons	<75 years	393.5544	385.3984	401.8389	20130000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2014	Persons	<75 years	409.3180	401.0662	417.6961	20140000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2015	Persons	<75 years	397.2898	389.2034	405.5013	20150000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2016	Persons	<75 years	401.0763	393.0351	409.2402	20160000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2017	Persons	<75 years	391.5006	383.6584	399.4625	20170000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2018	Persons	<75 years	393.7469	385.9343	401.6775	20180000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2019	Persons	<75 years	391.8462	384.1015	399.7075	20190000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2020	Persons	<75 years	426.3580	418.2956	434.5364	20200000	1
108	Deaths from all causes, ages under 75	E12000001	North East	Regions (statistical)	2021	Persons	<75 years	429.0573	421.0004	437.2290	20210000	1







The line chart shows the average number of years a person would expect to live based on contemporary mortality rates. For males, the life expectancy in England increased from 76.0 years in 2001 to 79.3 years in 2023. For females, the life expectancy in England increased from 80.6 years in 2001 to 83.2 years in 2023.

Generate reports

- Get data
- Create chart
- Create tile image
- Summary page
- Summary tile chunk
- Details page
- Details chunk
- CSS
- Navigation
- Create dynamic text