Improving productivity, addressing unmet needs and prevention in a time of financial constraint

January 2025

Context and aims

Context

There is widespread concern about the current state of the National Health Service (NHS). The recent Darzi Report characterised it as "in serious trouble," highlighting the significant pressures it faces[1]. The NHS is experiencing declining—or at best, stagnating—performance even though it now absorbs approximately 29% of total public service spending[2].

The government has also made clear its commitment to a triple shift towards prevention, community and digital. Darzi points out that the commitment to prevention is two decades old and yet funding for acute hospital care has increased from 49% to 58% between 2002 and 2021 as a proportion of total health service spend, whilst proportional spend in other care settings has been flat or has fallen. The inverse of the strategic intent has happened.

A significant consequence of this is that the NHS perceives there is no new money—whilst the government view is that it has constrained or reduced spending elsewhere to invest in health. In recent speeches Prime Minister, Keir Starmer, and Health Secretary, Wes Streeting, have both asserted that any additional funding must sit alongside comprehensive reforms, underscoring the urgent need for systemic change.

As a result the NHS need to consider how it can increase healthcare value—i.e., deliver better outcomes and greater output from the amount of input. Delivering more from existing resource means increasing productivity. At the same time it needs to understand the opportunity is in prevention and better managing illness can deliver. Together these things need to be possible for the NHS to be sustainable.

Aims

This report seeks to understand at the highest level:

1) What is the **size of the productivity** opportunity in the NHS overall and what is driving it?
2) What is the **size of unmet needs** in chronic conditions, and what is the potential impact of closing these gaps through improved care and treatment?
3) What is the opportunity for **improved return on investment of prevention**?
4) What are the **critical enablers** to permit this to happen?

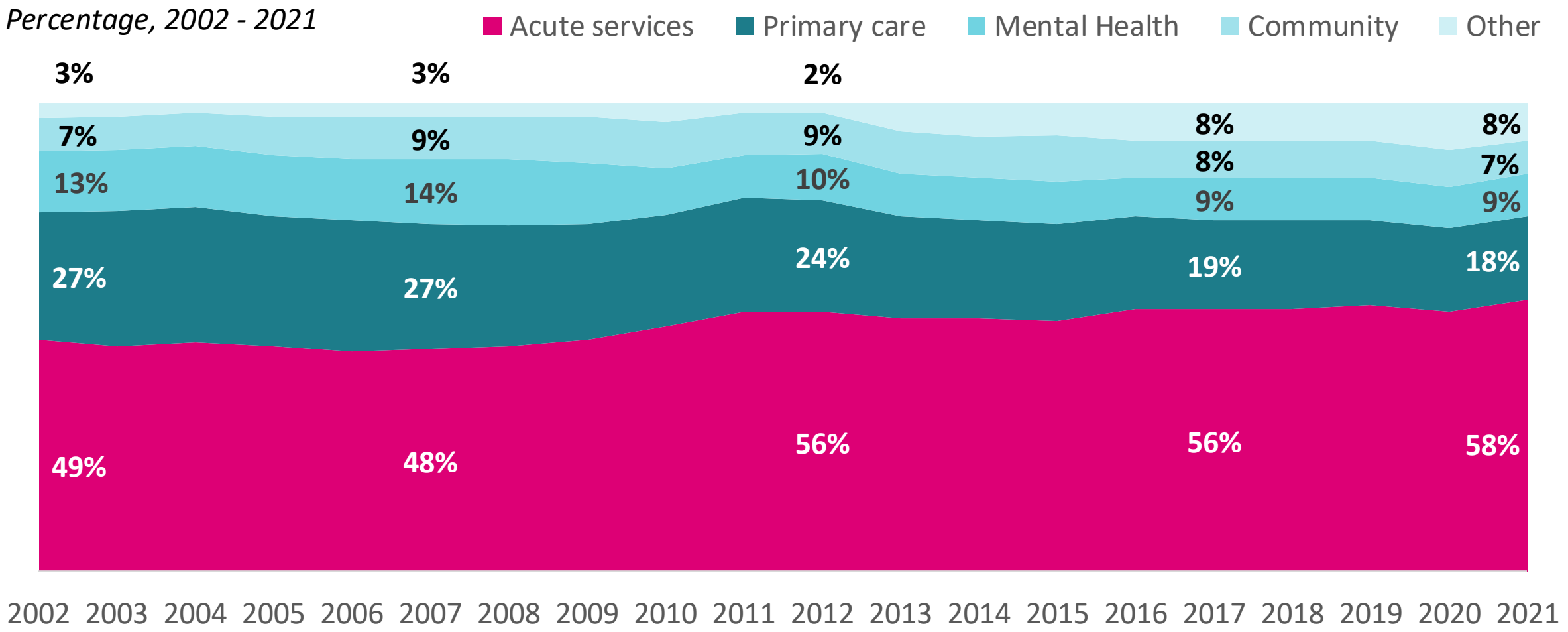
[1] Lord Ali Darzi's Independent investigation of the NHS in England (2024)
[2] Past and Future UK Health Spending, Institute of Fiscal Studies (2024)

Headline messages

- A substantial opportunity exists to improve productivity, increase congruence with guidelines in treating chronic conditions and better select investments in prevention.
  - NHS productivity has declined in acute hospitals but not in the rest of the NHS, if addressed it could release £10-16b in resources in pure productivity gain from the acute sector. Productivity increased for first half of last decade and then started to fall in 2018/19, a year before Covid, as annual growth in clinical staff increased 2.7-3.7x
  - Significant unmet health needs exist in the management of chronic conditions relative to guidelines which contribute to the nation's ill health and increasing burden on the health system; closing these gaps could lower acute sector resource utilisation costs on chronic diseases by 11%, estimated as £2.3b just from the cost of activity in the acute sector.
  - Prevention spending is hard to identify and rarely evaluated but there is a wide range in impact from 0 to 35x; Improving the targeting of spending on prevention could double the impact it has from a median of 2x to an upper quartile of 4x which when applied to the at least £5b per year spent on mandated prevention activity would deliver an additional £11b per year
- Achieving this would require:
  - Focusing on acute productivity and aligning the amount of workforce with the underlying patient needs on the one hand, and pursuing the transformation of outpatients which remains the biggest driver of growth and waitlists in order to release £10-16b
  - Agreeing an explicit focus on the major unmet health needs that driver ill health to close gaps in diagnosis and treatment with a greater emphasis on case finding and population health management; this will require using the disinvestment in acute and re-investment in primary and community care, diagnostics and medicine and data/digital to support this
  - Taking a more business-like approach and reducing or decommissioning low impact preventions interventions and investing more in high impact interventions, develop the commissioning approaches for high impact interventions and systematically evaluate these
  - A common set of enablers including greater use of linked patient level data, incentives ,
- If the opportunity of £10-16b in acute productivity and £2.3b in reduced acute healthcare costs from reducing unmet needs for selected chronic conditions were added together, with the £11b value of improved return on investment from prevention, the total would be £23-29b per year. Realising this benefit would allow the NHS to invest in spending more on the priorities of government including the additional activity that is needed to deliver elective waiting times, treat patients according to guidelines and invest in the triple shift (prevention, community and digital) that has been the stated priority of this government and previous ones.

Context: The Darzi report revealed that despite strategic intention to “shift left” acute spend has continued to grow from 49% to 58%

Estimate of NHS spend by healthcare service



Summary of key findings

Productivity

NHS productivity has been cited as a key issue, but it needs to be more narrowly understood. If issues in productivity were addressed, this is estimated to release £10-16b in resources.

Analysis has found that real spend per capita has increased by 23% across the NHS with spend in the acute sector growing 39% faster than the whole NHS. However, whilst real spend has grown 41% and weighted activity output grew 22%, acute productivity has fallen 8-13%. The principal driver of this is workforce rising faster than output with doctors increasing 37% and nurses 32% since 2013/14.

The loss in acute productivity between 2019/20 and 2023/24 is estimated to have cost approximately 10% of the acute budget and is equivalent to £10b.

Whilst spend in primary care and community care has fallen over the last 5 years, overall productivity in these areas has kept in level or increased as activity has increased in line with spend.

It is important to consider reasons why productivity may have decreased over the last 10 years including staffing inquiries and incentivisation of services.

Unmet health needs

Umet health needs contribute to the ill health of the nation and place an increasing burden on the health system. Addressing the gaps can lower acute sector resource utilisation costs on chronic diseases (CVD, CKD and dementia) by 11%, which can be conservatively estimated as £2.3b.

In 2023/24, cardiovascular disease (CVD), type 2 diabetes, obesity, chronic kidney disease (CKD), and dementia accounted for £13.9b, £4.8b, £14.4b, £3.2b, and £3.5b in secondary care costs, respectively.

Approximately 18% to 40% of patients remain undiagnosed and 32% to 94% of patients are not receiving optimal treatment across these conditions.

Analysis has found that closing these gaps through optimised treatment can potentially prevent 71,000 deaths across the five chronic conditions.

Combining the impact of the interventions could result in healthcare resource utilisation (HCRU) savings of £4b across the five chronic conditions. By focusing on cost savings from CVD, CKD, and dementia alone, the total gross HCRU savings amounted to £2.3b, representing 11% of baseline HCRU costs for these three conditions in 2023/24.

Prevention

Improving the targeting of spending on prevention could double the impact it has, raising the impact of at least £5b per year spent on this by an additional £11b per year.

Prevention is a stated priority for the NHS and the government, but what is spent on it is poorly captured and the return on investment is rarely analysed.

Analysis of prevention interventions shows median ±2x ROI and upper quartile ±4x ROI – with some interventions delivering far higher.

NHS and Local Authority (LA) colleagues indicated they do not use ROI routinely, hence there is no reason to think more than median impact.

Mandated spending on prevention of £5b a year would at median return deliver £11b a year, if raised to upper quartile return, this investment would deliver £22b a year.

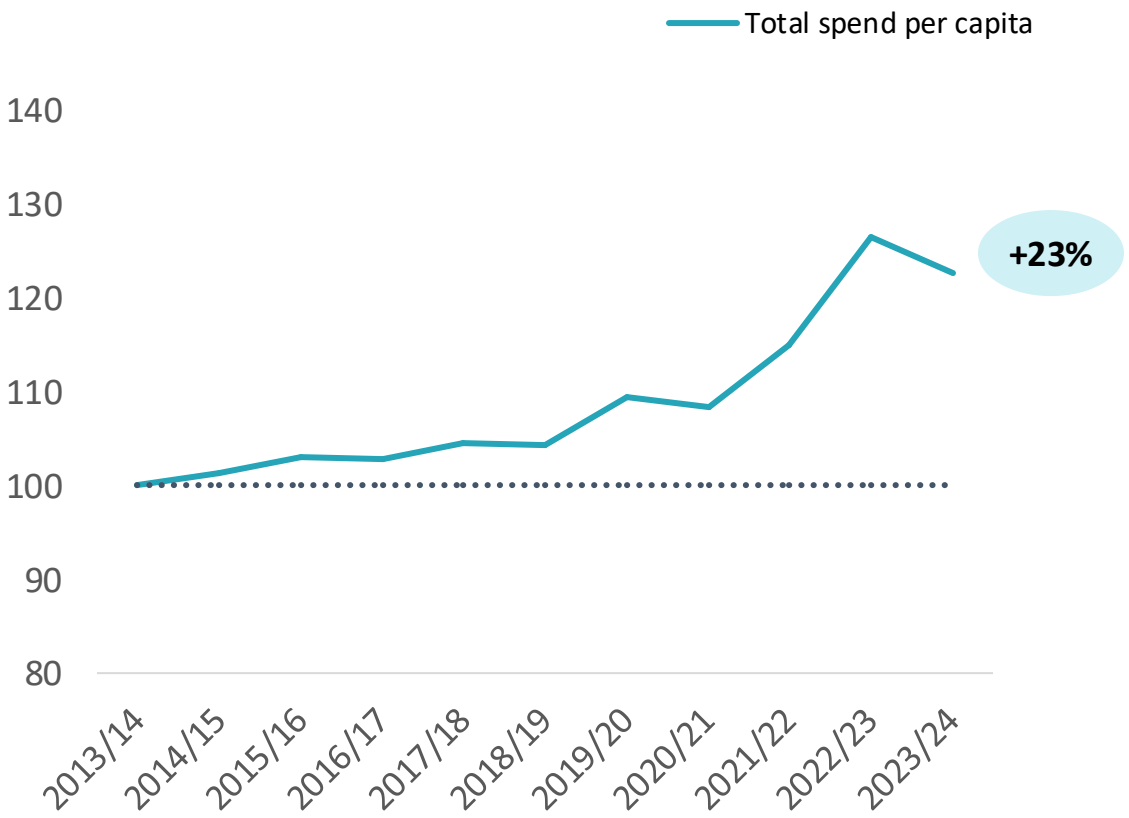
Achieving this would require commissioning changes to reduce low value and increase high value interventions and evaluating impact routinely.

Productivity

Real spend per capita has increased 23% across the NHS from 2013/14 to 2023/24 with acute sector growing 39% faster than whole NHS, primary care only 5% and community falling 5%

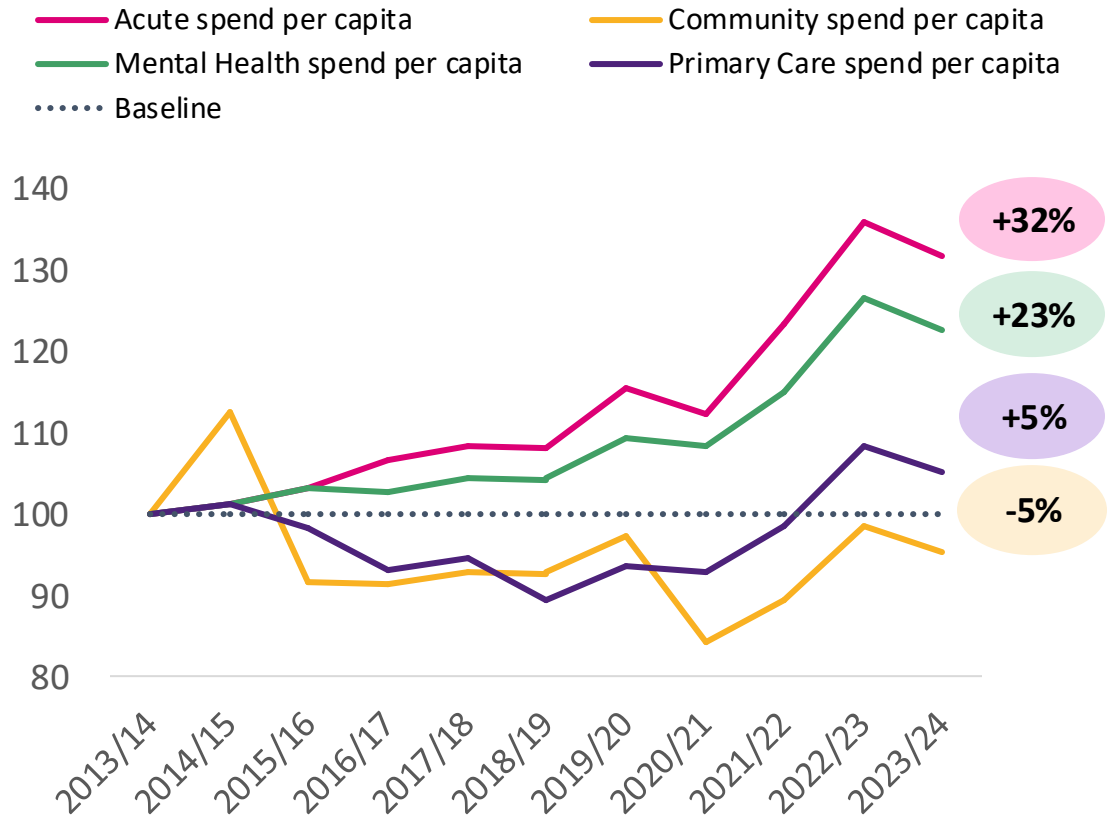
Total NHS spend per capita as a proportion of 2013/14 spend

£ spend per head between 2013/14 and 2023/24 indexed to 2013/14, constant at 2022/23 prices



NHS spend per head as a proportion of 2013/14 spend

£ spend per head between 2013/14 and 2023/24 indexed to 2013/14, constant at 2022/23 prices



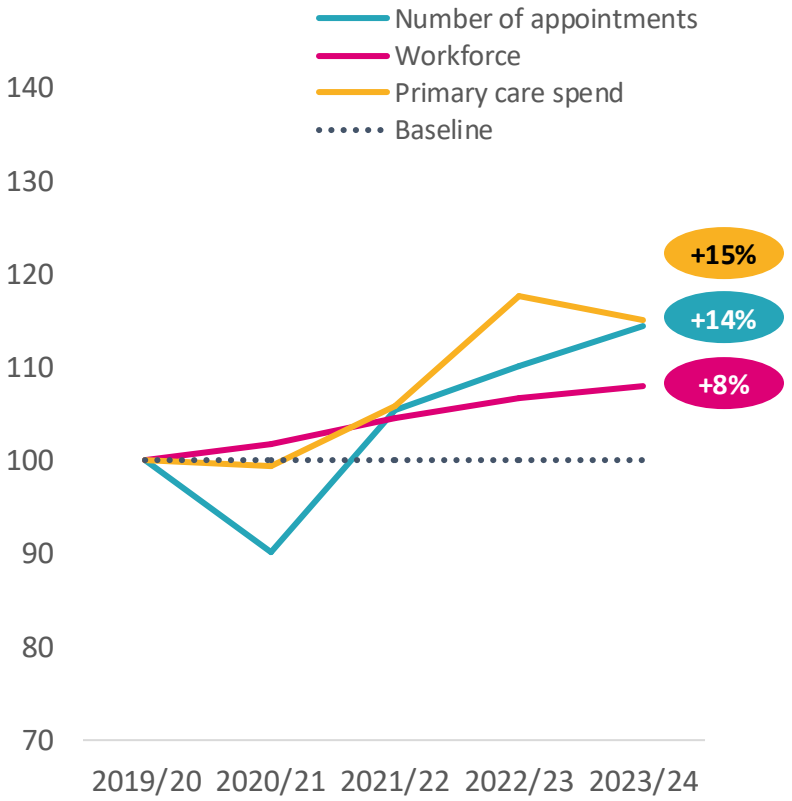
Source: UK House of Commons Research Briefing: NHS funding and expenditure (2024), Populations data is from ONS. Spend by care setting is taken from Darzi report (2024), 2021/22 – 2023/24 splits are assumed to 2020/21 proportions documented in Darzi. Between 7-10% of spend categorised as 'Other' and not attributed to any care setting.

Productivity outside the hospital has kept level or increased from 2019/20 to 2023/24 as activity has increased in line with spend and workforce

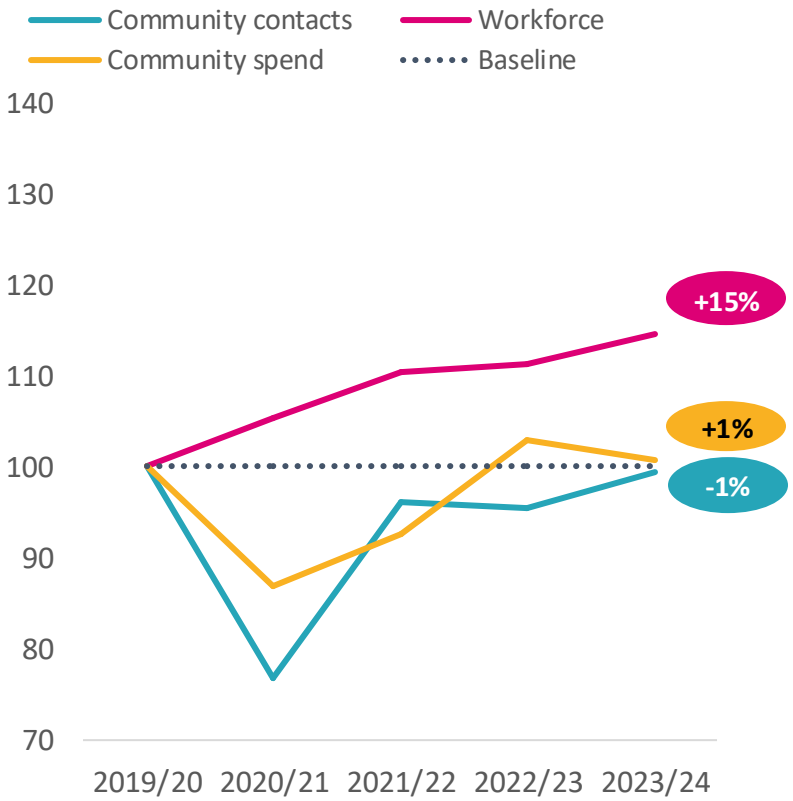
Total number of appointments/contacts, workforce (WTE) and spend per capita in England

All indexed to 2019/20 and per capita, spend is expressed in constant prices for 2022/23

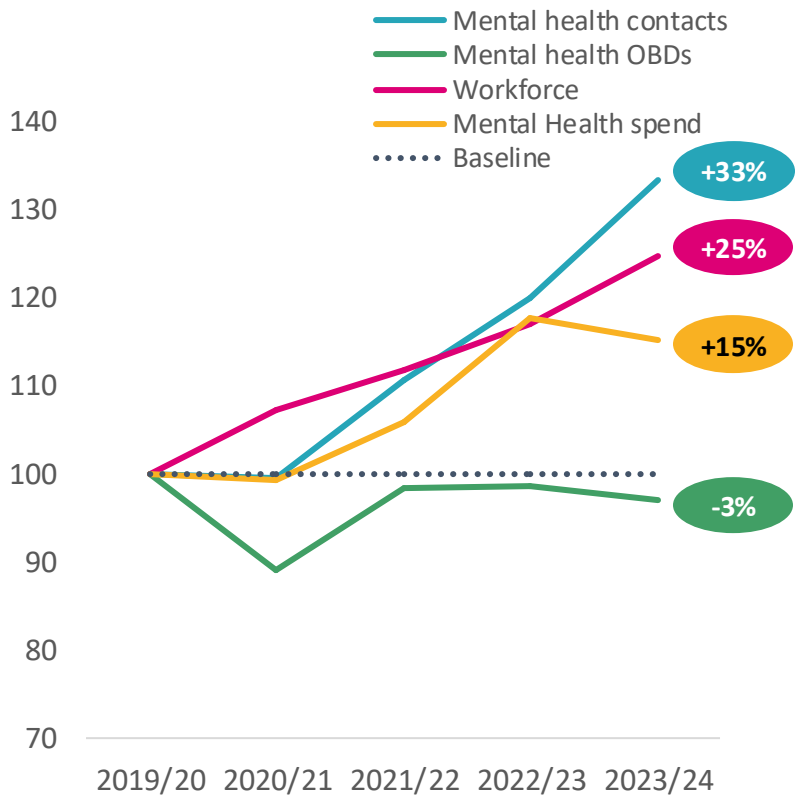
General Practice appointments and workforce



Community contacts and workforce



Mental health contacts, OBDs and workforce

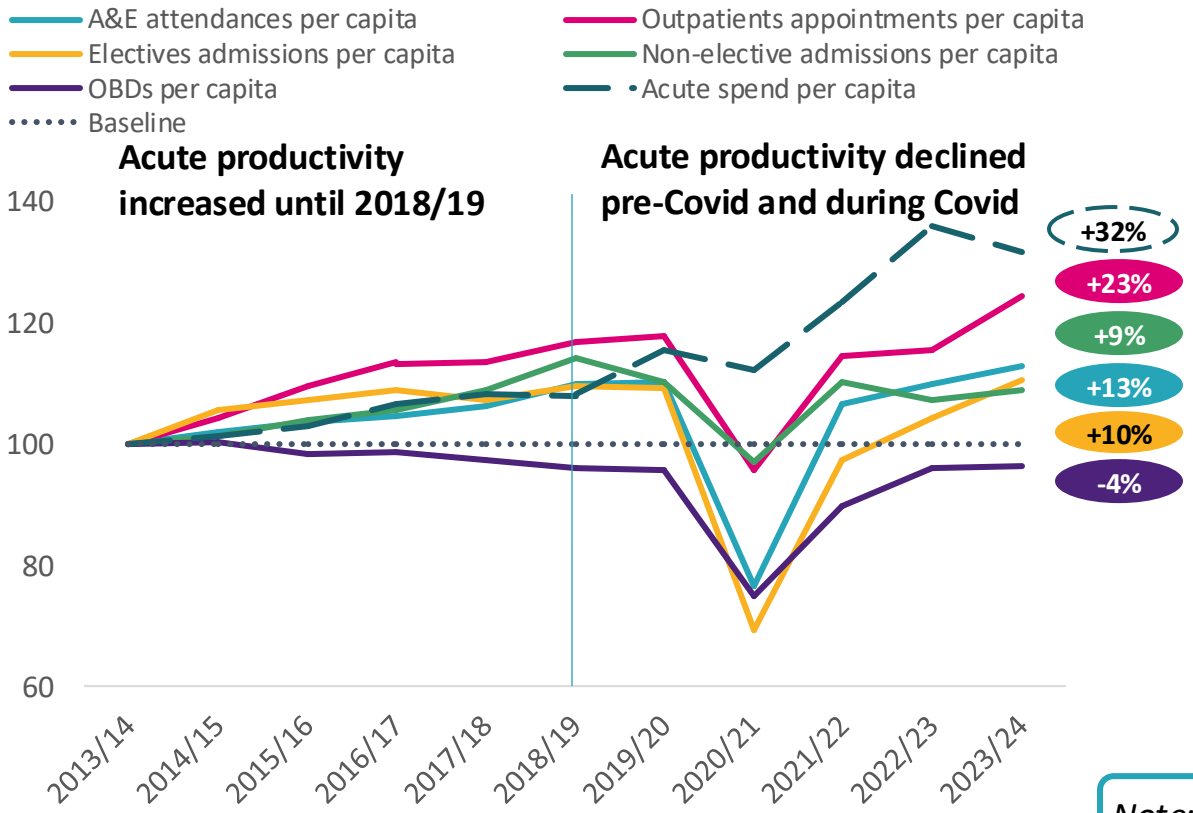


Source: Appointments in General Practices (NHS Digital), General Practice Workforce (NHS Digital) (2019/20 - 2023/24), Mental Health Dataset (MHSDS; NHS Digital), NHS Workforce Statistics (HCHS Mental Health Workforce), Community Care Dataset (CSDS), NHS Workforce Statistics (NHS Digital – mapped to community trusts), CF analysis

Acute activity generally increased until 2018/19 and fell before covid, during covid and has not recovered to pre-Covid levels as real funding per capita outstrips activity

Acute activity and real spend per capita from 2013/14 to 2023/24

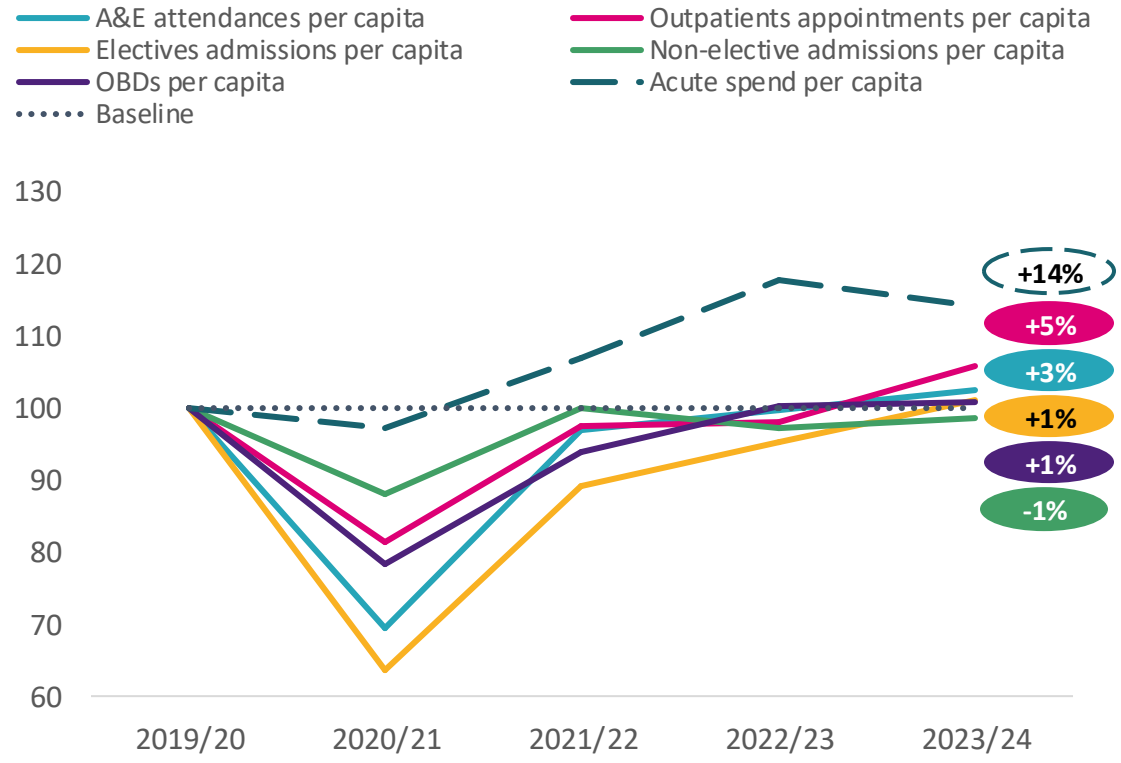
All items indexed to 2013/14, spend in constant 2022/23 prices



See page 41 for weighted activity unit calculation

Acute activity and real spend per capita from 2019/20 to 2023/24

All items indexed to 2019/20, spend in constant 2022/23 prices



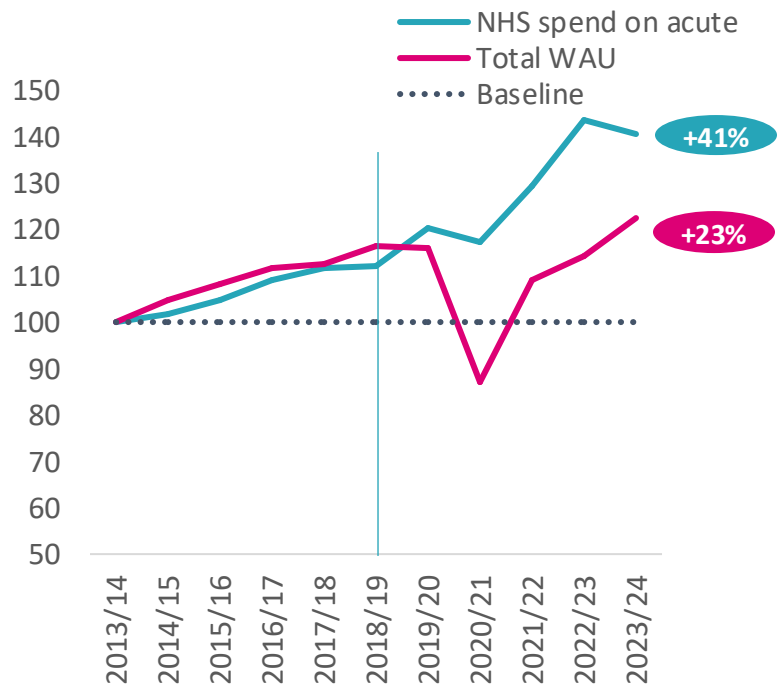
Note: Some of the outpatient growth is a reflection of the backlog being delivered

Source: UK House of Commons Research Briefing: NHS funding and expenditure (2024), Populations data is from ONS. Spend by care setting is taken from Darzi report (2024), 2021/22 – 2023/24 splits are assumed to 2020/21 proportions documented in Darzi. Between 7-10% of spend categorised as 'Other' and not attributed to any care setting. NHS A&E attendances, NHS Outpatients appointment dataset, NHS Emergency and Non-elective admissions, NHS Hospital Admitted Patient Care and Adult Critical Care Activity, NHS KH03 Occupancy Dataset.

Acute productivity has fallen 8-13% from 2013/14 to 2023/24 as real spend has grown 41% while weighted activity output grew 22% and workforce 34-37%

Real NHS spend on acute and output

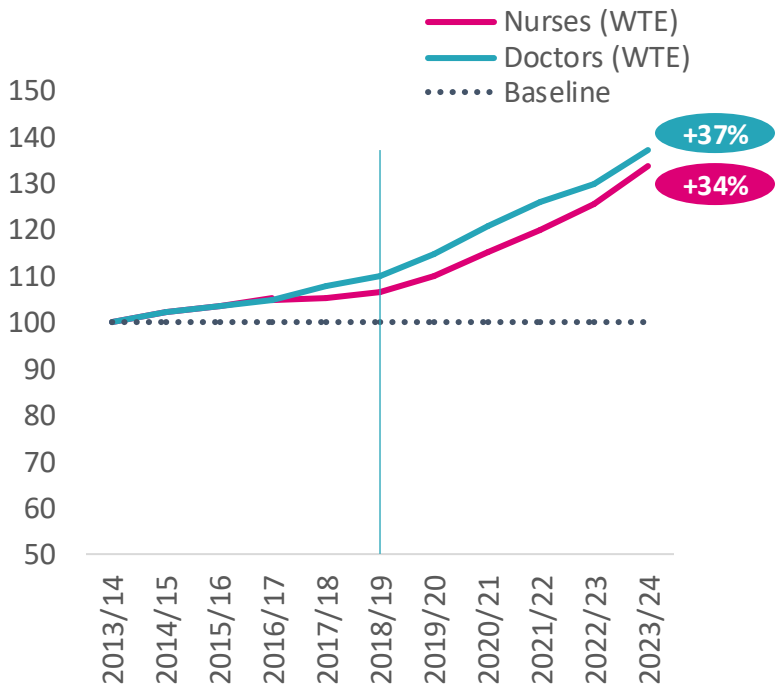
%, indexed to 2013/14, 2013/14 – 2023/24



- 41% increase in NHS acute spend vs 2013/14 (based on constant 2023/24 prices)
- 22% increase in output as expressed by weighted activity unity vs 2013/14

Medical and nursing staff FTE

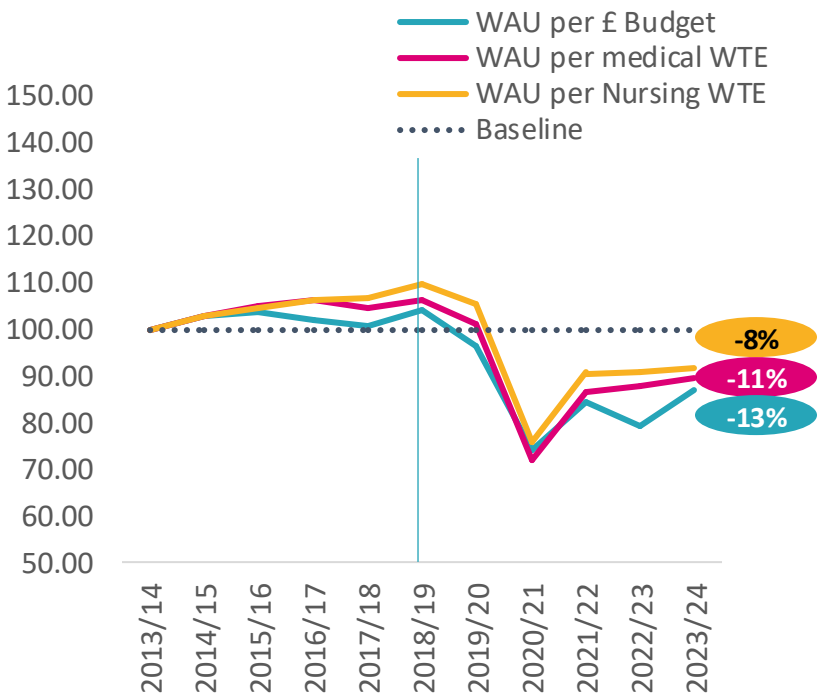
%, indexed to baseline (2013/14 – nursing or 2019/20 – medical), 2013/14 – 2023/24



- 37% increase in acute doctors since 2013/14
- 34% increase in acute nurses since 2013/14

Productivity

%, indexed to 2013/14, 2013/14 – 2023/24



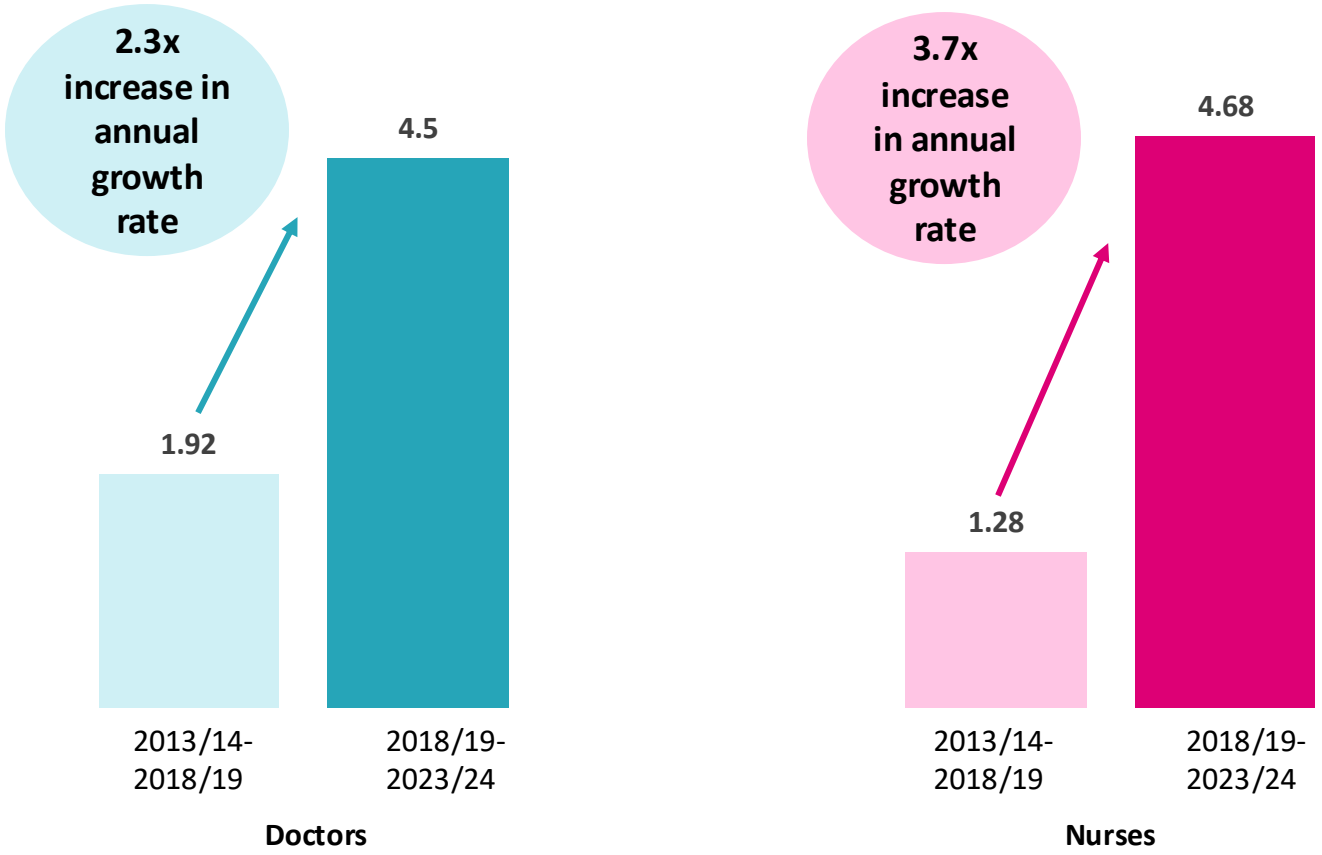
- Productivity rose through to 18/19
- Productivity fell in 19/20 and 20/21
- Improved productivity remains below pre-pandemic

Source: A&E Attendances and Emergency Admissions, Monthly Outpatient Referrals Data, KH03 Bed Occupancy, NHS Hospital Admitted Patient Care and Adult Critical Care Activity, Unit Costs of Health and Social Care 2023, NHS Workforce Statistics (Nursing Workforce), ONS (Medical Workforce), NHS funding and expenditure (Parliament papers, 2024), Populations data is from ONS. Spend by care setting is taken from Darzi report (2024), 2021/22 – 2023/24 splits are assumed to 2020/21 proportions documented in Darzi. Between 7-10% of spend categorised as 'Other' and not attributed to any care setting.

The annual rate of growth in the number of doctors and nurses was 2.3x and 3.7x higher in 2018/19 to 2023/24 than between 2013/14 and 2018/19

Annual rate of growth for doctors and nurses

%, 2013/14 – 2023/24



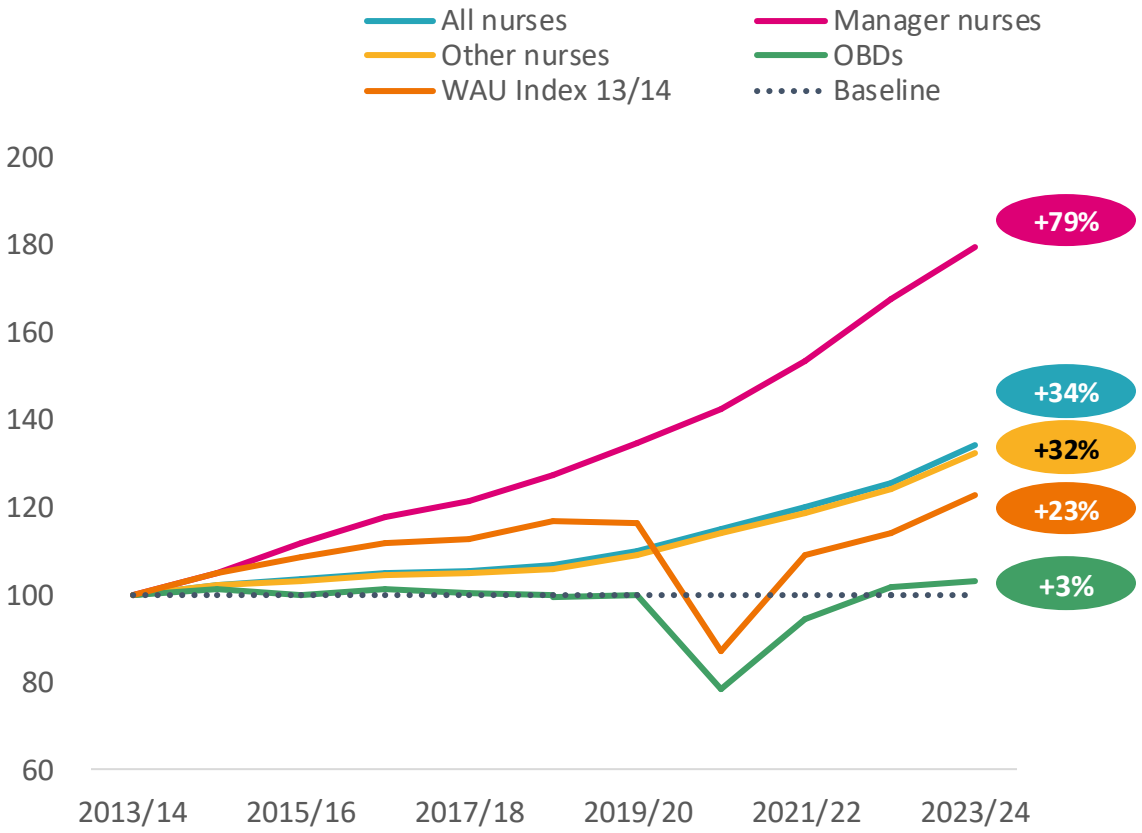
- Between 2013/14 and 2018/19, the annual increase in the number of medical FTE was 1.92%.
- In comparison, the annual growth rate in medical FTE between 2018/19 and 2023/24 was 234% higher (4.68%).
- Similarly, the annual growth rate for nursing FTE in 2013/14 – 2018/19 was 1.28% in England.
- Between 2018/19 and 2023/24, the annual growth rate in nursing FTE had increased to 4.68% (365% more than between 2013/14 and 2018/19).

Source: NHS Workforce Statistics (Nursing Workforce), ONS (Medical Workforce)

Nursing workforce has increased by 79% (manager) and 32% (other nurses) from 2013/14 to 2023/24 whilst WAU has increased 23% and OBDs has remained constant

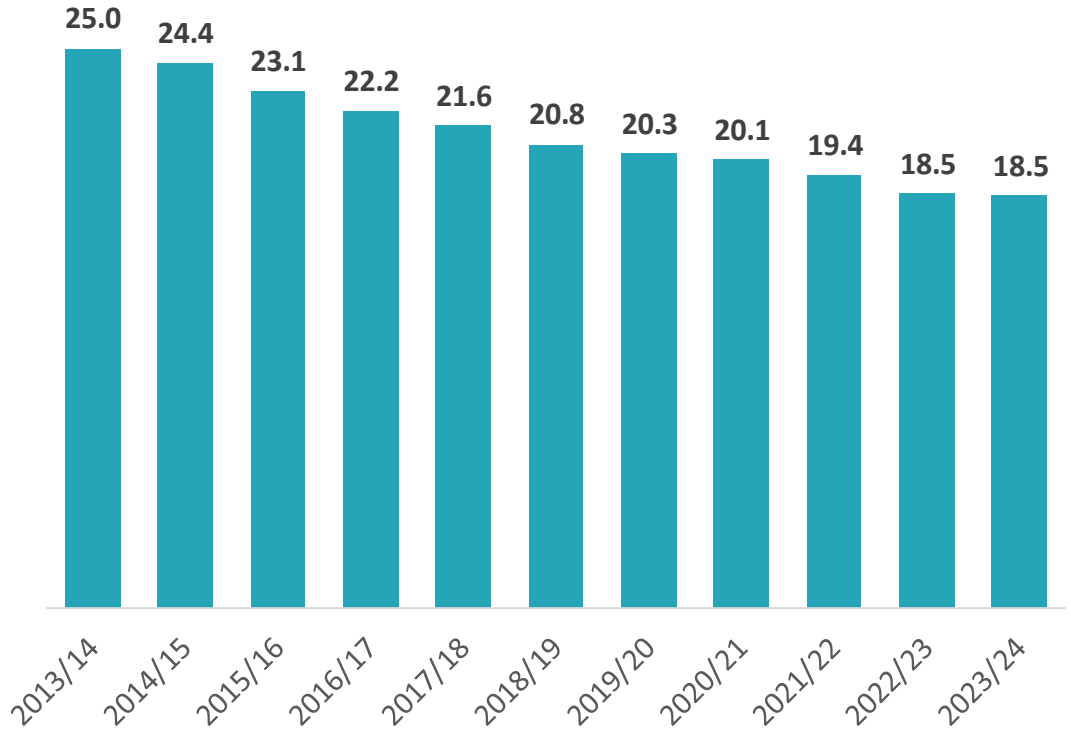
Nursing WTE, OBDs and productivity over time

WTE, OBDs and productivity indexed to 2013/14, 2013/14-2023/24



Number of non-manager nurses to manager nurses in acute trusts

Ratio of non-manager nurses to manager nurses in acute trusts in England, 2013/14 – 2023/24



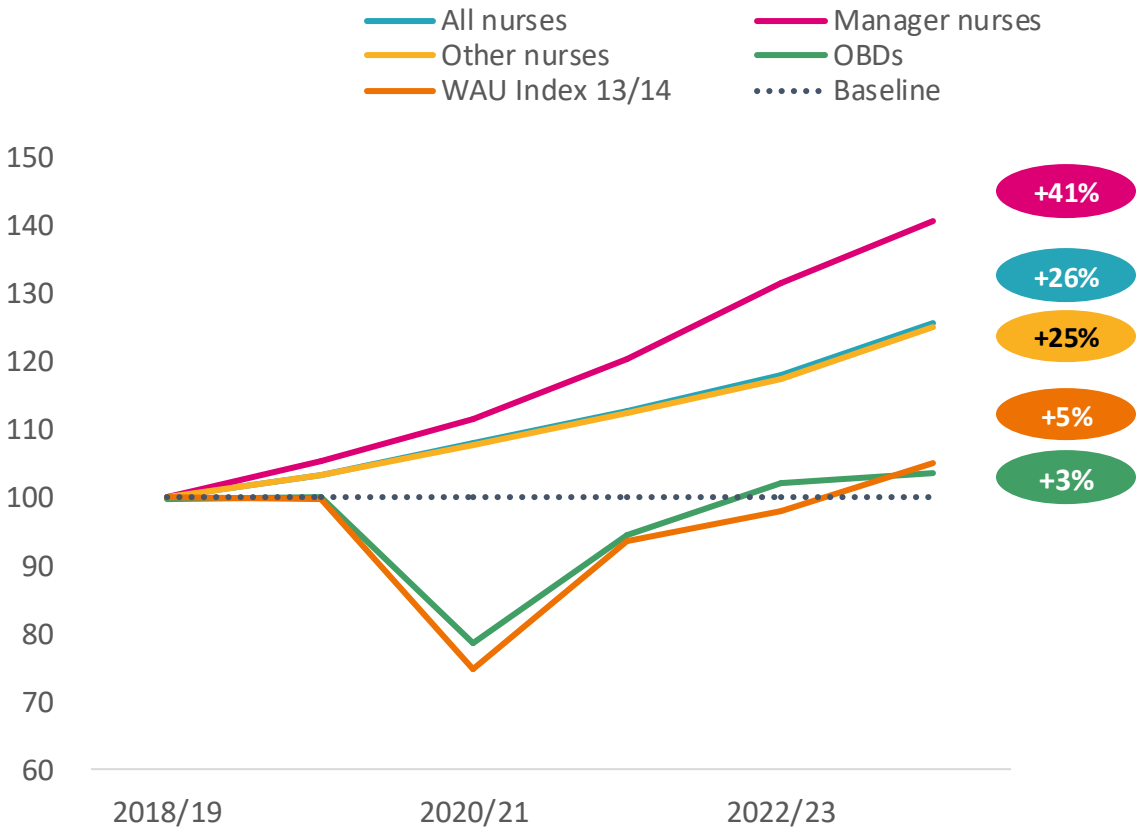
Source: KH03 Bed Available and Occupancy (NHS Statistics), NHS Workforce Statistics

Note: manager nurses include: nurse managers and modern matrons

Nursing workforce has increased by 41% (manager) and 26% (other nurses) from 2018/19 to 2023/24 whilst WAU has increased 5% and OBDs has remained constant

Nursing WTE, OBDs and productivity over time

WTE, OBDs and productivity indexed to 2018/19, 2018/19-2023/24



Absolute number of nurses (WTE)

2018/19 – 2023/24

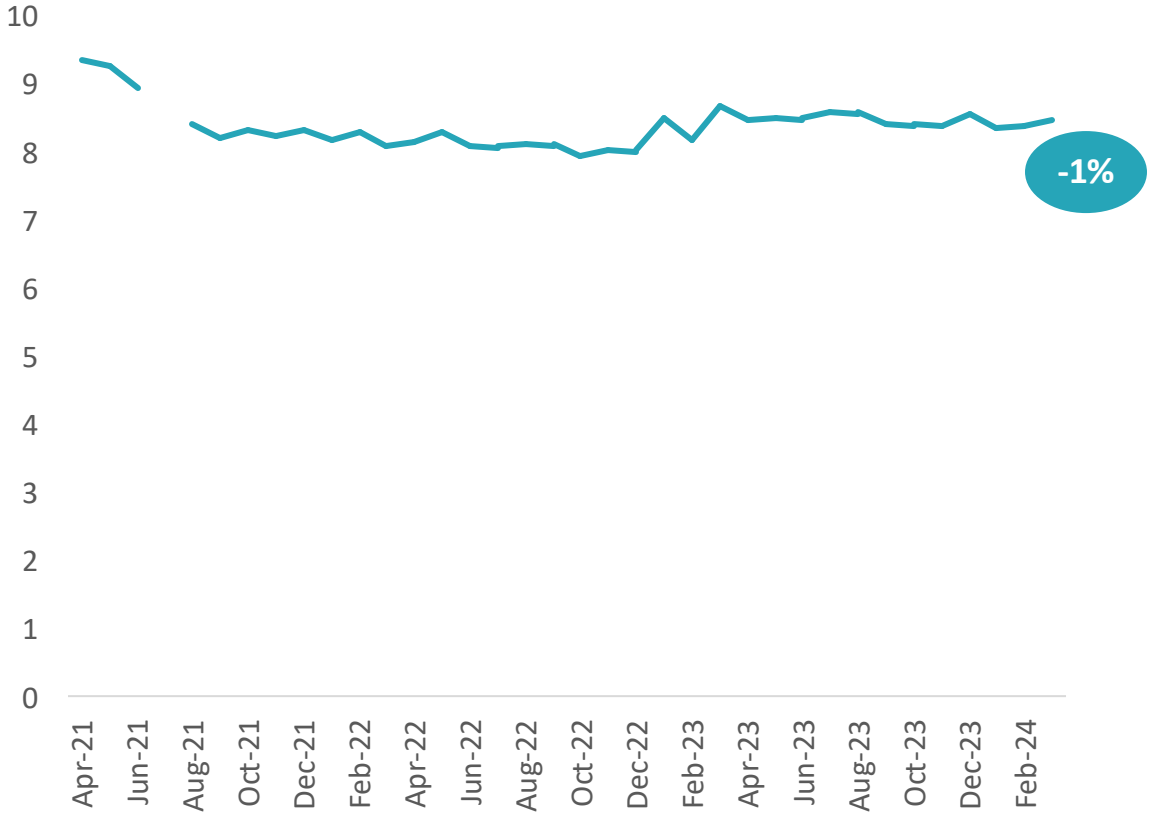
Year	Manager Nurses	Other Nurses	Adult Nurses
2018/2019	8,321	172,704	181,025
2019/2020	8,772	178,205	186,977
2020/2021	9,276	186,149	195,425
2021/2022	10,021	194,020	204,041
2022/2023	10,927	202,462	213,389
2023/2024	11,697	215,855	227,553

Source: KH03 Bed Available and Occupancy (NHS Statistics), NHS Workforce Statistics
Note: manager nurses include: nurse managers and modern matrons

Care hours per patient in acute trusts has remained flat whilst nursing workforce has increased 12% over the last 3 years

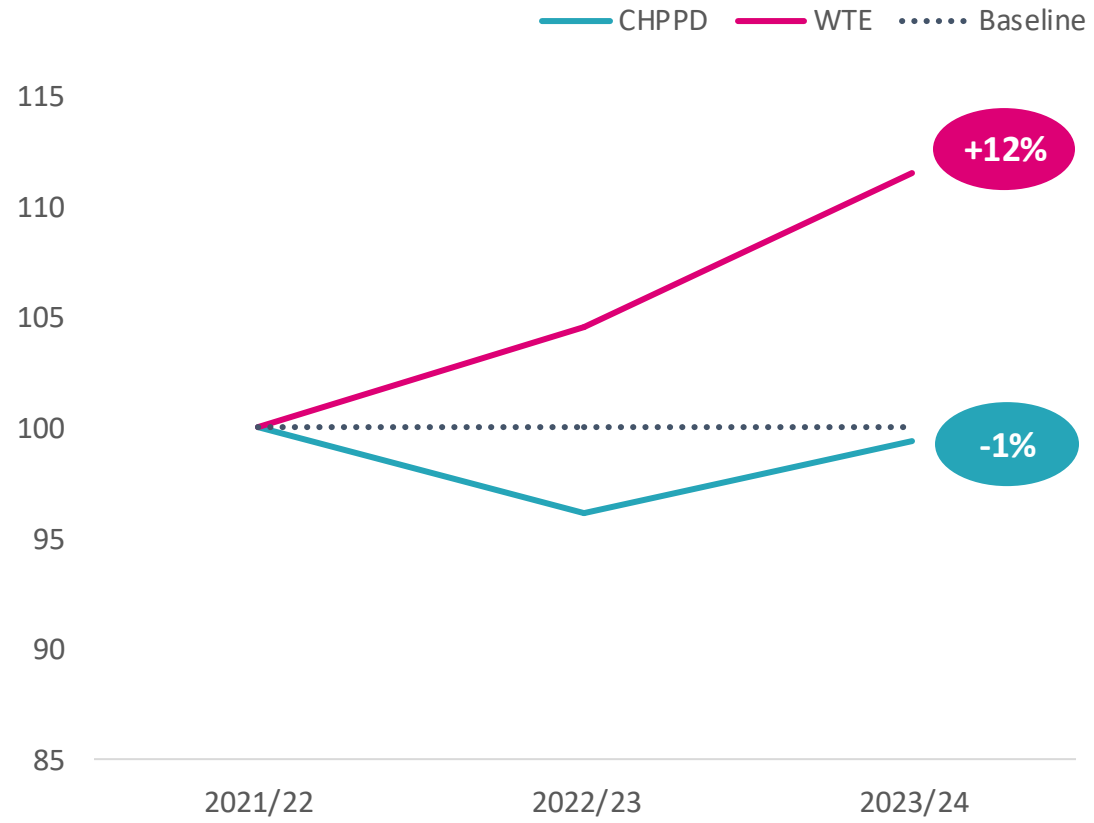
Care hours per patient in acute trusts

Average number of CHPPD by Nurses & Midwives and Nursing Associates, 2021/22 – 2023/24



Care hours per patient and nurse WTE in acute trusts

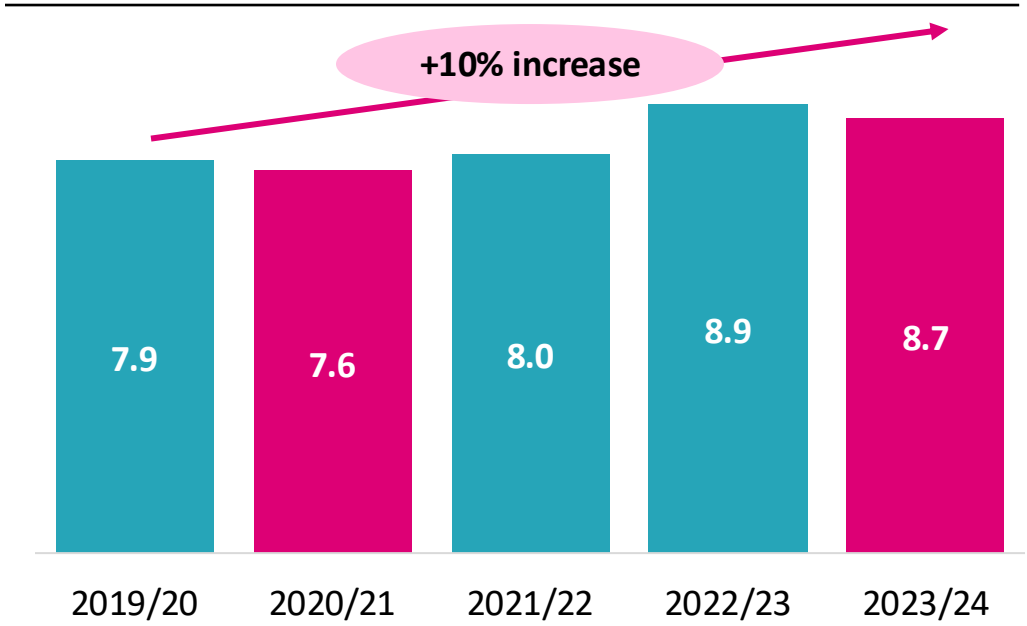
Hours or WTE indexed to 2021/22 (baseline)



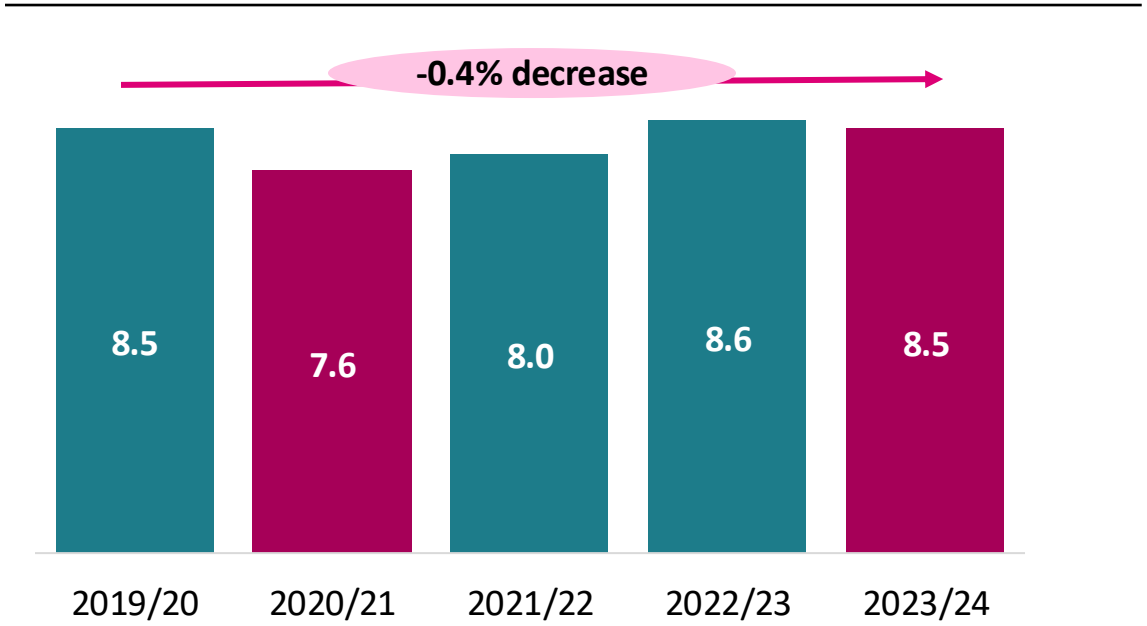
Source: Care hours per patient day (CHPPD) data (NHS Digital), NHS Workforce Statistics, CF analysis, Notes: Acute providers defined as per the list of trusts and foundation trusts in the TAC accounts

Almost all of the increase in length of stay between 2019/20 and 2023/24 can be attributed to the increase in complexity of spells

Non-elective length of stay, days, exc. zero day



Non-elective length of stay, days, exc. zero day weighted for complexity



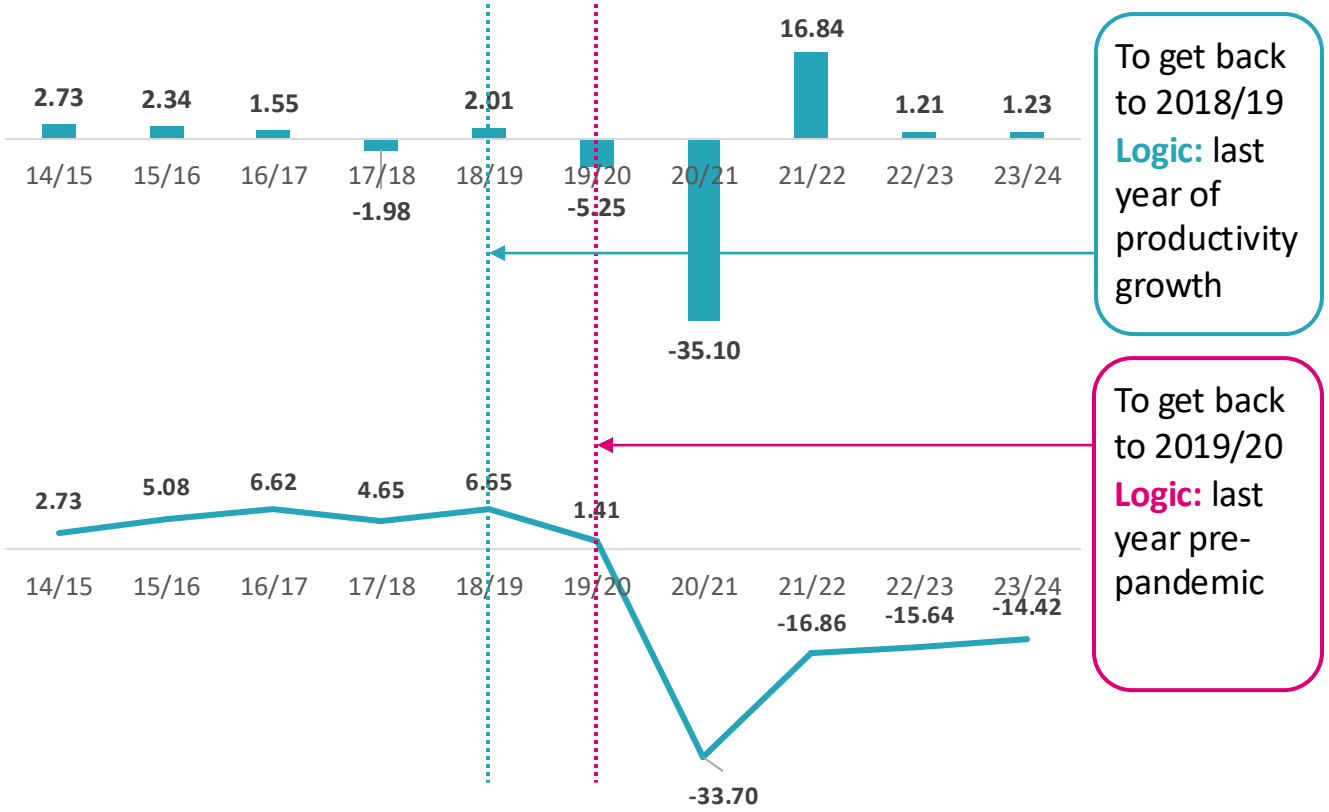
- 19/20 HRG base tariff prices used as a proxy for complexity
- Regression analysis performed to understand impact of length of stay on price and predict price for HRGs without tariff
- For each month, activity cost calculated for each HRG by multiplying number of spells for by associated price
- Within each month, HRG activity cost summed and divided by total number of spells to give average activity cost per spell
- Average activity cost per spell compared to 19/20 to determine complexity index
- Complexity index multiplied by spells for a given month to determine weighted spells
- Total bed days divided by weighted spells to give weighted average LOS
- *Note: 19/20 baseline is assumed to be March 2019 to Feb 2020 to correct for impact of pandemic*

Source: HES, CF analysis

The loss in acute productivity between 2019/20 and 2023/24 is estimated to have cost approximately 10% of the acute budget and is equivalent to £10B

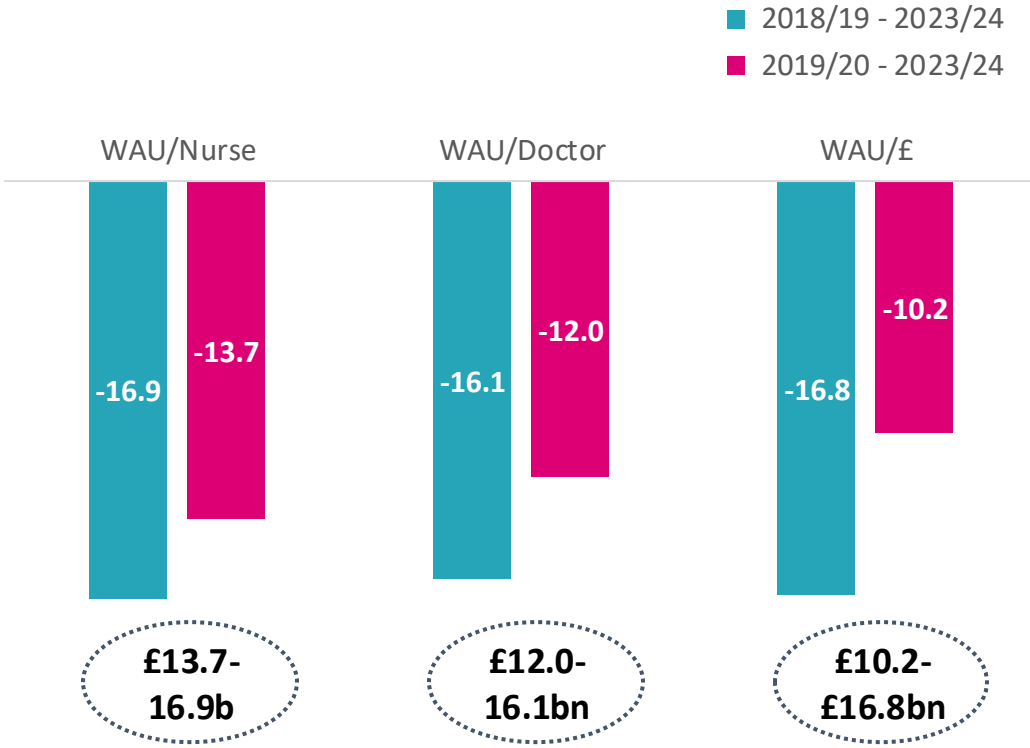
Change in productivity over time

Change in acute activity as a percentage of change in acute spend, 2014/15 - 2023/24



Change in productivity

Change productivity between 2018/19 or 2019/20 and 2023/24



Source: A&E Attendances and Emergency Admissions, Monthly Outpatient Referrals Data, KH03 Bed Occupancy, NHS Hospital Admitted Patient Care and Adult Critical Care Activity, Unit Costs of Health and Social Care 2023, NHS Workforce Statistics (Nursing Workforce), ONS (Medical Workforce), NHS funding and expenditure (Parliament papers, 2024), Populations data is from ONS. Spend by care setting is taken from Darzi report (2024), 2021/22 – 2023/24 splits are assumed to 2020/21 proportions documented in Darzi. Between 7-10% of spend categorised as 'Other' and not attributed to any care setting.

Considerations affecting productivity in the NHS

An older and sicker population with more complexity

- The Darzi investigation found that **the health of the nation has worsened** with an increasing number of people with long term conditions and mental health[2]
- A significant reduction in patients accessing healthcare during the COVID pandemic, led to the **delayed diagnosis of physical and mental health conditions, as well as delayed detection of deteriorating pre-existing conditions**[2]
- Analysis has also revealed that whilst the average length of stay has increased by 10% between 2019/20 and 2023/24, **almost all of the increase in length of stay in the last 5 years can be attributed to the increase in complexity of spells**

Regulatory requirements affecting staffing

- Following the enquiry into Mid-Staffordshire, the Francis Report highlighted the **need for safe staffing standards**[1]
- They called for **minimum nurse-to-patient ratios and prioritising patient care**, establishing clear care standards and fostering to prevent future failings in healthcare
- Implemented in 2018/19, it appears **introduction of safe staffing standards is linked to the large increase in levels of staffing** which began in 2018/19 and continued uninterrupted since

Incentives and coding

- **Suspension of PbR removed linkage of activity and payment in acute** which had contributed to productivity in earlier periods
- **Inconsistent clinical coding in SDEC/ zero-day admissions** may have contributed to the observed productivity decline
  - In comparison, primary care has continued to be incentivised for outcomes and activity (and is the only setting where in the NHS individuals have any incentive) and has high productivity and good data
- **Community and mental health lack any incentive or link between activity and payment** and poor data quality

Challenges associated with recovering productivity

- **Longer lengths of stay and difficulty turning beds around** are major challenges in recovering acute productivity, influenced by permanent COVID-19 measures and the balance between short and long stayers. This is compounded by the fact there has been no increase in occupied bed days owing to no change in physical bed capacity
- **Structural challenges make it complex to reallocate funds** from acute care to primary and community care
- Darzi also highlighted the numbe**r of managers and the degree of turnover of senior managers** may have contributed to decline in management capabilities and knowledge across the NHS. A loss of discretionary effort and high training needs of new joiners to perform work as efficiently as those with experience may have contributed to reduced productivity

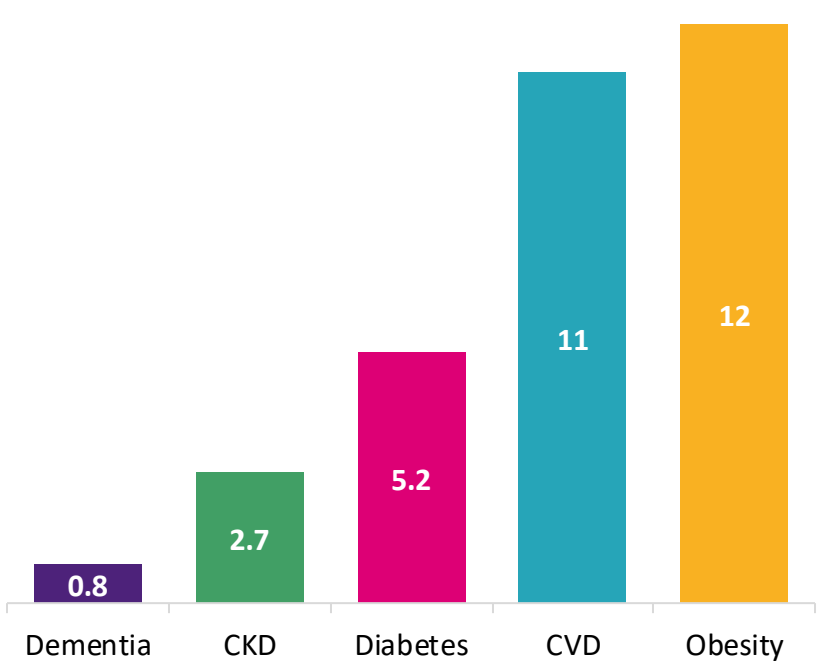
Source: [1]Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry; [2]Independent investigation of the NHS in England (2024)

Unmet needs

Cardiovascular disease, chronic kidney disease, diabetes, dementia and obesity is associated with almost 300,000 deaths per year

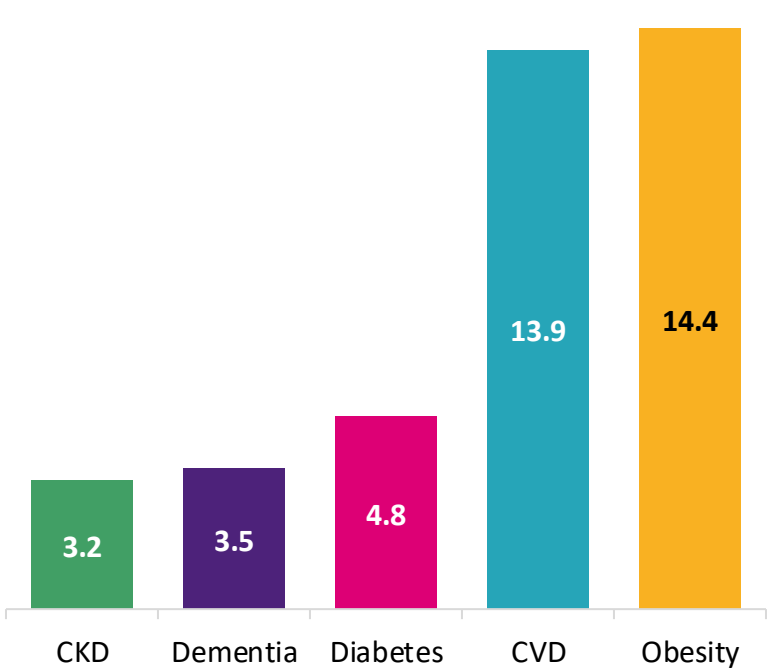
Total estimated prevalence by condition

Number of people (million)



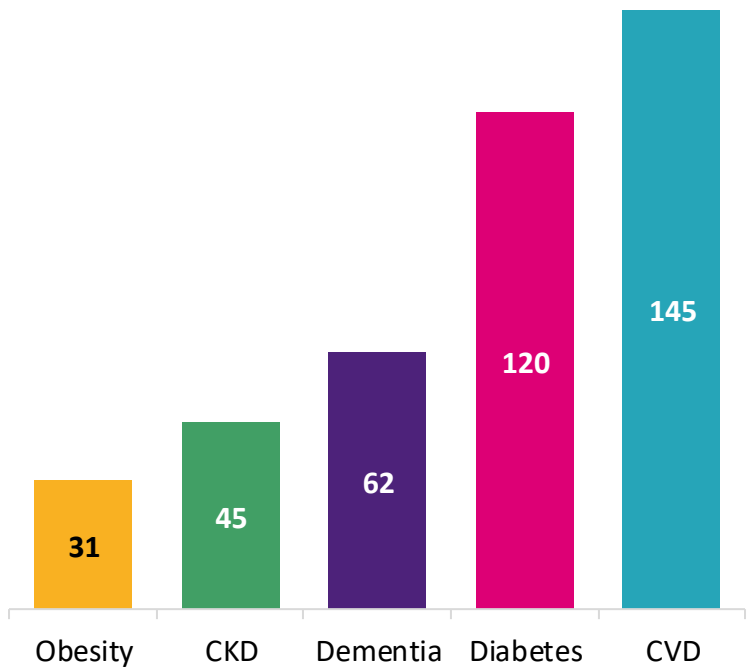
Baseline HCRU costs

Secondary care costs (£ billion), 2023/24



Baseline deaths

Number of deaths associated with condition ('000)



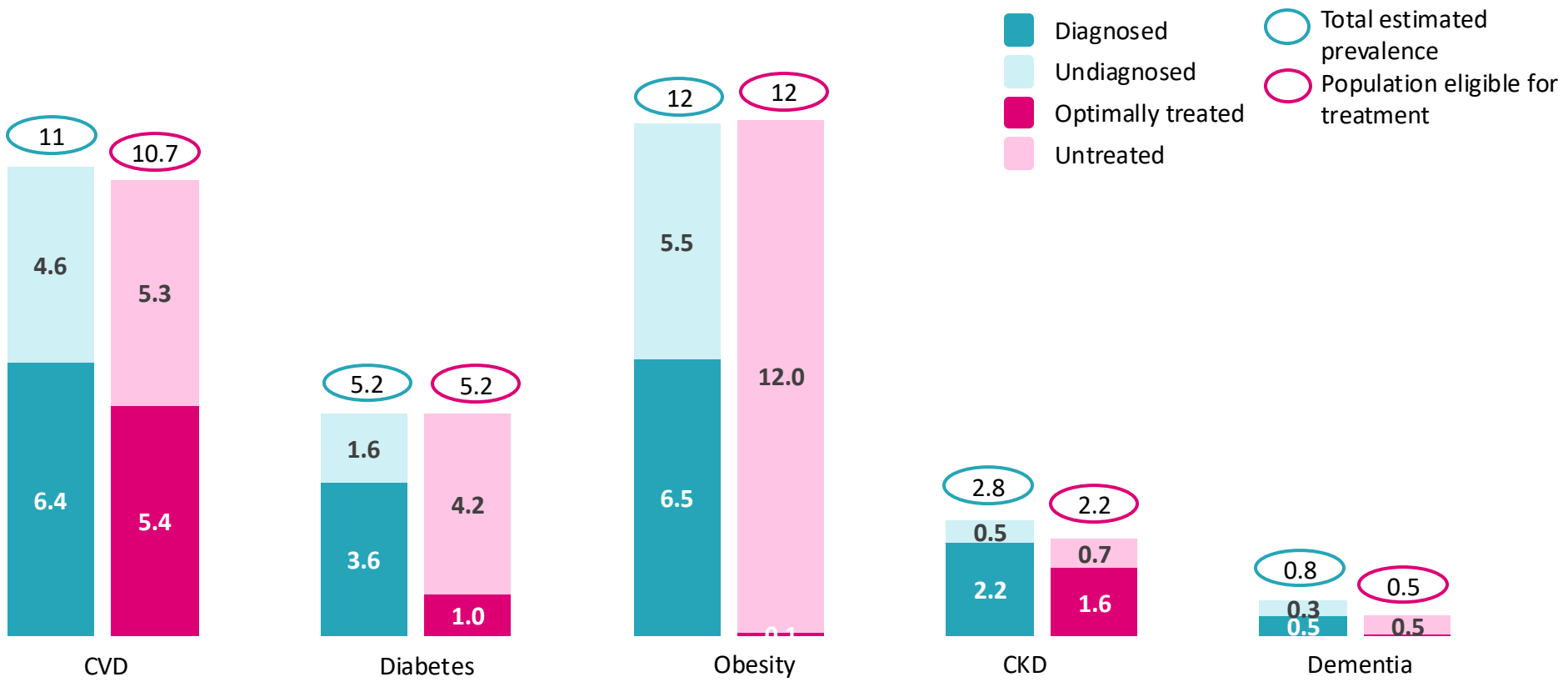
*Treatment statistics for obesity were not included as treatment targets for obesity are subjective and differ for each individual

Source: HES APC, ECDS, OP; CF analysis; CVD: NHSE, ONS, CVDPREVENT, Health Survey England; Diabetes: BNF, NHSE, QOF, ONS, diabetes.co.uk; CKD: Kidney Research UK, CVDPREVENT, Ku et al. (2018); Obesity: GOV.UK, QOF, Jensen et al. (2024); Dementia: QOF, Zuin et al. (2022), Xu et al. (2021), Davis et al. (2018);, CF

Significant gaps exists in the diagnosis and treatment of major health conditions

Diagnosis and treatment gap in CVD, diabetes, obesity, CKD and dementia

Number of people (million)



*Treatment statistics for obesity were not included as treatment targets for obesity are subjective and differ for each individual

- Over 40% of individuals with high LDL-cholesterol remain undiagnosed and nearly half of the eligible population are not receiving optimal treatment for CVD.
- While 70% of type 2 diabetes patients are diagnosed, less than 20% of those eligible for treatment are receiving treatment that meets optimal standards.
- Only 54% of individuals with obesity are diagnosed
- 79% of CKD patients in stages 3-5 diagnosed and 73% of those eligible treated optimally.
- Over 40% of individuals with dementia are undiagnosed, and just 6% of eligible patients currently receiving treatment.

Sources: CVD: Health Survey England; NHSBSA; British Heart Foundation; Diabetes: QOF, NHSE, ONS; Obesity: Gov.UK, QOF, National Obesity Audit; CKD: Kidney Research UK, QOF; Dementia: DiscoverNOW, QOF, CF

Summary of interventions

Category	Cardiovascular disease (CVD)	Type 2 Diabetes	Obesity	Chronic Kidney Disease (CKD)	Dementia
Diagnostic assessment	Blood drawn and sent away; POC	Blood drawn and sent away	Scales and BMI calculator	Blood drawn and sent away	Clinical evaluations, neuroimaging, lab tests, and cognitive assessments
Criteria	LDL > 1.8 mmol/L	HbA1c > 48 mmol/mol	BMI > 30	eGFR < 90ml/min, proteinuria	
Treatment standard	• Statins, PCSK9 inhibitors, • siRNA	• DPP4, GLP1, SGLT2, Insulin	• GLP-1 agonists	• SGLT2 inhibitors	• Cholinesterase Inhibitors • NMDA Receptor Antagonists
Expected impact of treatment	• 1 mmol/L reduction in LDL results in 25% reduction in CVD events[1]	1% reduction in HbA1c associated with a • 25% reduction in risk of microvascular complications[2] • 14% reduction in risk of heart attack[3] • 21% reduction in the risk of death from any cause[4]	1 unit reduction in BMI is associated with a • 5% reduction in the risk of cardiovascular disease[5] • 16% reduction in the risk of developing type 2 diabetes[6] • 6% reduction in all cause mortality[7] • 4% reduction in risk of mortality[8]	Treating CKD to maintain an eGFR above 90 mL/min/1.73 m² can result in • 30% lower risk of major adverse cardiovascular events (MACE), including heart attacks and strokes[9] • up to 40% reduction in the risk of all-cause mortality[10]	Treatment with AChE inhibitors can • result in a 20-30% slower decline in cognitive function over 6-12 months compared to placebo[11] • show a 15-20% improvement in daily functioning scores[12] • delay nursing home admission by an average of 6-12 months[13] • reduce the risk of severe dementia by 31%[14] • slow progression from mild to moderate dementia by 50%[15]
Intervention scenario	• All eligible patients (according to NICE guidelines) are treated, and their LDL-C levels are reduced to below 2.5mmol/L	• All current patients' HbA1c levels are reduced to between 42-48 mmol/mol	• The body weight of all obese patients are reduced by 17.8% and overall obesity rate is reduced by 16.6%	• 100% of patients with CKD stages 3-5 are treated to the appropriate BP threshold	• Progression rate from mild dementia to severe dementia is reduced by 50% (from 25% to 12.5%) and the rate from moderate dementia to severe dementia is reduced by 31% (from 36% to 25%)

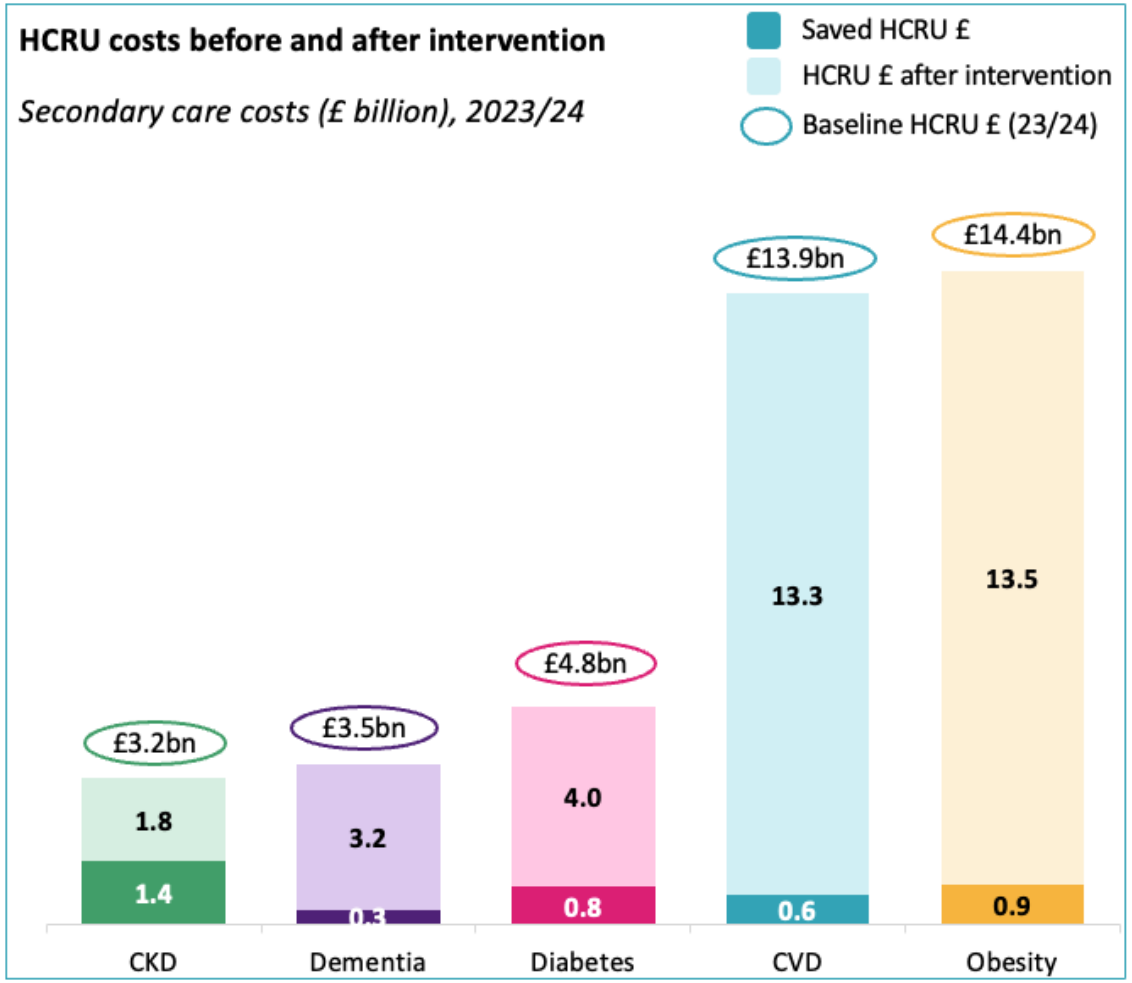
Source: 1 https://jamanetwork.com/journals/jama/fullarticle/2556125; 2 https://www.diabetes.co.uk/what-is-hba1c.html 3 https://diabetesjournals.org/care/article/43/2/329/36013/Diabetes 4 https://diabetesjournals.org/care/article/38/1/51/37874/HbA1c-as-a-Predictor-of-Diabetes-and-as-an-Outcome 5 JAMA Network., 6 Inside Precision Medicine, 7 NIH Research Matters , https://www.kidney.org/sites/default/files/CKDEndpoints_Reference10.pdf, 10 https://link.springer.com/article/10.1007/s12325-024-02913- 11 https://psycnet.apa.org/record/2021-28903-001 0067/21/10/3438 13 *The Journals of Gerontology: Series B*, Volume 55, Issue 3, 1 May 2000, Pages S152–S162, https://doi.org/10.1093/geronb/55.3.S152, 14 https://www.neurology.or

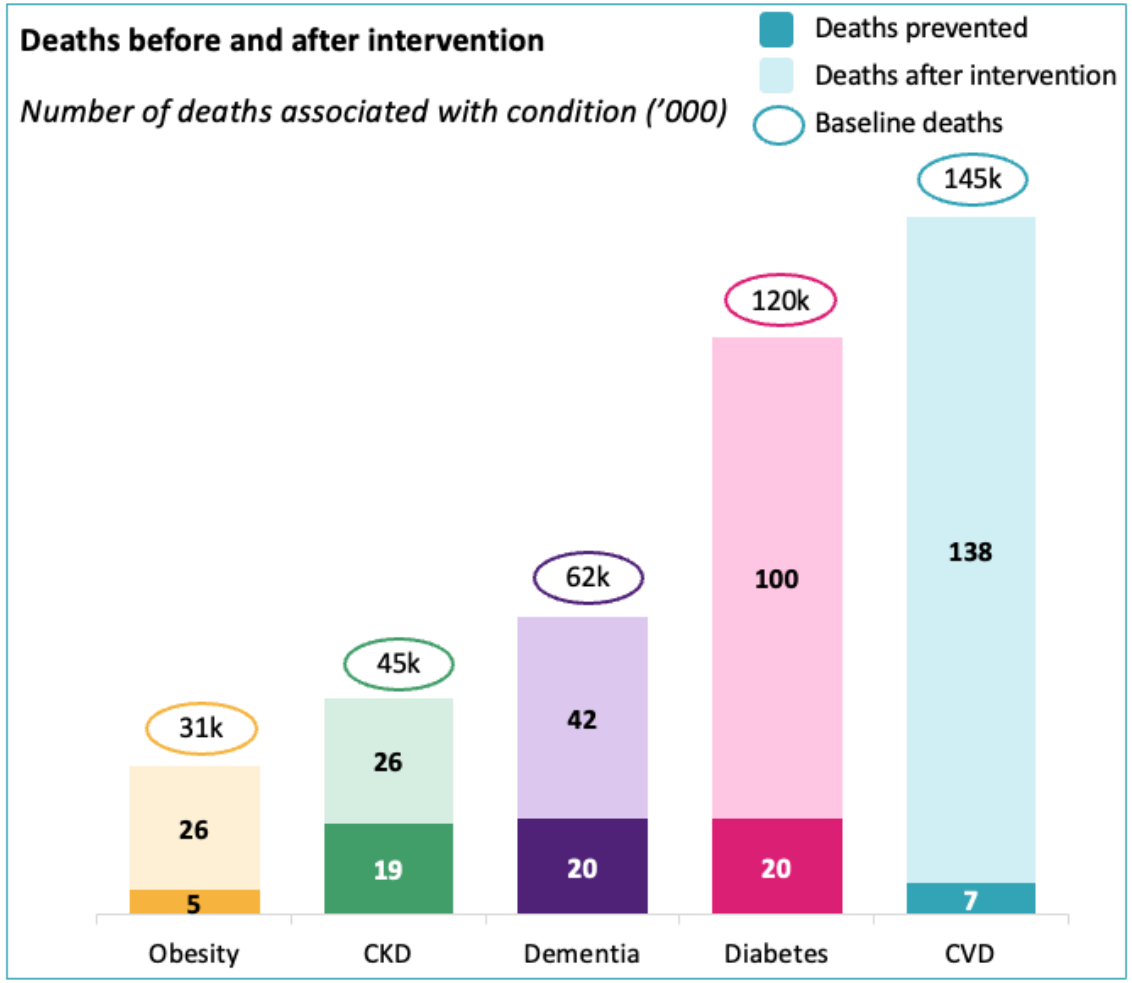
Potential impact of addressing gaps in disease through interventions

Category		Cardiovascular disease (CVD)	Type 2 Diabetes	Obesity	Chronic Kidney Disease (CKD)	Dementia
Events prevented		• 6.5k overall deaths • 17k heart attacks (810 deaths) • 15k strokes (1.2k deaths)	• 20k overall deaths • 5,700 heart attacks (1k deaths) • 8.1k strokes (2.5k deaths) • 1.6k amputations • 8.1k retinopathy	• 5.1k heart and circulatory deaths	• 14k dialyses • 1.4k kidney transplants • 19k deaths	• 20k deaths
HCRU saved	OBDs	• 1.2m	• 1.5m	• 1.8m	• 2.8m	• 831k
	Attendances	• 42k	• 13k	• 39k	-	• 34k
	Appointments	• 2m	• 1.8m	• 1.9m	• 2.6m	• 83k
Gross costs saved	Inpatient	• £417m	• £537m	• £630m	• £991m	• £291m
	A&E	• £7.5m	• £2.3m	• £7.2m	-	• £6.2m
	Outpatient	• £199m	• £271m	• £285m	• £386m	• £12m
	Total gross savings	• £624m	• £810m	• £870m	• £1.4bn	• £310m

Impact of inteventions

- Not sure what happened to the original chart like this? Can we have the sources



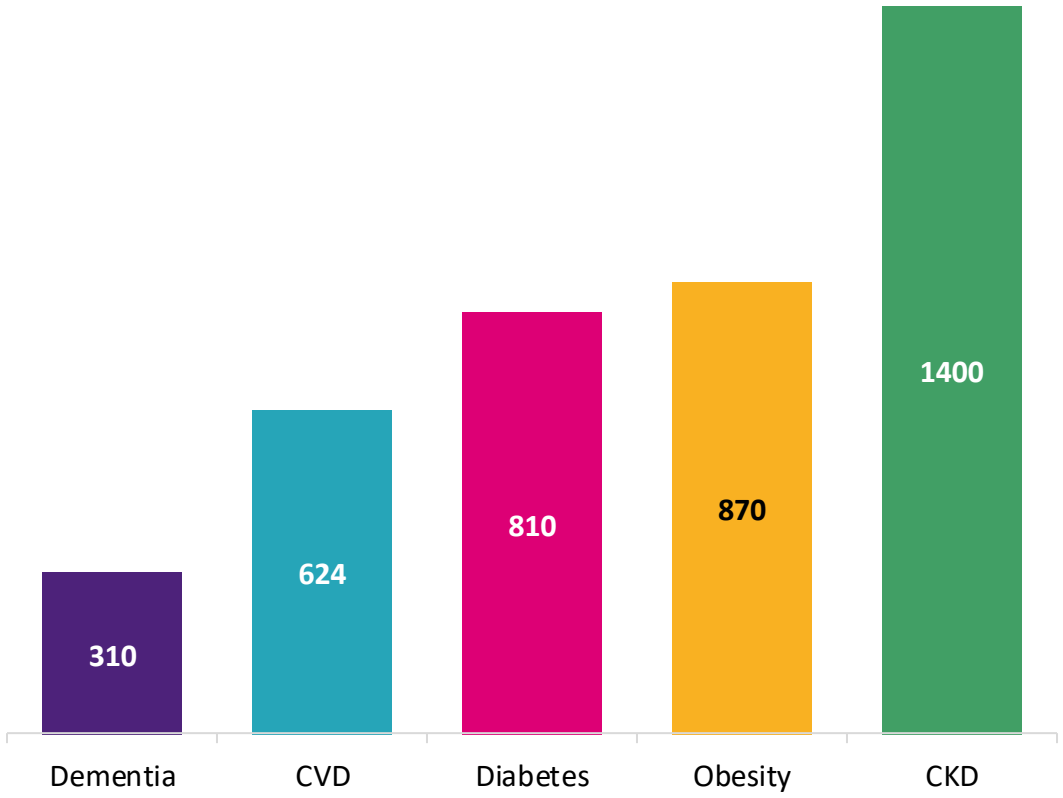


- Ideally make a waterfall

Optimising treatment based on intervention scenarios across the 5 disease areas with potential gross savings of almost £4bn

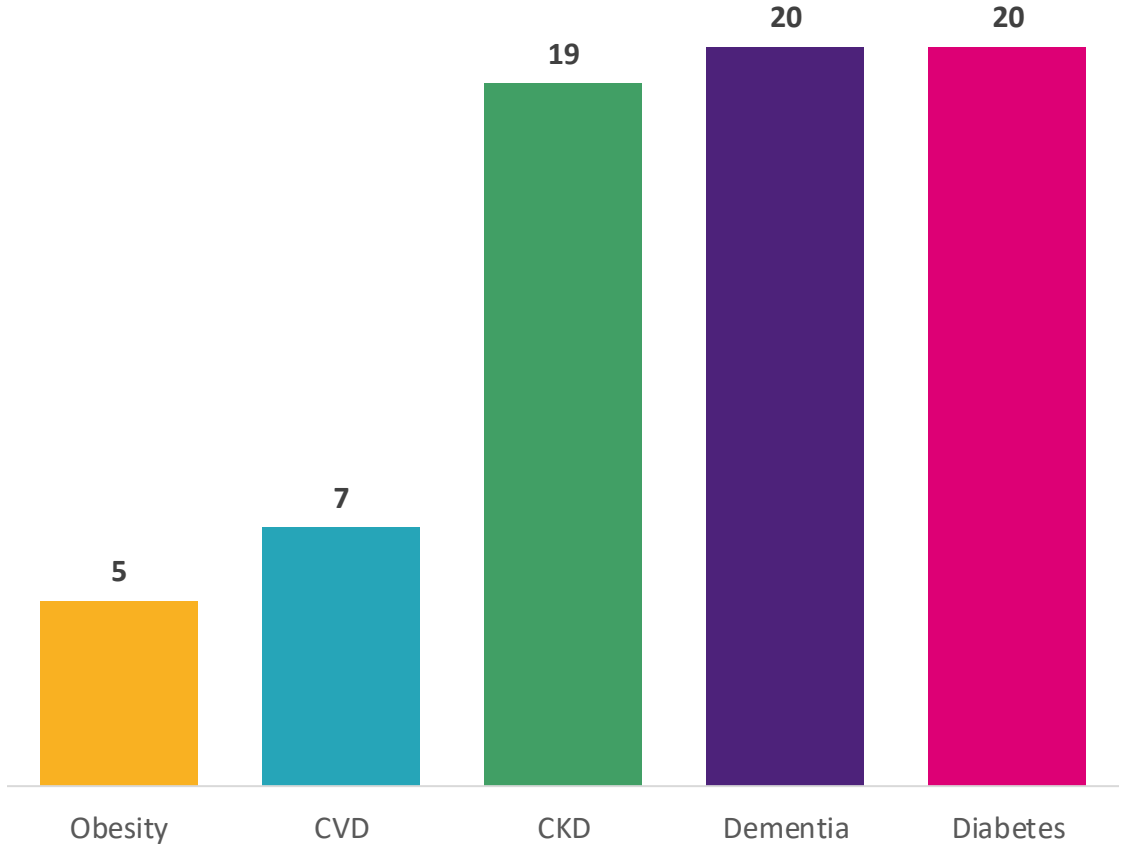
Acute care savings after intervention scenario

Secondary care gross savings (£ million), 2023/24



Lives saved

Number of deaths saved, thousands, 2023/24



Source: HES APC, ECDS, OP; CF analysis; CVD: NHSE, ONS, CVDPREVENT, Health Survey England; Diabetes: BNF, NHSE, QOF, ONS, diabetes.co.uk; CKD: Kidney Research UK, CVDPREVENT, Ku et al. (2018); Obesity: GOV.UK, QOF, Jensen et al. (2024); Dementia: QOF, Zuin et al. (2022), Xu et al. (2021), Davis et al. (2018)

Improving CVD treatment to lower LDL cholesterol levels can lead to gross savings of up to £3.9bn and prevent 13k deaths from heart attacks and strokes

LDL threshold (mmol/L)		Population size	
		Baseline	Scenario
Treated	< 2.5	2.9m	8.2m
	2.5 – 3.5	2.9m	2.5m
	> 3.5	720k	-
Untreated	< 2.5	6.4m	6.4m
	2.5 – 3.5	6.3m	6.3m
	> 3.5	26.8m	22.6m
HCRU			
Inpatient activity	Spells	6.0m	5.7m
	Bed days	26m	25m
Outpatient activity		30m	28m
A&E attendances		931k	889k
HCRU sub-total		£13.9bn	£13.3bn
HCRU savings		-	£624m
Avoided deaths		-	6.5k
Avoided events	Heart attacks	-	17k
	Strokes	-	15k

- **Diagnosis gap:** Approximately 22 million people with high LDL-cholesterol are undiagnosed
- **Treatment gap:** An estimated **5.3 million people** who should receive treatment are currently either untreated or sub-optimally treated
- **Events**: There are 102k heart attacks (18k deaths) and 88k strokes (27k deaths) from strokes in a year

- **Baseline**: 6.5m people in England are currently on lipid-lowering therapy
- **Intervention scenario:** All eligible patients (according to NICE guidelines) are treated, and their LDL-C levels are reduced to below 2.5mmol/L
  - Estimated eligible population: 10.7m
  - Estimated optimally treated population: 5.4m

- **Gross savings**: Appropriately treating all eligible patients to LDL-cholesterol level of below 2.5 mmol/L will lead to £624m savings on secondary care costs
- **Patient outcomes**: 17k heart attacks (810 deaths) and 15k strokes (1.2k deaths) prevented

Improving diabetes treatment to lower HbA1c levels can lead to gross savings of up to £810m, prevent 14k heart attacks and strokes, and avoid 1.6k amputations

HbA1c threshold (mmol/mol)		Population size	
		Baseline	Scenario
Treated	< 42	200k	200k
	42 – 48	800k	5.0m
	> 48	2.4m	-
Untreated	< 42	34.8m	34.8m
	42 – 48	6.0m	6.0m
	> 48	1.8m	-
HCRU			
Inpatient activity	Spells	2.1m	1.7m
	Bed days	9.2m	7.7m
Outpatient activity		11m	9.1m
A&E attendances		78k	65k
HCRU sub-total		£4.9bn	£4.1bn
HCRU savings		-	£810m
Avoided deaths		-	20k
Avoided events		-	5.7k heart attacks 8.1k strokes 1.6k amputations 8.1k retinopathy

- **Diagnosis gap**: Approximately 1.6 million people with diabetes are undiagnosed
- **Treatment gap**: An estimated 4.2 million patients who should receive treatment are currently either untreated or suboptimally treated*
- **Events**: There are 34k heart attacks (6k deaths), 48k strokes (15k deaths), 10k amputations and 49k retinopathy events associated with diabetes in a year

- **Baseline**: 3.4m people in England are being treated for diabetes
- **Intervention scenario 1:** All current patients' HbA1c levels are reduced to between 42-48 mmol/mol

- **Gross savings**: reducing all current diabetes patients' HbA1c levels to between 42-48 mmol/mol will result in £810 million gross savings on secondary care costs
- **Patient outcomes**: This intervention would prevent 5,700 heart attacks (1,000 deaths), 8,100 strokes (2,500 deaths), 1,600 amputations, and 8,100 retinopathy events associated with diabetes

*assumes 26% of the prediabetic patients have BMI > 30 and therefore eligible for diabetic medication

Reducing the overall obesity rate in the population could generate gross savings of £870m and prevent up to 5.1k CVD–related deaths associated with obesity

Disease		HCRU (patients with pre-existing obesity)	
		Baseline	Scenario
CVD	Spells	3.6m	3.4m
	Bed days	16m	15m
	Appointments	18m	17m
	Attendances	557k	527k
Diabetes	Spells	1.4m	1.3m
	Bed days	6.2m	5.7m
	Appointments	7.2m	6.6m
	Attendances	52k	47k
CKD (3-5)	Spells	934k	870k
	Bed days	4.6m	4.3m
	Appointments	4.0m	3.7m
	Attendances	58k	54k
HCRU sub-total		£14bn	£13bn
HCRU savings		-	£870m
Avoided CVD deaths		-	5.1k

- **Diagnosis gap**: Approximately 5.5 million people with obesity are undiagnosed
- **Events**: There are around 31,000 heart and circulatory deaths associated with obesity every year
- Treatment gap has not been calculated as treatment targets for obesity are subjective and differ for each individual

- **Baseline**: 26.2% of adults in England are estimated to be living with obesity
- Relative risk between obese vs. non-obese patients:
  - CVD: 1.49
  - Diabetes: 1.97
  - CKD: 1.70
- **Intervention scenario**: the body weight of all obese individuals are reduced by 17.8%[1] --> overall obesity rate is reduced by 16.6%[2]

- **Gross savings**: Reducing the average body weight of the obese population by 17.8% will lower the overall obesity rate by 16.6%, leading to an estimated £870 million gross savings on secondary care costs for CVD, diabetes, and CKD
- **Events**: 5,146 obesity related heart and circulatory deaths prevented

Source: 1) SURMOUNT-1 Trial results for tirzepatide: 17.8% body weight reduction 2) Community Services Dataset; CF analysis

Increasing the proportion of patients with CKD stages 3-5 receiving optimal treatment will result in £1.4bn gross savings and prevent 19k premature deaths due to CKD

CKD stages		HCRU	
		Baseline	Scenario
Stage 3	Spells	1.1m	736k
	Bed days	5.2m	3.6m
	Appointments	4.0m	2.8m
Stage 4	Spells	159k	60k
	Bed days	885k	337k
	Appointments	817k	310k
Stage 5	Spells	196k	42k
	Bed days	924k	194k
	Appointments	1.1m	233k
HCRU sub-total		£3.2bn	£1.8bn
HCRU savings		-	£1.4bn
Avoided deaths		-	19k
Avoided events	Dialysis	-	14k
	Transplant	-	1.4k

- **Diagnosis gap**: Approximately 520,000 people with CKD stages 3-5 are undiagnosed
- **Treatment gap**: An estimated 675,000 patients who should receive treatment are currently either untreated or sub-optimally treated
- **Events**: There are around 33k people receiving renal replacement therapy (RRT) and 40-45,000 premature deaths due to CKD every year

- **Baseline**: 70% of patients with CKD stages 3-5 are currently being treated to appropriate blood pressure (BP) threshold (controlled)
- **Intervention scenario:** 100% of patients with CKD stages 3-5 are treated to the appropriate BP threshold
  - There are 30% fewer people with stage 3 CKD + the progression rate between stage 3 to 4 decreases (from 2.4% to 1.3%) and the rate between stage 4 and stage 5 decreases (from 26% to 15%)
  - The progression rate between CKD stage 3 and renal replacement therapy (RRT) is reduced from 1% to 0.55%

- **Gross Savings:** Increasing the proportion of patients with CKD stages 3-5 who are treated to appropriate BP thresholds from 70% to 100% will result in £1.4b gross savings on secondary care costs

- **Patient outcomes**: 14,000 dialyses, 1,400 kidney transplants, and 19,000 deaths associated with CKD prevented

Delaying the progression from mild to moderate and severe dementia through treatment can lead to gross savings of £310m in acute care costs

Stages of dementia		HCRU*		
		Baseline (2023/24)	Baseline projection	Scenario-based projection
Severe	Spells	64k	94k	73k
	Bed days	2.3m	3.4m	2.6m
	Appointments	161k	234k	182k
	Attendances	77k	112k	88k
Moderate	Spells	167k	163k	153k
	Bed days	1.6m	1.6m	1.5m
	Appointments	565k	550k	519k
	Attendances	175k	170k	161k
Mild	Spells	171k	171k	171k
	Bed days	1.7m	1.7m	1.7m
	Appointments	1m	1m	1m
	Attendances	227k	227k	227k
HCRU sub-total		£2.32bn	£2.69bn	£2.38bn
HCRU savings		-	-	£310m
Avoided deaths				20k

- **Diagnosis gap:** Approximately 35% of people with dementia are undiagnosed
- **Treatment gap**: An estimated 453,000 dementia patients who should receive treatment are currently untreated
- **Events**: There are 74,000 deaths associated with dementia each year

Intervention scenario: Progression rate from mild dementia to severe dementia is reduced by 50%[1] (from 25%[2] to 12.5%) and the rate from moderate dementia to severe dementia is reduced by 31%[3] (from 36%[2] to 25%)

Number of people in each stage of dementia:

Stage	Baseline (23/24)	Baseline projection	Scenario projection
Severe	107k	144k	110k
Moderate	308k	300k	283k
Mild	411k	411k**	411k**

***the number of people with mild dementia was assumed to be the same*

- **Gross savings**: Reducing the progression rate of dementia from mild to moderate and from moderate to severe, through the use of AChE inhibitors, will result in £310 million gross savings on secondary care costs
- **Patient outcomes**: 20k deaths from severe dementia prevented
- Additional studies suggest that treatment can also **delay nursing home admission** by as long as 21 months, leading a per-person saving of up to £45k. (£64k reduction in nursing home costs – [£19k in diagnosis, prescription, healthcare, and domiciliary care costs])

Source: 1) Zuin et al. (2022) 2) Davis et al. (2018) 3) Xu et al. (2021)

*HCRU in this analysis did not include those of undiagnosed dementia patients

In practice, the actual impact on cost savings and patient outcomes is likely to be greater than what have been estimated in the report

QALY

- The current analysis does not account for improvements in the population's quality of life, such as reduced pain, increased mobility, and better mental health
- Incorporating these benefits through QALY could show a greater value from the interventions assessed in this report

Multi-year impact

- The current analysis only captures the impact of different intervention over a single year
- In reality, the benefits of these interventions are likely to be recurring, extending across multiple years as they prevent disease progression, reduce healthcare utilisation, and improve long-term patient outcomes
- Over time, this cumulative effect would amplify cost savings and health gains

Other direct costs

- The analysis in this report narrowed in and focused on NHS acute care costs
- Chronic conditions also place substantial financial strain on primary care, community care, and social care services
- The interventions could significantly reduce the burden across other care sectors, leading to much greater overall savings

Wider economic impact

- Our estimates do not consider the broader economic benefits of healthier individuals being able to remain active in the workforce and contributing to the economy
- Reducing illness-related absences, improving productivity, and preventing premature deaths would generate significant additional economic value that is not captured in this analysis

Addressing care gaps will require investing in community and primary care, improving awareness, access and capacity, and optimising medicines in line with guidelines

Investment in Primary and Community Care

- **A large increase in funding in acute care has been at expense of primary and community care**. The current approach is not conductive to focus on early detection and prevention of disease. The increase and diversity of roles within primary care presents an opportunity to form multi-disciplinary teams to manage chronic conditions more effectively. A targeted expansion of roles within community (e.g. specialist nursing capacity) would increase the capacity to enable the shift from hospital to community, and sickness to prevention.

Improve Awareness and Screening Within At-risk Population

- **Limited awareness and screening contribute to gaps in diagnosis.** Opportunities to detect early signs of disease or elevated risk factors—in primary care settings and especially in the wider community —are not fully realised. Awareness of risk factors and early disease symptoms is not high in public consciousness. Invitations for screening and health check programmes are pathway focused not person-centric, meaning at-risk populations may not be routinely or proactively invited. This leads to low levels of successful outreach and lower levels of uptake within targeted populations.

Improved Access, Capacity and Waiting Times

- **Socioeconomic factors and access also contribute to underdiagnosis.** Areas with higher levels of deprivation see disproportionately high numbers of undiagnosed cases. Barriers such as transport, cost, health literacy, and cultural factors prevent individuals from seeking or receiving timely diagnostic assessment.
- **Post-pandemic pressures, including general capacity constraints and longer waiting times,** contribute to delayed or incomplete diagnostic pathways. As the NHS struggles to recover, screening backlogs and clinic cancellations can lead to delays in diagnosis.
- **Waiting times are also impacting the reduction treatment rates**; this delays initiation of therapy and increases the time that the optimal intervention can be established.

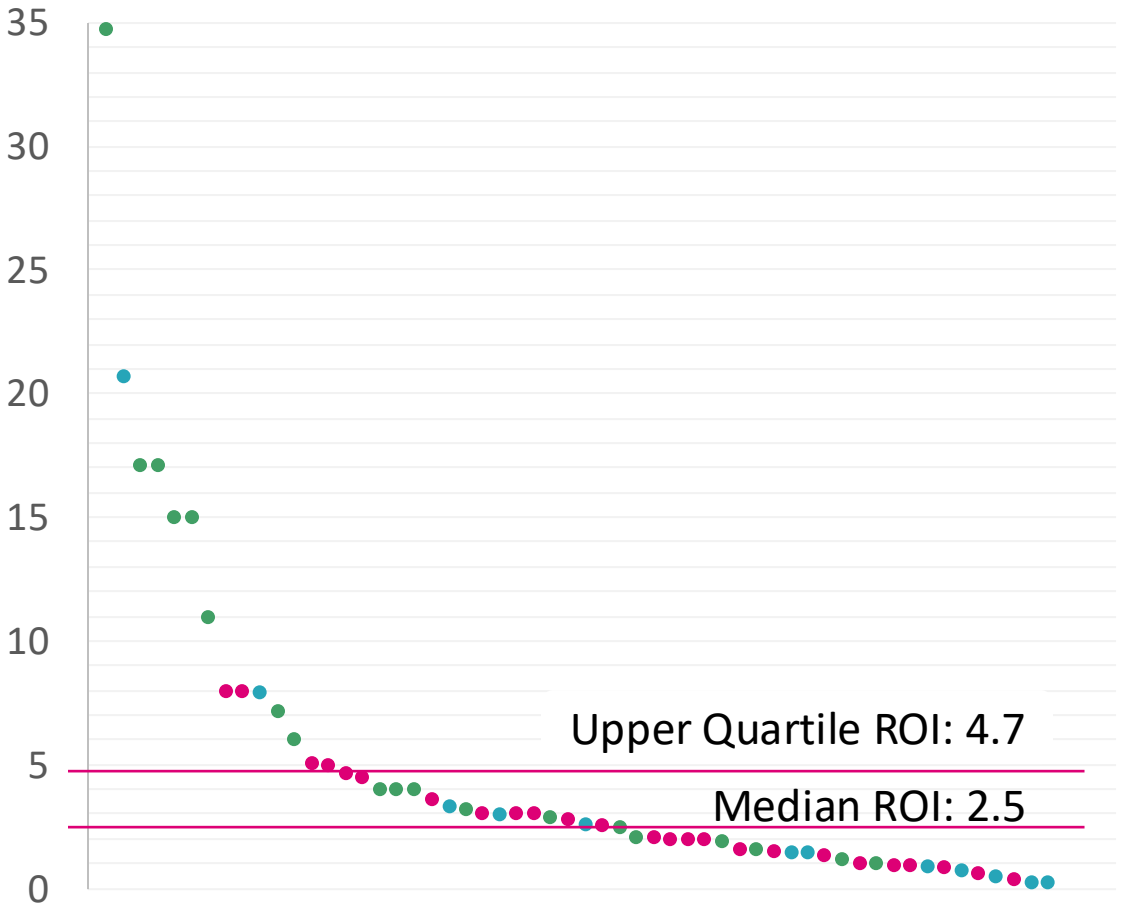
Improved Medicines Optimisation in-line with guidelines

- **Inadequate use of new and established therapies of medicines** that have received regulatory approval (e.g., safe by MHRA, cost-effective by NICE, and reimbursable via NHS England), yet these “triple-approved” medicines may be under-utilised as innovation takes too long to spread. Ensuring that eligible patients actually receive these treatments remains a persistent challenge.

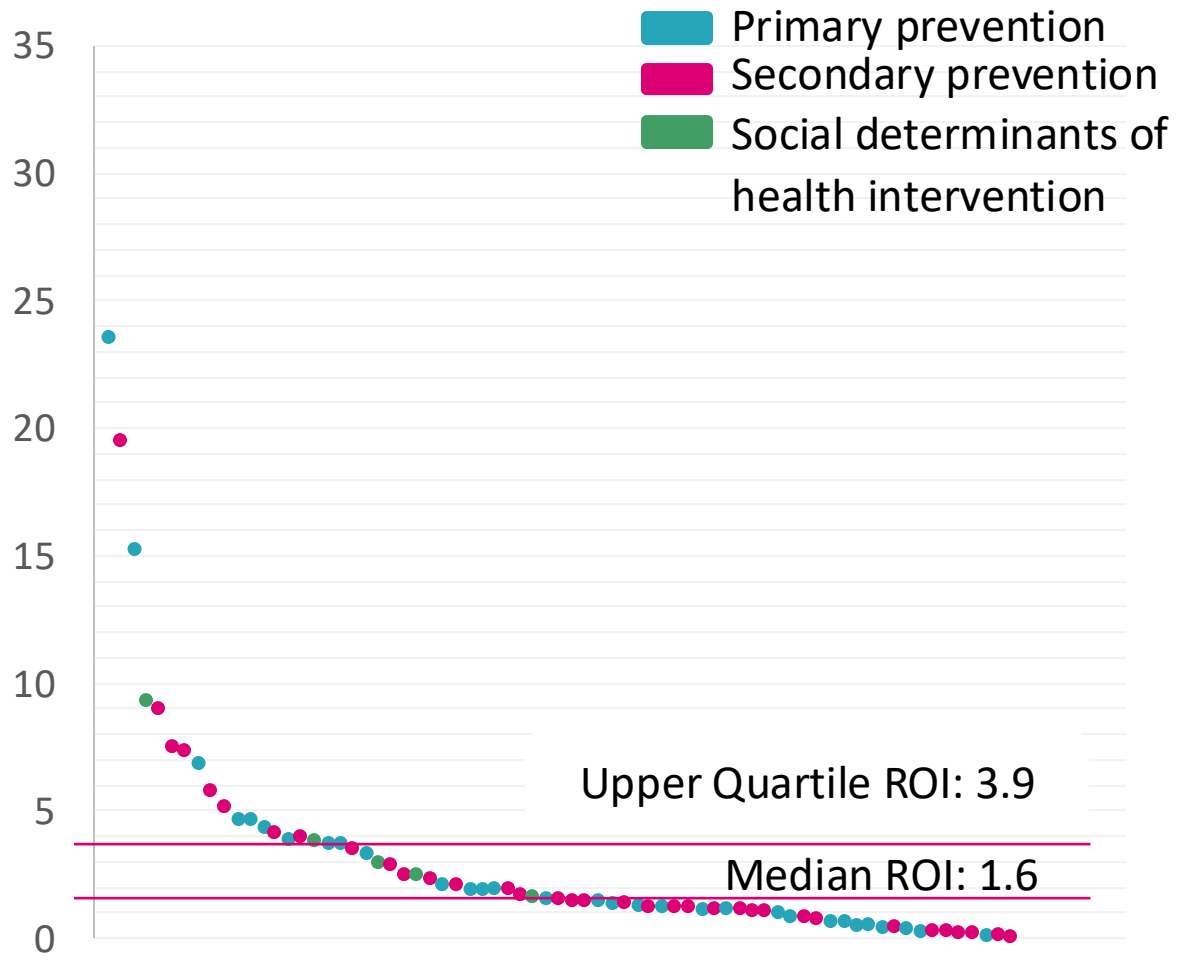
Prevention

Analysis of prevention interventions shows median ±2x ROI and upper quartile ±4x ROI – with some interventions delivering far higher

Return on investment for LA interventions



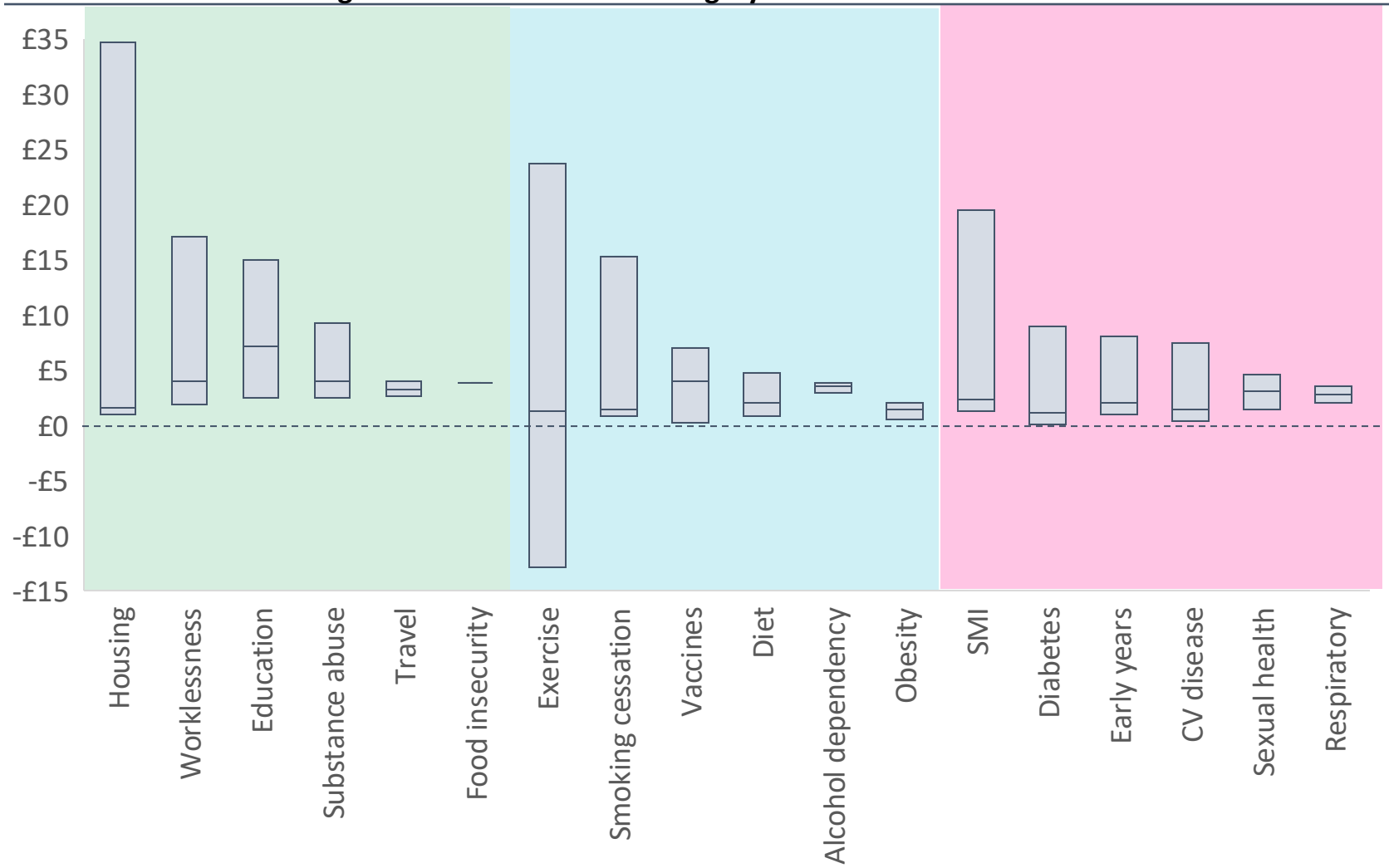
Return on investment for NHS interventions



Source: CF & NHS Confederation analysis, 2024

There is significant variance in ROI between interventions, both between intervention categories and with studies of the same intervention type

Return on investment range for each intervention category



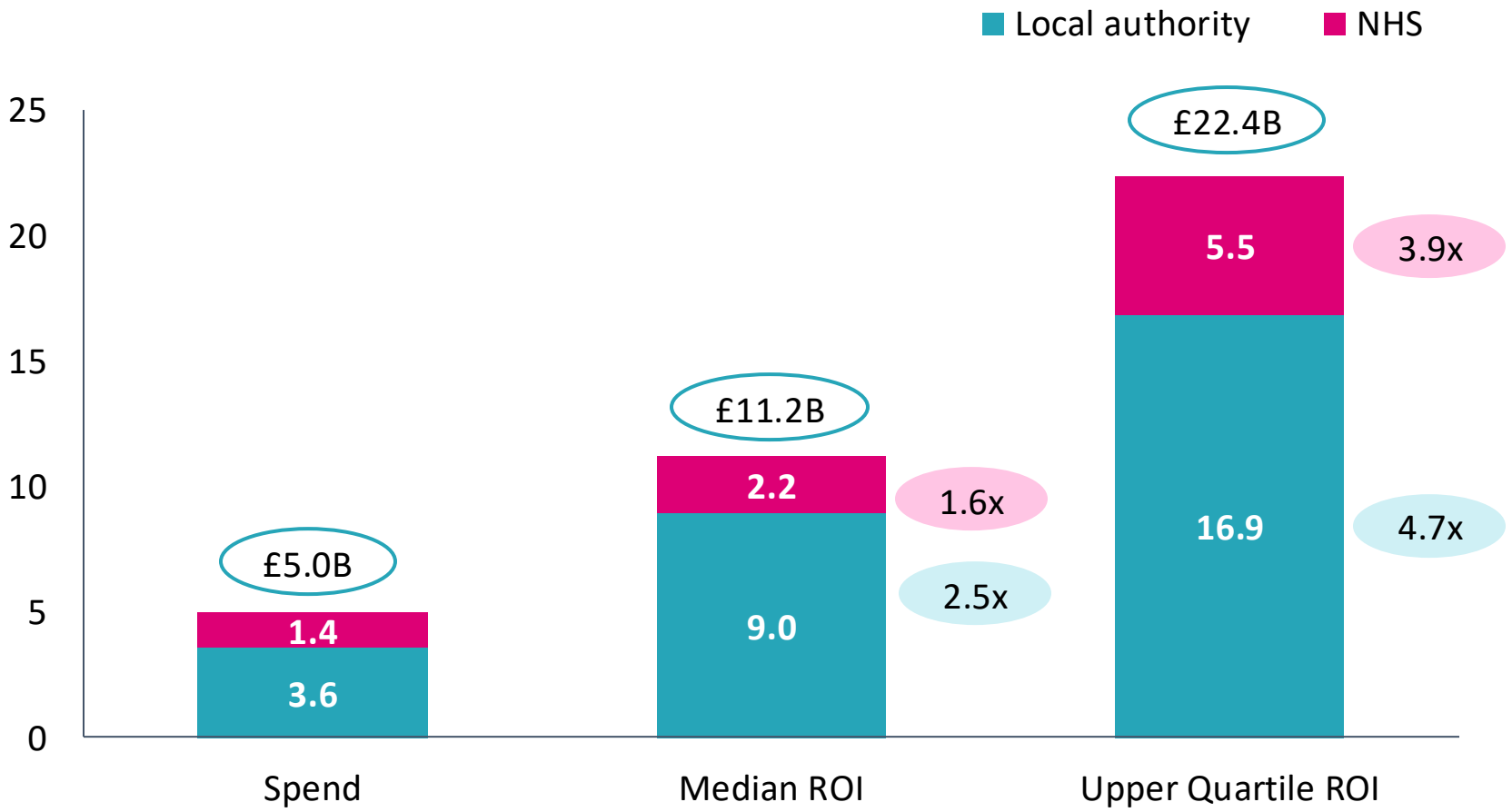
- Large amount of variance across intervention categories maximum ROI
- Even bigger variation *within* intervention categories
- Selecting not just the right categories but right interventions is critical
- Doing so requires making using ROI a key part of commissioning decisions
- All interventions should have rapid-evaluation using routinely collected data
- Leveraging the unrivalled access to linked data sets within the NHS can support this

Source: CF & NHS Confederation analysis, 2024

Combined NHS and Local authority could have an impact of £11bn if they achieved the upper quartile ROI rather than median value

Impact from investment in prevention, £billion

NHS and Local authority opportunity targeting median and upper quartile return on investment



- The local authority public health grant given nationally was **£3.6b** in 2024/25
- A total of **£1.4b** was allocated as the NHS budget, which is made up of the health inequalities funding and the budget for NHS Section 7A
  - **£200m** was allocated as the NHS health inequalities funding for ICSs to specifically address health inequalities in their areas
  - **£1.2b** was allocated under Section 7A of the NHS Act 2006 that requires health and justice services to meet national targets and unique indicators

Source: DHSC; NHS Confederation; King's Fund; CF Analysis

Recommendations

Recommendations

	High workforce productivity	Unmet needs in chronic conditions	Investing effectively in prevention
Priorities	Urgently review safer staffing guidance for impact on safety vs cost Match workforce to level of demand through data-driven tools Transform outpatient with digitalisation	Set "left swift" strategy to focus on targeting unmet needs in chronic conditions with diagnosis and treatment Commission care packages for chronic conditions – and make savings from acute care	Take business-like approach to prevention spending, cutting low-value investments and doubling down on high value ones Evaluate the impact of prevention spending using routinely collected data Either focus NHS on secondary prevention and LA on primary prevention/Social determinants or reunify prevention funding

Enablers

Data: use of existing NHS longitudinal data at patient, provider and ICB level to 1) evaluate staffing level vs demand and measure safety, 2) measure gaps in care at ICB and PCN level, target individuals with unmet care, track impact, 3) quantify expected ROI and measur impact

Funding: make fund follow the patient in general; cost care packages for chronic conditions and Increase spend in primary care, community, pharmacy and prescribing to decrease acute); establish bundled episode approach for elective care; consider reunifying prevention budget

Evidence: Use evidence-based approaches and strategies to guide investments and prioritise and allocate resources effectively. . This requires an urgent assessment of safer staffing impact vs cost. Develop and then maintain evidence on interventions for prevention.

Evaluation Create a habit of using routinely collected data to support evaluation and learning about any interventions in health service. Require completion of evaluation to be incorporated in commissioning approach.

Regulation: Incorporate consideration of productivity and unmet needs in assessing the effectiveness of care. Adopt an approach to regulation based on the use of routinely collected information

Coordinated action across a common set of enablers are needed to support this

	Data	Incentives	Flow of funds	Evaluation	Effective regulation
Current status	• The UK has one of the largest longitudinal datasets globally, providing significant data to evaluate impacts and enhance productivity.	• The NHS uses activity-based payment for acute care, primary care, private sector provision, medicines, and medical devices.	• Increase in acute spending from 47% to 58% of current NHS budget with reductions in community and primary care	• Medicines undergo thorough evaluation for safety, cost-effectiveness, and budget impact but services rarely evaluated	• CQC facing serious issues of credibility of methods in Dash report
Gaps	• Underutilisation of data i • Lack of integration in NHS data (e.g. workforce, activity, medicines) • Lack of IG to support linked patient level data • Community and MH data collection is not fit for purpose	• Suspension of PbR for acute trusts • Lack of any activitybased payment for community and mental health services create lack of productivity incentives.	• Lack of resources for PHM and case finding. • No mechanism to capture savings from preventive measures. • Medicine spending pressures with limited management tools at the ICB level.	• NHS service interventions lack economic evaluation. • Decisions on safe staffing have not been economically evaluated • ROI on investment in prevention not ofter measured	• Primary focus on safety appears to failed to consider impact on staffing levels • Lack of credible approach to regulaion
Recommendations	• Invest in IG to enable linked data in each ICB to draft data-sharing agreements to maximise GDPR flexibility and engage clinicians and patients. • Rationalise and improve data collection for community and MH.	• Introduce activity-based payments for desired activities in community and mental health. • Incentivise timely and accurate reporting, care plans, and shared goals. • Consider value-based payments, especially in primary and acute care.	• Create linkages between budget elements in the NHS. • Enable models of value-based payment. • Address funding flow issues to support preventive measures.	• Implement routine economic evaluations for NHS service interventions leveraging longituindal data. • Ensure understanding of impacts before national rollout.	• Regulators need to adopt and use routinely collected data to inform rationale regulation Improve the use of data and data quality through regulatory adoption. • Ensure consistent information flow.

Data

Funding

Date	Cash prices (£billions)	2022/23 prices (£billions)	Real terms change (%)
2013/14	109.8	135.6	2.4%
2014/15	113.3	138.4	2.0%
2015/16	117.2	142.1	2.7%
2016/17	120.6	142.9	0.6%
2017/18	125.2	146.0	2.2%
2018/19	128.4	146.7	0.5%
2019/20	138.5	154.6	5.3%
2020/21	144.9	153.4	-0.8%
2021/22	153.1	163.4	6.5%
2022/23	181.7	181.7	11.2%
2023/24 planned	189.5	177.9	-2.1%

Breakdown of NHS spending £ Billion: real terms 2023/24 prices			Change over period	
	2015/16	2023/24	£ billion	%
Acute	49.3	63.6	+14.3	+28.9%
Specialised services	19.1	24.9	+5.8	+30.3%
Core mental health	9.4	13.7	+4.3	+45.3%
Primary medical care	11.2	12.9	+1.7	+14.8%
Community services	9.2	12.3	+3.1	+34.2%
Continuing care	5.6	6.5	+0.9	+17.1%
Other	24.4	20.0	-4.4	-18.0%
Total	128.4	153.8	+25.4	+19.8%

Source: Parliamentary Briefing: NHS funding and expenditure (2024)

Activity

Date	A&E attendances	Outpatients	Electives admissions	NEL admissions	OBDs	Population
2013/14	21,778,657	101,844,824	7,760,623	5,565,567	36,848,377	53,918,686
2014/15	22,354,781	107,188,423	8,273,821	5,691,577	37,283,771	54,370,319
2015/16	22,920,435	113,298,661	8,464,215	5,885,604	36,782,169	54,808,676
2016/17	23,362,301	118,578,912	8,676,087	6,022,019	37,228,867	55,289,034
2017/18	23,830,120	119,378,895	8,583,947	6,243,151	37,029,010	55,619,548
2018/19	24,826,982	123,351,435	8,809,917	6,597,117	36,717,901	55,924,528
2019/20	25,017,116	124,927,782	8,842,098	6,398,352	36,753,847	56,230,056
2020/21	17,429,559	101,898,658	5,628,814	5,328,755	28,813,755	56,325,961
2021/22	24,374,967	122,325,785	7,931,133	6,112,702	34,718,080	56,554,891
2022/23	25,348,842	124,461,569	8,560,692	6,318,832	37,449,292	57,112,542
2023/24	26,321,069	135,445,596	9,165,026	6,776,814	37,988,331	57,690,323

Source: Quarterly Attendances & Emergency Admission monthly statistics, NHS and independent sector organisations in England, Hospital Outpatient Activity, Summary Table 1: FCEs, FAEs, Admission method, 2014-15 to 2023-24, Monthly Hospital Activity, Average Daily Available and Occupied Beds Timeseries, ONS England population.

Workforce

Date	Adult nurses	Manager nurses (modern matron, nurse manager)	All other nurses	Ratio
2010/11	169,917	7,124	162,793	22.9
2011/12	167,593	6,822	160,770	23.6
2012/13	166,376	6,544	159,832	24.4
2013/14	169,862	6,526	163,336	25.0
2014/15	173,601	6,840	166,761	24.4
2015/16	175,820	7,282	168,538	23.1
2016/17	178,475	7,686	170,789	22.2
2017/18	179,035	7,932	171,102	21.6
2018/19	181,025	8,321	172,704	20.8
2019/20	186,977	8,772	178,205	20.3
2020/21	195,425	9,276	186,149	20.1
2021/22	204,041	10,021	194,020	19.4
2022/23	213,389	10,927	202,462	18.5
2023/24	227,553	11,697	215,855	18.5

Date	Medical workforce - Acute	Increased output if regained productivity of 2019/20
2013/14	73,701	1,179
2014/15	78,139	1,201
2015/16	78,438	1,185
2016/17	80,512	1,165
2017/18	86,390	1,153
2018/19	90,379	1,139
2019/20	99,564	1,109
2020/21	105,975	1,171
2021/22	110,977	1,194
2022/23	116,266	1,204
2023/24	123,019	1,200

Source: NHS Hospital & Community Health Service (HCHS) monthly workforce statistics

Methodology

Methodology for weighted activity index

A **Weighted Activity Unit (WAU)** allows for hospital activity (elective and non-elective admissions, A&E attendances and outpatient appointments) to be expressed in a single, comparable metric by weighting each activity according to its relative cost and complexity (using 2022/23 prices). By converting varied clinical activities into one unit, we can more accurately compared how different types of work use staff and resources. This allows analysis of workforce-to-activity relationships to be fair and meaningful. Instead of simply counting activity volumes, we account for the fact that some activities are more resource-intensive or complex than others.

Acute activity data was sourced from NHS data collections services over a 10 year period from 2013/14 to 2023/24 and on an annual basis (NHS A&E Attendances, NHS Outpatients Appointment Dataset, NHS Emergency and Non-elective admissions, NHS Hospital Admitted Patient Care and Adult Critical Care Activity). Where information was provided monthly, the data was aggregated to reflect activity for the year. Each type of acute activity was normalised to the baseline year (2013/14).

The unit cost of each activity was sourced from Jones et al., (2023) for an A&E attendance, outpatient appointment, elective admission, non-elective admission. The annual cost for each activity was then derived by multiplying the total recorded activity for the specific year by the unit cost. This was replicated for all acute activity from 2013/14 to 2023/24 and totalled together for each year to obtain the total acute costs for a given year. The cost weighting of each acute activity spend as a proportion of total acute spend for each year was then calculated.

The weighted activity index for each acute activity was calculated by multiplying the cost weighting of that activity with the activity indexed to the respective year (WAU index per activity type = cost weighting x activity index). For example, if in 2022/23 the cost weighting for A&E attendances was 5% of the total acute spend and A&E attendances (indexed to 2013/14) was 116%, then the weighted activity unit for A&E attendances in 2014/15 would be 6%. The weighted activity index for each activity during a year were summed to provide the integrated WAU for the year (Integrated WAU = sum of WAU index for all activity types).

We have used NHS acute activity data to calculate the productivity of the workforce since 2013/14 and determined the cost associated with lost output

1	**Calculate the cost of each activity**	Calculate the cost of total A&E attendances, outpatient appointments, elective admissions, non-elective admissions since 2013/14	• 10 years of activity for elective and non-elective admissions, outpatient appointments and A&E attendances • Calculate the total cost of activity by multiplying total activity by unit cost
2	**Calculate the integrated weighted activity unit (WAU)**	Calculate the cost weighing of each activity	• Calculate the proportional cost of each activity using the total cost of acute activity for the year
		Calculate the integrated WAU using the cost weighting	• Calculate the integrated WAU for each activity type using the relative cost of the activity and index activity per capita for the year
3	**Calculate the cost associated with reduced productivity**	Calculate the productivity of the medical and nursing workforce	• Identify the total nursing and medical workforce for the relative years • Index the medical and nursing workforce to baseline years • Calculate the productivity of the workforce by dividing integrated WAU by indexed workforce
		Estimate the cost associated with reduced productivity	• Calculate the total cost of reduced productivity since from baseline to 2013/14 • Calculate the cost of reduced productivity on the NHS workforce budget

Quality gap methodology

1	**Calculate prevalence of disease and elevated risk factors**	Understand the prevalence of disease	• Understand the diagnosed and undiagnosed populations using QOF and published literature
		Understand the split between treated and untreated populations	• Estimate the split between untreated and treated population using national prescribing data and published literature
2	**Attribute healthcare resource utilisation (HCRU) to different risk thresholds**	Calculate the distribution of disease risk factor across the population	• Estimate the distribution of population across the relevant clinical risk factor thresholds and/ or disease progression rates using QOF, published literature and surveys
		Calculate the healthcare resource utilisation based on risk factor distribution	• Identify patients with underlying disease using ICD-10 and SNOMED codes in Hospital Episodes Statistics (HES) and distribute the hospital activity across the risk factor populations based on established hazard ratios
3	**Calculate the impact of intervention on healthcare resource utilisation**	Estimate the eligible population for risk factor intervention	• Estimate the population that are eligible for intervention based on NICE guidelines • Understand the number of people currently treated who are sub-optimally managed based on QOF
		Calculate impact of different interventions on healthcare resource utilisation	• Calculate the impact of interventions on healthcare resource utilisation and morbidity and mortality figures

CVD care gap: assumptions and calculations

LDL threshold (mmol/L)	Number of population	Source / Assumption	Number of population	Source / Assumption
Treated <2.5	6.5m	• Number of people taking lipid-lowering drugs in England (NHSE News (2021))	2.9m	• 45% of patients with recorded CVD is treated to appropriate LDL cholesterol threshold (CVDPREVENT) • 6.5m x 45% = 2.9m
Treated 2.5-3.5			2.9m	• Assumed that the the proportion of treated patients within the 2.5-3.5 range is the same as that within the <2.5 range
Treated >3.5			720k	• 6.5m – 5.8m = 720k
Untreated <2.5	39.5m	• 46 million – 6.5 million = 39.5 million	6.4m	• 41% of adult population in England has low to medium LDL level (Health Survey England) = 18.5m • 18.5m – number of treated people with low to medium LDL-C (5.8m) = 12.7m • Assumed even split between those with LDL levels below 2.5 and between 2.5-3.5
Untreated 2.5-3.5			6.3m	
Untreated >3.5			26.8m	• 39.5m – 12.7m = 26.8m
Total	46m	• Number of adult population in England (ONS Mid-Year Population Estimates 2023)	46m	-

Type 2 diabetes: assumptions and calculations

HbA1c threshold (mmol/mol)	Population size	Source / Assumption	Population size	Source / Assumption
Treated < 42	3.4m	• Number of adults treated with diabetes medicine = 3.64m (BNF) • Number of people with type 1 diabetes = 270k (NHSE) • Number of adults with type 2 diabetes that are treated = 3.64m -270k = 3.4m	200k	• 31% of adults with diabetes achieved glycaemic control (National Diabetes Audit) • 3.4m x 31% = 1.0m • Since it is unlikely/ not recommended for HbA1c levels in diabetic patients to go below 42 mmol/mol due to hypoglycaemia (NHS), assumed a 20:80 split within the 1.2m (200k : 800k)
Treated 42-48			800k	
Treated > 48			2.4m	• 3.4m – 1.0m = 2.4m
Untreated < 42	42.6m	• 46m - 3.4m = 42.6m	34.8m	• 42.6m – 6m – 1.8m = 34.8m
Untreated 42-48			6m	• 7 million people in the UK are estimated to be prediabetic (diabetes.co.uk) (=13% of the UK adult population) • 46m (England adult population) x 13% = 5.98m
Untreated > 48			1.8m	• Total number of people diagnosed with type 2 diabetes = 3.63m (3.9m (QOF) – 270k (NHSE)) • 30% of people with type 2 diabetes in England are undiagnosed (ONS) • 5.2m x 30% = 1.56m (undiagnosed) • 3.63m – 3.37m = 264k (diagnosed but untreated) • 1.56m + 264k = 1.82m
Total	46m	• Number of adult population in England (ONS Mid-Year Population Estimates 2023)	46m	-

CKD care gap: assumptions and calculations

Measures		Source/ Assumption
Estimated prevalence of total CKD (UK)	7.2m	Number of adults with chronic kidney disease in the UK (Kidney Research UK, 2023)
Estimated number of people with CKD stage 3-5 (UK)	3.25m	
Cost of dialysis per patient per year	£34k	Cost of dialysis to the NHS per year per patient in 2023 (Kidney Research UK, 2023)
Cost of kidney transplant per patient (surgery + immunosuppression)	£34.3k*	• The NHS indicative cost of kidney transplant was £17,000 per patient and the immuno-suppression required by a patient with a transplant was £5,000 per patient per year in 2009 = £22,000 (NHS Blood and Transplant, 2009) • Inflation rate was applied to this cost to 2024 levels = £34,300
Total costs for RRT	£1.1b	• Number of people receiving dialysis in 2020 = 29,580 (Kidney Research UK, 2023 • Number of people receiving kidney transplant 2021 = 3,011 (Kidney Research UK, 2023) • (£34,000 x 29,580 people) + (£34,300 x 3,011 people) = £1.1b
RRT cost per capita	£33.7k	£1.1b / (29,580 + 3,011) = £33,740

Measures		Source/ Assumption
Ratio of median time spent in CKD stages 3 between controlled vs. uncontrolled BP	3.7	• 12.9 years vs. 3.5 • Ku et al. (2018)
Proportion of patients with CKD stages 3-5 that are treated to appropriate BP threshold	70%	• CVDPREVENT
Baseline progression rate from stage 3 to RRT	1%	Number of people in RRT/ estimated number of people in stage 3 = 32,591/ 3.15m = 1%
New progression rate from stage 3 to RRT	0.55%	Applied 3.7 ratio to the scenario where the proportion of controlled population is increased from 70% to 100%
Baseline progression rate from stage 3 to stage 4	2.4%	Number of admissions in stage 4/ number of admissions in stage 3 (HES APC)
New progression rate from stage 3 to stage 4	1.3%	Same approach as stage 3 to RRT
Baseline progression rate from stage 4 to stage 5	26.4%	Number of admissions in stage 5/ number of admissions in stage 4 (HES APC)
New progression rate from stage 4 to stage 5	14.6%	Same approach as stage 3 to RRT

Obesity care gap: assumptions and calculations

Measures		Source/ Assumption
Estimated prevalence of obesity in England	26% (12m)	• 26.2% of adults in England were estimated to be living with obesity in 2022/23 • Obesity Profile: short statistical commentary May 2024 (GOV.UK)
Number of adults diagnosed with obesity	13% (6.5m)	• Obesity: QOF prevalence (18+ years) 2023/24
Number of adults accessing any treatment	±100k	• Obesity National Audit referrals to Tier 2 and Tier 3 weight management services
Relative risk of CVD between obese vs. non-obese patients	1.49	• Number of CVD patients among those with obesity listed in any diagnosis code vs. those without obesity in any diagnosis code • Hospital Episode Statistics Admitted Patient Care (HES APC) 2023/24
Relative risk of diabetes between obese vs. non-obese patients	1.97	• Number of diabetes patients among those with obesity listed in any diagnosis code vs. those without obesity in any diagnosis code • Hospital Episode Statistics Admitted Patient Care (HES APC) 2023/24
Relative risk of CKD between obese vs. non-obese patients	1.70	• Number of CKD patients among those with obesity listed in any diagnosis code vs. those without obesity in any diagnosis code • Hospital Episode Statistics Admitted Patient Care (HES APC) 2023/24
Percentage reduction in body weight	17.8%	• Percentage difference in body weight from placebo during tirzepatide clinical trials (SURMOUNT-1 trial) • Jensen et al. (2024)

Dementia care gap: assumptions and calculations

Measures		Source/ Assumption
Estimated prevalence of dementia in England	826k	• DiscoverNOW; CF analysis
Number of people diagnosed with dementia	482k	• QOF
Diagnosis gap	344k	• 826k - 482k
Proportion of patients with dementia that are treated	6%	• Primary Care Prescribing Dataset; CF analysis
Treatment gap	453k	• Number of people with diagnosed dementia that are not treated = 482k x 6% = 29k • Number of people diagnosed – number of people treated = 482k – 29k = 453k
% reduction in progression rate from mild to moderate dementia with AChE inhibitors	50%	• Zuin et al. (2022)
% reduction in progression rate from moderate to severe dementia with AChE inhibitors	31%	• Xu et al. (2021)
Baseline progression rate from mild to moderate dementia	25%	• Davis et al. (2018)
New progression rate from mild to moderate dementia	13%	• 25% x (1 - 50%) = 12.5%
Baseline progression rate from moderate to severe dementia	36%	• Davis et al. (2018)
New progression rate from moderate to severe dementia	25%	• 36% x (1 - 31%) = 24.8%

Limitations

Productivity:

- We have looked at at high level national metrics around workforce and activity, but we are unable to make inferences about the exact reasons why output has not increased proportionally with the standard activity metrics that we have used.

Care gaps:

- We based our estimates of healthcare resource utilisation on activity data from 2023/24, assuming these figures provide a representative measure of current trends.
- To determine the number of inpatient spells associated with a particular disease area, we counted any spell in which a relevant ICD-10 or SNOMED code appeared in a diagnosis field. This approach may include cases where the disease in question was not the primary reason for admission, but given the conditions examined are known risk factors, we considered it appropriate to adopt a more inclusive definition.
- For outpatient appointments, diagnosis fields are less reliably populated, making direct attribution more challenging. To approximate outpatient resource use, we identified all outpatient appointments for individuals who had at least one inpatient spell in 2023/24 with a relevant disease code. While this method may overestimate the number of outpatient visits directly attributable to a disease (since some appointments may be unrelated), it also potentially underestimates total disease-related outpatient contacts by excluding relevant patients who did not have an inpatient stay in 23/24. We assume these biases may partially balance each other, though the exact degree of offset is not fully quantifiable.

List of sources

Category		Cardiovascular disease (CVD)	Type 2 Diabetes	Obesity	Chronic Kidney Disease (CKD)	Dementia
Estimated prevalence vs. Diagnosed population		• 1) Health Survey England • 2) NHSBSA • 3) British Heart Foundation	• 4) QOF • 5) NHSE • 6) ONS	• 7) GOV.UK • 8) QOF	• 9) Kidney Research UK • 10) QOF	• 11) DiscoverNOW • 12) QOF
Diagnosis gap		• CF Analysis				
Eligible vs. Optimally treated population		• 13) CVDPREVENT • 14) NHSE News	• 15) QOF • 16) National Diabetes Audit • 17) NHSE		• 18) QOF • 19) CVDPREVENT	• 20) QOF • 21) Primary Care Prescribing Dataset; CF analysis
Treatment gap		• CF Analysis				
Events (per year)		• 22) NICE CKS • 23) Hospital Episode Statistics (HES) • 24) NHS Compendium: Mortality	• 25) International Diabetes Federation • 26) Diabetes UK • 27) NHS Compendium: Mortality • 28) HES	• 29) British Heart Foundation	• 30) Kidney Research UK • 31) NHSE	• 32) Alzheimer's Research UK Dementia Statistics Hub
Events prevented		• HES APC, ECDS, OP • CF Analysis				
HCRU	Spells	• HES APC, ECDS, OP • CF Analysis				
	OBDs					
	Attendances					
	Appointments					
Costs	Inpatient	• HES APC, ECDS, OP • CF Analysis				
	A&E					
	Outpatient					
	Total costs					
Gross savings		• CF Analysis				