Data on antibiotic use through the ages

SAPG@15 Meeting

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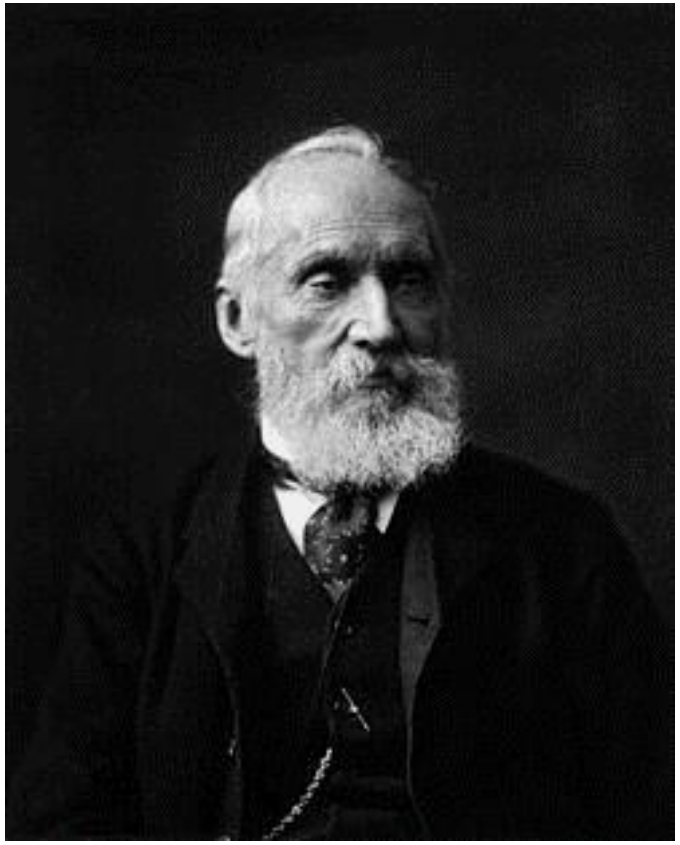
ARHAI Scotland

ARHAI Scotland

Antimicrobial Resistance and Healthcare Associated Infection

What is measurement and why is it important?

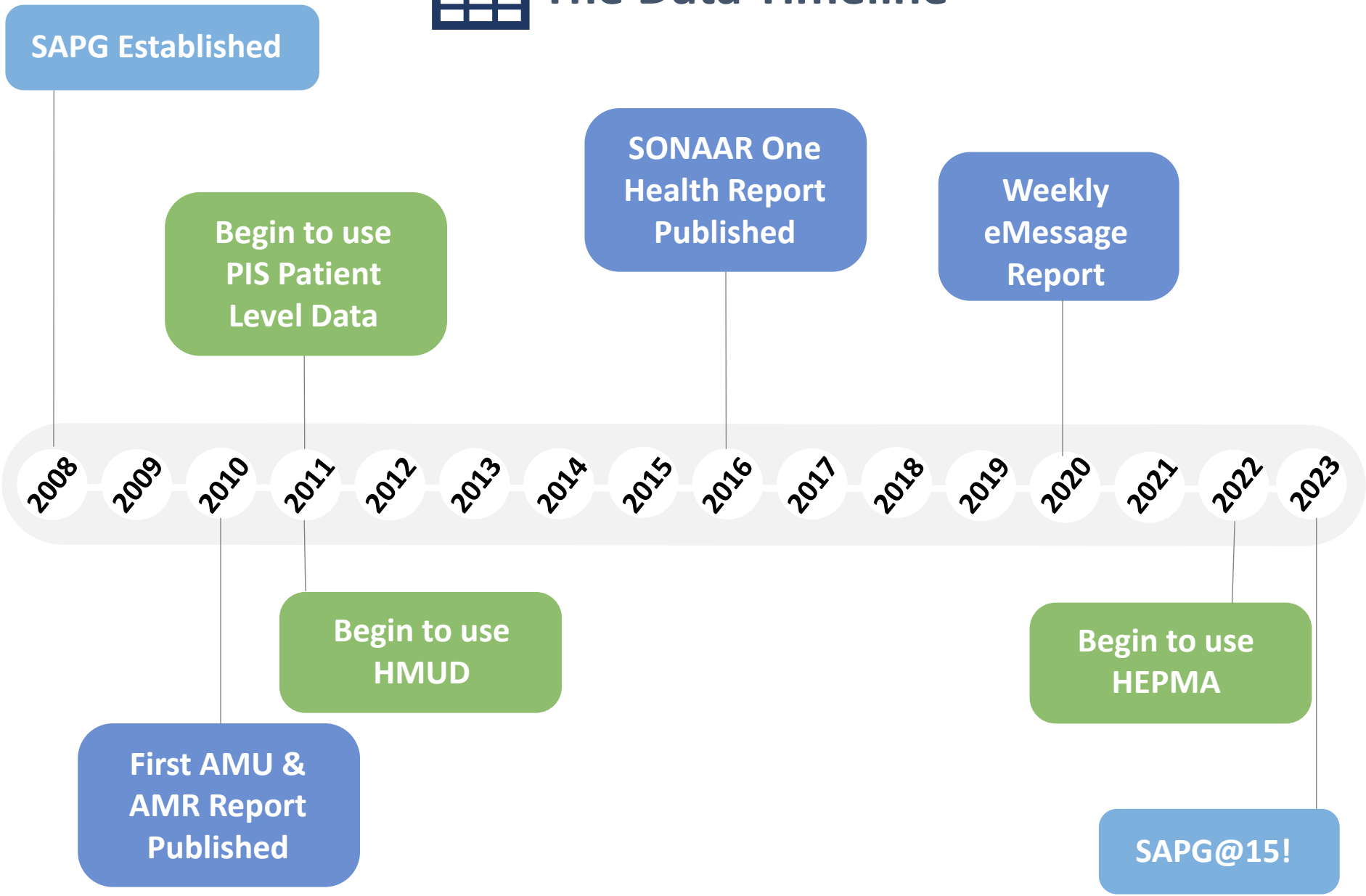
"the act or process of ascertaining the extent, dimensions or quantity of something"



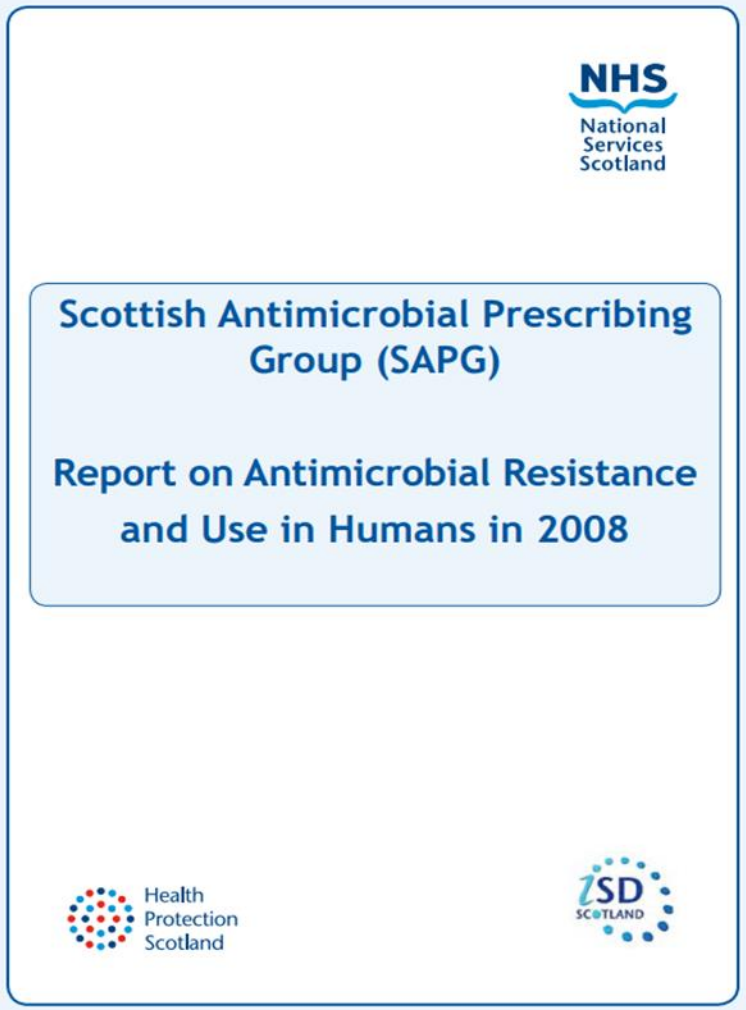
- *"To measure is to know"*
- *"When you can measure something and express it in numbers, you know something about it. But when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind."*
- *"If you cannot measure it*
  you cannot improve it"

  – Lord Kelvin (1824-1907)

The Data Timeline



In the beginning…



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The Four Ages of Antimicrobial Stewardship in Scotland

What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

Whether to Prescribe

Reducing the use of antibiotics for common self-limiting infections where antibiotics are seldom required in healthy individuals

How Long to Prescribe

Encouraging the use of short courses when indicated

Who to Prescribe

Optimising the time and resource of clinicians by diversifying the range of healthcare professionals involved

What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

- SAPG forged in fire of CDI as key stewardship driver
- Minimising inappropriate use of broad spectrum antibiotics
  - From 4C to Watch and Reserve (and Access too)

What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

In the beginning…

NHS National Services Scotland

Scottish Antimicrobial Prescribing Group (SAPG)

Report on Antimicrobial Resistance and Use in Humans in 2008

Health Protection Scotland

ISD SCOTLAND

Figure 5. NHS Scotland: combination penicillins in primary care, DDD/1000/day, 1993-2008.

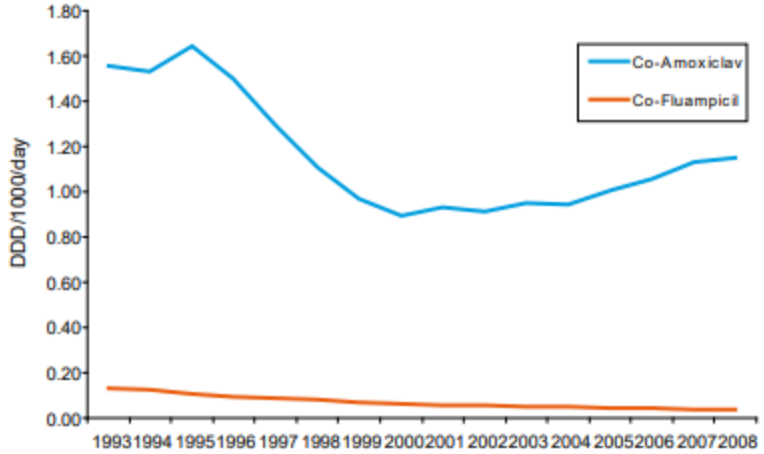
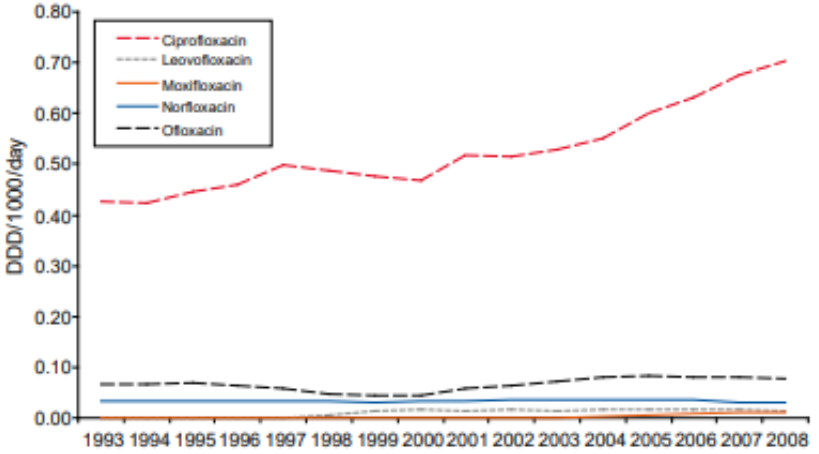


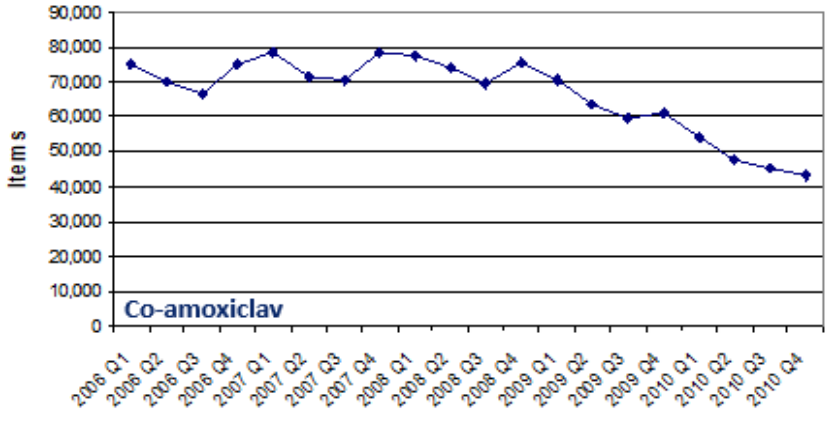
Figure 6. NHS Scotland: fluoroquinolone in primary care, DDD/1000/day, 1993-2008.

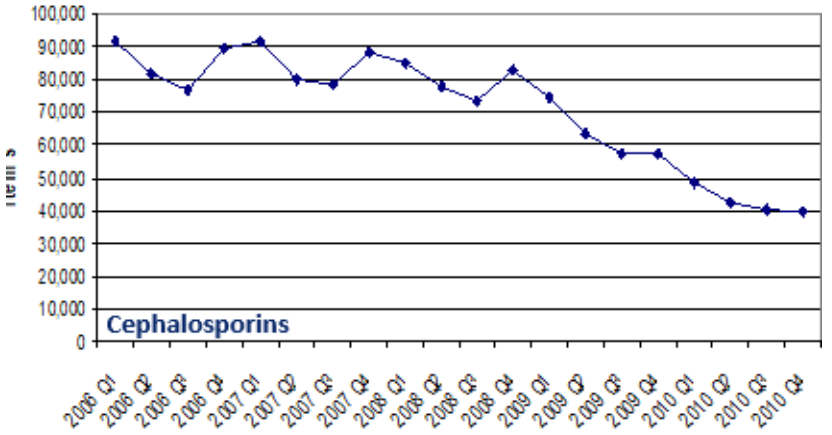


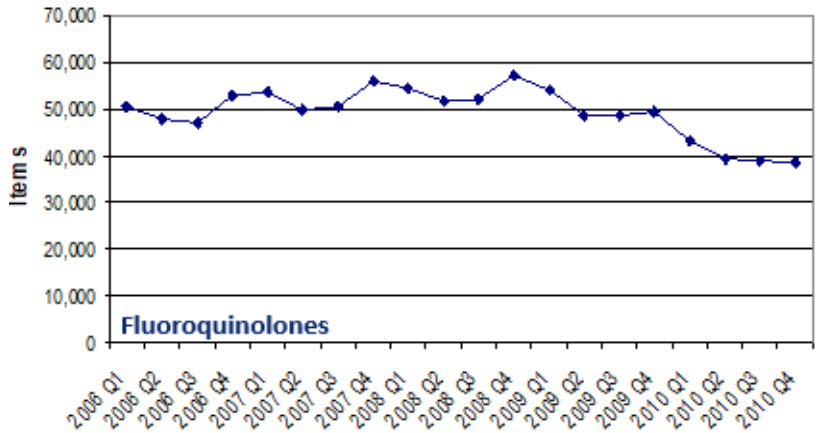
What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

Within two years in primary care…



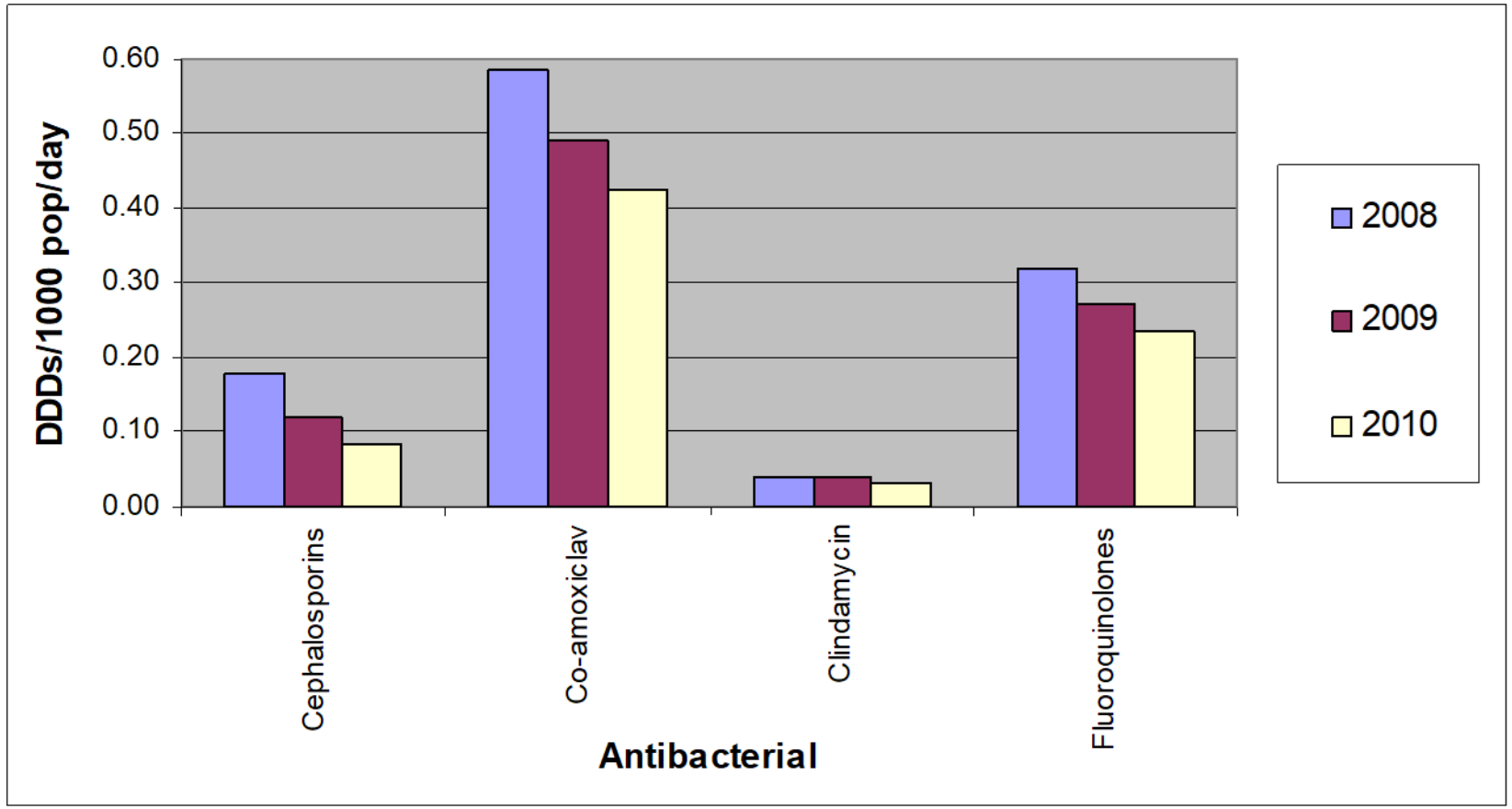




What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

Also within two years in secondary care…



What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

And in 2022…

Percentage of all antibiotics in Scotland that belonged to the Access group

To avoid unnecessary use of broad-spectrum antibiotics an adapted version of the **World Health Organization (WHO) Access, Watch, Reserve (AWaRe)** classification of antibiotics is used to monitor antibiotic use in Scotland. Access antibiotics should be used as first line treatment for most common infections.

In **2022, Access antibiotics** accounted for **64.3%** of total antibiotic use, compared to **62.4%** in **2021**.

There has been a **1.9%** year-on-year **increase** over the **last five years**.

What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

Acute hospitals in 2022…

Choice of antibiotic

Access antibiotics accounted for **63.6%** of total antibiotic use in **2022**, compared to **64.3%** in **2021**.

In **2019**, a **national indicator** was developed by Scottish Government with support from ARHAI Scotland and Scottish Antimicrobial Prescribing Group (SAPG), to encourage **compliance with local antibiotic prescribing policies** and minimise inappropriate use of broad spectrum antibiotics.

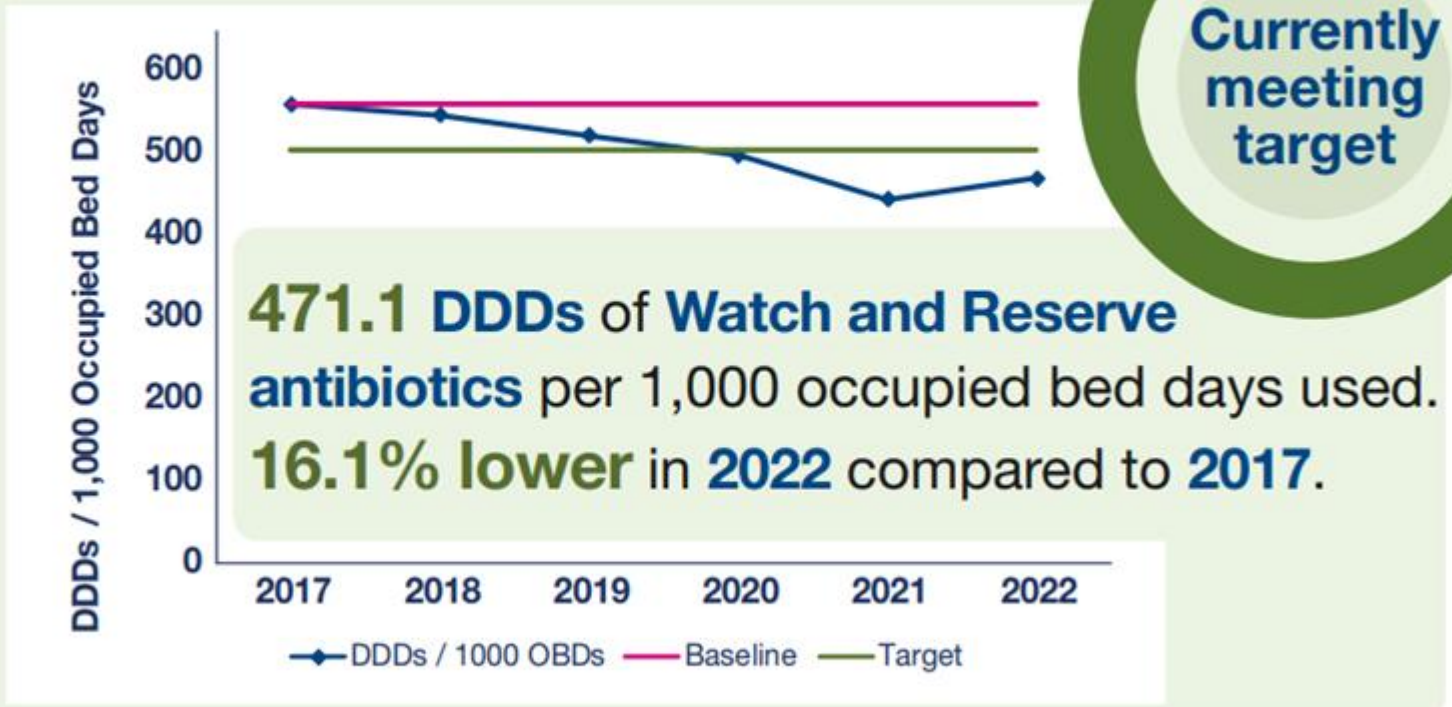
National indicator: at least 60% of total antibiotic use in acute hospitals to be Access antibiotics by 2023.

What to Prescribe

Reducing the use of certain broad-spectrum antibiotics due to their association with antimicrobial resistance and *Clostridiodes difficile* infection

Acute hospitals in 2022…

Ambition to reduce use of Watch and Reserve antibiotics by 10% by 2024 (2017 baseline)



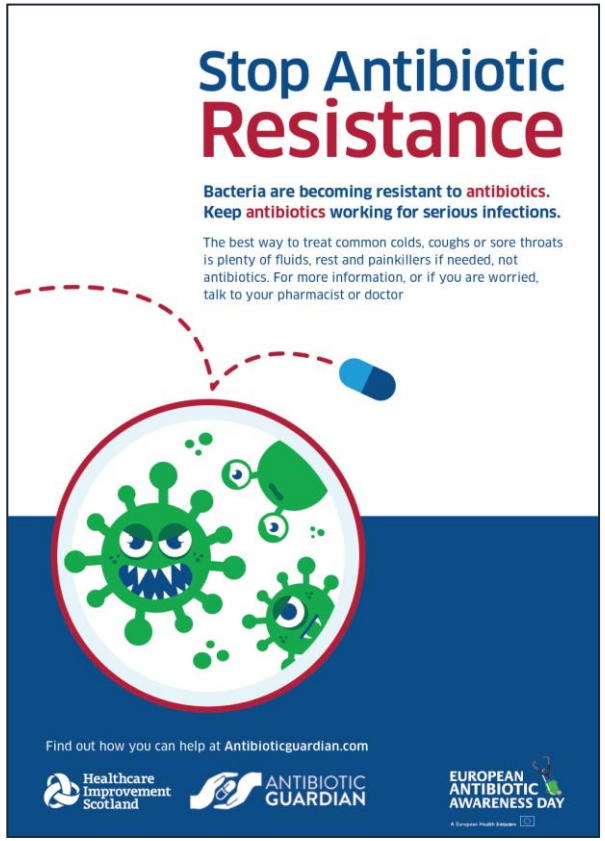
471.1 DDDs of **Watch and Reserve antibiotics** per 1,000 occupied bed days used.

16.1% lower in **2022** compared to **2017**.

Currently meeting target

Whether to Prescribe

Reducing the use of antibiotics for common self-limiting infections where antibiotics are seldom required in healthy individuals



- *"Our mission is not to prescribe as few antibiotics as possible, but to identify that small group of patients who really need antibiotic treatment and to explain, reassure and educate the large group of patients who don't."*

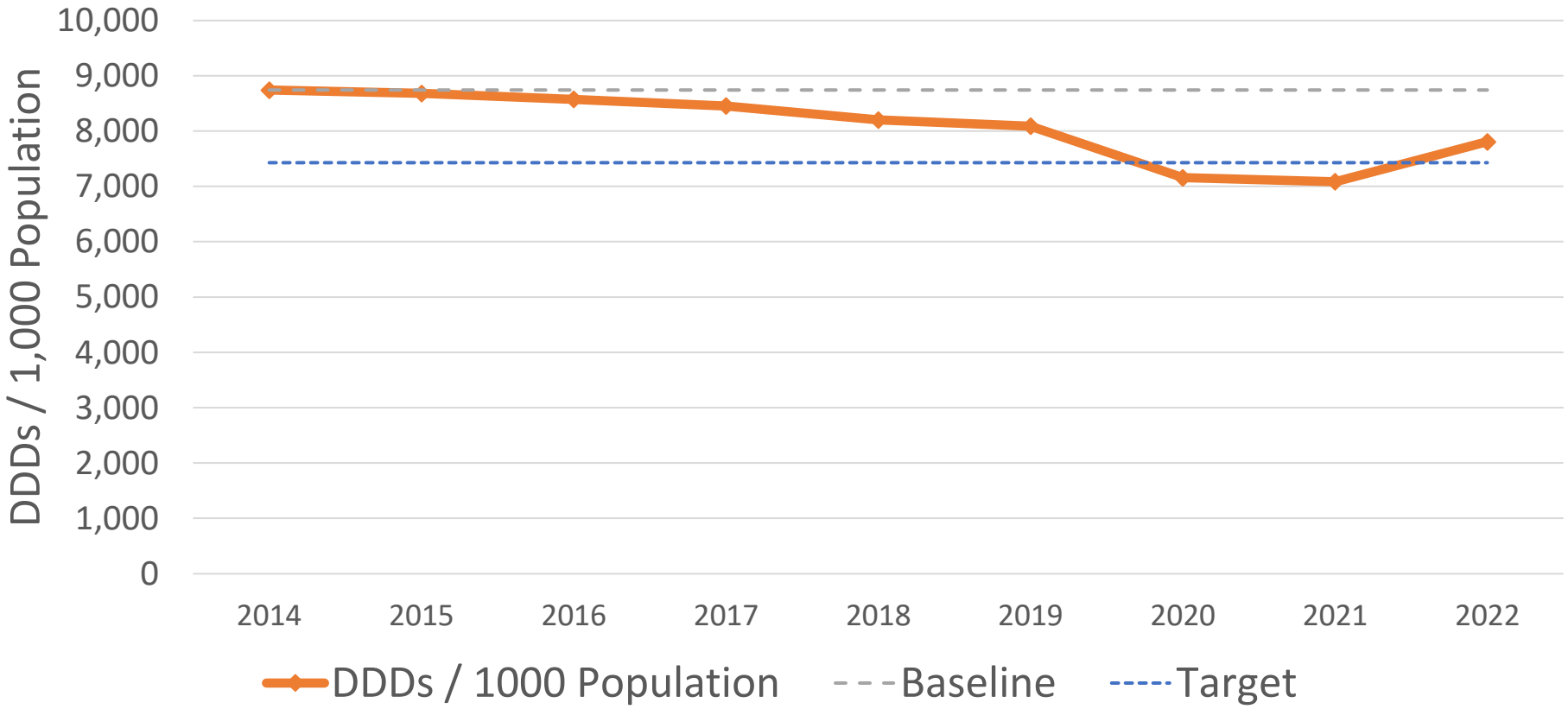
Van Duijn et al. *Br J Gen Pract. 2007 Jul;57(540):561-8.*

Whether to Prescribe

Reducing the use of antibiotics for common self-limiting infections where antibiotics are seldom required in healthy individuals

How Far We've Come…

Ambition to reduce antimicrobial use in humans by 15% by 2024 (2014 baseline)

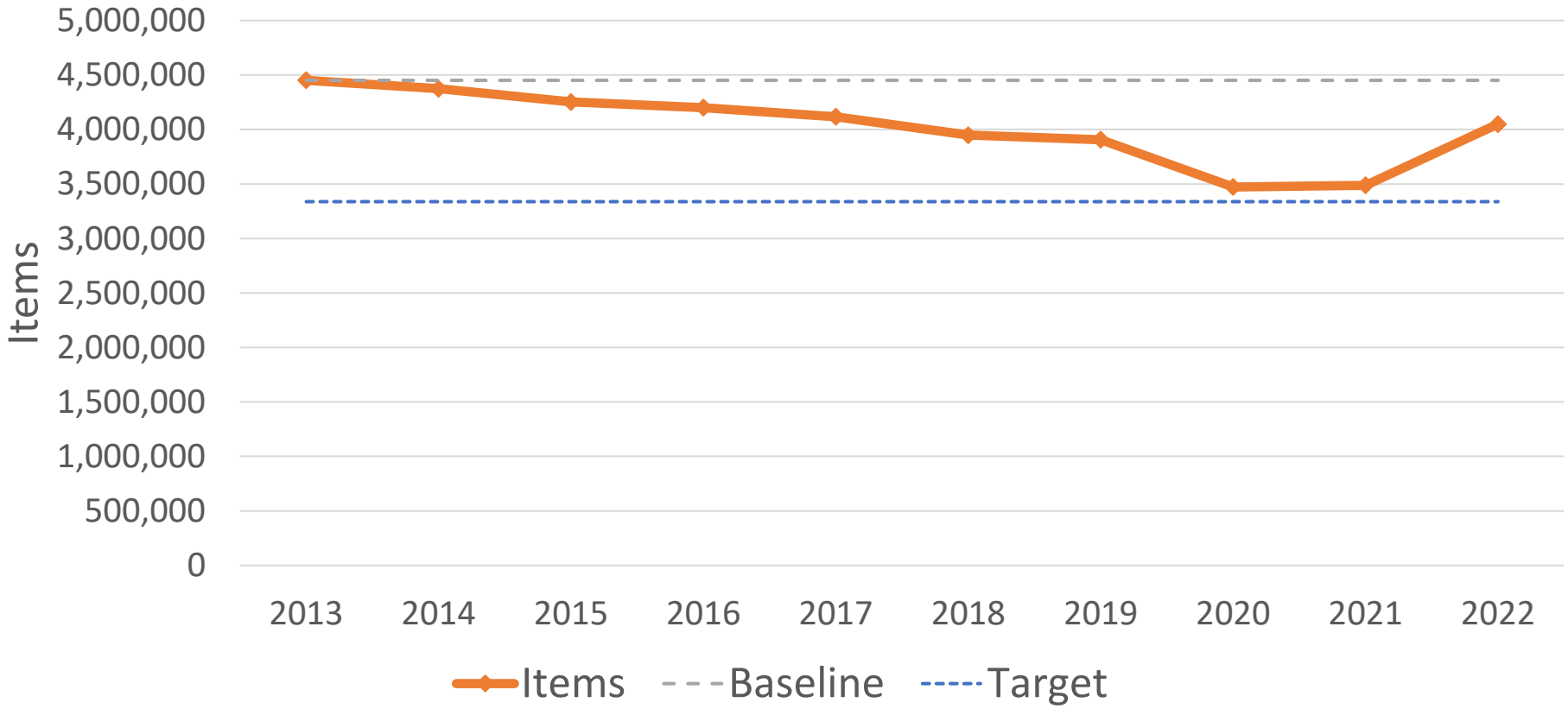


Whether to Prescribe

Reducing the use of antibiotics for common self-limiting infections where antibiotics are seldom required in healthy individuals

How Far We've Come…

Ambition to reduce primary care antimicrobial use by 25% by 2024 (2013 baseline)



The power of patient level antimicrobial use data in primary care

What have we learned so far…

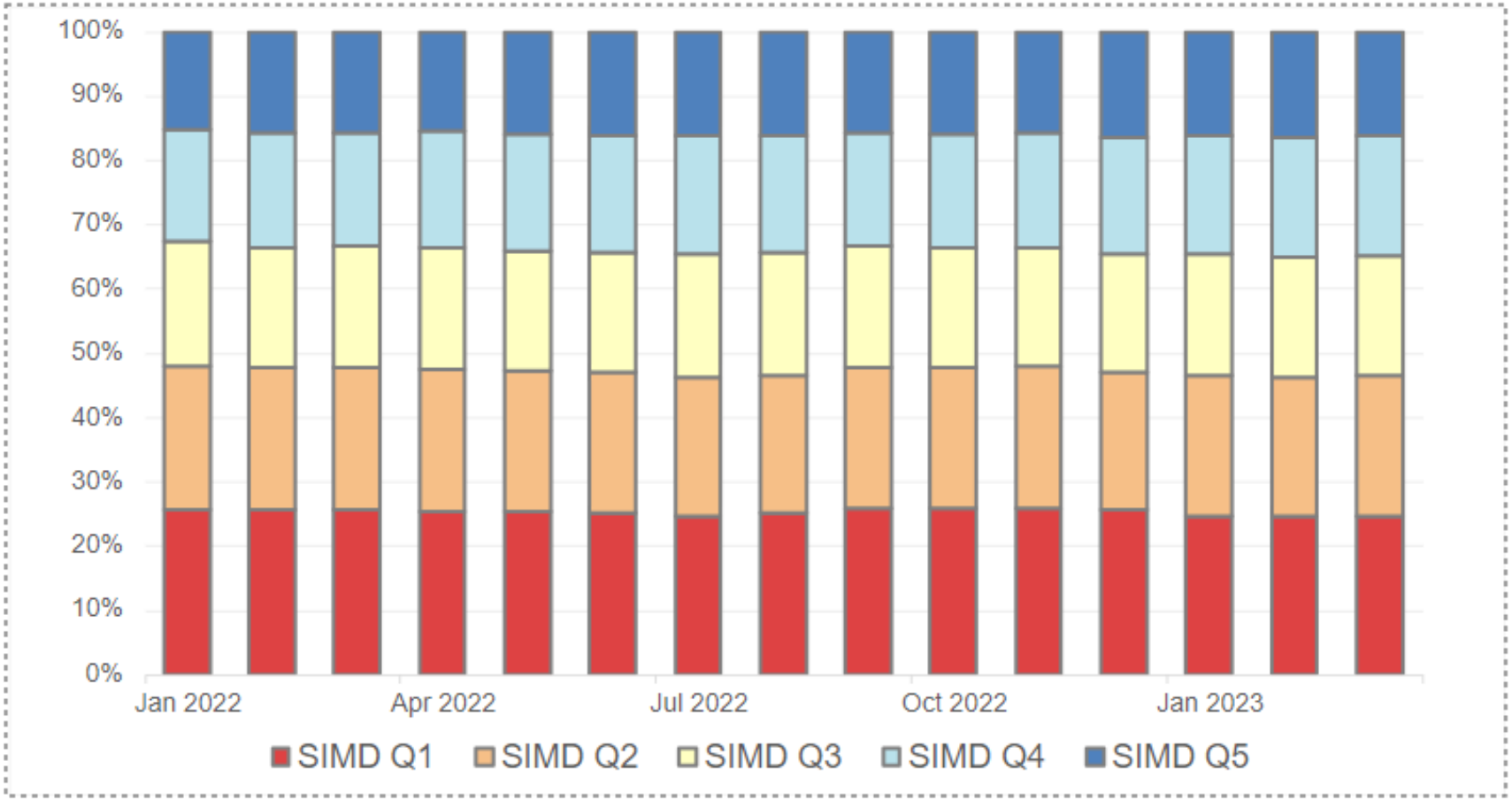
The power of patient level antimicrobial use data in primary care

In **2022**, **27.3%** of the Scottish population received **at least one course of antibiotics** in primary care, excluding dental.

The power of patient level antimicrobial use data in primary care

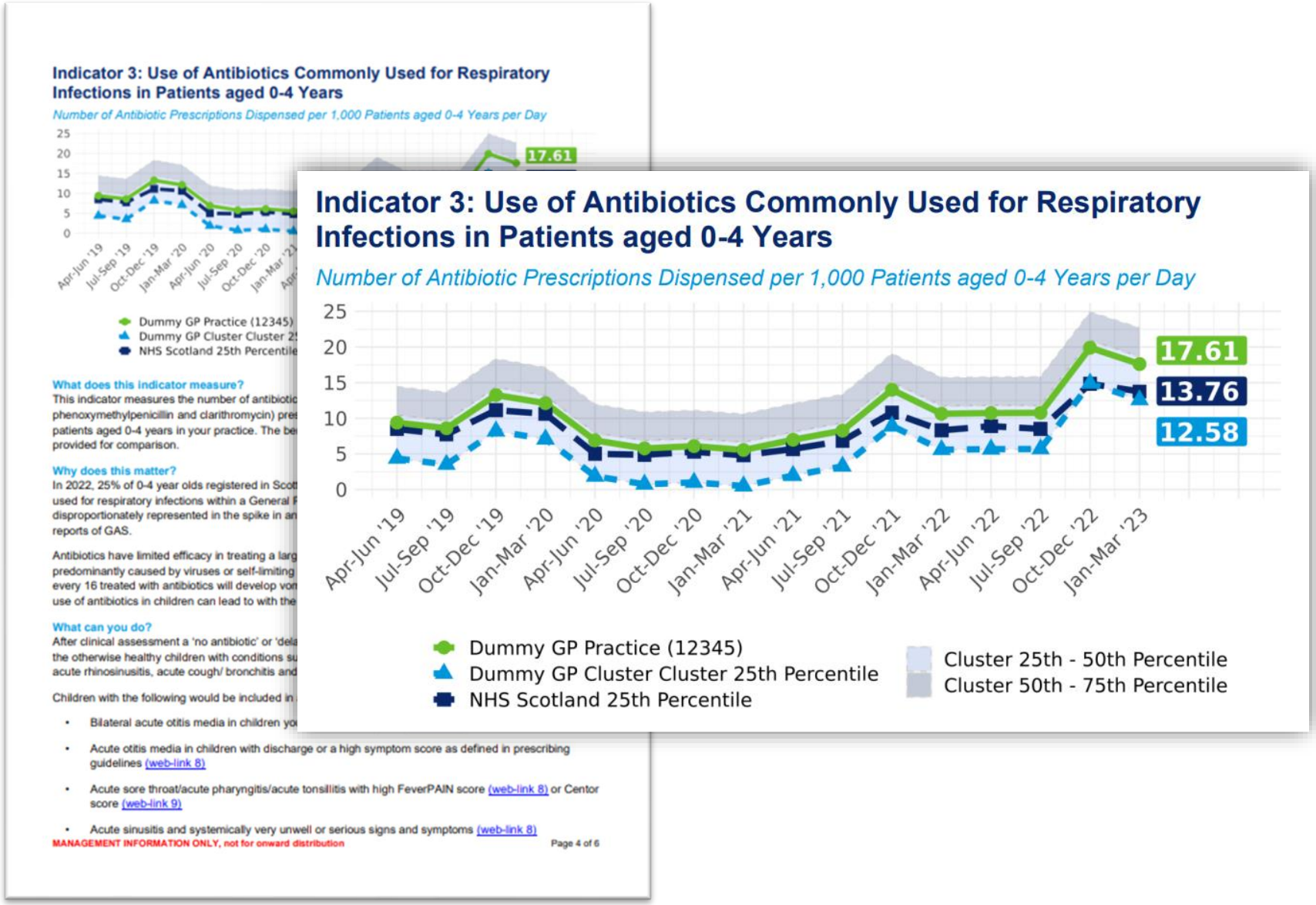
Results: SIMD breakdown

Proportion of antibiotic items by month



*SIMD Q1 – Most Deprived, SIMD Q5 – Least Deprived

The power of patient level antimicrobial use data in primary care



Indicator 3: Use of Antibiotics Commonly Used for Respiratory Infections in Patients aged 0-4 Years

Number of Antibiotic Prescriptions Dispensed per 1,000 Patients aged 0-4 Years per Day

25
20
15
10
5
0

17.61
13.76
12.58

Apr-Jun '19
Jul-Sep '19
Oct-Dec '19
Jan-Mar '20
Apr-Jun '20
Jul-Sep '20
Oct-Dec '20
Jan-Mar '21
Apr-Jun '21
Jul-Sep '21
Oct-Dec '21
Jan-Mar '22
Apr-Jun '22
Jul-Sep '22
Oct-Dec '22
Jan-Mar '23

Dummy GP Practice (12345)
Dummy GP Cluster Cluster 25th Percentile
NHS Scotland 25th Percentile
Cluster 25th - 50th Percentile
Cluster 50th - 75th Percentile

What does this indicator measure?

This indicator measures the number of antibiotic
phenoxymethylpenicillin and clarithromycin) pres
patients aged 0-4 years in your practice. The be
provided for comparison.

Why does this matter?

In 2022, 25% of 0-4 year olds registered in Scot
used for respiratory infections within a General F
disproportionately represented in the spike in an
reports of GAS.

Antibiotics have limited efficacy in treating a larg
predominantly caused by viruses or self-limiting
every 16 treated with antibiotics will develop von
use of antibiotics in children can lead to with the

What can you do?

After clinical assessment a 'no antibiotic' or 'dela
the otherwise healthy children with conditions su
acute rhinosinusitis, acute cough/ bronchitis and

Children with the following would be included in

- Bilateral acute otitis media in children yo
- Acute otitis media in children with discharge or a high symptom score as defined in prescribing guidelines (web-link 8)
- Acute sore throat/acute pharyngitis/acute tonsillitis with high FeverPAIN score (web-link 8) or Centor score (web-link 9)
- Acute sinusitis and systemically very unwell or serious signs and symptoms (web-link 8)

MANAGEMENT INFORMATION ONLY, not for onward distribution

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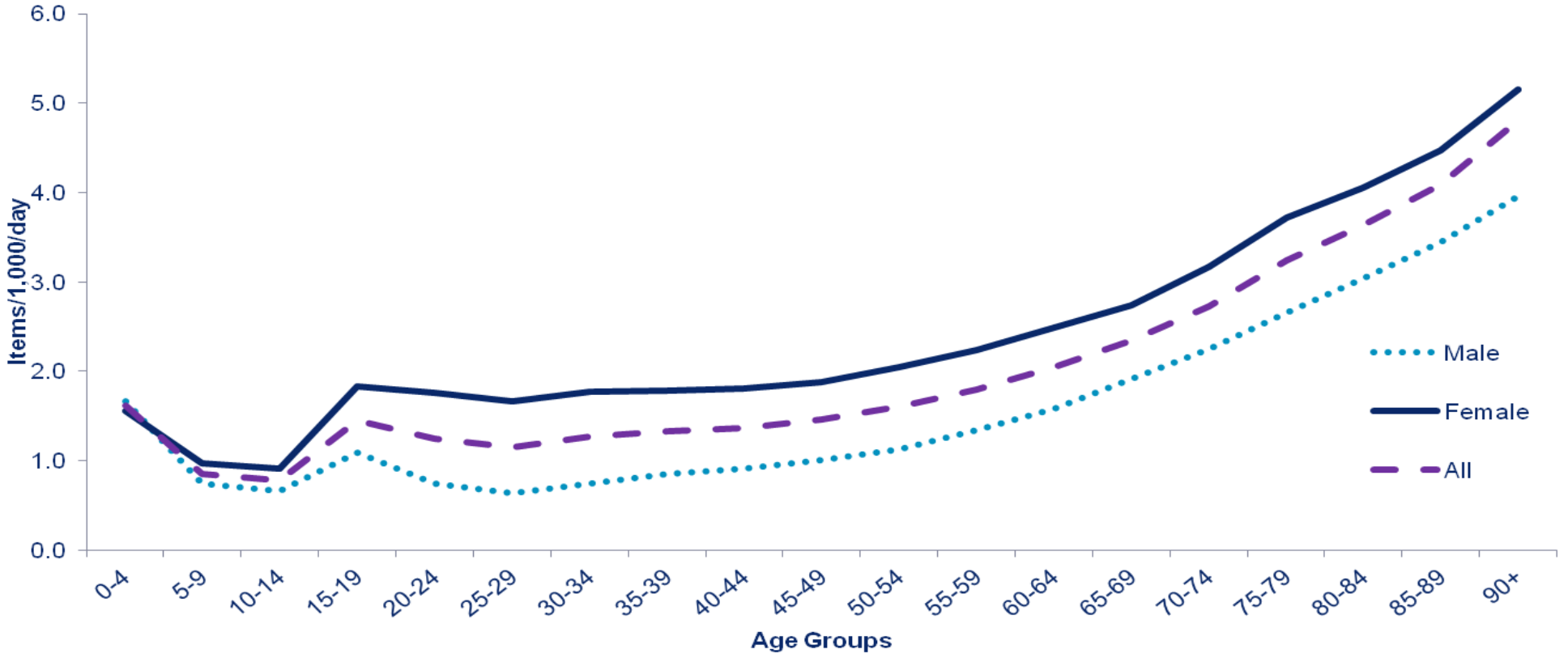
The power of patient level antimicrobial use data in primary care

Primary Care Use of Antibiotics by age group and Gender - 2017



Who to Prescribe

Optimising the time and resource of clinicians by diversifying the range of healthcare professionals involved

The changing face of prescribing

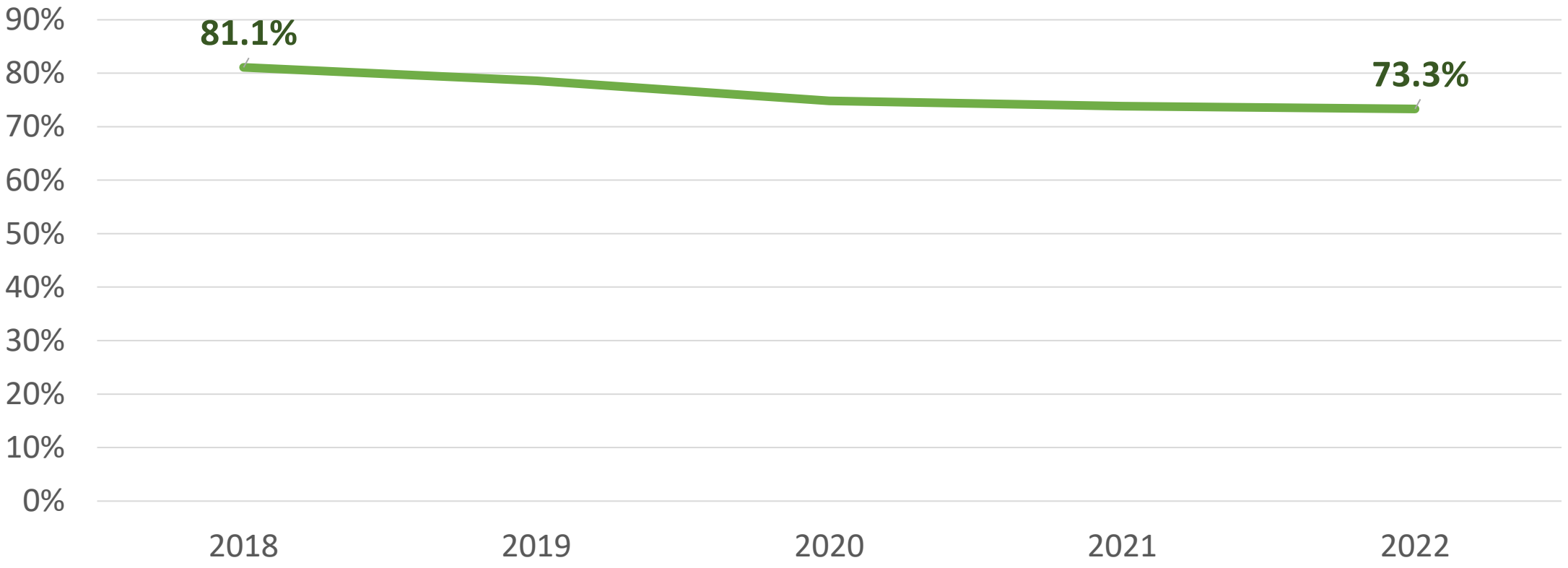
- Doctor who?

Who to Prescribe

Optimising the time and resource of clinicians by diversifying the range of healthcare professionals involved

The changing face of prescribing

Proportion of Antibiotic Items in Primary Care Prescribed by 'Medical' Prescribers

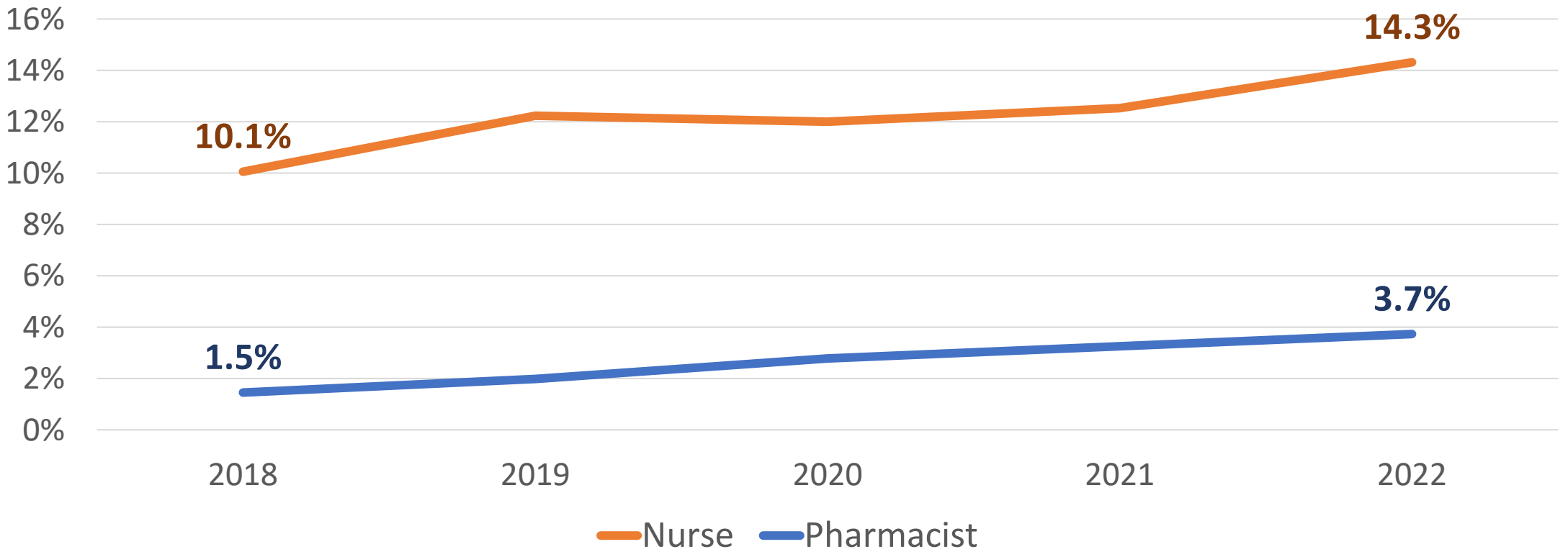


Who to Prescribe

Optimising the time and resource of clinicians by diversifying the range of healthcare professionals involved

The changing face of prescribing

Proportion of Antibiotic Items in Primary Care Prescribed by Nurses and Pharmacists

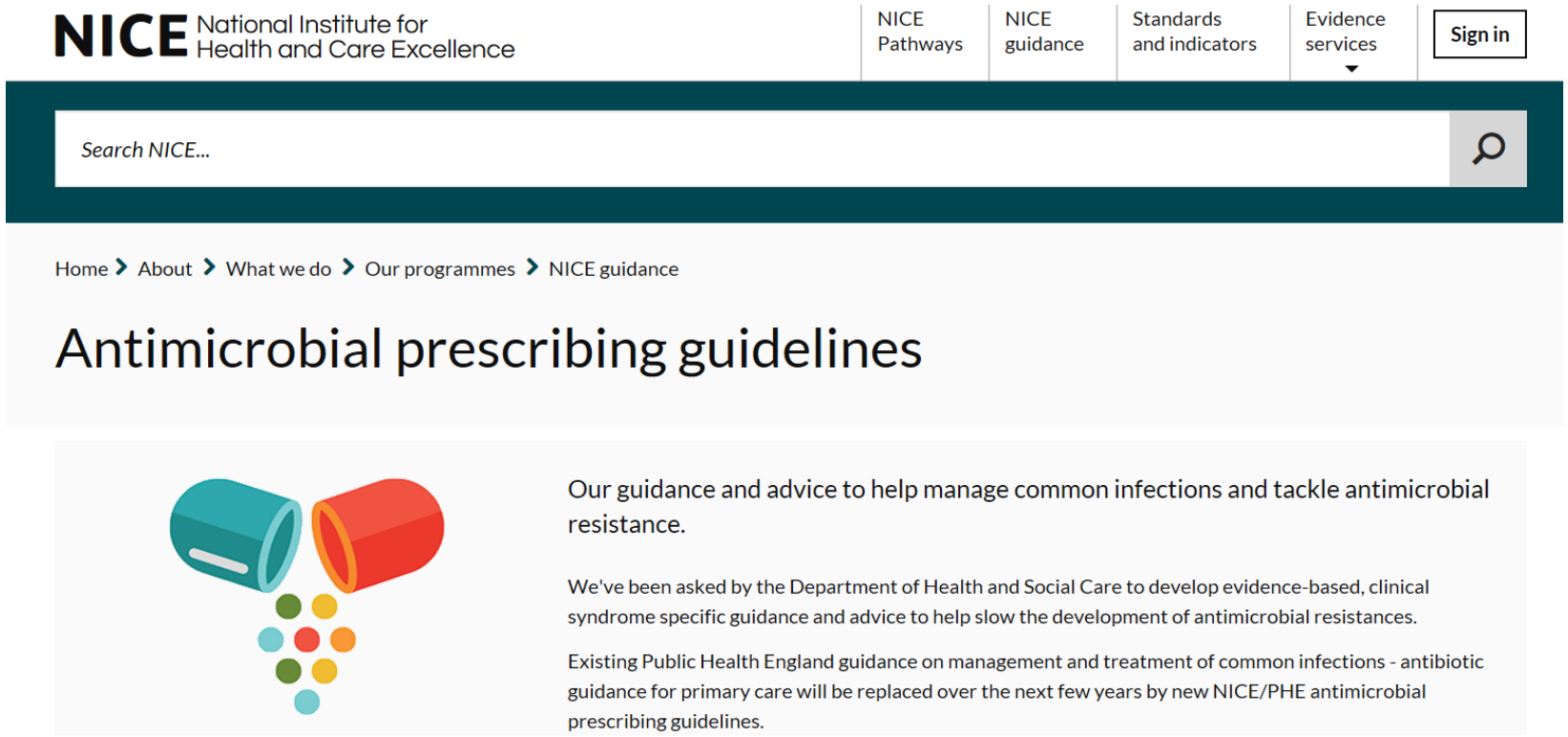


How Long to Prescribe

Encouraging the use of short courses when indicated

What is the recommended duration for common infections ?

What does the guidance tell us?



How Long to Prescribe

Encouraging the use of short courses when indicated

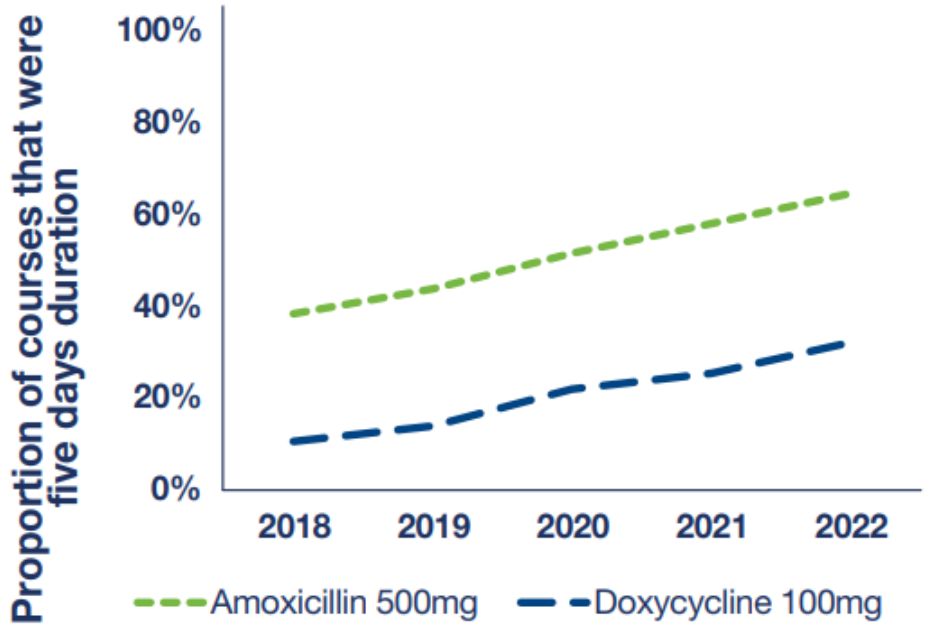
What is the recommended duration for common infections ?

What does the guidance tell us?

How Long to Prescribe

Encouraging the use of short courses when indicated

In **2022**, **64.7%** of courses of **amoxicillin 500mg capsule** prescriptions were for **five days duration**, compared to **58.1%** in **2021**.



In **2022**, **32.2%** of courses of **doxycycline 100mg capsule** prescriptions were for **five days** duration, compared to **25.5%** in **2021**.

The power of more current data in primary care

What have we learned so far…

The power of more current data in primary care

Near real time monitoring and reporting of trends on use of antibiotics commonly used for respiratory infection.

E-Prescribing Data: Antibiotics Commonly Used In Respiratory Tract Infection

Amoxicillin, Clarithromycin, Co- Amoxiclav, Co-Trimoxazole, Doxycycline, and Phenoxymethylpenicillin

Management information only, not for onward distribution

What is an electronic prescription message?

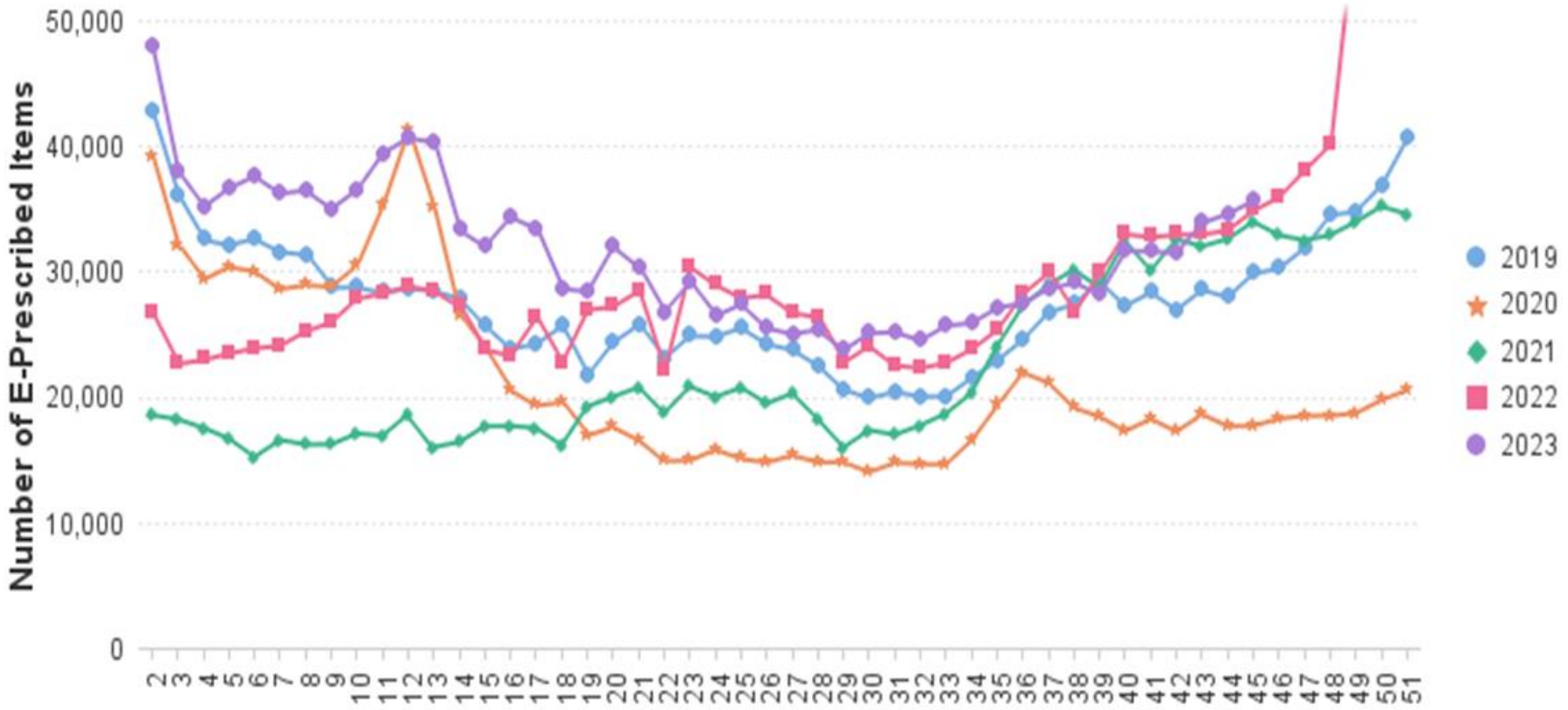
In the majority of cases, electronic messages are generated when a prescription is issued by a GP Practice. Approximately 95% of prescriptions for medicines are written by GPs and over 97% of these have electronic messaging (eMessage) support.

Why are we using electronic prescription message data?

The information from these eMessages is normally transferred into Public Health Scotland databases within 48 hours of being written and so, by using this, we are able to analyse and detect changes in prescribing behaviour in almost real-time. This compares with a delay of two-three months, or longer, for data to become available through the prescription payment process.

The power of more current data in primary care

Near real time monitoring and reporting of trends on use of antibiotics commonly used for respiratory infection.



The new kid: HEMPA

HMUD:

- Monthly data submitted from hospital pharmacy stock control systems
- Includes all issues i.e.to inpatient and outpatients areas
- Reported in DDDs, volume and cost – simple to interrogate
- Data submitted by all Health Boards
  - Timeliness of data varies between Health Boards and can be impacted by resource e.g. staff shortages
  - Can cause lag in the data availability
- Reporting available to hospital level – allows easy comparison across Scotland
- No patient level information, limited intelligence

Vs

HEPMA:

- Data collected from inpatient electronic prescribing systems, excludes discharge meds
- Two datasets at in-patient level:
  - Individual prescriptions
  - Individual administrations
- Allows basic patient characterisation
- Potential to link to other patient datasets
- Six Health Boards currently submitting data
  - Ayrshire and Arran, Dumfries and Galloway, Forth Valley, Greater Glasgow and Clyde, Lothian and Lanarkshire
  - Will be sometime before dataset is complete for the whole of Scotland and so no comparisons can be drawn yet
- Health Boards working to automate the data submission process, providing close to real time data

Key Success

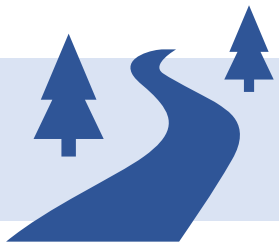
- Volume
- Choice
- Duration
- Variation
- Prescriber type
- Data Currency
- Annual reports
- FAPPC Reports
- Discovery Dashboard

Threats

- Post Covid19
  - Staffing levels
  - Attitudes ?
  - Less face to face consultations?
  - Changing landscape

Opportunities

- New Prescribers
- HEPMA
- Technology



We've come a long away but its just a start

- Not just counting… but understanding
- Move from what and how much to why
- Unleash power
  - Data linkage
  - Artificial Intelligence
  - Machine Learning
  - Risk
  - Outcomes
  - Personalised prescribing

Here’s to SAPG @ 20 and 25!

Acknowledgements

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NHS National Services Scotland

ARHAI Scotland
Antimicrobial Resistance and Healthcare Associated Infection