A ten-year workforce strategy for UK clinical pharmacology

1. Executive summary

Investment in the UK clinical pharmacology workforce is an investment in the NHS of the future, helping build connectivity and synergy for delivery of the NHS Long-Term Plan[1], government vision for Clinical Research Delivery[2], and government vision for UK Life Sciences. The NHS Long-Term Plan promises a joined-up, coordinated, and more personalised approach to patient care. As part of this holistic, whole-person centred vision the plan recognises that the NHS must do more to reduce health inequalities and maximise prevention. It recognises that elderly people have complex healthcare needs (particularly in the management of multiple long-term conditions and complex polypharmacy) that will peak in the next decade. It sees the potential of genomic medicine, and the opportunity of a thriving medical science and innovation base that can deliver transformative treatments. Over the next 10 years, the NHS must invest in the workforce of the future - characterised by multi-professional teams working in integrated care pathways, embedding research into care and taking an evidence-based approach to the use of medicines. **Clinical pharmacology** is a small specialty that, through expert knowledge and partnership working, creates a multiplier effect in exactly these areas.

Clinical pharmacologists are **expert generalists**, using knowledge of how medicines work and affect the body to provide integrated assessment and care, including for complex polypharmacy. They are **research leaders** who investigate the mechanism(s) of action of potential therapeutics, translating these into clinical use through the design and delivery of innovative trials. They are **precision medicine leaders**, supporting stratification of trials and implementation of pharmacogenomics in the NHS. They are **regulatory and policy leaders**, ensuring safety, effectiveness, quality and value through regulatory evaluation, pharmacovigilance and health technology assessment. They are **education leaders**, supporting the NHS workforce to be skilled in the use of medicines and to engage in research. Clinical pharmacologists can help deliver the Long-Term Plan through leadership in:

Implementation of genomic medicine

To help ensure that the right patient receives the right medicine, clinical pharmacologists can:

- Lead implementation of pharmacogenomics (including education and training) to reduce harms and improve efficacy.
- Stratify by disease, genomics and other biomarkers, embedding this into trials and clinical practice to guide treatments to specific populations.
- Support functional genomics to improve the identification of potential drug targets

Increased capacity and capability in clinical research & life sciences

The development of new medicines and treatments is essential to address unmet clinical need, bringing benefit for both society and the UK economy. Clinical pharmacologists can:

- Advise on trial methodology and regulatory requirements, including hybrid and adaptive designs, digital and decentralised trials, master protocols and efficient platform trials.
- Deliver and support more innovative early phase trials.
- Lead use of electronic health record data, gaining insights via state-of-the-art analytics.
- Support and train the wider NHS workforce, so more healthcare professionals (including those in under-served areas) can reach patients with research.

Tackling multimorbidity and complex polypharmacy

An ageing population means that complexity of care and medicines management pose a major challenge for the NHS. In partnership with pharmacy, clinical pharmacologists can:

- Improve the safe, effective and cost-effective use of medicines[3] e.g., in complex polypharmacy, by decreasing adverse drug reactions and prescribing errors, and improved prevention and management of drug-drug interactions.
- Support education and training, so the NHS workforce is skilled in the use of medicines.

We propose investing <u>£57.5m by 2031 to double the number of clinical pharmacologists</u> in the NHS (to 215 consultants and 87 training posts) – people that the NHS needs to create the workforce of the future.

2. Current CPT distribution (consultant & pipeline numbers by region)

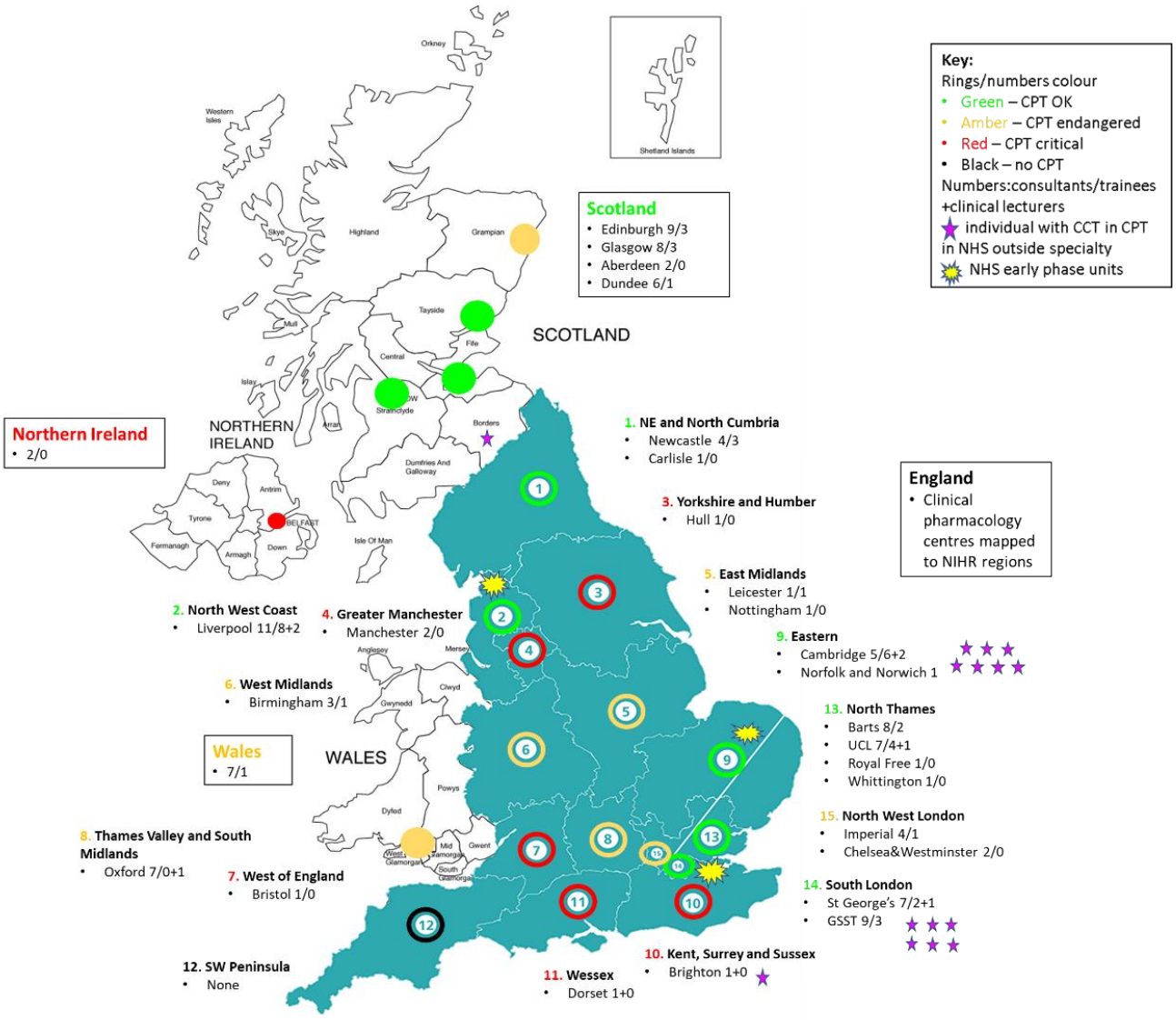

Fig 1. Clinical pharmacology & therapeutics (CPT) in the NHS mapped to the 15 NIHR clinical research network regions in England. Status codes: "good" (green; 6 regions, including Scotland as one region, but the centre in Dundee is amber); "at risk" (amber 4 regions); "critical" (red 5 regions); "completely absent" (black). Status of Scotland, Wales and Northern Ireland shown in separate boxes. Numbers indicate consultants/trainees + academic clinical lecturers in CPT. Individuals with a CCT in CPT not working in the specialty are shown as pink stars & early phase units with CPT engagement/recruiting NHS patients are shown as yellow splashes. ***Total consultants = 105 (13 new CCT in 2020, 12% growth).***

HEE training region	*East of England*	*London*	*Midlands*	*North east & Yorkshire*	*North west*	*South east*	*South west*	*Scotland*	*Wales*	*NI*	**Total**
ACF for 21/22		3			1						4
ACF IM1		1									1
ACF IM2		4			1						5
ACF IM3		1									1
Frozen - IM transition		6						1			
ST3	1	1	2	3					1		8
ST4		2			1			2			5
ST5	2	2			4			3			11
ST6	2	1									3
ST7		1			1			1			3
C lecturer	3	2			3						8
Total NIHR	**0/3**	**9/2**	**0**	**0**	**2/3**	**0**	**0**	**NA**	**NA**	**NA**	**11/8**
Total NHS	**5**	**13**	**2**	**3**	**6**	**0**	**0**	**7**	**1**	**0**	**37**

Figure 2. Current CPT training pipeline. We were successful in appointing a large cohort of London trainees to consultant posts in 2020/21 and are not able to recruit to our specialty until 2022 due to the IM transition.

3. Workforce strategy for UK clinical pharmacology

Phase	Detail
Status (current)	*Total number of filled CPT training posts in the NHS = 30 (ST3-ST7, *7 frozen)* *Total number of CPT consultants = 105*
1. Secure (2021-22) *Recommission posts lost in 2018.* *Return posts frozen in 2021.* *Reactivate CPT capacity in the NHS.* *Recruit new consultants to keep them in the specialty*	**StR training posts (12 new posts)** 1.1 In 2021, Recommission 5 training posts lost in 2018, reallocate to 'amber' areas in figure 1. 1.2 In 2022, Prevent any post loss due to IM3 training and ensure that all 7 posts frozen during the IM transition are recruited to in 2022. **Consultant sessions** 1.3 Reactivate existing CPT capacity in the NHS, by buying out PAs for clinical pharmacologists who are currently working outside the specialty, and also buying out PAs for existing consultants to support new fellows/trainees - plus backfilling the NHS service gap that would result. **Consultant posts (5 new posts)** 1.4 Funding for 5 new CPT consultant posts (3 in 2021, 2 in 2022) to ensure jobs for those reaching CCT in this period (see figure 2).
Status (projected, end August 2022)	*Total number of CPT training posts in the NHS = 42 (ST4-ST7)* *Total number of CPT consultants = 110*
2. Strengthen (2023 - 24) Sow seeds, by pump-priming with new fellowship post bids Feed the pipeline, with new training posts. *Recruit new consultants to keep them in the specialty.*	**Fellowships (20 fellowships)** 2.1 Allocate 20 fellowships to begin pump priming (14 in 2023, 6 in 2024) **StR training posts (23 new posts)** 2.2 Allocate 15 new training posts to green areas to strengthen clinical pharmacology representation in Integrated Care Systems (ICSs). 2.3 In 2023-4, Allocate 8 new training posts to strengthen red/amber areas. **Consultant posts (19 new posts)** 2.4 Funding for 19 new CPT consultant posts in 2023-24, to ensure jobs for those reaching CCT in this period.
Status (projected, end August 2024)	*Total number of CPT training posts in the NHS = 65 (ST4-ST7)* *Total number of CPT consultants = 129*
3. Grow (2025– 2031) Stabilise pump priming, continuing to support fellowships, but fewer. *Recruit new trainees, and new consultants to keep them in the specialty.* Re-epithelialise, turning all areas green & ensuring all ICSs have CPT support.	**StR training posts (22 new posts)** 3.1 In 2025-7, Allocate 22 new training posts, aiming to turn all areas green and boost ICS coverage. **Fellowships (16 fellowships)** 3.2 Allocate 16 fellowships to continue pump priming (6 in 2025, 3 in 2026, 5 in 2027, 2 in 2028) **Consultant posts (124 new posts)** 3.3 Funding for 124 new CPT consultant posts in 2025-31, to ensure jobs for those reaching CCT in this period.
Status (projected, end August 2031)	***Total number of CPT training posts in the NHS = 87 (ST4-ST7)*** *Total number of CPT consultants = 253* ***Total consultants included projected retirement = 215***
4. Maintain (2031 onwards)	4.1 Expectation is that each new consultant post added during phases 1-3 would transition to business as usual after 3 years of central funding. In phase 4, we would expect all new posts to be paid for by employers in accordance with business need – phases 1-3 having helped raised awareness and experience of the value of CPT. 4.2 NHSEI/HEE/CPSA to review pipeline investment against need/demand.

**Clinical pharmacology networks will support the strategy: by twinning strong centres with developing ones, by connectivity via fellowships, and by continuing grassroots visibility & engagement activities.*

Total cost = £57.5 million (£5.2m per year, 2021-31)
£27.24m for 57 new StR posts
£16.02m for 36 fellowship posts
£14.24m for 148 consultant posts (assuming funding continued by employer after 3-years, including PAs to buy time from existing consultants to support 1.3, and allowing for retirement)

Case study 1: Precision & genomic medicine
About 90% of drugs only work in 30-50% of patients, while approximately 6.5% of all admissions to our hospitals are due to adverse drug reactions. Precision medicine approaches allow the targeting of drugs to those who will respond favourably, thereby improving the benefit-risk ratio of existing drugs, and improve the development of new drugs. Genomics is the mainstay of precision medicine at present, and there is a need to mainstream genomics in the NHS.

Clinical Pharmacology has been playing a leadership role in pharmacogenomics, the study of how genetic variation affects drug response. Clinical Pharmacologists have worked with NHS England to identify gene-drug pairs which are ready for implementation into the NHS, including eligibility criteria for testing. The British Pharmacological Society is currently working with the Royal College of Physicians to define the need for pharmacogenomics in the NHS, including the educational, training and evidence requirements. This includes input from Health Education England in order evaluate the resources and learning needs to increase the skills of the workforce. In addition to implementation, clinical pharmacology continues to play a major role in discovery pharmacogenomics, including the use of polygenic risk scores, which will act to produce the evidence base to expand pharmacogenetic testing with the NHS genetics test directory.

Case study 2: Clinical research & life sciences
Investment in clinical pharmacologists will enable research in the NHS, in line with the government's vision for clinical research delivery[2]. For example, the British Pharmacological Society is partnering with the Royal College of Physicians to produce introductory e-learning on research to support education and confidence of the wider NHS workforce. The contributions of clinical pharmacology to research were powerfully illustrated[4] as part of the UK's response to the COVID-19 pandemic. Clinical pharmacologists used their expertise in evaluating risk-benefit, through a structured approach to level of evidence, mechanism, dose and safety to help deliver proven treatments and vaccines, and to support patients and clinicians to engage with clinical research on an unprecedented scale.

The UK RECOVERY trial, jointly led by Professor Peter Horby and **Professor Martin Landray,** (which demonstrated the benefits of dexamethasone and tocilizumab, and failed to show a benefit of hydroxychloroquine) has influenced COVID-19 treatment worldwide. The UK COVID Therapeutics Advisory Panel (UK-CTAP) advises the Chief Medical Officer on drugs that can be prioritised for the major UK platform trials (including RECOVERY, PRINCIPLE, REMAP-CAP, AGILE, PROTECT and HEAL) and has three clinical pharmacology members: **Professor Sir Munir Pirmohamed**, **Professor Duncan Richards** and **Professor Ian Hall**. The UK AGILE trial platform was set up by clinical pharmacologists at the University of Liverpool, principally, **Professor Saye Khoo**, **Dr Richard Fitzgerald** and **Dr Lauren Walker**, and is a novel adaptive phase I/IIa trial platform to evaluate novel compounds for the treatment of COVID-19. **Professor Mark Caulfield** (Chief Scientist for Genomics England), worked with a UK wide genomic consortium (GENOMICC) to run whole genome sequencing in patients with COVID-19 to identify new therapeutic opportunities. **Professor Sir Munir Pirmohamed** (Chair of the Commission on Human Medicines) and other clinical pharmacologists including **Professor Jamie Coleman** were responsible for advising the MHRA, ensuring COVID-19 vaccines meet the highest standards of safety, effectiveness and quality. **Professor Sir Munir Pirmohamed** (with HDR-UK) is leading development of data infrastructure to support research following the roll-out of vaccines.

Case study 3: Multimorbidity and complex polypharmacy
As the population ages, people increasingly have multiple co-existing chronic diseases (i.e., multimorbidity)[5], necessitating the use of multiple medicines - over 1 million people take 8 or more medicines per day – this is referred to as polypharmacy. As the number of medications increases so does the possibility of drug interactions and adverse drug reactions resulting in hospital admission and further morbidity[6,7]. Structured medication reviews are being implemented in primary care to optimise

medicines to improve benefit and reduce the risk of harm. Barriers to tailoring medicines for patients with polypharmacy include lack of guidelines and permissions, lack of professional skills and confidence, lack of time and priority.

The Polypharmacy Service Consortium is a collaborative venture between Clinical Pharmacologists, Clinical Pharmacists, Geriatricians and General Practitioners with a vision that "every medicine brings worthwhile benefit to the person for whom it is prescribed". Members of the consortium include Clinical Pharmacologists in South West London who are working with primary and secondary care colleagues across the integrated care system to break down the barriers to tailoring medicines for patients with polypharmacy. Their innovative service includes rapid advice and guidance, face-to-face and virtual patient reviews, multi-professional meetings, and training and network development. This service has been developed in collaboration with primary care pharmacists and GPs to meet their requirements in managing patients with complex polypharmacy. Examples of areas where this service is already helpful include: managing complex multimorbidity where patients are cared for by multiple specialists, optimising medications for chronic pain, supporting withdrawal from prescribed medicines, discussing medicines optimisation with families where patients no longer have capacity.

References

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