Physiological Sciences transformation

A Midlands Approach

Peter Bill

Midlands Chief Scientific Officer

The beginning

- Respiratory Physiology
- Cardiac Physiology
- Neurophysiology
- Audiology
- Gastro Intestinal Science (GI)
- Urodynamics
- Ophthalmic and Vision Science
- Vascular Science

- Subject Matter Experts identified
- Development of template
  - CDC
  - Business intelligence
- Information gathering
- Reviewed at hackathon event
- Outputs guide implementation

The case for change

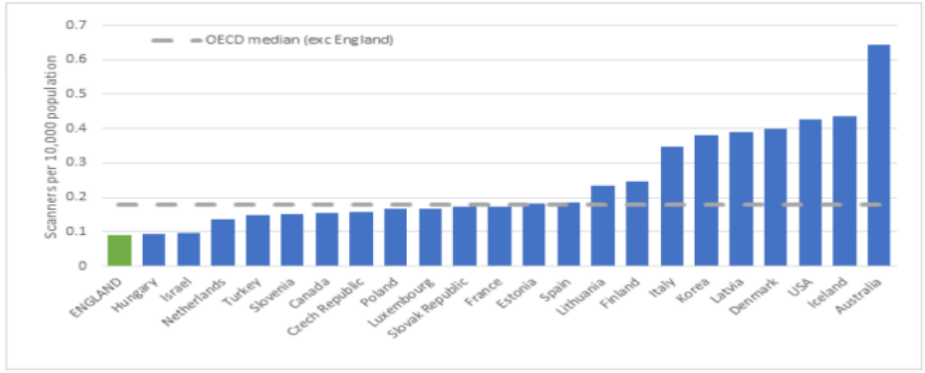
Figure 1: Number of patients waiting 6+ weeks at month end for a diagnostic test

Source: NHS England. *Monthly Diagnostic Waiting Times and Activity Data (DM01)*

Diagnostic Test	Average growth p.a
colonoscopy	5.30%
Flexi Sig	8.40%
Gastroscopy	3%
Echocardiography	5.70%

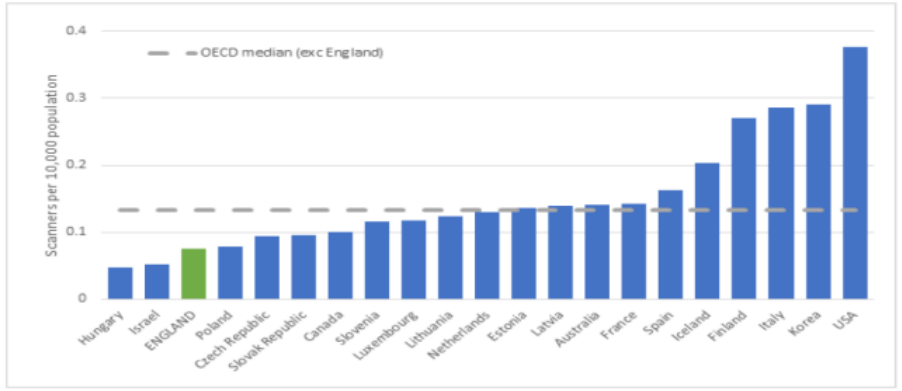
Scanners per 10k population

Figure 2: CT scanners per 10,000 population: international comparisons (2017)



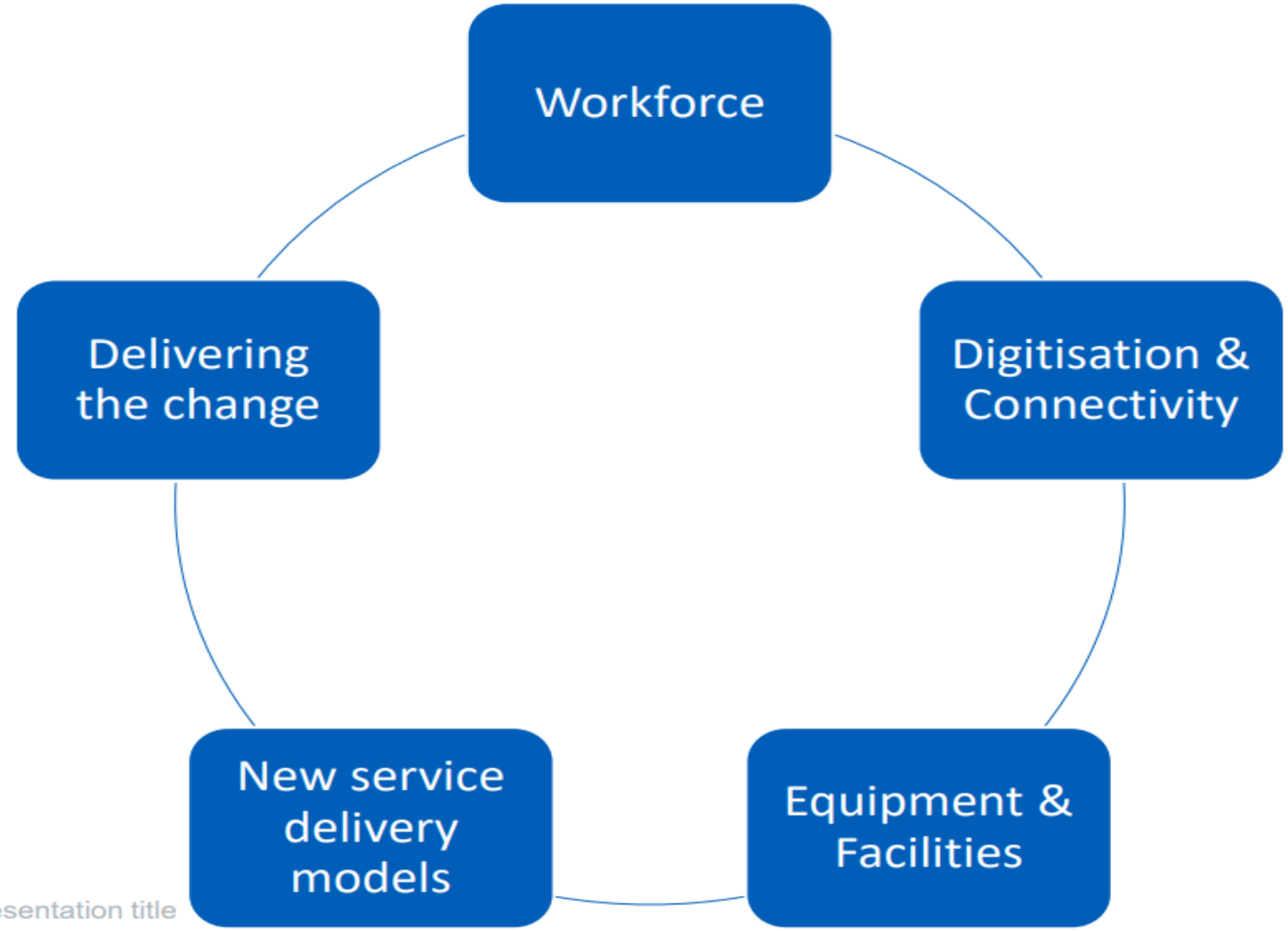
Source: OECD. 2017. *OECD diagnostic exams and population data*

Figure 3: MRI scanners per 10,000 population: international comparisons (2017)



Source: OECD. 2017. *OECD diagnostic exams and population data*

Recommendations



Outputs of the hackathon event

- Hackathon event 16th April
- Faculty:
  - Sir Mike Richards
  - Prof Berne Ferry
  - Dr Martin Allen
  - Regional NHSEI diagnostic board team
  - Regional Chief Healthcare Scientists
- Attendees
  - Total 141
  - 127 Midlands
  - 14 out of region
  - Approx. 50/50 split clinical vs managerial

Hackathon 16.04.21 Breakout room numbers	
Workshop session 1	
Digital/Connectivity	43
Workforce/Training	98
Workshop session 2	
Audiology	26
Cardiac Physiology	23
Gastrointestinal (GI) Physiology	15
Neurophysiology	24
Ophthalmic and Vision Science	8
Respiratory Physiology (including Sleep Physiology)	28
Urodynamics	7
Vascular Technology	10

- Midlands key themes identified/to be addressed
  - Data/business intelligence
  - Workforce
  - Digital connectivity
  - Community diagnostic centres

Coding

- SME developed ‘long list’ of investigations
- Variability in coding system used
- Regional grab of random sample tests showed wide variation
- Decision by PS board to develop BI solution

Activity Category	Volume of providers with apparently meaningful levels of activity reported via SUS	Percentage of providers
Airway responsiveness	18	43.9%
Breathing mechanics	11	26.8%
Cardiac	24	58.5%
Complex sleep investigations	17	41.5%
Dynamic lung assessments	21	51.2%
Exercise testing	18	43.9%
Full lung function	12	29.3%
GI Physio	21	51.2%
Home diagnostic sleep studies	20	48.8%
neurophysiology	16	39.0%
Oxygen assessment	17	41.5%
Ventilation	22	53.7%

Excluding providers with minimal comparative levels of activity expressed, ie less than 40 in 2019 against comparators reporting activity in the hundreds. 2020 activity also extracted as part of this exercise.

Data/business intelligence

Assess

Diagnostic Waiting times and activity (DM01) dataset widely used

Limited and fails to describe PS services

No unified asset register

Plan

SME long list of tests provided to capture all diagnostic area withing the speciality

Grouped tests to provide a shorter ‘high-level’ list for data monitor

Mirror DM01 data collection for regional trend analysis

Include asset register to understand existing equipment infrastructure (one off collection plan to revisit annually and as part of the CDH development plans)

Implement

Regional sign off

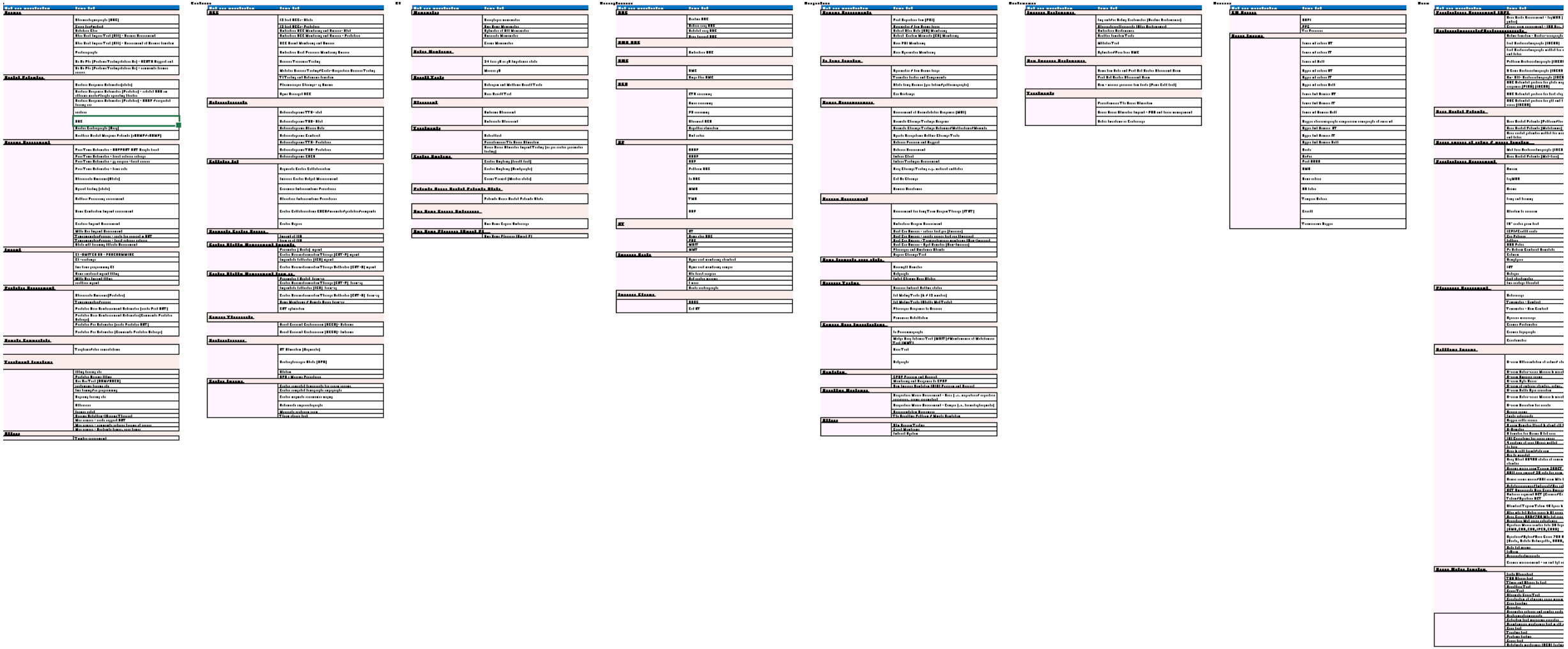
Request data collection from systems

Commence monthly returns

Review datasets at Physiological Sciences Network

Share regular updates at Regional diagnostics board

Developing the BI solution



BI template

	Activity during month			Numbers													
	Planned tests / procedures	Unscheduled tests / procedures	Waiting list tests / procedures (excluding planned)	<1 week	1-2 weeks	2-3 weeks	3-4 weeks	4-5 weeks	5-6 weeks	6-7weeks	7-8 weeks	8-9 weeks	9-10 weeks	10-11 weeks	11-12 weeks	12-13 weeks	13+ weeks
Balance																	
Evoked																	
Hearing																	
Implant																	
Paediatric																	
Remote																	
Treatment																	
Others																	

Physiological Science workforce - issues

- PS services under resourced and under appreciated
- Lack of high level Healthcare Science leadership roles reflective of professional background
- Training capacity issues
- Difficult to robust workforce plan in small teams
- Limited understanding of training opportunities
- Difficulty advancing practice, recognition of skill and knowledge
- Variation in registration status
- Retention challenging in some shortage occupation disciplines
- Current issues with burn out and concerns regarding back log
- Regional PS workforce review funded by Health Education England

Physiological Science workforce opportunities

Visibility of services with new data collection	Create HCS leadership roles within organisations and systems	Development of PS regional networks	Development of training academies/consortia
Develop practice educator roles within organisations and systems	Design training to meet demands of developing new workforce	Grow numbers rapidly and develop career opportunities	Utilise HCS leadership structure to workforce plan at system level
Tackle registration inequalities	‘Passport’ transferable skills to facilitate multi-site working	Champion consultant HCS roles	Engage and educate school children on PS careers

Digital Connectivity – Midlands situation

SYSTEMS

5 out of 17 systems were over 10 years old with 80% of respondents stating no replacement was planned

HOSPITAL INFORMATION SYSTEM INTERFACING (INTERNAL)

Circa 80% of specialty systems were not interfaced to the main hospital system care record

57% of specialty systems were partially integrated

EXTERNAL INTERFACING (CDH READY)

66% not integrated, 24% partially integrated (less than half of these are able to share diagnostic image information) and 10% fully integrated

REPORTING

62% of respondents were able to remotely view investigation reports generated by specialist test equipment (part of operational activity reporting)

AI / WEARABLE DEVICES

A few excellent examples were provided: Sleep screening, ECG / Atrial Fibrillation (AF) and Hearing aids

NEW SYSTEMS INNOVATION GROUP

The Digital session was very well attended (42 people) and there was great enthusiasm to form a group to explore innovation and best-in-class solutions and potentially create a specification where gaps in the market exist for Physio Science specialty area systems

Digital Connectivity Key Messages

Highlights

- Diversity in equipment purpose and manufacturer
- Huge variability in equipment age and interoperability
- Variability in level of connectivity with hospital IT systems
- Long standing lack of required capital investment
- Commitment to set up a regional task and finish group
- Appetite to explore single solution

Recommendations

- Use BI template to ‘stock take’ current regional PS assets
- Identify regional digital lead with PS services in portfolio
- Establish connectivity strategy
- Explore single solution for data management
- Work with SME network to develop the solution
- Link to national team to support single strategy

Where are we now? the Team

Peter Bill
Regional Chief Scientific Officer

Claire Greaves
Regional Chief Scientific Officer

Dr Louise Stewart
Deputy Regional Diagnostic Lead

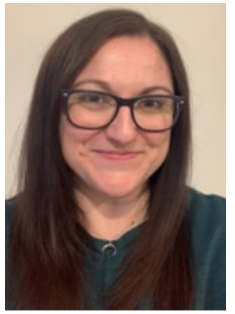
Dr Jo Horne
Regional Dean for Healthcare Science

Leigh Griffin
Workforce Consultant

Andrew Hall
Workforce Transformation Lead

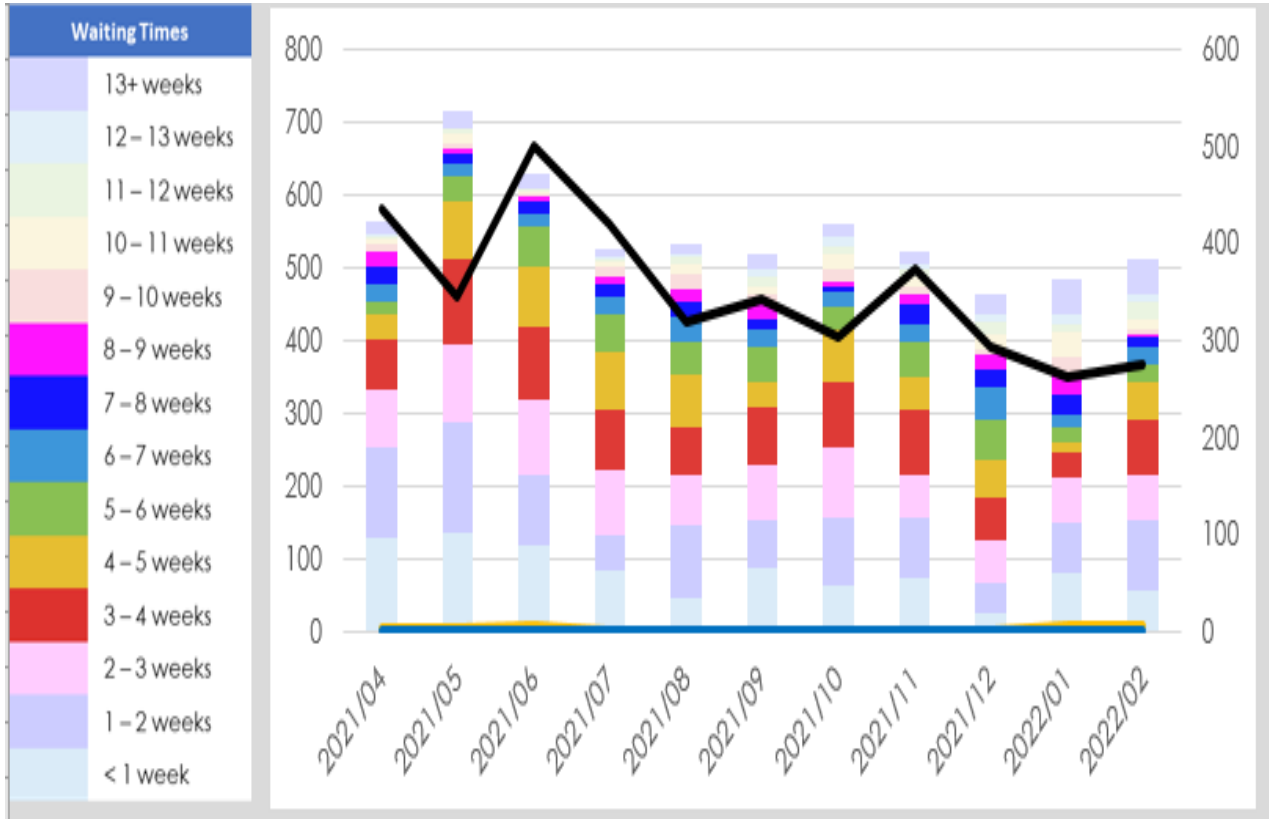
Michelle Mercer
Diagnostic Programme Manager

Joe Sinnott
Programme Support Officer



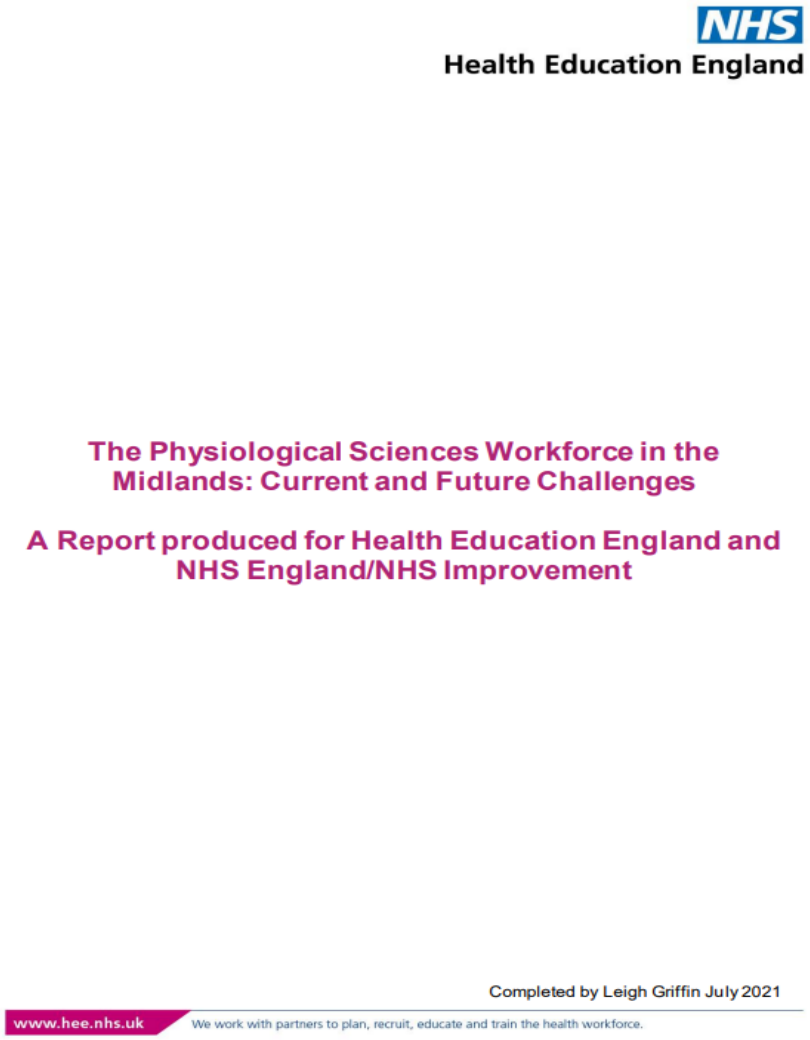
Laura Morgan
Programme Support Officer

Business Intelligence



- Data being collected
- Data quality improving
- Approx 50% providers
- System discussions
- Dashboard development
- Capacity/demand models

HEE workforce report



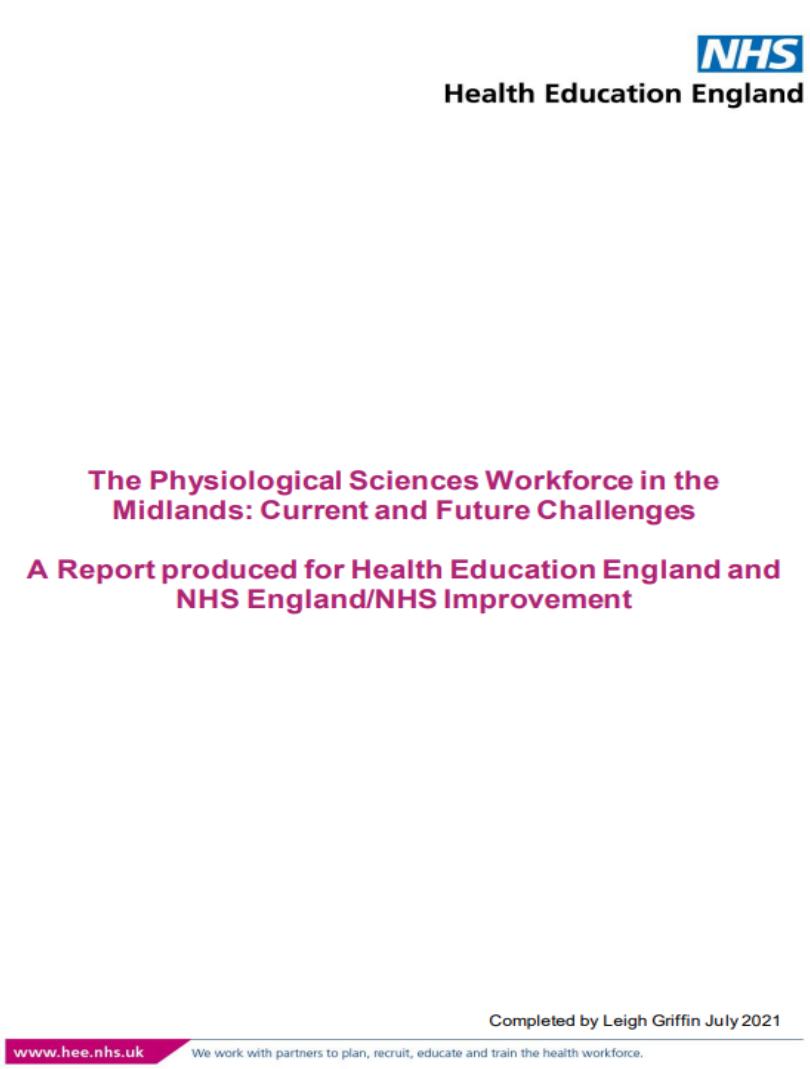
- There are c1250 qualified Physiological Scientists (typically qualified at Masters level) and c500 practitioners (with undergraduate degrees, typically 2:1 or above)

- The main areas of work are:-
  - Cardiac Physiology
  - Audiology
  - Respiratory and Sleep
  - Neurophysiology
  - Ophthamic/Vision Science
  - Vascular Science

- Most acute trusts provide cardiac physiology, audiology, neurophysiology and respiratory and sleep services

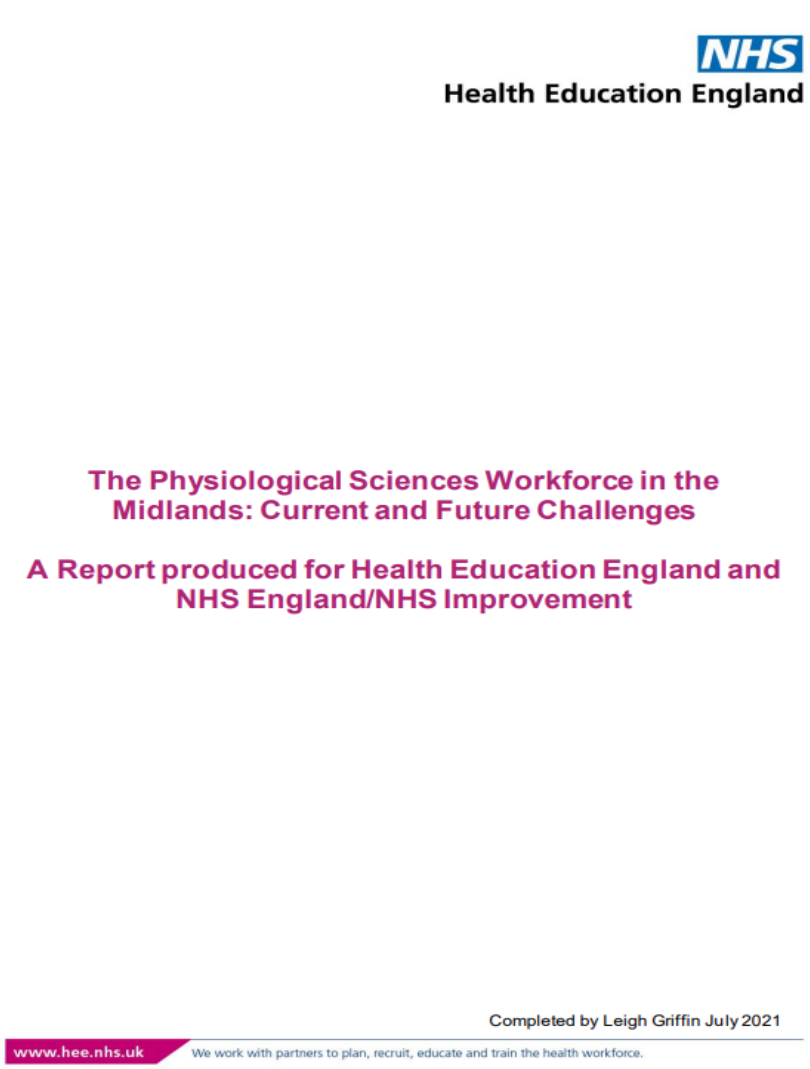
- There are very few scientists working in GI and urodynamic services

HEE workforce report



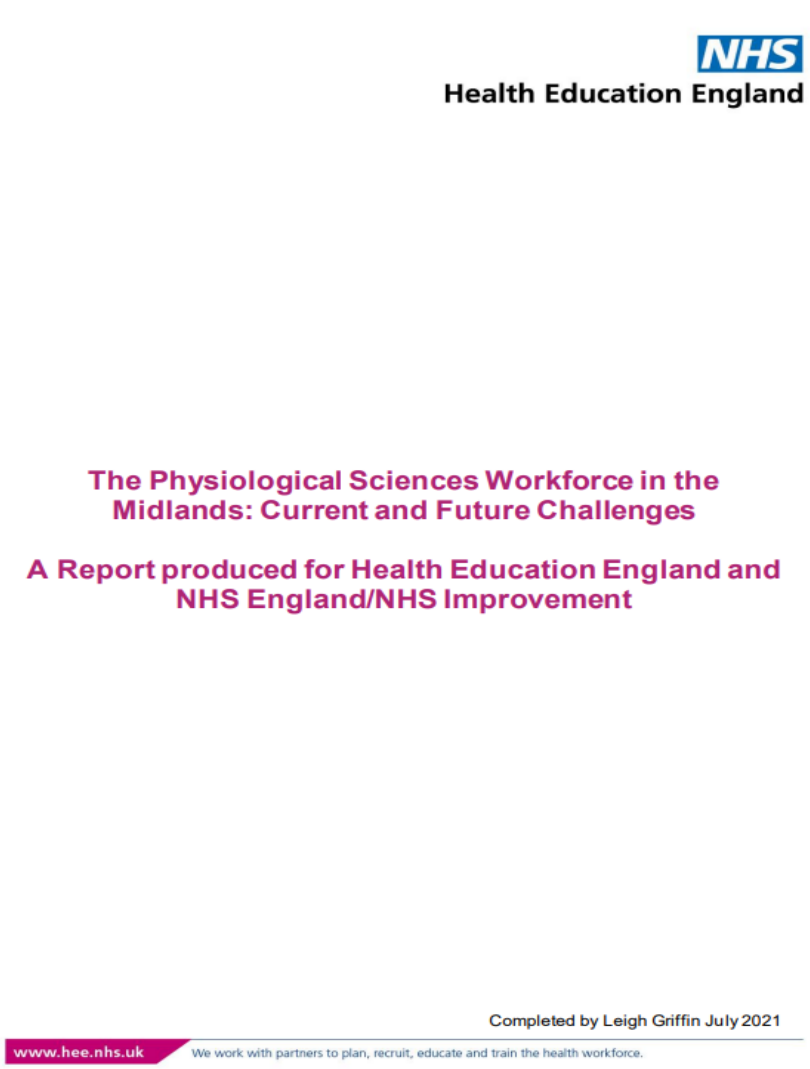
- Sickness levels are low, but many staff feel exhausted
- Vacancy levels are variable, and can be high, particularly away from conurbations/teaching hospitals
- Turnover levels are c8% per annum (quite low), although it is an ageing workforce, with over 1 in 8 scientists aged 55 or over. 1 in 3 are under 35
- Approximately 1 in 4 Scientists are of a non-white ethnic origin
- Extended practice, with scope to ease pressures on other disciplines, is evidenced but highly variable, with scope for greater extension and consistency
- Training and supervision requirements place considerable demands on qualified staff, limiting staff development

HEE workforce report



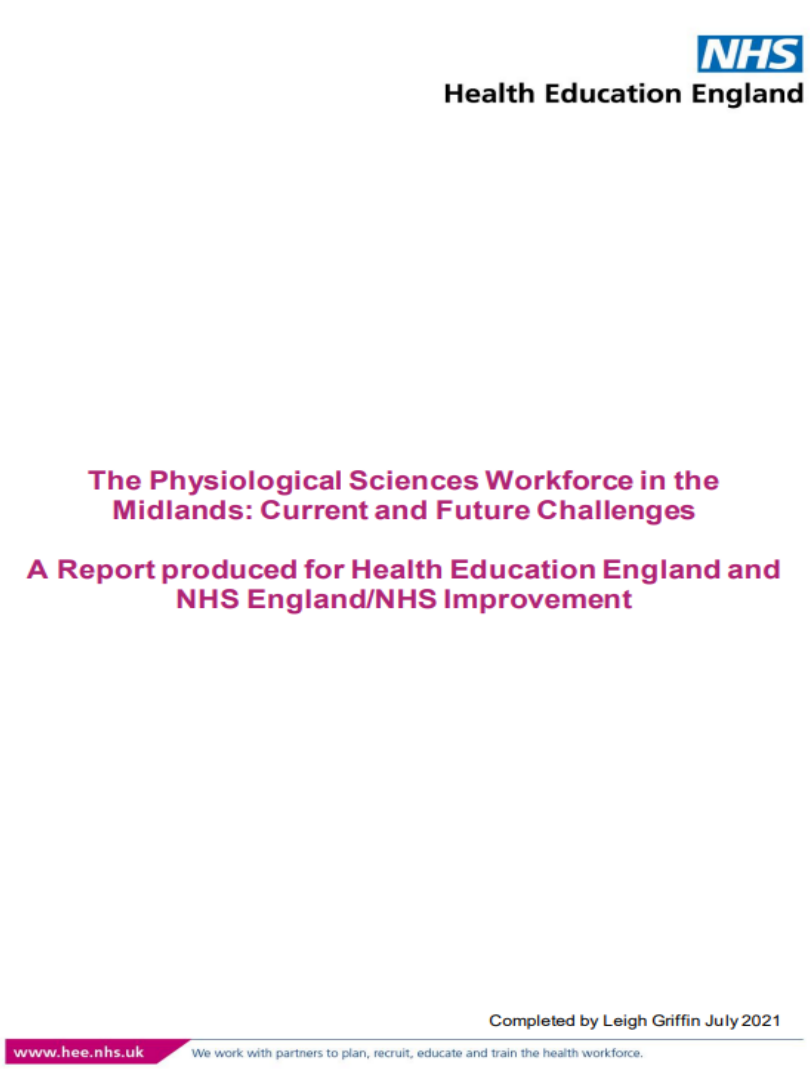
- Demographic change – e.g, 1 in 4 people will have some degree of hearing loss by 2031
- Unmet/ill-met/latent needs – e.g., cardiac, sleep, audiology
- Service backlogs ‘post’ pandemic
- Scope for advanced scientific practice – variably actioned
- Changing service delivery models – esp. the development of Community Diagnostic Centres (bases for much future scientific work)
- Technological change (incl., the advent and spread of AI in diagnostics)

HEE workforce report - recommendations



- To increase the number of qualified scientists and practitioners by 20% over the next five years – i.e., c300 WTE
- Particular areas of growth include Cardiac Physiology (we are seeing a continuing growth in demand for echoes), Respiratory and Sleep services and the development of a Scientific workforce to support GI/Urodynamics
- Community Diagnostic Centres are likely to include Cardiac Physiology, Respiratory and Sleep, Audiology and Urodynamic services

HEE workforce report – other key recommendations



- Ensure staffing levels are adequate to avoid service closure at times of annual leave – e.g., sleep services
- Support the creation of effective Business Intelligence on Physiological Sciences to enable benchmarking and inform value-based investment
- Strengthen training capacity at all levels (Practitioners, Scientist and Higher Specialist Scientific Training through the enhancement of training programmes and extension of targeted programmes – e.g., echos)
- Create a cohort of funded trainees for deployment across the East and West Midlands
- Establish/strengthen sub-regional networks
- Strengthen leadership and voice
- Improve the understanding of and engagement with Physiological Sciences

Digital

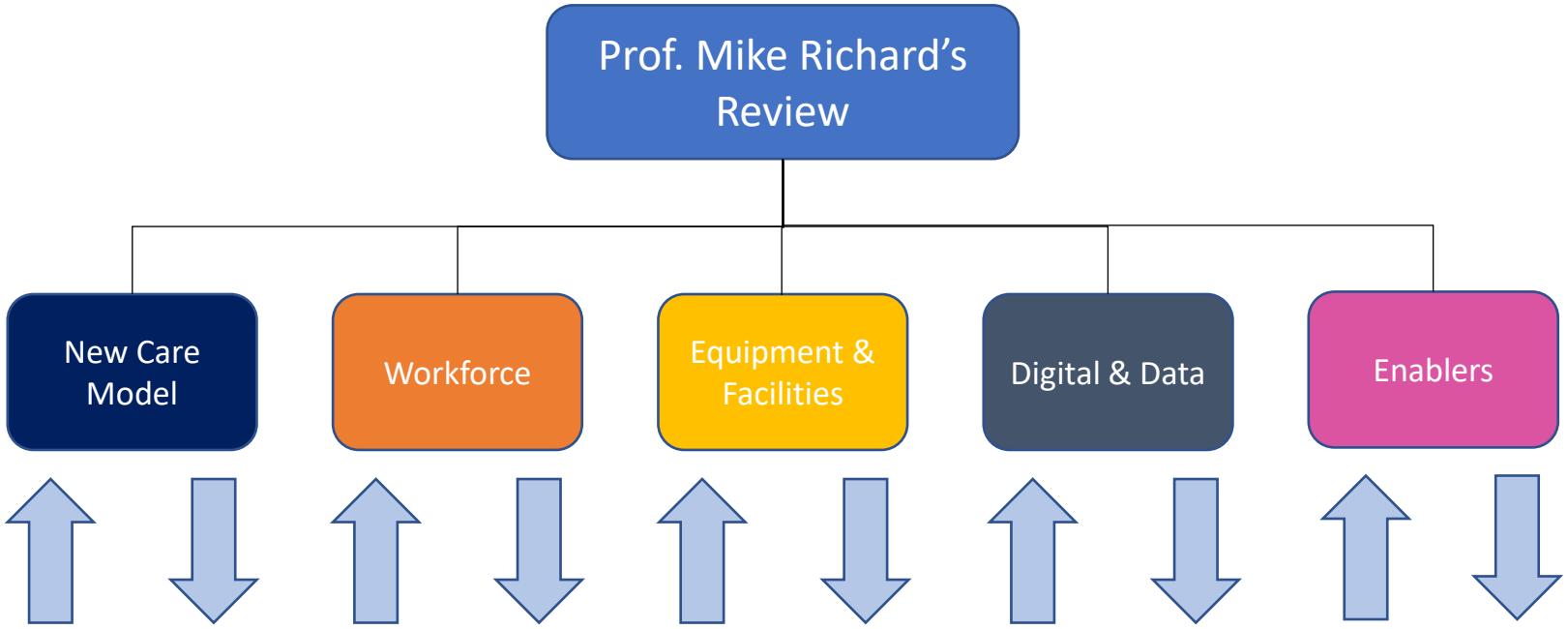
- More challenging due to the varied equipment and maturity
- Working on a digital maturity matrix/assessment
- What are the ‘stones in the shoe’
- Engagement with systems to validate
- Linked into AHSN to pose issues through manufacturer portal
- Stocktake

Targeted approach

- Practice educators
- B2-4 apprenticeships
- ETP
- Echo survey
- Spirometry data

National overlap and interaction

- National PS transformation board
- Led by national director for PS
- Governance structure developed
- Regional PS reporting
- Spending review includes growth in PS
  - Built around CRS
  - Education infrastructure growing
  - Training to meet demands of services
  - Much more needed



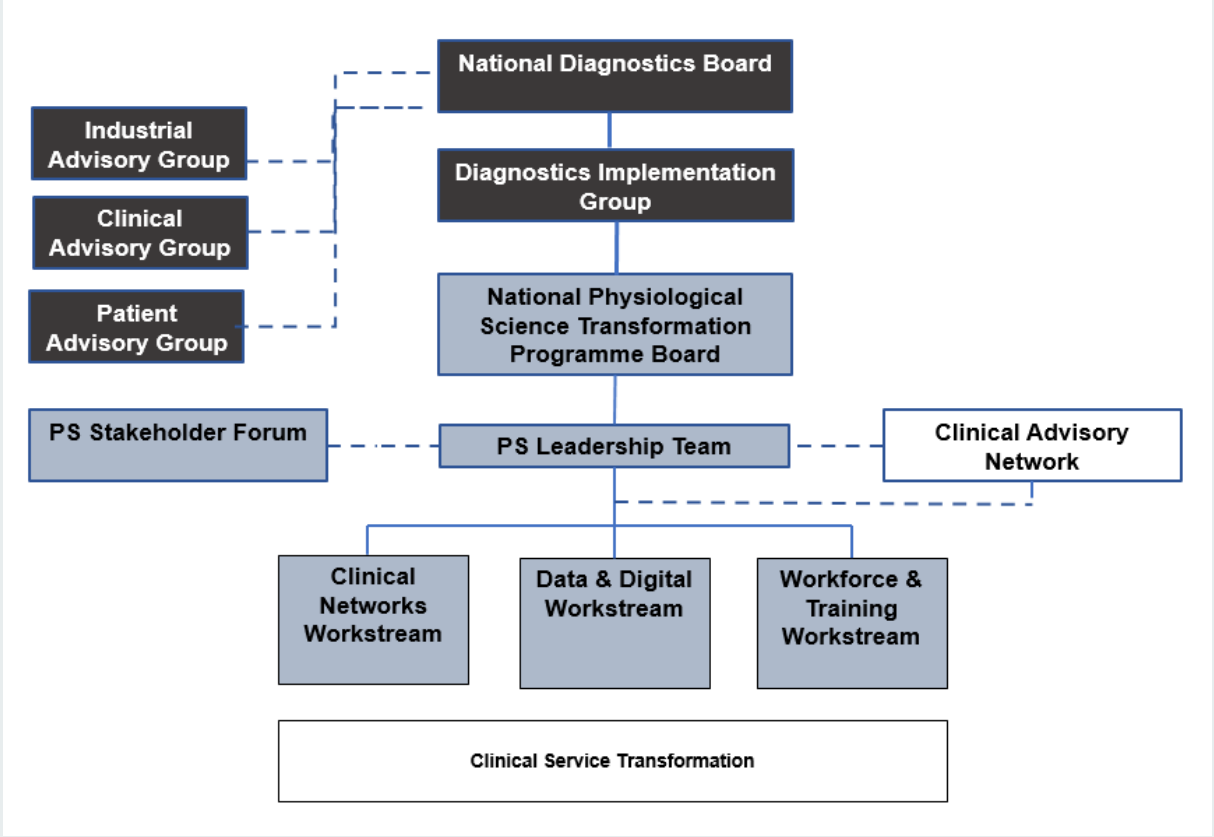
DATA COLLECTION

Hackathon output lessons learned – to adopt and build on dataset and work with stakeholder groups on logistics

Aim to have a tiered approach in the data collection and ensure the prioritisation is in line with Prof. Mike Richard's diagnostics review.

Linking in with NHSEI data collection leads in pathology and imaging to discuss logistics around IG, hosting data, data collection portal and establish a timeline/resourcing.

Programme Governance

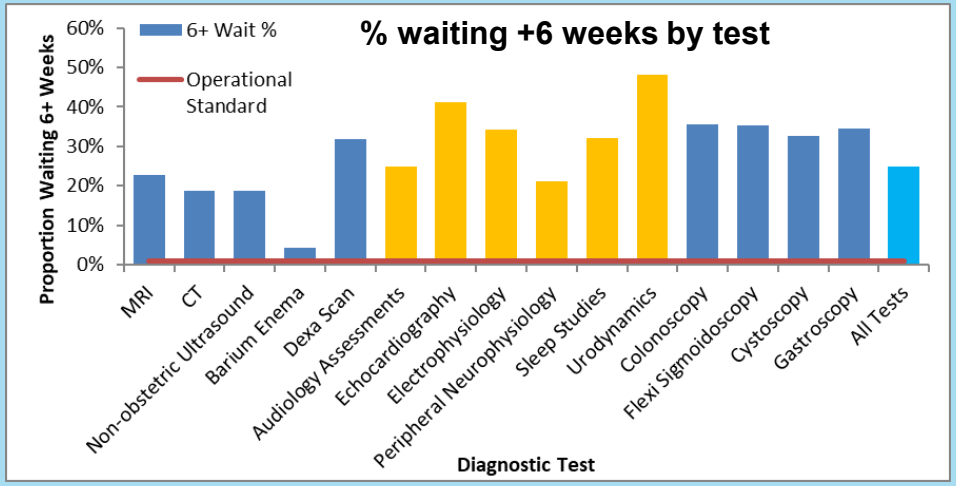


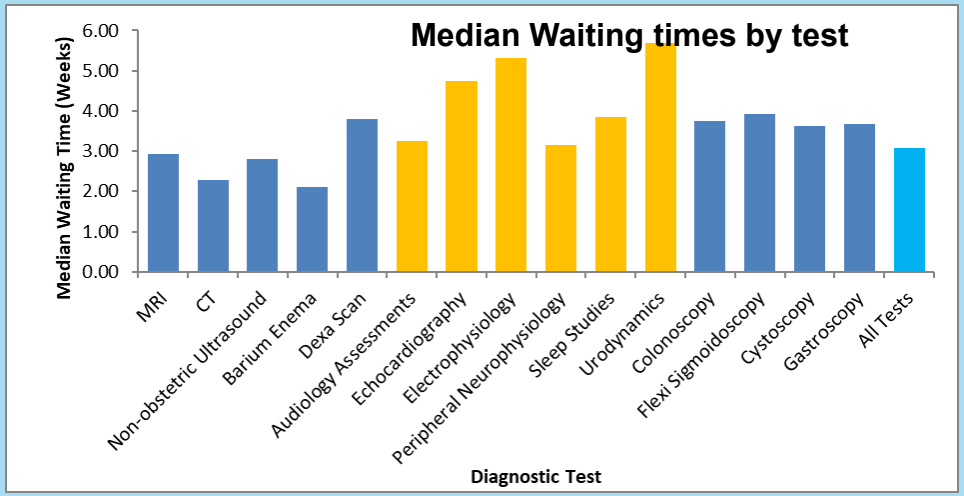
Programme Board established, meets monthly. Includes 2 representatives from each Region (Phys Science Programme lead and Regional Healthcare Science Lead). Highlight reports from national and Regional teams.

Leadership Team will comprise:
Martin Allen – National Speciality Advisor
Nathan Hall – Head of Programme
Amy Taylor-Gonzalez – Implementation Lead
Karen Pearson – Senior Project Manager
Karen Luck – Project Manager
Lucia Katsumbe – Data Hub Lead

Clinical Advisory Network will include subject matter experts and professional association representatives across the 8 disciplines

Waiting Times : DM01 Data (March 2022)





PS tests captured through DM01 demonstrate high % of +6 week waits, high median wait times and high monthly activity growth rates compared to other modalities

6 Physiological Science tests are captured in the DM01 dataset.

In March 2022 across those 6 PS tests, 34.8% of patients were waiting more than 6 weeks, compared to 20.5% in Imaging and 34.8 in Endoscopy.

Echocardiography represents 7% of the overall activity volumes captured in DM01, 18% of the 6 week wait total and 22% of 13+ weeks.

Of the 6 tests captured in DM01, total test volumes vary significantly between these tests for example during March 2022 the NHS in England recorded 143,404 echocardiographs and 828 Electrophysiology tests.

There has been significantly higher rates of monthly activity growth between March 2021 and March 2022 across the physiological science tests captured in DM01 than for imaging and endoscopy. For example, there has been an average monthly growth in sleep study activity of 2.1% per month (8,880 in March 2021 compared to 11,386 in March 2022)

Many important physiological science tests are not reported through DM01.

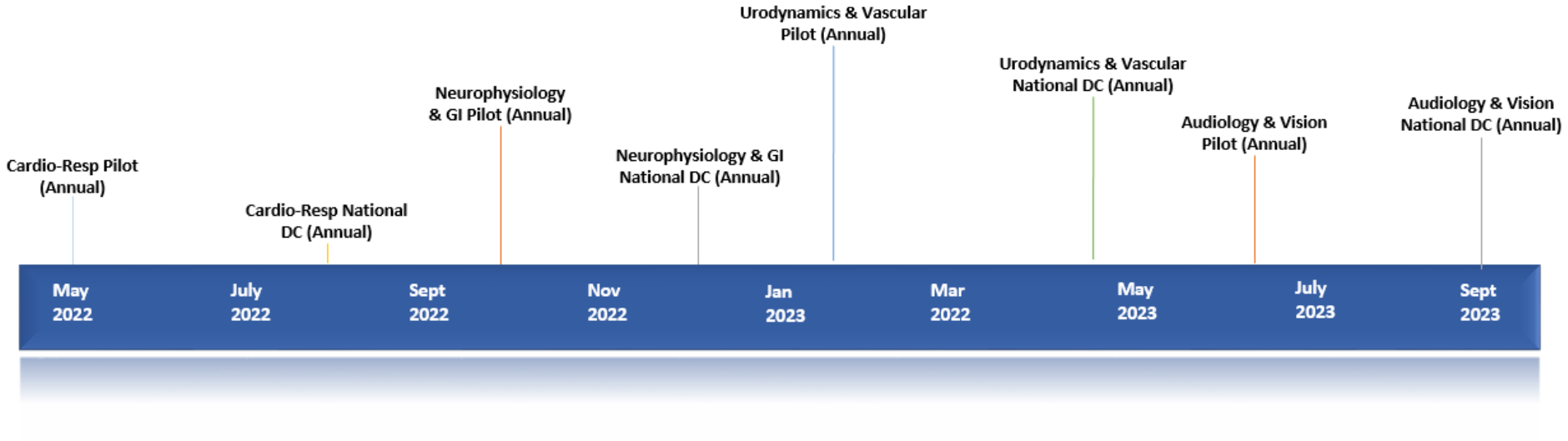
Data and Digital

Our ambition is to deliver annual national data collections for all 8 disciplines of physiological science. Workbooks, detailing the data collection requirements & fields have been developed with expert working groups for all 8 physiological science disciplines. Each workbook includes detailed collections covering:

- Service Activity/waiting list by test,
- Facilities and kit,
- Workforce
- Digital maturity.

Each workbook Requires a web-collection tool to be build (by the Applications & Development Team) and the tool requires piloting in a number of provider Trusts. Results of piloting inform updates to the collection prior to the final version of the web-collection tool being ready for national launch.

Final amendments are being made to the cardio-respiratory workbook post piloting and this should go live within weeks.



PM – SR investments 22-25

Key: Supply | Infrastructure | Upskilling | New Role | Value may change *

People Plan Triple Aim	Workforce Levers	2022/23 Intervention	2022/23 Costs	2023/24 Intervention	2023/24 Costs	2024/25 + Intervention	2024/25 + Costs
More people . . .	Recruitment / supply	Expansion following pilot of Echocardiography PG Cert - **60** people	£2,400,000	Expansion following pilot of Echocardiography PG Cert. **60** people	TBC	Expansion following pilot of Echocardiography PG Cert.- **60** people	TBC
		21 Practice Educators - in Trusts, linked to academies for Echo, Respiratory , Sleep and Cardiac	£1,345,911	**21** Practice Educators - in Trusts, linked to academies for Echo, Respiratory , Sleep and Cardiac	£1,345,911*	**21** Practice Educators - in Trusts, linked to academies for Echo, Respiratory , Sleep and Cardiac	£1,345,911*
		Expand cardiac STP numbers in Respiratory Physiology – **15** (3 years)	£600,000	Expand cardiac STP numbers in Respiratory Physiology – **15**	£1,200,000*	Expand cardiac STP numbers in Respiratory Physiology – **15**	£1,800,000*
		Expand cardiac HSST numbers in Respiratory Physiology – **10** (5 years)	£160,000	Expand cardiac HSST numbers in Respiratory Physiology – **10**	£320,000*	Expand cardiac HSST numbers in Respiratory Physiology – **10**	£640,000*
		Expand cardiac STP numbers in Echo – **15** (3 years)	£600,000	Expand cardiac STP numbers in Echo – **15**	£1,200,000*	Expand cardiac STP numbers in Echo – **15**	£1,800,000*
		Expand cardiac HSST numbers in Echo – **10** (5 years)	£160,000	Expand cardiac HSST numbers in Echo – **10**	£320,000*	Expand cardiac HSST numbers in Echo – **10**	£640,000*
. . . Working differently . . .	Training / skills	Training Grants for **25** level 6 cardiac scientists in Electrophysiology procedures	£500,000	Training Grants for **25** level 6 cardiac scientists in Electrophysiology procedures	£500,000*	Training Grants for **25** level 6 cardiac scientists in Electrophysiology procedures	£500,000*
		39 Band 2 training grants for sleep disorders assistants.	£312,000	**49*** Band 2 training grants for sleep disorders assistants.	£312,000*	**49*** Band 2 training grants for sleep disorders assistants.	£312,000*
		266 Band 2 Training Grants for physiological measurement assistants	£2,130,000	**266** Band 2 Training Grants for physiological measurement assistants	£2,130,000*	**266** Band 2 Training Grants for physiological measurement assistants	£2,130,000*
		174 Band 4 Training Grants to help deliver required numbers of physiological measurement associates.	£1,740,000	**174** Band 4 Training Grants to help deliver required numbers of physiological measurement associates.	£1,740,000*	**174** Band 4 Training Grants to help deliver required numbers of physiological measurement associates.	£1,740,000*
		76 Band 4 Training Grants to increase physiological Sleep disorder associates	£608,000	**76** Band 4 Training Grants to increase physiological Sleep disorder associates	£608,000*	**76** Band 4 Training Grants to increase physiological Sleep disorder associates	£608,000*
		64 PG Cert Sleep disorders University fees and trainee training grant	£1,280,000	**64** PG Cert Sleep disorders University fees and trainee training grant	£1,280,000*	**64** PG Cert Sleep disorders University fees and trainee training grant	£1,280,000*
		50 Grad diploma in Respiratory Physiology for University fees & trainee training grant	£1,000,000	**50** Grad diploma in Respiratory Physiology for University fees & trainee training grant	£1,000,000*	**50** Grad diploma in Respiratory Physiology for University fees & trainee training grant	£1,000,000*
		50 Grad diploma in Cardiac Rhythm for University fees and trainee training grant	£1,000,000	**50** Grad diploma in Cardiac Rhythm for University fees and trainee training grant	£1,000,000*	**50** Grad diploma in Cardiac Rhythm for University fees and trainee training grant	£1,000,000*
Annual Funding Allocation			£13,835,911		£13,048,911*		£14,888,911*

Developing Physiological Science Networks

The Likely Functions of Physiological Science Networks

- Plan and manage capacity and demand for physiological science services
- Stewardship of resources, including capital planning and collective procurement
- Workforce planning, including addressing training, skill mix, insourcing, retention and new ways of working
- Implement digital solutions to improve service delivery and outcomes
- Quality Management and Improvement, including supporting service accreditation
- Collaboration: including working together at local, regional and national levels
- Leading rapid evaluation and implementation of new innovations

The Likely Form of Physiological Science Networks

- Single operational governance model with clearly defined clinical leadership
- Operating model that allows oversight of clinical performance, clinical governance and quality
- Discipline specific focus within overarching physiological science network
- Regional footprint (to ensure scale and influence)
- Aligned to and embedded within Integrated Care Systems
- Aligned to disease/pathway specific networks

Next Step: Stakeholder Workshop to further develop model and review of current early network arrangements across each Region

Factors for further Consideration and Debate

- Balancing separate discipline focus with benefit of “umbrella” support and leadership fo[illegible]work, ability to facilitate interdisciplinary approaches and reduced bureaucracy
- Different disciplines may require different geographical footprints due to nature and scale of speciality


Seat at the table