

MILLIMAN WHITE PAPER

# How is the English NHS prescription drugs budget spent?

Third edition: FY 2019/20

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## Executive summary

In October 2019, we presented an analysis on prescription drug expenditure and activity for NHS England<sup>1</sup> from financial year<sup>2</sup> (FY) 2017/18 to FY 2018/19. In this third edition report, we provide an updated view of NHSE prescription drug expenditure for FY 2019/20.

In FY 2019/20, NHS England (NHSE) spent £8.47 billion on prescription drugs prescribed by general practitioners (GPs) to their patients. This level of expenditure has increased by approximately 5.25% from FY 2018/19.

In Figure 1, we compare the trends for the four most recent financial year periods. Our analysis focuses on trends per person per month (PPPM) to standardise for population size changes between the comparison years. Overall, we observe an increasing trend in the prescription drug PPPM this year, whereas the trend in FY 2018/19 was negative.

**FIGURE 1: OVERVIEW OF COSTS AND LIVES, FY 2016/17 TO FY 2019/20**

Cost/activity component	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	2016/17 to 2017/18	2017/18 to 2018/19	2018/19 to 2019/20
<b>TOTAL FIGURES</b>					<b>TREND</b>	<b>TREND</b>	<b>TREND</b>
Total cost (£'millions)	8,283.82	8,209.51	8,043.89	8,466.07	-0.90%	-2.02%	5.25%
Total lives	57,880,736	58,672,414	59,370,620	60,087,639	1.37%	1.19%	1.21%
Total cost PPPM (£)	11.93	11.66	11.29	11.74	-2.23%	-3.17%	3.99%

In this version of the report, we have used population data from the NHS Digital website. This is consistent with the second version of this report. In the first edition, we used population data from the Office for National Statistics (ONS). Further detail on this methodology change is included in the 'Underlying data and limitations' section of the second edition of this report.

In this actuarial report, we investigate the drivers of the PPPM trend at a drug class and regional level using actuarial principles. The data and findings are interesting and certainly invite additional research into issues such as how different population risk profiles in different regions are expected to affect prescription drug costs, and how we can expect these costs to change over time, given expected changes in the population size and structure.

These insights can help stakeholders with experience analysis and planning by identifying cost and utilisation drivers on a population risk-adjusted basis as well as having a view of how demand may develop over the projection period.

### WHAT IS DRIVING THE UPWARD TREND?

The overall increase in prescription drug expenditure is driven by a combination of higher average costs and higher levels of activity. The average cost per item has increased by 4%, and items per 1,000 lives has increased by 0.90% from FY 2018/19 to 2019/20. An increasing population size, by 1.21% over the financial years, has further amplified the increase trend seen.

The majority of primary prescription drug spend in FY 2019/20—close to 60%—has been used to treat central nervous system, endocrine, cardiovascular and respiratory conditions. The PPPM costs for central nervous system has increased slightly, with total average costs remaining fairly consistent over time. Respiratory conditions have increased by 2.3%, with the increase mainly driven by a 2.1% increase in the items per thousand lives. The main

<sup>1</sup> Buckle, J., Hayward, T., Aggarwal A., (10 October 2020). How Is the English NHS Prescription Drugs Budget Spent? Milliman White Paper. Retrieved 16 November 2020 from <https://uk.milliman.com/en-gb/insight/how-is-the-english-nhs-prescription-drugs-budget-spent-second-edition-fy-201819>.

<sup>2</sup> The financial year period runs from 1 April to 31 March.

drivers of overall increased PPPM is attributed to a 10.7% increase in prescription drug spend for cardiovascular conditions and 5.3% increase in prescription drug spend for endocrine conditions. The cardiovascular conditions PPPM drug increase is predominantly driven by a 9.3% increase in cost per item, whereas the endocrine conditions PPPM drug increase is driven fairly equally by increasing costs per item and utilisation.

We have analysed cost and activity by Sustainability and Transformation Partnership (STP) areas to understand trends at a regional level and to reflect the regional level at which planning decisions are going to be made moving forward. All, apart from four of the STPs, have experienced PPPM increases (ranging from 0.0% to 5.5%). These increases are all largely driven by the increases in cost per item during FY 2019/20, which has increased from FY 2018/19 to FY 2019/20 for all STPs. The four STPs with decreasing PPPM trends are Humber, Coast & Vale, North West London Health & Care Partnership, Hertfordshire & West Essex and Birmingham & Solihull. This decreasing PPPM trend is driven by a decreasing trend in activity. In the previous report, every STP experienced a downward trend in PPPM costs across the two relevant financial years.

### RISK PROFILE ADJUSTMENT AND PROJECTIONS

To enhance our trend analysis, we calculated risk-adjusted PPPMs for each STP to determine what PPPM we 'expect' based on each STP's risk profile compared to the English average. This insight allows us to identify STPs with lower-risk or higher-risk profiles compared to the average population and to identify STPs with lower or higher actual PPPM costs than expected based on the risk adjustment.

Last, using all of the above, we projected total and PPPM prescription drug costs over a five-year period under various trend scenarios to illustrate how changes in these trends and the population size and structure may change this area of NHS spend compared to the current experience.

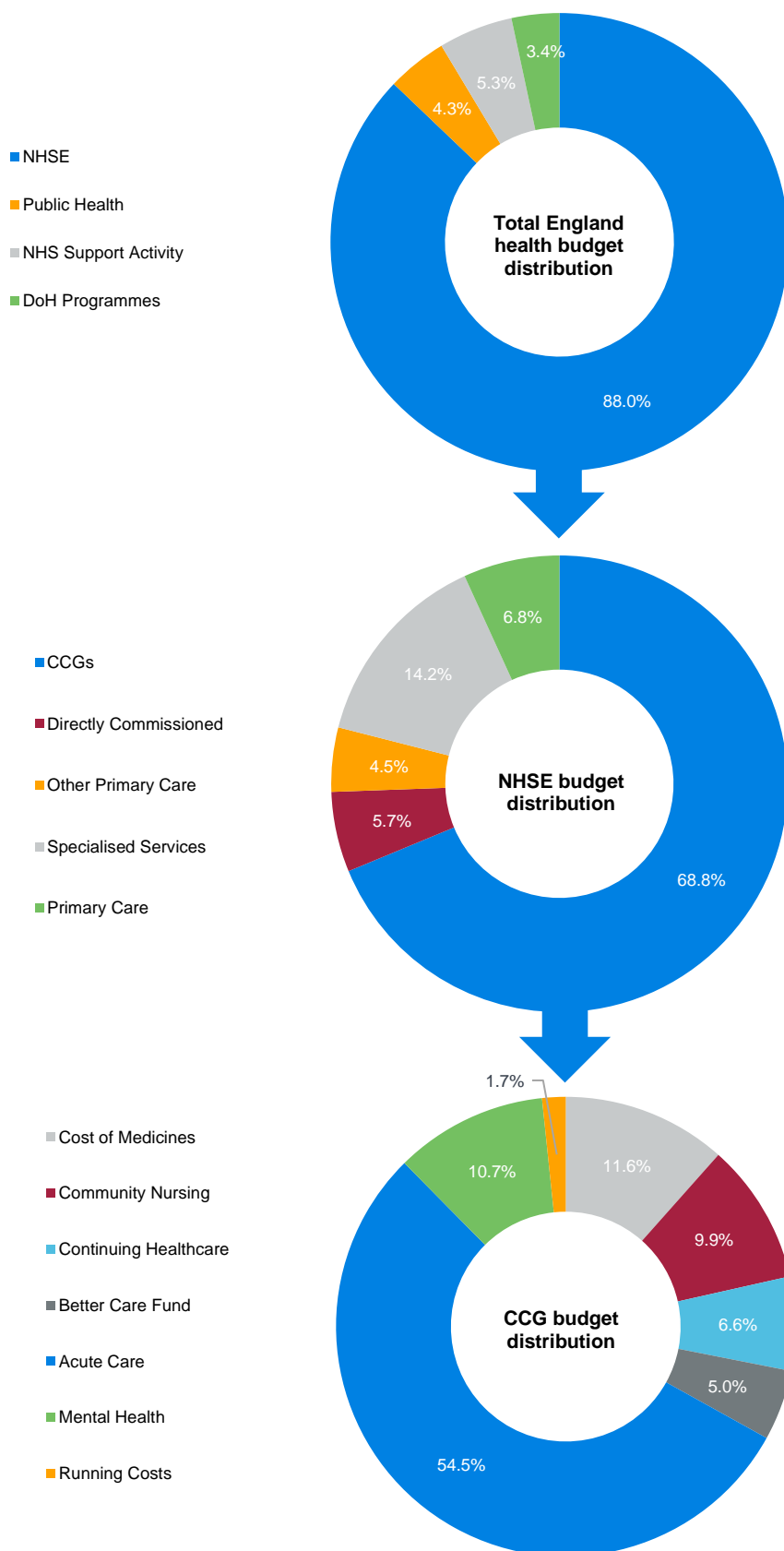
## Introduction

In the FY 2018/19, the total healthcare budget for NHS England was £114 billion,<sup>3</sup> and in FY 2019/20, the budget increased to £124 billion.<sup>4</sup> NHS England receives the majority of the budget for health, approximately 88% of the total Department of Health and Social Care budget (at £140 billion), to deliver healthcare services across the population. In 'Fair Shares: A Guide to NHS Allocations' for FY 2019/20, NHSE reports that it allocates approximately 69.0% of its budget to clinical commissioning groups (CCGs), and, of this, 11.6% is spent on medicines prescribed by GPs to their patients. This represents 8.0% of the total NHSE budget and 7.0% of the total Department of Health (DoH) budget.

<sup>3</sup> NHS England. Our 2018/19 Report. Retrieved 1 October 2019 from <https://www.england.nhs.uk/wp-content/uploads/2019/07/Annual-Report-Full-201819.pdf>.

<sup>4</sup> NHS Providers Briefing (March 2020). Retrieved 15 November 2020 from <https://nhsproviders.org/media/689303/nhs-providers-briefing-march-2020-budget.pdf>.

FIGURE 2: BUDGET FOR HEALTHCARE IN ENGLAND, FY 2019/20<sup>5</sup>



<sup>5</sup> NHS England (February 2020). Fair Shares: A Guide to NHS Allocations. Retrieved 15 November 2020 from <https://www.england.nhs.uk/wp-content/uploads/2020/02/nhs-allocations-infographics-feb-2020.pdf>.

## Glossary of terms

FIGURE 3: GLOSSARY OF TERMS

TERM	DESCRIPTION
<b>BNF</b>	British National Formulary, the standard list of medicine codes used by the NHS.
<b>CCG</b>	Clinical commissioning group.
<b>FY</b>	Financial year.
<b>Items</b>	A single supply of medicine, e.g., three items will be recorded for a prescription form with three medicine items.
<b>NHS BSA</b>	NHS Business Services Authority.
<b>NHSE</b>	National Health Service England.
<b>NIC</b>	Net ingredient cost. This is the list price excluding the value-added tax (VAT) that can be found in the National Drug Tariff.
<b>PCO</b>	Primary care organisation.
<b>PPPM</b>	Per person per month cost.
<b>RA</b>	Risk-adjusted.
<b>STP</b>	Sustainability and Transformation Partnership.
<b>Total cost</b>	Represents the true price paid by the NHS. Total cost = NIC – (discounts) + (payment for consumables, container and out-of-pocket expenses).

## Underlying data and limitations

Data has been extracted from the publicly available prescription drugs data<sup>6</sup> published by the NHS Business Services Authority (BSA) from FY 2017/18 to FY 2019/20, and data from the Office for National Statistics (ONS) for FY 2016/17. The BSA published data includes the number of prescription items and associated costs that are prescribed and dispensed for each GP practice in England on a monthly basis by British National Formulary (BNF) code for drugs. The data excludes high-cost drugs, drugs dispensed in a hospital setting, drugs prescribed in hospital and dispensed in the community, private prescriptions, over-the-counter (OTC) drugs and dispensing costs. For the purposes of our analysis, we have only included data where the primary care organisation (PCO) name within the data relates to a CCG.

Population risk-adjustment factors used in our analysis have been calibrated using the prescribing needs factors<sup>7</sup> published by NHSE. The prescribing needs factors are used by NHSE to allocate financial resources to CCGs based on local healthcare needs.

Population figures by CCG have been extracted from the NHS Digital website.<sup>8</sup> The projected population figures have been extracted from the allocations section of the NHS website.<sup>9</sup> Note that the first version of this paper,<sup>10</sup> which reported on FY 2016/17 and FY 2017/18, used projections from the ONS data set 'Population projections for clinical commissioning groups and NHS regions.'<sup>11</sup> For more information on the reasoning behind this change, please refer to this section in the second version of this report.

In carrying out our analysis and producing this paper, we relied on the data and information obtained from the sources described above. We have not audited or verified this data or other information. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete. We performed a limited review of the data used directly in our analysis for reasonability and consistency, and we have not found any material defects in the data. This paper is intended solely for education purposes and presents information of a general nature.

<sup>6</sup> NHS BSA. Prescription Data. Retrieved 7 October 2020 from <https://www.nhsbsa.nhs.uk/prescription-data>.

<sup>7</sup> NHSE. Allocations. Retrieved 7 October 2020 from <https://www.england.nhs.uk/allocations/>.

<sup>8</sup> NHS Digital. Patients Registered at a GP Practice (month-wise registration at GP practices). Retrieved 1 June 2020 from <https://digital.nhs.uk/data-and-information/publications/statistical/patients-registered-at-a-gp-practice>.

<sup>9</sup> NHS England. Allocations (population projections). Retrieved 1 October 2019 from <https://www.england.nhs.uk/allocations/>.

<sup>10</sup> Buckle, J. et al., op cit.

<sup>11</sup> ONS. Data set: Population Projections for Clinical Commissioning Groups and NHS regions: Table 3. Retrieved 17 May 2019 from <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections>.

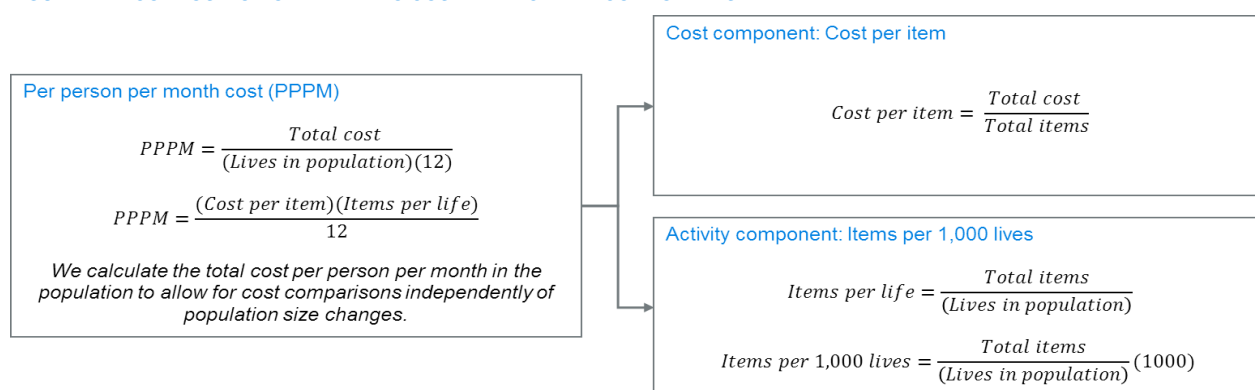
The underlying data and analysis have been reviewed on this basis. This paper is not intended to guide or determine any specific individual situation, and readers should consult qualified professionals before taking specific actions.

Differences between our projections and actual amounts depend on the extent to which future experience conforms to the assumptions made for this analysis. It is certain that actual experience will not conform exactly to the assumptions used in this analysis. Actual amounts will differ from projected amounts to the extent that actual experience deviates from expected experience.

## Cost and activity overview

To understand how total prescription drug cost has changed from one financial year to the next, we use a PPPM measure and decompose it into cost per item and items per 1,000 lives to identify trend drivers, as shown in Figure 4.

**FIGURE 4: DECOMPOSITION OF PPPM INTO COST AND ACTIVITY COMPONENTS**



The total spend on prescription drugs increased by almost 5.25% from FY 2018/19 to FY 2019/20. This is driven by a 4% increase in PPPM costs and an increase of 1.21% in the total entitled population. The total cost PPPM trend is driven mainly by the total cost per item trend of 3.1%, and a smaller component of the trend is driven by the items per 1,000 lives trend of 0.90%.

**FIGURE 5: OVERVIEW OF COST AND ACTIVITY ACROSS ALL FINANCIAL YEARS**

Cost/activity component	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	2016/17 to 2017/18	2017/18 to 2018/19	2018/19 to 2019/20
<b>TOTAL FIGURES</b>					<b>TREND</b>	<b>TREND</b>	<b>TREND</b>
Total cost (£'millions)	8,283.82	8,209.51	8,043.89	8,466.07	-0.90%	-2.02%	5.25%
Total lives	57,880,736	58,672,414	59,370,620	60,087,639	1.37%	1.19%	1.21%
Total cost PPPM (£)	11.93	11.66	11.29	11.74	-2.23%	-3.17%	3.99%
NIC cost PPPM (£)	12.81	12.53	12.10	12.58	-2.24%	-3.39%	3.97%
<b>COST</b>							
Total cost per item (£)	7.58	7.52	7.32	7.55	-0.80%	-2.61%	3.07%
NIC cost per item (£)	8.14	8.08	7.85	8.09	-0.80%	-2.83%	3.05%
<b>ACTIVITY</b>							
Items per 1,000 lives	18,887	18,614	18,508	18,674	-1.45%	-0.57%	0.90%

## BNF chapters driving trend

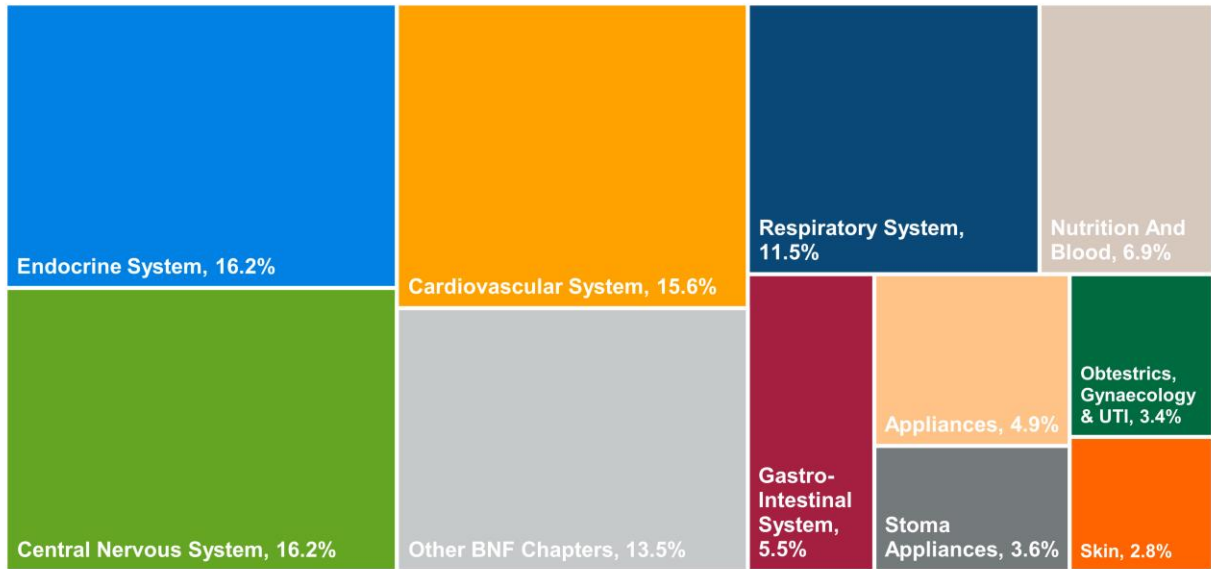
Close to 60% of the total cost in FY 2019/20 is attributed to the Central Nervous System, Endocrine, Cardiovascular and Respiratory British National Formulary (BNF) chapters. Within these four major chapters, over 80% of costs are due to the types of drugs shown in Figure 6. We have included the equivalent breakdown in FY2018/19 for comparison.

**FIGURE 6: MAJOR BNF SECTIONS WITHIN TOP FOUR BNF CHAPTERS BY TOTAL COST, FY 2018/19 AND FY 2019/20**

BNF CHAPTER AND SECTION	PROPORTION OF TOTAL COST WITHIN CHAPTER, FY 2018/19	PROPORTION OF TOTAL COST WITHIN CHAPTER, FY 2019/20
<b>CENTRAL NERVOUS SYSTEM</b>		
Analgesics	28.9%	29.2%
Antiepileptic Drugs	23.3%	21.3%
Antidepressant Drugs	13.6%	15.4%
Drugs Used in Psychoses and Related Disorders	9.9%	8.1%
Drugs Used in Parkinsonism/Related Disorders	6.8%	6.8%
Total Within BNF Chapter	82.5%	80.7%
<b>ENDOCRINE</b>		
Drugs Used in Diabetes	77.4%	77.8%
Thyroid and Antithyroid Drugs	7.8%	6.6%
Total Within BNF Chapter	85.2%	84.5%
<b>CARDIOVASCULAR</b>		
Anticoagulants and Protamine	42.6%	46.0%
Hypertension and Heart Failure	15.7%	15.7%
Nit, Calc Block and Other Antianginal Drugs	14.2%	12.2%
Lipid-regulating Drugs	11.1%	9.4%
Total Within BNF Chapter	83.6%	83.3%
<b>RESPIRATORY</b>		
Corticosteroids (Respiratory)	59.8%	58.4%
Bronchodilators	32.0%	32.4%
Total Within BNF Chapter	91.8%	90.8%



FIGURE 7: DISTRIBUTION OF THE TOP 10 BNF CHAPTERS RANKED BY TOTAL COSTS, FY 2019/20



Cardiovascular system drugs have experienced a 10.7% PPPM increase, driven by a 9.3% increase in cost per item. 'Anticoagulants and protamine,' and 'Hypertension and Heart Failure' are the main BNF sections driving the cardiovascular PPPM trend, with an increase of 19.7% and 10.5% in their PMPM trends, respectively.

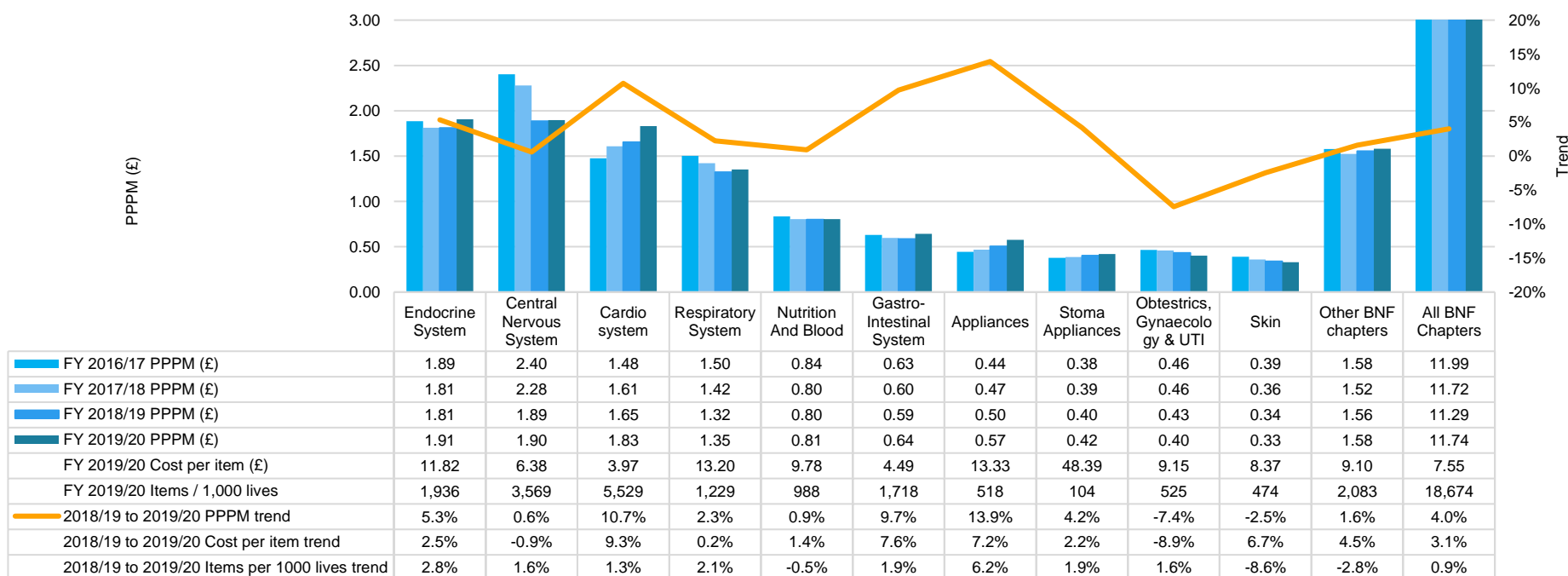
Endocrine system drugs have experienced a 5.3% PPPM increase, driven by a 2.5% increase in costs per item and a 2.8% increase in items per 1,000 lives. 'Drugs Used In Diabetes' is the main BNF section driving the endocrine PPPM trend, with an increase in its PMPM trend from FY 2018/19 to FY 2019/20 of approximately 6%.

The central nervous system had a relatively stable PPPM across the two financial years, driven by a decrease (-0.9%) in cost per item trend, which is offset by an increase of 1.6% in the items per 1,000 lives trend.

The respiratory system PPPM increased by 2.3%, driven almost entirely by its' increasing items per 1,000 lives trend of 2.1%.

All other BNF chapters, as grouped in Exhibit 7, experience an increasing PMPM trend other than Obstetrics, Gynaecology & UTI and Skin, where the decreasing PPPM trend for Obstetrics, Gynaecology & UTI is driven by a decrease in the cost per item, and the decreasing trend for Skin is driven by a decrease in activity.

FIGURE 8: COMPONENTS OF TOTAL PPPM TREND BY BNF CHAPTER; FY 2017/18 VS. FY 2018/19 VS. FY 2019/20



## STPs driving trend

### SUSTAINABILITY AND TRANSFORMATION PARTNERSHIPS (STPs)

Sustainability and Transformation Partnerships (STPs) have been established as part of the NHS's five-year forward view. Local NHS organisations and councils have drawn up shared proposals to improve health and care in the areas they serve, with the long-term needs of local communities in mind. Each STP comprises an assembly of CCGs, local councils and providers.

In order to understand the distribution of cost and activity and associated trends for prescription drugs at a regional level, we have grouped the experience by CCG into the respective STPs. STP boundaries are shown in Figure 9.

FIGURE 9: STP BOUNDARIES AND LABELS, FY 2019/20



NO.	STP	NO.	STP	NO.	STP
1	Cumbria and North East	15	The Black Country and West Birmingham	29	North West London Health and Care Partnership
2	Healthier Lancashire and South Cumbria	16	Birmingham and Solihull	30	Bristol, North Somerset and South Gloucestershire
3	Humber, Coast and Vale	17	Cambridgeshire and Peterborough	31	Our Healthier South East London
4	West Yorkshire and Harrogate (Health and Care Partnership)	18	Coventry and Warwickshire	32	Frimley Health and Care ICS
5	Greater Manchester Health and Social Care Partnership	19	Northamptonshire	33	South West London Health and Care Partnership
6	South Yorkshire and Bassetlaw	20	Herefordshire and Worcestershire	34	Bath and North East Somerset, Swindon and Wiltshire
7	Cheshire and Merseyside	21	Suffolk and North East Essex	35	Surrey Heartlands Health and Care Partnership
8	Lincolnshire	22	Bedfordshire, Luton and Milton Keynes	36	Kent and Medway
9	Joined Up Care Derbyshire	23	Mid and South Essex	37	Hampshire and the Isle of Wight
10	Nottingham and Nottinghamshire Health and Care	24	Hertfordshire and West Essex	38	Somerset
11	Staffordshire and Stoke on Trent	25	Gloucestershire	39	Sussex and East Surrey Health and Care Partnership
12	Leicester, Leicestershire and Rutland	26	Buckinghamshire, Oxfordshire and Berkshire West	40	Dorset
13	Norfolk and Waveney Health and Care Partnership	27	North London Partners in Health and Care	41	Devon
14	Shropshire and Telford and Wrekin	28	East London Health and Care Partnership	42	Cornwall and the Isles of Scilly Health and Social Care Partnership

## TREND DRIVERS

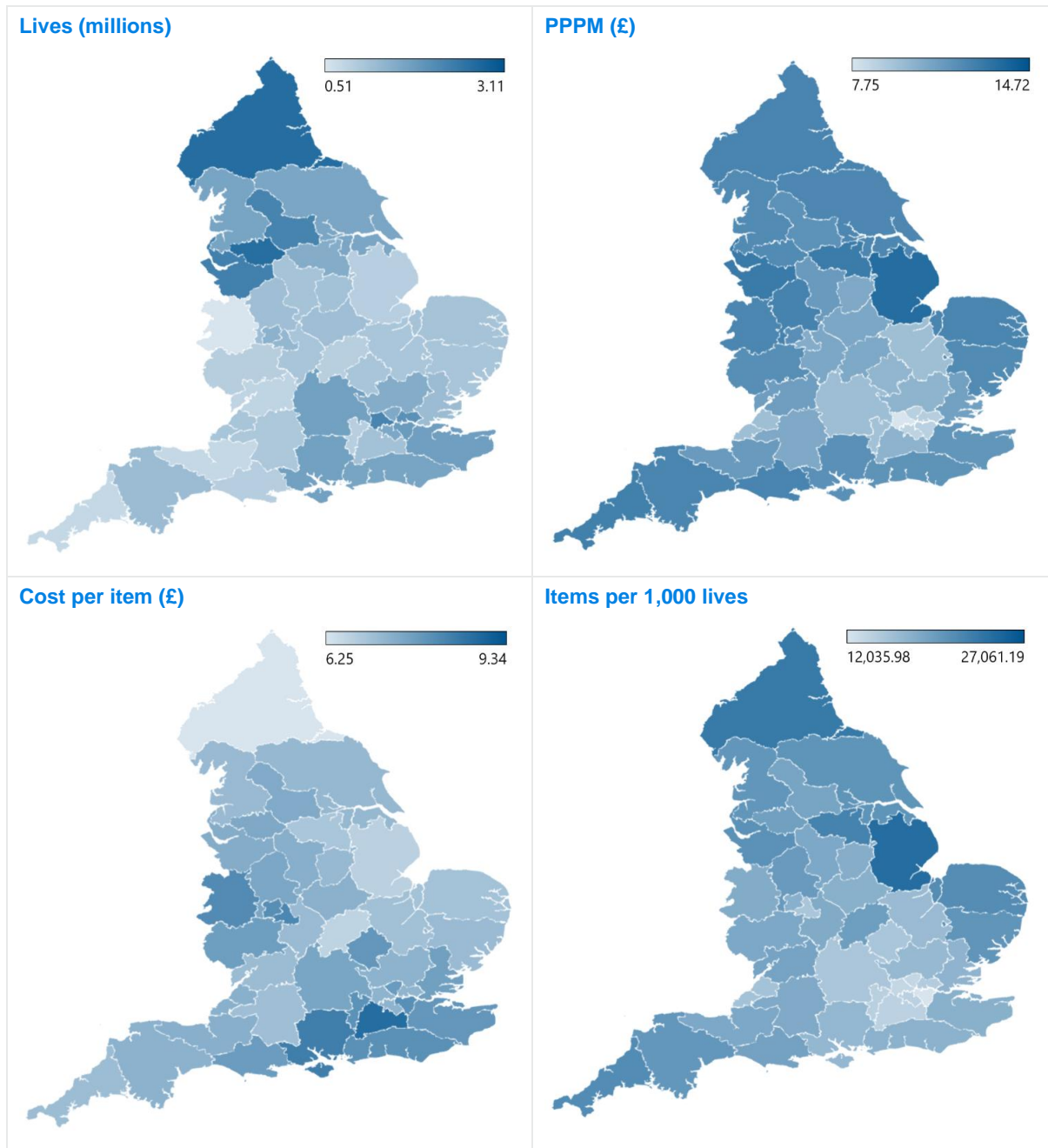
Figure 10 shows the drivers of PPPM trend for the top 20 STPs by total cost in FY 2019/20. Of the top 20 STPs, Cumbria and North East STP has the highest total cost in FY 2019/20. Almost all of the STPs have experienced an increase in the PPPM, which is mainly driven by an increase in cost per item. Similarly, the cost per item has a positive trend for all STPs for the two comparison years. There is a marginal increase in the items per 1,000 lives for seven of the 20 STPs. For the remaining STPs there is a decrease in the items per 1,000 lives.

The heat maps in Figure 11 help us to visually identify if high/low PPPM STPs have high/low costs per item and/or items per 1,000 lives.

FIGURE 10: COMPONENTS OF PPPM TREND BY STP FY 2018/19 VS. FY 2019/20

STP No.	STP	FY 2019/20	PPPM (£)			Cost per item (£)			Items per 1,000 lives		
		Lives (millions)	FY 2018/19	FY 2019/20	Trend	FY 2018/19	FY 2019/20	Trend	FY 2018/19	FY 2019/20	Trend
1	Cumbria and North East	3.11	13.13	13.24	0.82%	6.12	6.25	2.27%	25,759	25,393	-1.42%
5	Greater Manchester Health and Social Care Partnership	3.10	12.47	12.85	3.05%	7.43	7.65	3.01%	20,144	20,152	0.04%
7	Cheshire and Merseyside	2.66	13.27	13.88	4.64%	7.36	7.54	2.49%	21,632	22,086	2.10%
4	West Yorkshire and Harrogate (Health and Care Partnership)	2.58	11.88	12.31	3.56%	7.38	7.61	3.06%	19,315	19,409	0.48%
37	Hampshire and the Isle of Wight	1.89	12.00	12.44	3.69%	8.57	8.85	3.22%	16,794	16,870	0.45%
36	Kent and Medway	1.92	11.98	12.11	1.15%	7.97	8.17	2.50%	18,035	17,799	-1.31%
2	Healthier Lancashire and South Cumbria	1.78	12.49	12.82	2.69%	6.95	7.17	3.10%	21,557	21,472	-0.39%
3	Humber, Coast and Vale	1.75	13.18	13.02	-1.26%	7.02	7.21	2.75%	22,533	21,653	-3.91%
39	Sussex and East Surrey Health and Care Partnership	1.78	12.21	12.26	0.46%	8.15	8.34	2.36%	17,977	17,643	-1.85%
6	South Yorkshire and Bassetlaw	1.58	13.30	13.78	3.61%	6.67	6.85	2.58%	23,915	24,156	1.01%
29	North West London Health and Care Partnership	2.56	7.82	7.75	-0.87%	7.15	7.35	2.81%	13,125	12,655	-3.58%
28	East London Health and Care Partnership	2.24	8.36	8.56	2.37%	7.14	7.31	2.39%	14,045	14,042	-0.02%
15	The Black Country and West Birmingham	1.48	12.43	12.50	0.57%	8.10	8.39	3.50%	18,402	17,880	-2.83%
26	Buckinghamshire, Oxfordshire and Berkshire West	1.89	9.08	9.57	5.33%	7.45	7.75	3.93%	14,623	14,820	1.35%
31	Our Healthier South East London	2.01	8.20	8.39	2.38%	8.15	8.37	2.66%	12,069	12,036	-0.28%
41	Devon	1.24	12.47	13.15	5.45%	7.11	7.40	4.17%	21,049	21,308	1.23%
24	Hertfordshire and West Essex	1.58	10.26	10.23	-0.34%	7.24	7.37	1.89%	17,015	16,642	-2.19%
11	Staffordshire and Stoke on Trent	1.16	13.14	13.32	1.39%	7.51	7.71	2.73%	21,009	20,733	-1.31%
16	Birmingham and Solihull	1.33	11.32	10.63	-6.14%	8.39	8.60	2.44%	16,188	14,832	-8.38%
23	Mid and South Essex	1.24	11.40	11.40	0.00%	7.75	7.92	2.16%	17,658	17,285	-2.11%
	Others	21.20	10.72	10.96	2.25%	7.21	7.43	3.12%	17,844	17,693	-0.85%
	<b>Total</b>	<b>60.09</b>	<b>11.21</b>	<b>11.43</b>	<b>1.92%</b>	<b>7.30</b>	<b>7.51</b>	<b>2.88%</b>	<b>18,442</b>	<b>18,270</b>	<b>-0.93%</b>

FIGURE 11: COMPONENTS OF PPPM BY STP, FY 2019/20



## Risk adjustment

Each CCG (and by extension each STP) has a different population size and risk profile and consequently a different cost and activity profile for prescription drugs. We standardise for differences in population size by reporting cost and activity at PPPM, cost per item and items per 1,000 lives levels. To standardise for differences in risk profile, we use the prescribing factors that have been developed by NHSE.

### NHSE PRESCRIBING FACTORS

The allocation of financial resources from NHSE to each CCG is determined using a statistical formula.<sup>12</sup> The formula takes into account various demand and supply factors. The aim is to make the geographical distribution of funds fair and objective while reflecting local healthcare needs and reducing inequalities.

The funding allocation formula for CCGs considers prescribing, mental health and maternity services separately from other healthcare services. As such, we have used the prescribing factors as part of our risk adjustment methodology. The prescribing factors incorporate adjustments for the following:

1. Distribution of registered patients by age band and sex
2. Other factors:
  - Proportion of registered patients aged over 85
  - Proportion of registered patients aged over 70 and claiming Disability Living Allowance
  - Standardised mortality ratio for all ages
  - Fertility rate
  - Practices with the largest proportions of registered patients aged 20 to 24
  - Index of Multiple Deprivation (IMD) overall score<sup>13</sup>
  - Proportion of registered patients with activity-limiting health conditions, age/sex-standardised
  - Proportion of registered patients in social housing
  - Ethnicity, age/sex-standardised

In order to use these factors in our modelling, we have considered them in two major categories: 'age/sex' and 'other' factors. We have normalised the factors based on the population size and age/sex distribution of the population for each CCG for each financial year included in the analysis. For each CCG, we expect the 'age/sex' factor to change from one year to the next as the mix in lives changes. For the 'other' factors, there is no published change at a CCG level from one year to the next. At an STP level, there is a change in both groups of factors based on how the mix in lives changes within the CCGs that are allocated to each STP.

### RISK-ADJUSTED PRESCRIBING PPPMS

After calculating the total prescribing 'age/sex' and 'other' factors, we calculate a risk-adjusted PPPM cost for each STP. The risk adjustment factor for each STP represents how different we expect the PPPM for a particular STP to be, compared to the average PPPM across all STPs, given the risk profile of registered patients within the STP. Consequently, the risk-adjusted PPPM is the PPPM we *expect* based on the average across the country and the STP's risk profile.

For example, for an STP with a risk adjustment factor of 1.03 relative to the average, we expect a PPPM 3% higher than the average PPPM, i.e., if the average PPPM is £100, the risk-adjusted PPPM is £103. If the STP has an actual PPPM of £105, the actual versus risk-adjusted value is 1.02 (£105/£103). The STP has a PPPM that is 5.0% higher than the average PPPM but, after adjusting for the STP's risk profile, we see that the difference between the STP's risk-adjusted PPPM and the average PPPM is 2.0%.

By comparing the actual and risk-adjusted PPPMs, we are able to:

- Identify STPs with lower-risk and higher-risk profiles compared to the average population
- Identify STPs with lower and higher actual PPPM costs than expected based on their risk-adjusted PPPMs

<sup>12</sup> For additional detail on the funding allocation formula, see: NHS England (April 2016). Technical Guide to Allocation Formulae and Pace of Change. Available at: <https://www.england.nhs.uk/wp-content/uploads/2016/04/1-allctins-16-17-tech-guid-formulae-v1.pdf>.

<sup>13</sup> The indices of deprivation measure relative levels of deprivation in small areas and neighbourhoods in England.

The total risk adjustment factors by STP have negligible changes between FY 2018/19 and FY 2019/20. Consequently, differences in risk-adjusted PPPM costs and risk-adjusted versus actual PPPM costs are due to changes in experience for reasons other than changes in risk profile.

Column B in the table in Figure 12 denotes the relative risk profile of an STP relative to the average across all STPs. For example, the risk profile of Devon is significantly higher than average. Column D in Figure 12 denotes the relative difference between actual and risk-adjusted PPPM. For example, South Yorkshire and Bassetlaw and The Black Country have higher PPPMs than we would 'expect' given their risk profiles.

FIGURE 12: RISK-ADJUSTED PPPM COSTS BY STP, FY 2019/20

STP NO.	STP	Actual PPPM (£) (A)	Risk adjustment factor relative to average (B)	Risk adjusted PPPM (£) (C) = (A <sub>Total</sub> )*(B)	Actual vs. risk adjusted PPPM (D) = (A)/(C)
1	Cumbria and North East	13.24	1.13	12.95	1.02
5	Greater Manchester Health and Social Care Partnership	12.85	1.04	11.88	1.08
7	Cheshire and Merseyside	13.88	1.12	12.83	1.08
4	West Yorkshire and Harrogate (Health and Care Partnership)	12.31	0.99	11.34	1.08
37	Hampshire and the Isle of Wight	12.44	1.00	11.43	1.09
36	Kent and Medway	12.11	0.99	11.31	1.07
2	Healthier Lancashire and South Cumbria	12.82	1.11	12.67	1.01
3	Humber, Coast and Vale	13.02	1.08	12.32	1.06
39	Sussex and East Surrey Health and Care Partnership	12.26	1.06	12.10	1.01
6	South Yorkshire and Bassetlaw	13.78	1.10	12.53	1.10
29	North West London Health and Care Partnership	7.75	0.82	9.34	0.83
28	East London Health and Care Partnership	8.56	0.85	9.68	0.88
15	The Black Country and West Birmingham	12.50	1.07	12.26	1.02
26	Buckinghamshire, Oxfordshire and Berkshire West	9.57	0.86	9.88	0.97
31	Our Healthier South East London	8.39	0.81	9.28	0.90
41	Devon	13.15	1.11	12.72	1.03
24	Hertfordshire and West Essex	10.23	0.92	10.47	0.98
11	Staffordshire and Stoke on Trent	13.32	1.08	12.34	1.08
16	Birmingham and Solihull	10.63	0.99	11.36	0.94
23	Mid and South Essex	11.40	0.99	11.30	1.01
	Other STPs	10.96	0.99	11.35	0.97
	<b>Total</b>	<b>11.43</b>	<b>1.00</b>	<b>11.43</b>	<b>1.00</b>

Differences between risk-adjusted PPPMs and actual and risk-adjusted PPPM costs are highlighted in the heat maps in Figure 13. The risk-adjusted PPPM map shows how risk profiles vary by STP, with darker areas having higher-risk profiles. The actual versus risk-adjusted PPPM map shows how different STPs are spending less money (lighter areas) or more money (darker areas) than their risk profiles would suggest. STPs in the north, southwest and east of the country appear to have higher-risk profiles and, consequently, higher risk-adjusted PPPMs than central regions and London.

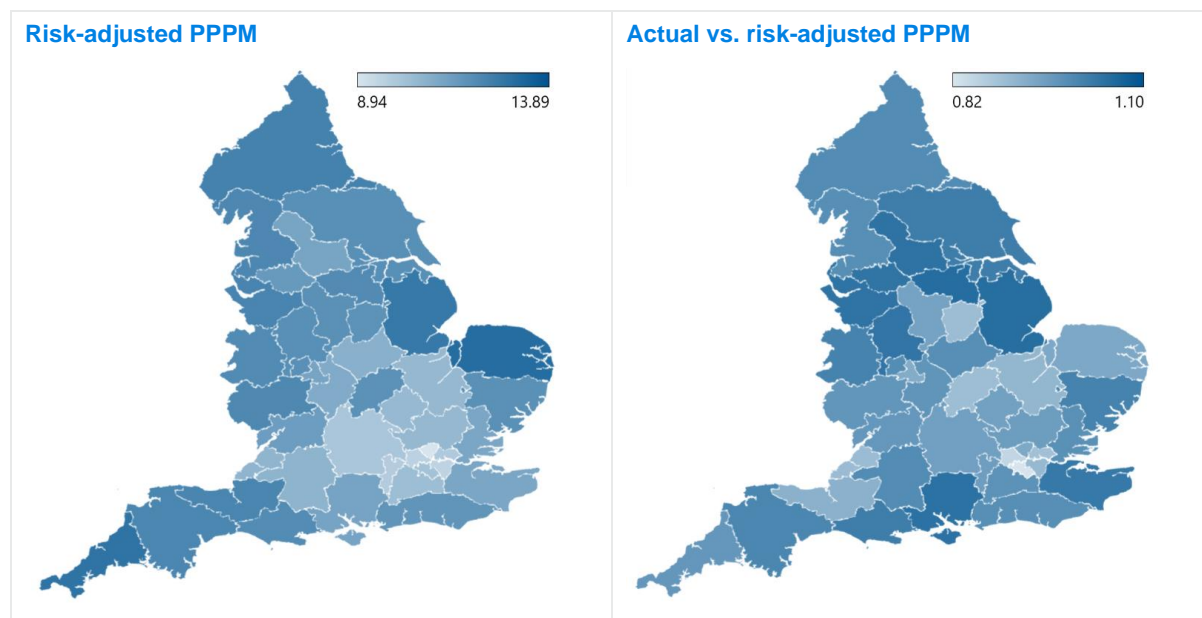
Larger differences between actual and risk-adjusted PPPMs are observed in the north of the country as well as in the southeast.

As an example, the two STPs of Devon and Cumbria and North East have a high risk-adjusted PPPM, indicating that the two STPs have higher-risk profiles than an average STP. This can be seen in Figure 12 and Figure 13.



Lincolnshire has one of the highest actual PPPM of all STPs in FY 2019/20 and also the largest difference between the actual and risk-adjusted PPPMs, i.e., after standardising for the higher-risk profile in Lincolnshire, it still has a higher average PPPM than the total. The differences between actual and risk-adjusted PPPMs may indicate that the funding allocation formula is not accurately capturing the risk profiles within the CCGs or STPs, which may signal that the factors used could benefit from being updated to reflect current risk profiles.

**FIGURE 13: RISK-ADJUSTED PPPM AND ACTUAL VS. RISK-ADJUSTED PPPM BY STP, FY 2019/20**



## Projections

So far, we have focused on historical data for two financial years, but it is also possible to project how we may expect prescription drug total cost PPPMs and total costs to change over the next five years. These projections are based on how we expect the population size and structure to change, along with various scenarios for PPPM cost trends.

In order to determine how the population size and structure may change over the projection period, we have used NHS England allocations population projections by age band, sex and CCG.

We have defined various PPPM trend scenarios to give an idea of how prescription drug PPPMs and total costs may develop over the projection period. The historical trend has been calculated as the PPPM trend from FY 2018/19 and FY 2019/20, after removing the effects of age/sex and other prescribing factors. This is approximately equal to 5.3% per year.

All scenarios include demographic trends which adjust the total costs and PPPM projections for the projected effects of age/sex and other prescribing factors, as well as projected changes in the population size.

**FIGURE 14: DESCRIPTION OF PROJECTION SCENARIOS**

Scenario	Trends used
Historical	PPPM trend of 5.3% for all projection years
Zero	PPPM trend of 0.0% for all projection years
Low	PPPM trend of -2.0% for all projection years
High	PPPM trend of 7.5% for all projection years

The historical trend is driven by the increase in total cost from FY 2018/19 to FY 2019/20. Actual future trends will depend on changes to the overall health budget and funding allocation decisions made by NHSE.

The 'zero' trend scenario shows the expected effect of changes in age/sex and other factors without any assumed cost or activity per person trend. The 'high' trend scenario illustrates how total cost and PPPM costs may change if PPPM costs increase by 7.5% per year. We have also included a 'low' scenario, where costs increase at a rate of -2.0% per annum, which is similar to the historical trend in last year's report.

Unlike the PPPM projection, the total cost projection reflects expected changes in the population size. We observe that the annual average trend for the total prescribing costs for the 'zero' trend scenario is 0.2%, which reflects the impact of demographic changes in the projection period.

FIGURE 15: PROJECTED PPPM PRESCRIBING COSTS (USING ACTUAL FY 2019/20 FIGURES)

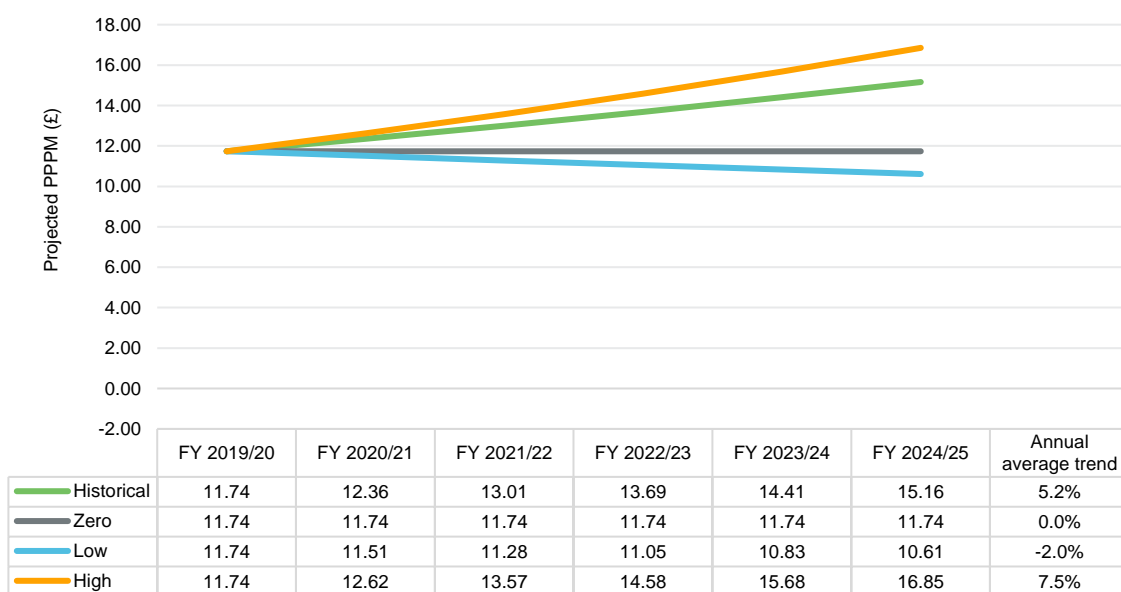
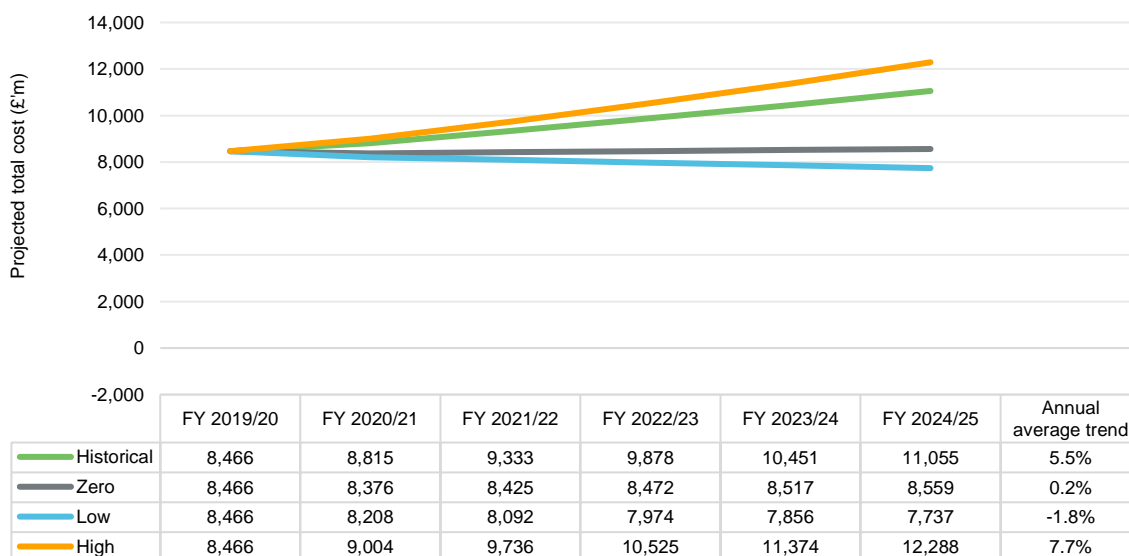


FIGURE 16: PROJECTED TOTAL PRESCRIBING COSTS (USING ACTUAL FY 2019/20 FIGURES)



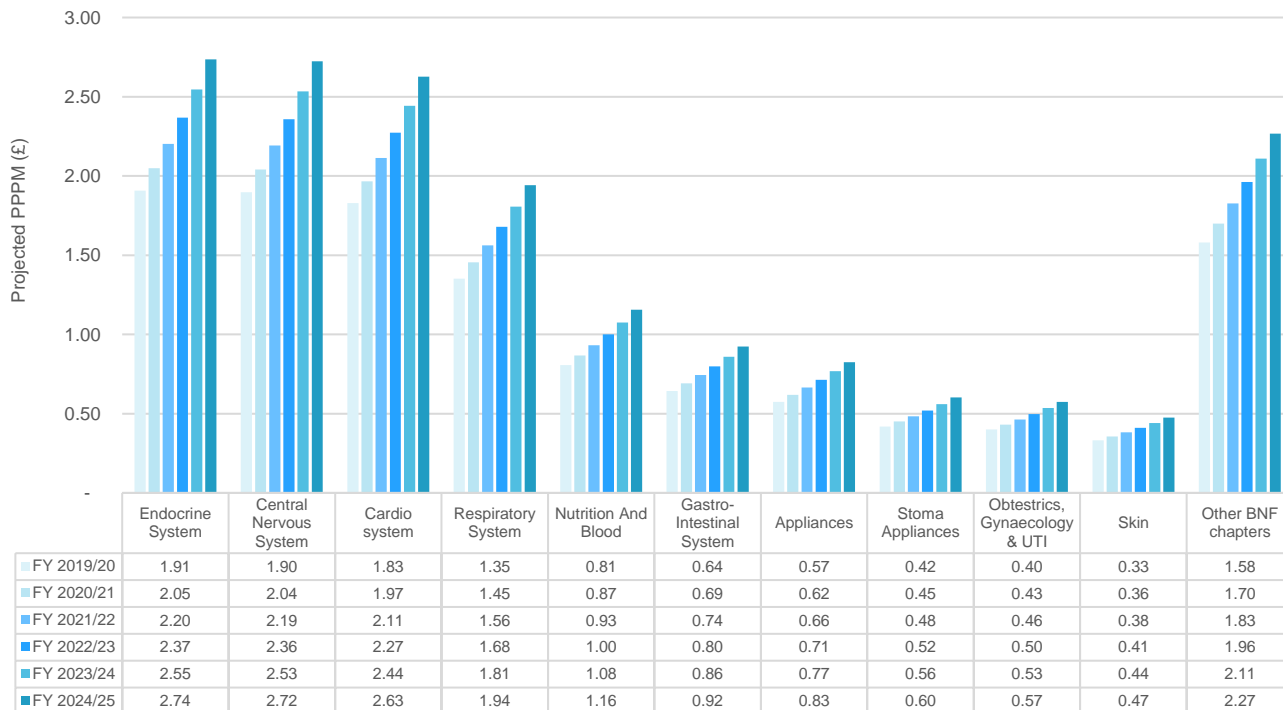
Applying the historical trend scenario by STP, we are able to calculate the projected PPPM for each projection year. The projected PPPMs observed in Figure 17 are driven by a combination of the demographic factor changes and the PPPM trend that has been applied. In this projection, non-demographic risk profile changes were assumed to have an immaterial impact.

**FIGURE 17: PROJECTED PPPM PRESCRIBING COSTS FOR TOP 20 STPS (USING ACTUAL FY 2019/20 FIGURES)**

STP No.	STP	PPPM (£)					
		FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
1	Cumbria and North East	13.24	14.23	15.29	16.44	17.67	18.99
5	Greater Manchester Health and Social Care Partnership	12.85	13.81	14.85	15.96	17.15	18.43
7	Cheshire and Merseyside	13.88	14.93	16.05	17.25	18.54	19.93
4	West Yorkshire and Harrogate (Health and Care Partnership)	12.31	13.23	14.22	15.29	16.43	17.66
37	Hampshire and the Isle of Wight	12.44	13.38	14.38	15.46	16.61	17.86
36	Kent and Medway	12.11	13.02	14.00	15.05	16.18	17.39
2	Healthier Lancashire and South Cumbria	12.82	13.79	14.82	15.93	17.12	18.40
3	Humber, Coast and Vale	13.02	13.99	15.04	16.17	17.38	18.68
39	Sussex and East Surrey Health and Care Partnership	12.26	13.19	14.18	15.24	16.39	17.62
6	South Yorkshire and Bassetlaw	13.78	14.82	15.93	17.12	18.40	19.78
29	North West London Health and Care Partnership	7.75	8.37	9.00	9.68	10.41	11.19
28	East London Health and Care Partnership	8.56	9.20	9.89	10.63	11.43	12.28
15	The Black Country and West Birmingham	12.50	13.43	14.44	15.52	16.68	17.92
26	Buckinghamshire, Oxfordshire and Berkshire West	9.57	10.29	11.06	11.89	12.78	13.73
31	Our Healthier South East London	8.39	9.02	9.70	10.43	11.21	12.05
41	Devon	13.15	14.13	15.19	16.33	17.56	18.87
24	Hertfordshire and West Essex	10.23	10.99	11.82	12.70	13.66	14.68
11	Staffordshire and Stoke on Trent	13.32	14.32	15.40	16.55	17.79	19.12
16	Birmingham and Solihull	10.63	11.42	12.28	13.20	14.19	15.25
23	Mid and South Essex	11.40	12.26	13.18	14.16	15.22	16.36
	Other STPs	10.96	11.75	12.64	13.60	14.62	15.73
	<b>Total</b>	<b>11.43</b>	<b>12.29</b>	<b>13.21</b>	<b>14.20</b>	<b>15.26</b>	<b>16.40</b>
	<b>Total lives (millions)</b>	<b>60.1</b>	<b>59.4</b>	<b>59.8</b>	<b>60.1</b>	<b>60.5</b>	<b>60.8</b>
	<b>Total cost (£ millions)</b>	<b>8,241</b>	<b>8,765</b>	<b>9,478</b>	<b>10,245</b>	<b>11,072</b>	<b>11,962</b>

Figure 18 illustrates projected PPPM costs over the projection period using the historical trend scenario. With the data available, it is not possible to isolate the impact of changing age/sex and other factors at a BNF chapter level and, as such, the same historical trend and age/sex and other factors have been applied across all BNF chapters.

**FIGURE 18: PROJECTED PPPM PRESCRIBING COSTS FOR TOP 10 BNF CHAPTERS (USING ACTUAL FY 2019/20 FIGURES)**



## Conclusion

In this paper, we provide a snapshot of the GP prescription cost and activity as well as driving trends for FY 2018/19 and FY 2019/20 in England. In addition to the actual position, we also discuss the cost and activity in FY 2019/20 if they are risk-adjusted for demographic factors. Finally, we provide a five-year trended, risk-adjusted projection of prescription cost (on total and PPPM bases).

We observe that the population size of NHS England has increased by 1.21% (59.4 million to 60.1 million) and the total cost PPPM has increased by 4% (£11.29 to £11.74) from FY 2018/19 to FY 2019/20. Hence, the net effect is the increase of total cost of almost 5.3% from FY 2018/19 to FY 2019/20. The increase in total cost PPPM is driven by both the increase in total cost per item trend and the increase in levels of activity.

Of the 21 BNF chapters, the following four comprise close to 60% of total drug costs: Central Nervous, Endocrine, Cardiovascular and Respiratory. We observe that the total PPPM cost increases for most of the top 10 BNF chapters (by cost for FY 2019/20), except for Obstetrics, Gynaecology & UTI and Skin, which experienced PPPM decreases.

We risk-adjusted the FY 2019/20 prescription cost of each STP (using demographic variables of age, gender and other factors) to obtain a more comparable view of cost by STPs. Overall, after risk adjustment, we observe a more consistent spread of total PPPM costs across England. Broadly, in FY 2019/20 the STPs in the north, east and southwest of England seem to have higher risk-adjusted total cost PPPMs as compared to the central and southern regions.

We also provide a five-year projection based on the total cost PPPM of FY 2019/20 and the population size and mix projections. We use various scenarios to understand the impact of demographic and cost trends on the total cost. In the case of 'historical' and 'high' total cost PPPM trend scenarios, we observe that total costs increase by approximately 5.5% and 7.7% per year, respectively. For the 'zero' trend total cost PPPM scenario, we observe the pure impact of the age/sex and other factors, which is about 0.2% per year on the total cost which indicates that trends in drug spending are not being driven by the aging population on a year to year basis, but more by cost inflation.

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