IPEM Institute of Physics and Engineering in Medicine

IPEM Laser Physics Workforce Staffing Calculator

NIRSIG AOR Workforce Task and Finish Group: Jason Britton (lead); Grace Aneju; Natalie Bales; Emma Barton; Jane Brown; Charlotte Groves; Shijie Liang; Tom Lister; Katie Marshall; Adam Studd

Introduction

This is the Institute of Physics and Engineering in Medicine's Optical Non-Ionising Radiation Staffing Calculator. Users input service factors into the blue cells, such as amount and type of lasers, phototherapy cabinets, numbers of departments covered etc. along with research, development and innovation projects, and training. The calculator will then give a total Whole Time Equivalent (WTE) expected to support the workload for lead scientists, registered scientists and Healthcare Science (HCS) Practitioners it is recommended your service to have. The fully automated calculator is available to IPEM members.

Instructions

The calculator has been published as a spreadsheet to allow for simple user input and automated calculations for IPEM members. Users can easily adjust any aspect of the calculator, considering factors such as staff with additional needs or broader roles within laser physics, varying distances between sites, or the complexity and commitment to research, development and innovation projects.

The workbook contains four worksheets. The first is this introduction, the second is the 'user interface' and provides the necessary functions to input the required information into the blue cells and output an estimate of medical laser physics staffing requirements, shown in the grey cells at the bottom. The third is the basis of the calculations which hidden from the user. The last worksheet shows a worked example.

The output is separated into three levels, described as lead, registered, and practitioner physicists. These broad descriptors are indicative of an expected structure but are not intended to be prescriptive. For example, we are aware of the important contributions made at all levels with the current lack of a suitable RCT pathway in this field at the time of writing.

The calculator automatically accounts for time required for work such as continuing professional development and supervision for each whole-time equivalent member of staff and explicitly allows for travel time between sites, as well as the additional requirements that come with working across a larger group of clinical and management colleagues, such as additional communications, and more MDT and Radiation Governance Group meetings. A simple input of the total number of sites is required. Most medical physics services should have an accurate count of equipment within their remit.

The tab labelled ‘calculations’ includes detailed descriptions of the areas of laser physics considered and how these are used to produce the staffing estimates. These values have been informed by national data collection and input from an expert group of laser physics leaders in the UK, before being peer reviewed. This spreadsheet has been designed for flexibility of use depending on the requirements of each unique service.

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Laser Physics Workforce Calculator with Worked Example

Organisation		WTE expected			Total WTE
Number of:	**Value**	**Lead scientist/ technologist (LPA)**	**Scientist/ technologist (B7)**	**HCS Practitioner (B6)**	
Lasers					
Number of single wavelength lasers (*)	16	0.073	0.196	0.080	0.349
Number of multi-wavelength lasers (*)	12	0.055	0.169	0.087	0.311
Phototherapy					
Single energy phototherapy cabinet measurements	6	0.0001	0.0003	0.0818	0.0822
Dual energy Phototherapy cabinet measurements	0	0.00000	0.00000	0.0000	0.0000
Hand and Foot Units	5	0.0023	0.0023	0.0341	0.0386
MED testers including Canopies	5	0.0057	0.0057	0.0227	0.0341
Home phototherapy units	18	0.00041	0.00082	0.0409	0.0421

Key	
RA	*Risk Assessment*
*	Inc. Local Rules/Risk assessment
**	Include separate hospitals/site within one trust

Support to phototesting service i.e. monochromator, solar simulator etc.	4	0.0182	0.0364	0.0218	0.0764
Photodynamic therapy units	4	0.0002	0.0045	0.0545	0.0593
Daylight Phototherapy	2	0.0023	0.0091	0.0009	0.0123
UVA1 High/Low dose unit	0	0.0000	0.0000	0.0000	0.0000
Risk Assessment/Local Rules (different types of equipment)	4	0.0045	0.0136	0.0018	0.0200
Blue light Neonatal Phototherapy					
Quality assurance	0	0.0000	0.0000	0.0000	0.0000
Risk assessments per equipment type	0	0.0000	0.0000	0.0000	0.0000
Equipment procurement					
Equipment specification, evaluation and Commissioning # number expected	1	0.0068	0.0045	0.0009	0.0123
Trust wide governance					
Clinical Governance Meetings and development and support	0	0.0000	0.0000	0.0000	0.0000

R&D					
All types of R&D support and leadership (number of projects)	0	0.0000	0.0000	0.0000	0.0000
Education and Training					
STP Specialist Trainees (UNIR, Rad Prot and route 2)	0	0.000	0.000	0.000	0.000
Healthcare science practitioner trainees	0	0.000	0.000	0.000	0.000
STP rotational training	0	0.000	0.000	0.000	0.000
Academic and clinical teaching & training i.e. FRCR, Core of Knowledge	1	0.005	0.002	0.005	0.011
Scientific leadership, computing, management including CPD					
Computing and Databases - number of systems	1	0.00005	0.00009	0.009091	0.009
E.g. Management of scientific service, Maintain knowledge, Meetings, Professional activities, General Admin	1	0.073	0.064	0.068	0.205
Sub Total		**0.245**	**0.509**	**0.509**	**0.602**
Site factor (minimum 1) (Hospitals)**	**1**	**0.00184**	**0.02543**	**0.05086**	**0.07814**
Grand Totals		**0.300**	**0.600**	**0.600**	**1.500**

Laser Physics Workforce Calculations

Optical Non-Ionising Radiations	Guidance notes	Unit	Annual time for different staffing groups			Annual WTE			Posts
Non		*Item*	Lead scientist (Days)	Registered Scientist (Days)	Healthcare Science Practitioner (Physics or Engineering) (Days)	Lead scientist	Registered Scientist	Healthcare Science Practitioner (Physics or Engineering)	Total WTE
Investigations following a clinical incident and incident review per laser	e.g. incident involving a member of staff or patient, or near miss	per incident	0.100	0.100	0.100	0.000455	0.000455	0.000455	**0.0014**
Equipment fault per laser	e.g. Beam misalignment, patient over-exposure	per incident	0.100	0.500	0.500	0.000455	0.002273	0.002273	**0.0050**
Laser safety									
On-going safety support	e.g. annual laser safety review/audit per laser	Safety review with LPS	0.100	0.500	0.000	0.000455	0.002273	0.000000	**0.0027**
		Local rules	0.100	0.250	0.000	0.000455	0.001136	0.000000	**0.0016**
		Risk assessment review and calculations	0.100	0.500	0.000	0.000455	0.002273	0.000000	**0.0027**
Laser safety training	LPS, authorised laser operators	Per speciality once per year core of knowledge	0.500	0.500	0.000	0.002273	0.002273	0.000000	**0.0045**
	Laser assistants	Laser safety awareness training per speciality	0.000	0.250	0.000	0.000000	0.001136	0.000000	**0.0011**
Laser Quality assurance	Single wavelength laser	Once per annum	0.000	0.100	0.500	0.000000	0.000455	0.002273	**0.0027**
	Multi Wavelength laser i.e. Nd:YAG	Once per annum	0.100	0.500	0.500	0.000455	0.002273	0.002273	**0.0050**
Phototherapy									
Single energy phototherapy cabinet measurements	Every three months	Per cabinet	0.005	0.010	1.000	0.000023	0.000045	0.004545	**0.0046**
Dual energy Phototherapy cabinet measurements	Every three months	Per cabinet	0.010	0.010	1.000	0.000045	0.000045	0.004545	**0.0046**
Hand and Foot Units	Every three months	Per unit	0.100	0.100	1.500	0.000455	0.000455	0.006818	**0.0077**
MED testers including Canopies	Every three months	Per system	0.250	0.250	1.000	0.001136	0.001136	0.004545	**0.0068**

Home Phototherapy units	Every three months on average	Per unit	0.005	0.010	0.500	0.0000227	0.0000455	0.002273	**0.0023**
Support to phototesting service i.e. monochromator, solar simulator etc.	Every three months and yearly external calibration	Per service	1.000	2.000	2.000	0.004545	0.009091	0.009091	**0.0227**
Photodynamic therapy units	Every year	Per unit	0.010	0.250	0.250	0.000045	0.001136	0.001136	**0.0023**
Daylight Phototherapy	Review every year	Per PDT service	0.250	1.000	0.100	0.001136	0.004545	0.000455	**0.0061**
UVA1 High/Low dose unit	Every 3 months	Per unit	1.000	0.500	0.500	0.004545	0.002273	0.002273	**0.0091**
Risk assessment and Local Rules	Every year	Per department	0.250	0.750	0.100	0.001136	0.003409	0.000455	**0.0050**
Blue Light Phototherapy									
QA Blue light Phototherapy Units	Every year	Per Unit including Blankets	0.005	0.050	0.500	0.000023	0.000227	0.002273	**0.0025**
Risk assessment, calculations and advising staff	Every year	Per system type	0.500	1.000	0.100	0.002273	0.004545	0.000455	**0.0073**
Equipment management									
Equipment specification	e.g. new laser, phototherapy cabinet etc.	Per procurement	0.500	0.500	0.100	0.002273	0.002273	0.000455	**0.0050**
Equipment evaluation	e.g. objective comparison of multiple trial units	Per procurement	1.000	0.500	0.100	0.004545	0.002273	0.000455	**0.0073**
Service delivery/development, protocol optimisation and sustainability (per department)									
Attendance at Radiation Governance meetings	i.e. attendance at meetings, preparation of reports etc.	Per trust	0.500	0.100	0.000	0.002273	0.000455	0.000000	**0.0027**
Ongoing service development/delivery	i.e. introduction of new techniques, consumables etc.	Per trust	0.500	0.500	0.100	0.002273	0.002273	0.000455	**0.0050**
Quality management and governance (per department)									

Clinical Governance including ongoing clinical audits/QI/clin effectiveness	3 per hospital	Per department	1.000	0.200	0.100	0.004545	0.000909	0.000455	**0.0059**
R&D&I (per department active in research (assume 1 in 5 departments are active, factor of 0.2 applied in columns G-I)									
Research and Development including clinical research (clinical) - overarching strategic and operational support for clinical trials	Covering a wide range of ongoing work, including strategic, operational and academic involvement - planning, staffing, costings, grants, protocols etc, supporting either NHS or university work (count as separate depts)	Per project	5.000	5.000	1.000	0.022727	0.022727	0.004545	**0.0500**
Carrying out research led by your service (academic)	Own dept research	Per project	5.000	2.000	1.000	0.022727	0.009091	0.004545	**0.0364**
Research/development leadership	e.g. Sitting on research management committees within Trust/University/region and providing laser safety specific advice eg interdisciplinary groups, academic committees, NIHR groups. MSc/PhD supervision.	Per project	5.000	2.000	1.000	0.022727	0.009091	0.004545	**0.0364**
Education and training (total)		***Item***							
Delivering STP specialism training and Route 2 trainees	Optical Non-Ionising and Radiation Protection	Per trainee	8.000	8.000	1.000	0.036364	0.036364	0.004545	**0.0773**
Healthcare Science Practitioner training	Optical Non-Ionising	Per trainee	8.000	4.000	2.000	0.036364	0.018182	0.009091	**0.0636**

Delivering STP rotational training	Optical Non-Ionising Radiation Only	Per trainee	2.500	2.500	1.000	0.011364	0.011364	0.004545	**0.0273**
Delivering academic and clinical teaching/training	e.g. FRCR, External Core of knowledge training	Per commitment	1.000	0.500	1.000	0.004545	0.002273	0.004545	**0.0114**
Clinical scientific computing and informatics		***Item***							
Computing network support and scientific computing input	e.g. Phototherapy Database	Per site	0.010	0.020	2.000	0.000045	0.000091	0.009091	**0.0092**
Scientific leadership and management (including own)		***Item***							
Management of scientific service (e.g. direct management of scientific support for clin service developments) - including other meetings/responsibilities	Management and supervision of Ultrasound/non-ionising Physics team and related responsibilities	Per person	5.000	2.000	1.000	0.022727	0.009091	0.004545	**0.0364**
Maintain knowledge - reading, courses, conferences, lectures, peer reviews	Gathering of new information and learning	Per person	3.000	5.000	5.000	0.013636	0.022727	0.022727	**0.0591**
Attend section meetings, supervisor meetings and maintain CPD (IPEM work)	Own supervision and development	Per person	3.000	2.000	2.000	0.013636	0.009091	0.009091	**0.0318**
Involvement in wider NHS activities and professional bodies	Wider professional activities e.g. IPEM, NIHR, BMLA committees	Per commitment	3.000	3.000	2.000	0.013636	0.013636	0.009091	**0.0364**
General administration	Invoicing, contracts, arranging travel, annual leave, stat and mand training, meeting organising etc	Per person	2.000	2.000	5.000	0.009091	0.009091	0.022727	**0.0409**