ACPSEM

Australasian College of Physical Scientists & Engineers in Medicine

Analysis of the ACPSEM ROMP workforce survey results

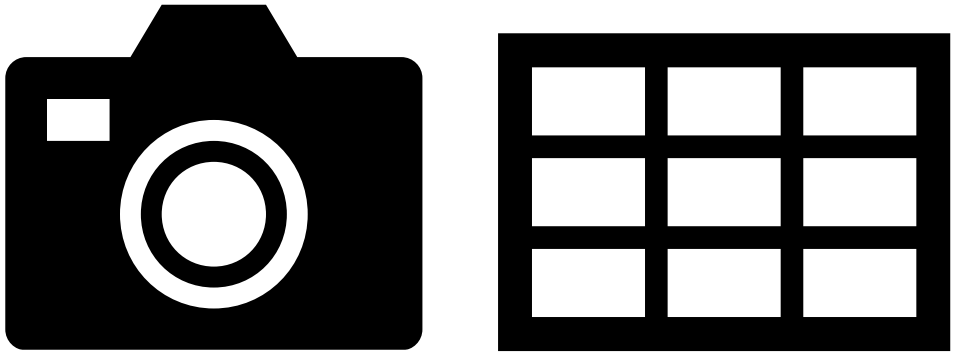
ACPSEM ROMP Workforce Modelling Project Task Group

Scott Crowe, Trent Aland, Darren Doromal, Lotte Fog, Lynne Greig, Lynsey Hamlett, Jenny Lydon, Howell Round, Adam Sawers, David Waterhouse

Background

- In October 2020, the ACPSEM initiated the ROMP workforce modelling project, with two outcomes:

Workforce snapshot
For demographics, scope of practice, work arrangements and future plans.



Workforce model
For calculation of staff requirements at departmental and national levels.

- The workforce model was to contextualise the IAEA activity based approach, by collection of granular snapshot data from the sector

Introduction

- The model was launched in late 2021 with a presentation at EPSM (available via ACPSEM website), and a published report (available at https://doi.org/10.1007/s13246-021-01078-z).
- Since the launch of the model, there has been an opportunity to dig further into the results of the surveys.
- Today I'll quickly summarise previously presented work, and present results from more recently completed analysis.

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ACPSEM REPORT

Report of the ACPSEM radiation oncology medical physics workforce modelling project task group

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Abstract
The ACPSEM radiation oncology medical physics workforce modelling project task group was formed to acquire a snapshot of practices in Australia and New Zealand and to develop an activity-based workforce model. To achieve this, two surveys were carried out, capturing the work practices of 98 radiation oncology departments and 182 college members. The member survey provided a snapshot of the current workforce: their demographics, work conditions, professional recognition, and future plans. The facility survey provided an Australian and New Zealand contextualisation of the volume-based activities defined in the International Atomic Energy Agency activity-based radiation oncology staffing model at a granular level. An ACPSEM ROMP workforce model was developed to be a modelling tool applicable at both the facility and sector levels.

Keywords Staffing · Medical physics · Radiation oncology · Workforce

Abbreviations

2D, 3D, 4D	Two-, three- and four- dimensional
ACPSEM	Australasian College of Physical Scientists and Engineers in Medicine
ARW	ACPSEM ROMP Workforce
CPD	Continuing professional development
CT	Computed tomography
EBRT	External beam radiotherapy
FTE	Full time equivalent
IAEA	International Atomic Energy Agency
IVD	In vivo dosimetry
IMRT	Intensity modulated radiotherapy
MRI	Magnetic resonance imaging
PET	Positron emission tomography
QA	Quality Assurance
ROMP	Radiation Oncology Medical Physicist
SABR	Stereotactic ablative body radiotherapy
SRS	Stereotactic radiosurgery
TEAP	Training, Education and Assessment Program
VMAT	Volumetric modulated arc therapy

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Introduction

Workforce surveys are crucial to understanding the needs of professionals. They can be used to explore longitudinal changes in the workforce, to identify issues relating to recruitment and retention, to serve as benchmarks for future studies, and to inform estimates about future trends [1–3]. For the ROMP workforce, it is important to understand the impact of changes in the provision of radiation oncology services in response to an aging population and increased incidence of cancer, and changes in practice made possible by technological and clinical advances, as well as networking capabilities of facilities.

Introduction

Member snapshot

ACPSEM database included age and gender demographics for

- 352 registered ROMPs: 314 AU, 29 NZ, 9 international
- 79 ROMP TEAPs: 64 AU, 15 NZ

A survey was sent to ROMPs and registrars. 182 responded

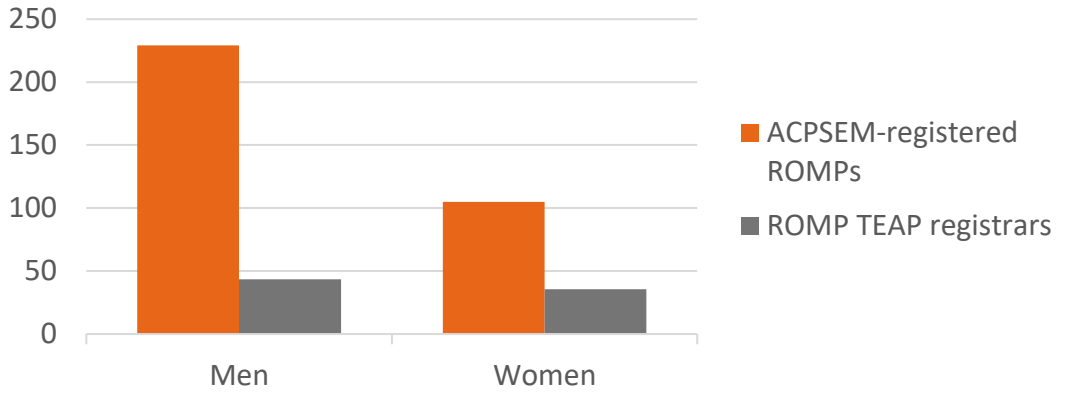
Facility snapshot

Survey profiling time spent on activities defined in IAEA model (in 2020), in addition to facility workload, staffing levels, and future plans.

98 facilities responded. Results were validated at 3 levels (survey instrument feedback, project team for outliers, and the task group for aggregated statistics at intervals).

Member Snapshot

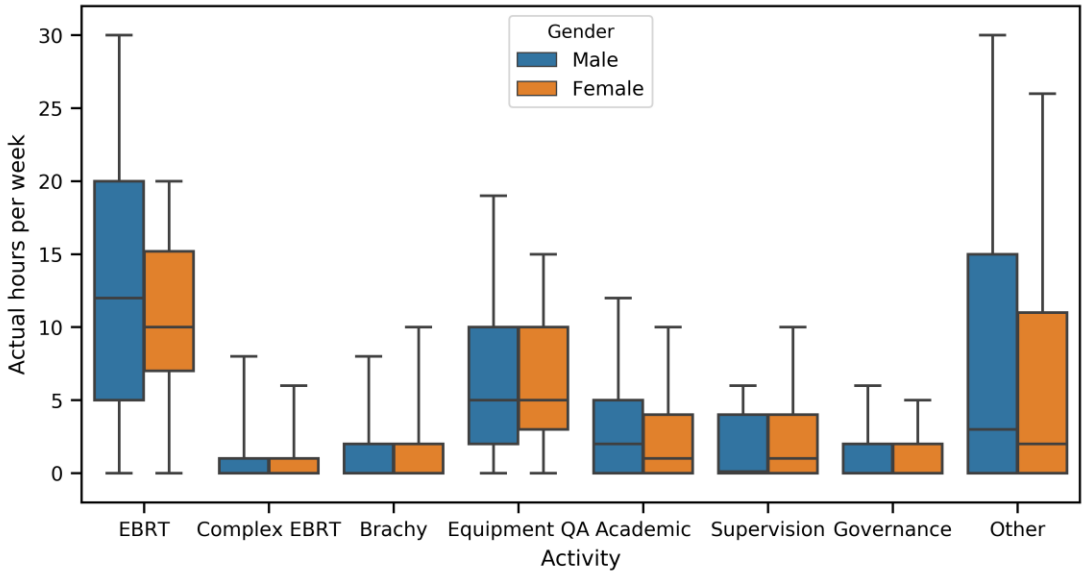
- Survey covered demographic data, history of training and experience, qualifications, retirement plans, and current, anticipated and desired work arrangements.
- Since 2009, the group has gotten larger, younger, and is working fewer hours.
- Women accounted for 44.9% of TEAPs and 31.4% of registered ROMPs.

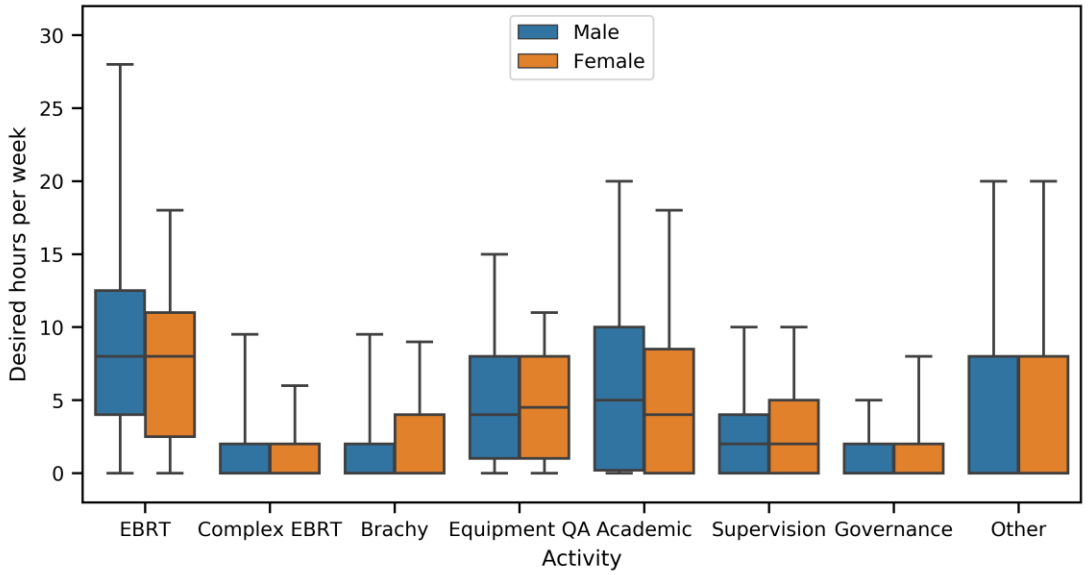


Hours worked	ROMPs in 2009	ROMPs in 2021
0-9	3 (1%)	8 (4%)
10-19	4 (2%)	2 (1%)
20-29	7 (3%)	9 (5%)
30-39	68 (31%)	131 (72%)
40-49	119 (55%)	25 (14%)
50-59	15 (7%)	3 (2%)
60-69	2 (1%)	0 (0%)
>70	0 (0%)	3 (2%)

Member Snapshot, activity by gender

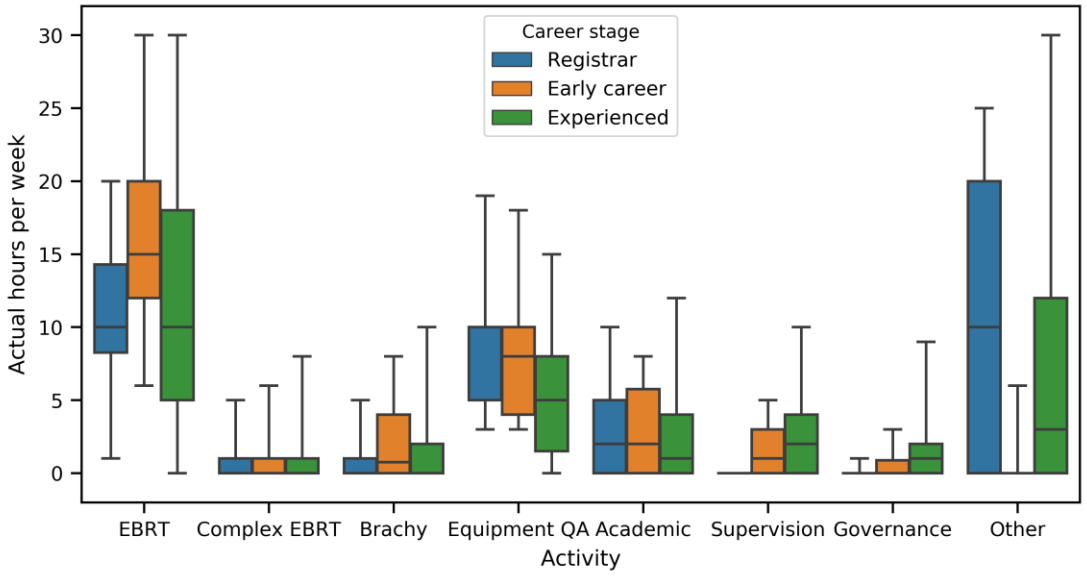
- Current workloads were similar, and desired workloads very similar.
- Men reported more time spent on EBRT plan and treatment QA, and “other” duties.
- Women reported more time spent on supervision.

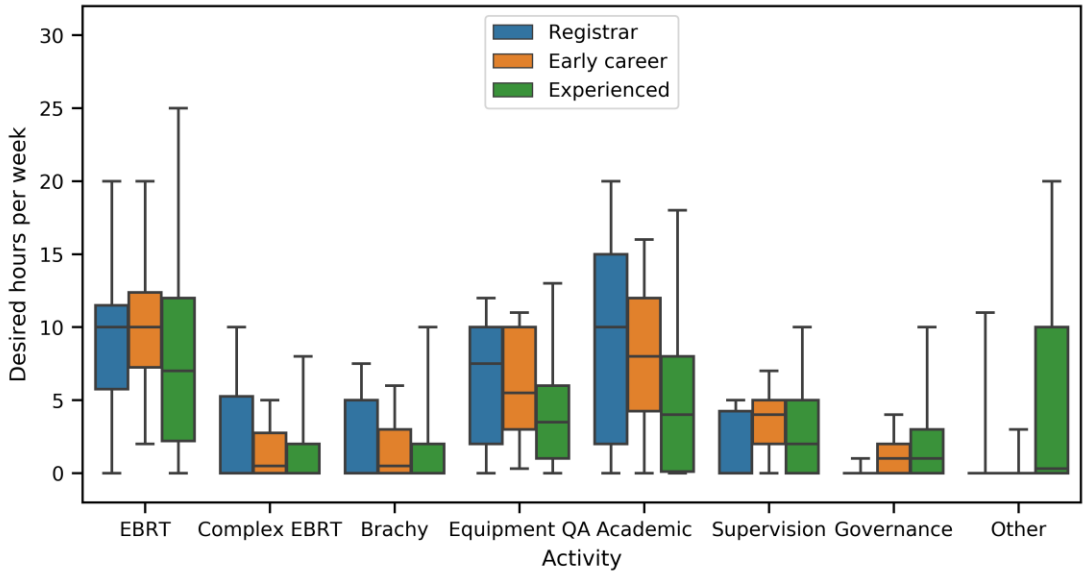




Member Snapshot, activity by career stage

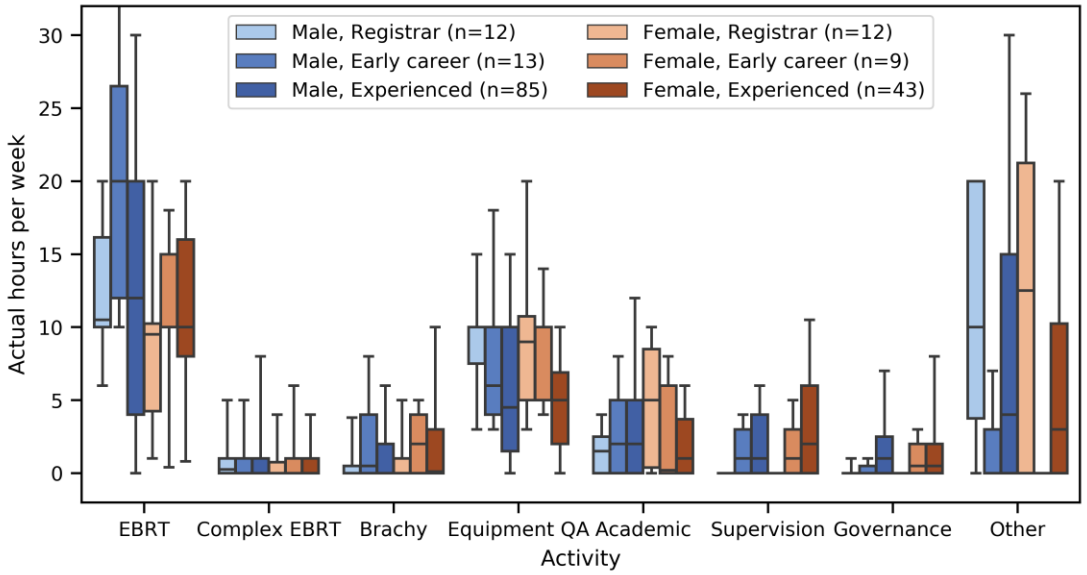
- Experienced ROMPs (>5 years post certification) working nearest desired workload distribution.
- Early career (≤5 years post certification) want to get more involved in supervision and academic work.
- Registrars (future certification) want to drop “other” work and increase academic and specialised technique work.

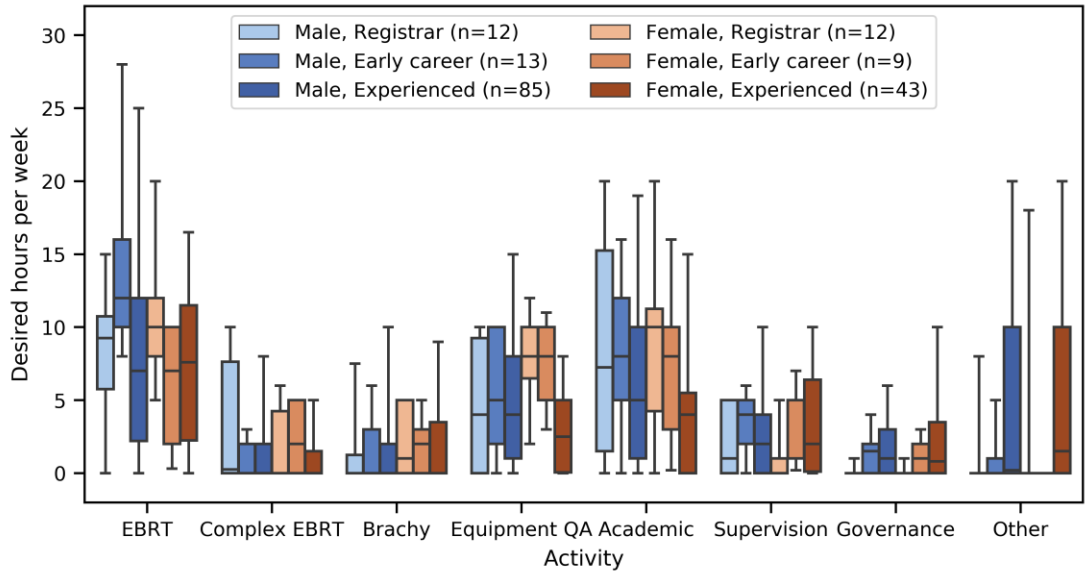




Member Snapshot, activity by both

- Cohorts are smaller, making observations less reliable.
- Female registrars are assigned EBRT QA work less frequently than male registrars, with that time being spent on academic and other (TEAP) activities.

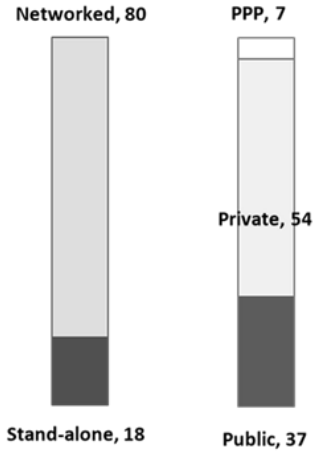




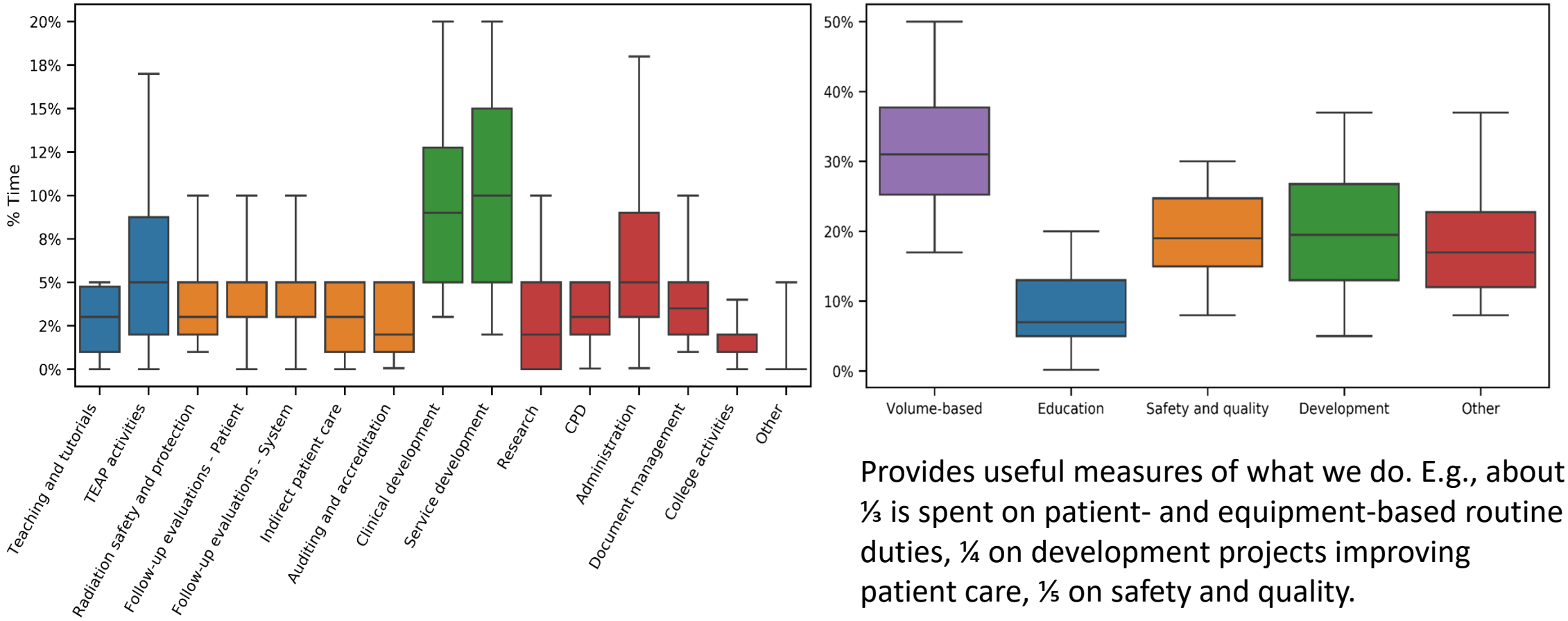
Facility Snapshot

- Survey covered facility profile, ROMP workforce details, time spent on case- and equipment-based activities (normalised against cases and items of equipment), workload for other activities, and future plans.
- Most departments were in a network, and a majority were in private sector.
- These departments accounted for 440 ROMPs, of which ¾ registered.

Physics staff	FTE (% of total)
ROMPs, ACPSEM registered	283.1 (64.3%)
ROMPs, registered elsewhere	45.6 (10.4%)
ROMPs, not on any register	22.2 (5.0%)
TEAP trainees, pre-clinical	1.6 (0.4%)
TEAP trainees, clinical year 1	15.7 (3.6%)
TEAP trainees, clinical year 2	23.3 (5.3%)
TEAP trainees, clinical year 3+	33.7 (7.7%)
Other physics staff	14.9 (3.4%)



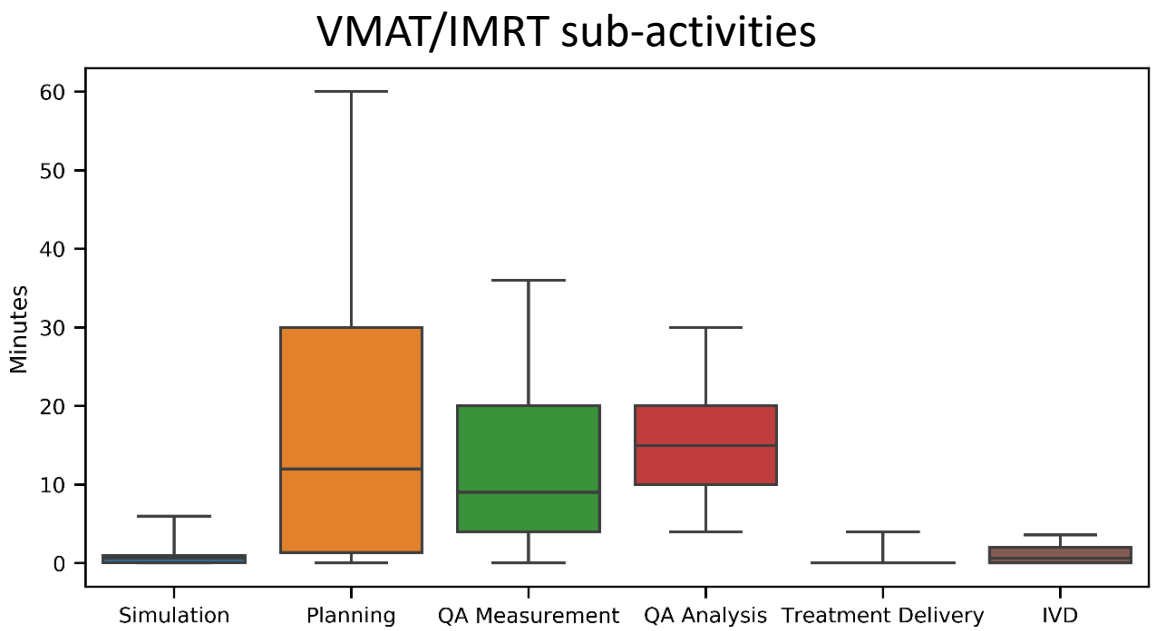
Facility Snapshot



Provides useful measures of what we do. E.g., about ⅓ is spent on patient- and equipment-based routine duties, ¼ on development projects improving patient care, ⅕ on safety and quality.

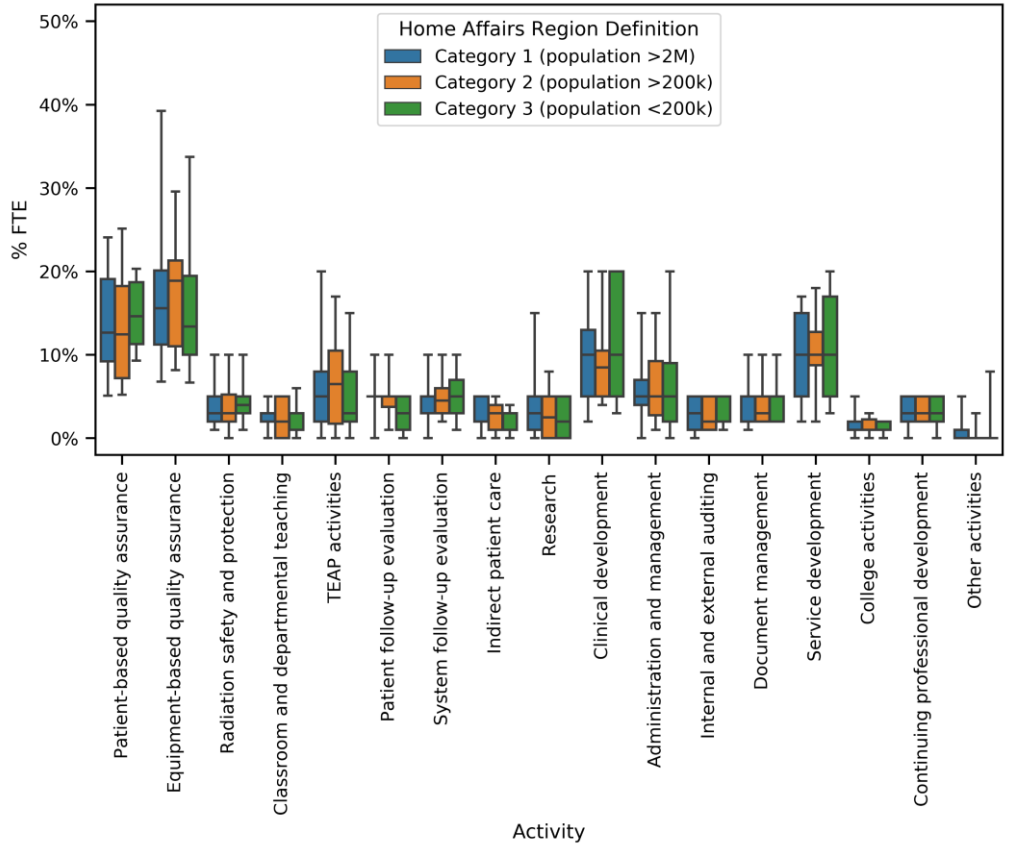
Facility Snapshot

- The data was highly granulated, allowing assessment of sub-activity times (e.g. planning vs. QA for patients, weekly vs. annual QA for equipment).
- Comparison data was returned to facilities as a benchmarking tool.



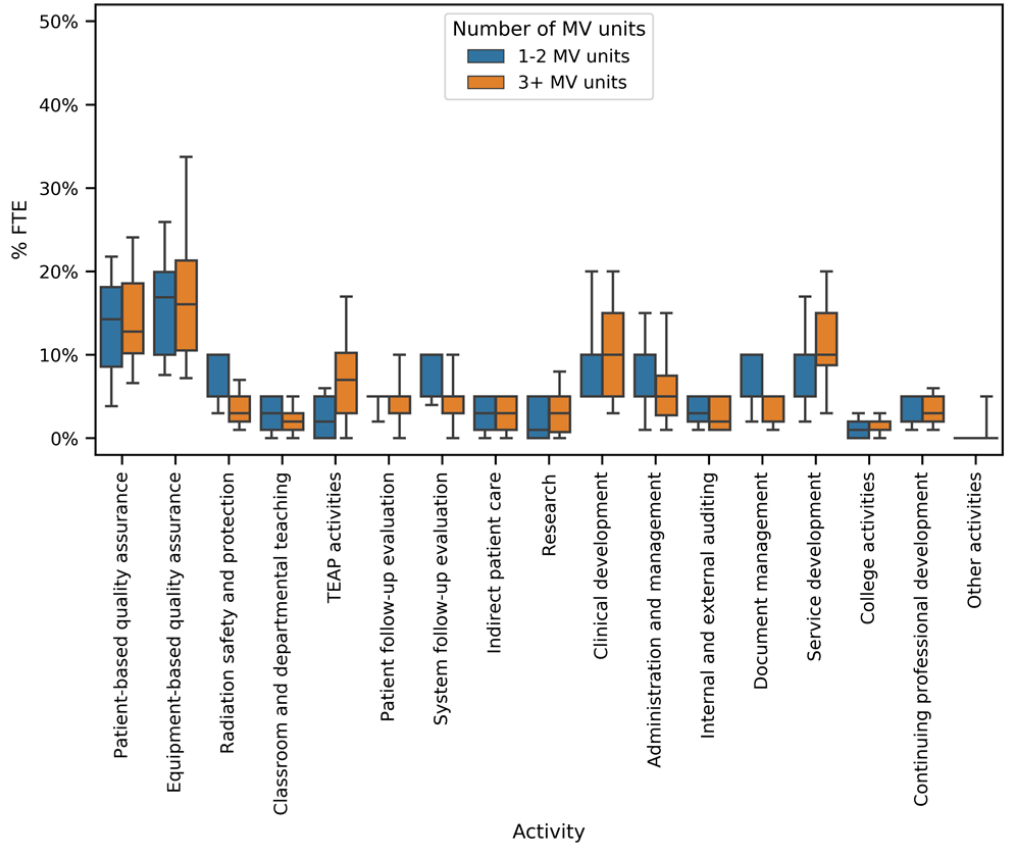
Facility Snapshot, activity by location

- Facility demographics allowed observations to be made.
- For example, departments in major cities have slightly more time for research and regional sites have slightly less time for TEAP activities.



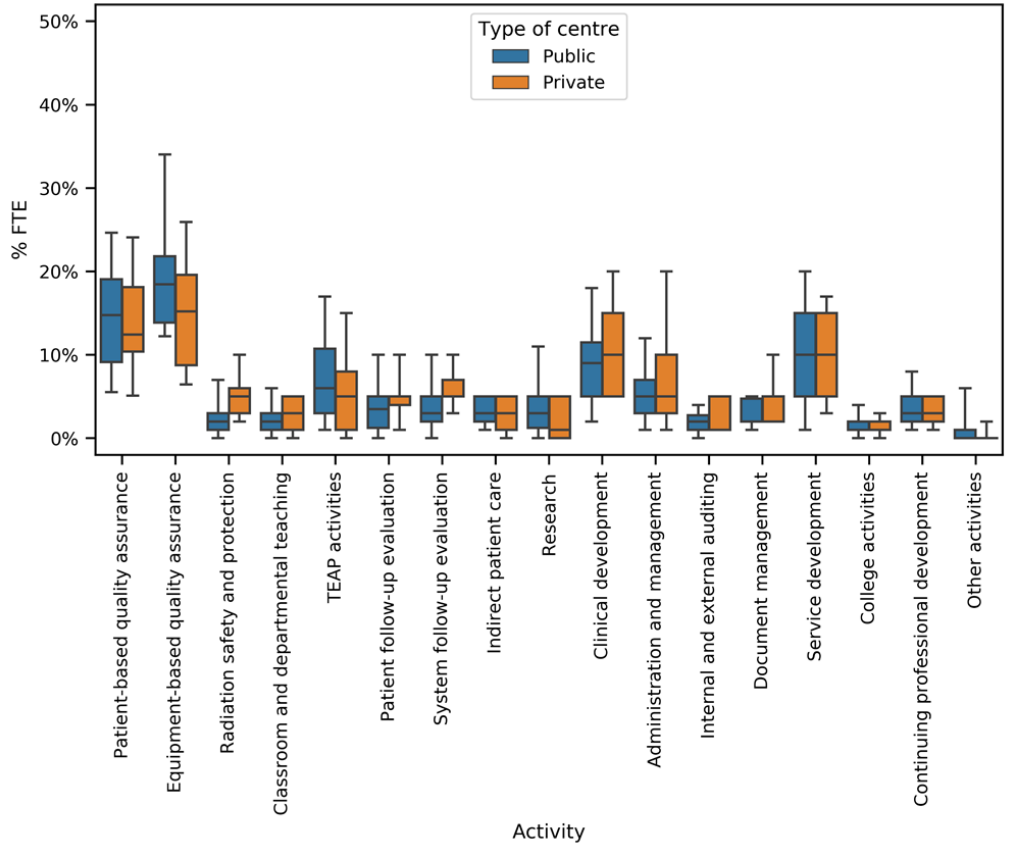
Facility Snapshot, activity by linac number

- Similar trends observed when categorised according to linac number, indicative of the size of the department.
- For example, large departments had more TEAP activities.
- Some activities don't scale linearly with department size, e.g. radiation safety and protection, document management, and teaching.



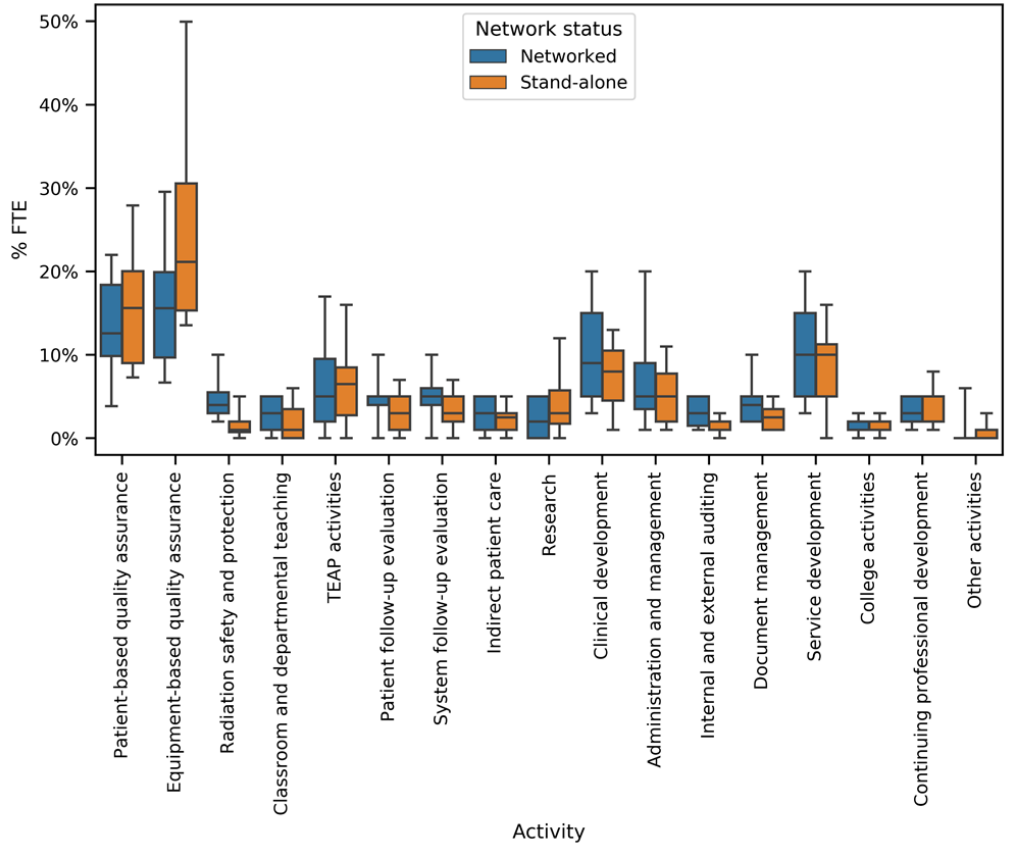
Facility Snapshot, activity by operation

- More playing to stereotypes.
- Public departments spent more time on research, TEAP activities, equipment- and patient-based activities.
- Conversely private departments spent more time on clinical development, and “quality management” activities (e.g. safety and documentation).

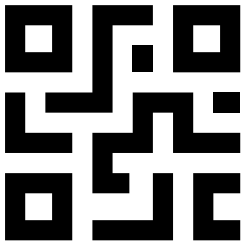


Facility Snapshot, activity by network status

- Some of this might relate to process optimisation promoted by networking of sites, i.e. the value of efficiency gain measures implemented at multiple sites.
- For example, patient- and equipment-based QA.



Facility Snapshot, thematic analysis



Some questions asked for the respondent (usually the physics lead at the site) about future changes to work practices and workforce.

These responses were provided in free text form, and I have coded the feedback according to some recurring themes.

Two of the questions provided some data I think is worth communicating.

Facility Snapshot, thematic analysis

- **What initiatives work well in addressing balance between demand and supply?**
- 46 unique responses, coded using frame to the right.
- Most common themes were:
  - updated staffing model
  - funding and support for registrars
  - concerns over high number of Masters program graduates

Category	Initiative coding	n (%)
University	Advertising medical physics as a career	1 (2%)
	Management of Masters student numbers	10 (22%)
	Collaboration between clinics and university programs	5 (11%)
Training	Management and funding of clinical training positions	14 (30%)
	Training conditions, including supervision	10 (22%)
	Training program design, length and/or curriculum	7 (15%)
Recruitment	Overseas recruitment processes	4 (9%)
	Financial incentives to work in rural/regional locations	2 (4%)
	Medical physics associate or technician positions	1 (2%)
Retention	Workplace culture and work conditions	2 (4%)
	Flexible working arrangements	3 (7%)
	Career progression opportunities	5 (11%)
	Competitive remuneration	4 (9%)
Professional	Staffing models and workforce planning	11 (24%)
	Networking and/or rotation of physics teams between sites	2 (4%)
	Recognised professional registration, e.g. AHPRA	3 (7%)
	Defined or expanded scope of practice / roles	5 (11%)

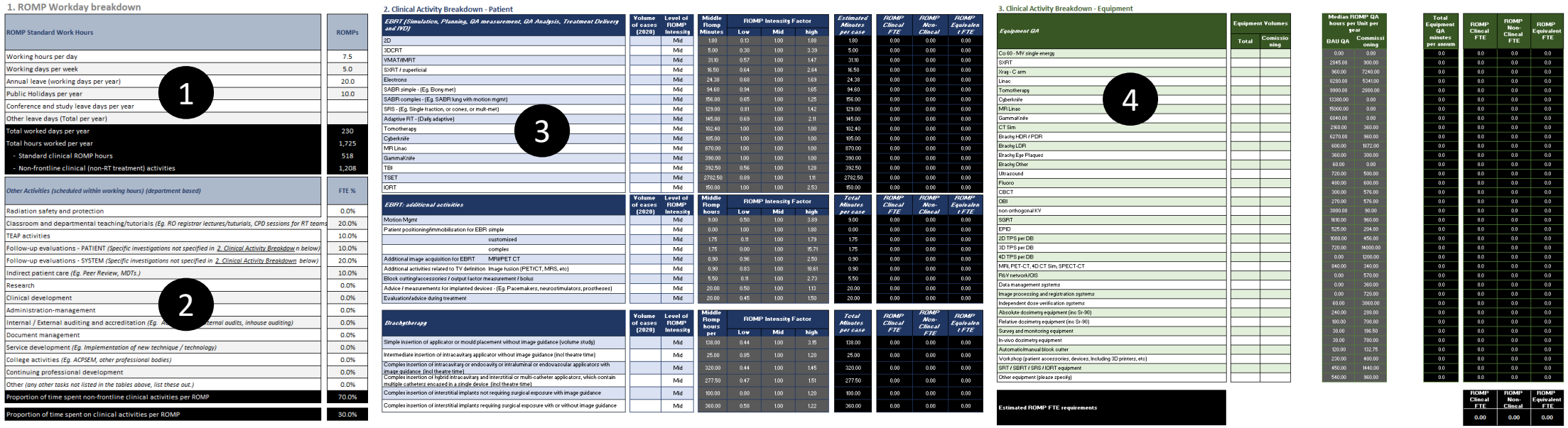
Facility Snapshot, thematic analysis

- **What practice changes do you think will have an impact on the ROMP workload and/or workforce?**
- 52 unique responses.
- Most common themes were
  - firmer scope of practice and Ahpra professional registration
  - reduction in QA, increase in focus on service development
  - need to develop additional skills: programming, data analysis, soft skills
  - automation and AI

Category	Practice change coding	n (%)
Workforce	Remote support and remote working arrangements	8 (15%)
	Flexible working arrangements	1 (2%)
	Medical physics associate or technician positions	5 (10%)
	Overtime/weekend work in response to equipment utilisation	1 (2%)
	Expanding responsibilities, scope of practice or specialisation	15 (29%)
	Recognised professional registration, e.g. AHPRA	1 (2%)
	Public and private sector health system balance	4 (8%)
	Efforts to reduce service delivery costs	4 (8%)
	Change to contract-based employment	1 (2%)
Techniques	Utilisation of existing advanced techniques, e.g. SRS, SBRT	10 (19%)
	Utilisation of brachytherapy	2 (4%)
	Adaptive radiation therapy	7 (13%)
	Advanced motion management techniques	7 (13%)
	Other cancer treatment techniques, e.g. molecular therapies	1 (2%)
Technology	New treatment technologies, e.g. MRI-linacs and protons	9 (17%)
	New non-treatment technologies, e.g. MRI simulators	7 (13%)
	Automation of clinical processes, e.g. contouring and planning	13 (25%)
	Automated or streamlined QA or reduced QA requirements	23 (44%)
	Artificial intelligence and machine learning	13 (25%)
	Data analytics and data management requirements	6 (12%)

ARW Model

- Survey model was based on IAEA Activity Based Model, with user entering standard hours (1), estimates of time spent on non-volume driven activities (2), and patient (3) and equipment load data (4)



1. ROMP Workday breakdown

ROMP Standard Work Hours	ROMPs
Working hours per day	7.5
Working days per week	5.0
Annual leave (working days per year)	20.0
Public Holidays per year	10.0
Conference and study leave days per year	
Other leave days (Total per year)	
Total worked days per year	230
Total hours worked per year	1,725
- Standard clinical ROMP hours	518
- Non-frontline clinical (non-RT treatment) activities	1,208

Other Activities (scheduled within working hours) (department based)	FTE %
Radiation safety and protection	0.0%
Classroom and departmental teaching/tutorials *(Eg. RO registrar lectures/tuturials, CPD sessions for RT teams*	20.0%
TEAP activities	10.0%
Follow-up evaluations - PATIENT *(Specific investigations not specified in 2. Clinical Activity Breakdow n below)*	10.0%
Follow-up evaluations - SYSTEM *(Specific investigations not specified in 2. Clinical Activity Breakdown below)*	20.0%
Indirect patient care *(Eg. Peer Review, MDTs.)*	10.0%
Research	0.0%
Clinical development	0.0%
Administration-management	0.0%
Internal / External auditing and accreditation *(Eg. A ternal audits, inhouse auditing)*	0.0%
Document management	0.0%
Service development *(Eg. Implementation of new technique / technology)*	0.0%
College activities *(Eg. ACPSEM, other professional bodies)*	0.0%
Continuing professional development	0.0%
Other *(any other tasks not listed in the tables above, list these out.)*	0.0%
Proportion of time spent non-frontline clinical activities per ROMP	70.0%
Proportion of time spent on clinical activities per ROMP	30.0%

2. Clinical Activity Breakdown - Patient

EBRT (Simulation, Planning, QA measurement, QA Analysis, Treatment Delivery and IVD)	Volume of cases (2020)	Level of ROMP Intensity	Middle Romp Minutes	ROMP Intensity Factor Low	Mid	high	*Estimated Minutes per case*	*ROMP Clinical FTE*	*ROMP Non-Clinical*	*ROMP Equivalent FTE*
2D		Mid	1.88	0.13	1.00	1.88	1.88	0.00	0.00	0.00
3DCRT		Mid	5.00	0.30	1.00	3.39	5.00	0.00	0.00	0.00
VMAT/IMRT		Mid	31.10	0.57	1.00	1.47	31.10	0.00	0.00	0.00
SXRT / superficial		Mid	16.50	0.64	1.00	2.64	16.50	0.00	0.00	0.00
Electrons		Mid	24.38	0.68	1.00	1.69	24.38	0.00	0.00	0.00
SABR simple - (Eg. Bony met)		Mid	94.60	0.94	1.00	1.65	94.60	0.00	0.00	0.00
SABR complex - (Eg. SABR lung with motion mgmt)		Mid	156.00	0.65	1.00	1.25	156.00	0.00	0.00	0.00
SRS - (Eg. Single fraction, or cones, or mult-met)		Mid	129.00	0.81	1.00	1.42	129.00	0.00	0.00	0.00
Adaptive RT - (Daily adaptive)		Mid	145.00	0.69	1.00	2.11	145.00	0.00	0.00	0.00
Tomotherapy		Mid	102.40	1.00	1.00	1.00	102.40	0.00	0.00	0.00
Cyberknife		Mid	105.00	1.00	1.00	1.00	105.00	0.00	0.00	0.00
MR Linac		Mid	870.00	1.00	1.00	1.00	870.00	0.00	0.00	0.00
GammaKnife		Mid	390.00	1.00	1.00	1.00	390.00	0.00	0.00	0.00
TBI		Mid	392.50	0.56	1.00	1.28	392.50	0.00	0.00	0.00
TSET		Mid	2782.50	0.89	1.00	1.11	2782.50	0.00	0.00	0.00
IORT		Mid	150.00	1.00	1.00	2.53	150.00	0.00	0.00	0.00

EBRT: additional activities	Volume of cases (2020)	Level of ROMP Intensity	Middle Romp hours	ROMP Intensity Factor Low	Mid	high	*Total Minutes per case*	*ROMP Clinical FTE*	*ROMP Non-Clinical*	*ROMP Equivalent FTE*
Motion Mgmt		Mid	9.00	0.50	1.00	3.89	9.00	0.00	0.00	0.00
Patient positioning/immobilisation for EBR simple		Mid	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
customised		Mid	1.75	0.11	1.00	1.79	1.75	0.00	0.00	0.00
complex		Mid	1.75	0.00	1.00	15.71	1.75	0.00	0.00	0.00
Additional image acquisition for EBRT MRI/PET CT		Mid	0.90	0.96	1.00	2.50	0.90	0.00	0.00	0.00
Additional activities related to TV definition Image fusion (PET/CT, MRS, etc)		Mid	0.90	0.83	1.00	18.61	0.90	0.00	0.00	0.00
Block cutting/accessories / output factor measurement / bolus		Mid	5.50	0.11	1.00	2.73	5.50	0.00	0.00	0.00
Advice / measurements for implanted devices - (Eg. Pacemakers, neurostimulators, prostheses)		Mid	20.00	0.50	1.00	1.13	20.00	0.00	0.00	0.00
Evaluation/advice during treatment		Mid	20.00	0.45	1.00	1.50	20.00	0.00	0.00	0.00

Brachytherapy	Volume of cases (2020)	Level of ROMP Intensity	Middle Romp hours per	ROMP Intensity Factor Low	Mid	high	*Total Minutes per case*	*ROMP Clinical FTE*	*ROMP Non-Clinical FTE*	*ROMP Equivalent FTE*
Simple insertion of applicator or mould placement without image guidance (volume study)		Mid	138.00	0.44	1.00	3.15	138.00	0.00	0.00	0.00
Intermediate insertion of intracavitary applicator without image guidance (incl theatre time)		Mid	25.00	0.85	1.00	1.20	25.00	0.00	0.00	0.00
Complex insertion of intracavitary or endocavity or intraluminal or endovascular applicators with image guidance (incl theatre time)		Mid	320.00	0.44	1.00	1.45	320.00	0.00	0.00	0.00
Complex insertion of hybrid intracavitary and interstitial or multi-catheter applicators, which contain multiple catheters encased in a single device (incl theatre time)		Mid	277.50	0.47	1.00	1.51	277.50	0.00	0.00	0.00
Complex insertion of interstitial implants not requiring surgical exposure with image guidance		Mid	100.00	0.80	1.00	1.20	100.00	0.00	0.00	0.00
Complex insertion of interstitial implants requiring surgical exposure with or without image guidance		Mid	360.00	0.58	1.00	1.22	360.00	0.00	0.00	0.00

3. Clinical Activity Breakdown - Equipment

Equipment QA	Equipment Volumes Total	Comissioning	Median ROMP QA hours per Unit per year BAU QA	Comissioning	Total Equipment QA minutes per annum	ROMP Clinical FTE	ROMP Non-Clinical FTE	ROMP Equivalent FTE
Co 60 - MV single energy			0.00	0.00	0.0	0.0	0.0	0.0
SXRT			2845.00	900.00	0.0	0.0	0.0	0.0
Xray - C arm			960.00	7240.00	0.0	0.0	0.0	0.0
Linac			8280.00	5341.00	0.0	0.0	0.0	0.0
Tomotherapy			3900.00	2880.00	0.0	0.0	0.0	0.0
Cyberknife			13380.00	0.00	0.0	0.0	0.0	0.0
MR Linac			15000.00	0.00	0.0	0.0	0.0	0.0
GammaKnife			6040.00	0.00	0.0	0.0	0.0	0.0
CT Sim			2160.00	360.00	0.0	0.0	0.0	0.0
Brachy HDR / PDR			6270.00	960.00	0.0	0.0	0.0	0.0
Brachy LDR			600.00	1072.00	0.0	0.0	0.0	0.0
Brachy Eye Plaques			360.00	300.00	0.0	0.0	0.0	0.0
Brachy Other			60.00	0.00	0.0	0.0	0.0	0.0
Ultrasound			720.00	500.00	0.0	0.0	0.0	0.0
Fluoro			480.00	600.00	0.0	0.0	0.0	0.0
CBCT			300.00	576.00	0.0	0.0	0.0	0.0
OBI			270.00	576.00	0.0	0.0	0.0	0.0
non orthogonal KV			3000.00	90.00	0.0	0.0	0.0	0.0
SGRT			1610.00	960.00	0.0	0.0	0.0	0.0
EPID			525.00	204.00	0.0	0.0	0.0	0.0
2D TPS per DB			1080.00	456.00	0.0	0.0	0.0	0.0
3D TPS per DB			720.00	14000.00	0.0	0.0	0.0	0.0
4D TPS per DB			0.00	1200.00	0.0	0.0	0.0	0.0
MRI, PET-CT, 4D CT Sim, SPECT-CT			840.00	340.00	0.0	0.0	0.0	0.0
R&V network/OIS			0.00	570.00	0.0	0.0	0.0	0.0
Data management systems			0.00	360.00	0.0	0.0	0.0	0.0
Image processing and registration systems			0.00	720.00	0.0	0.0	0.0	0.0
Independent dose verification systems			60.00	3060.00	0.0	0.0	0.0	0.0
Absolute dosimetry equipment (inc Sr-90)			240.00	288.00	0.0	0.0	0.0	0.0
Relative dosimetry equipment (inc Sr-90)			180.00	708.00	0.0	0.0	0.0	0.0
Survey and monitoring equipment			30.00	196.50	0.0	0.0	0.0	0.0
In-vivo dosimetry equipment			30.00	780.00	0.0	0.0	0.0	0.0
Automatic/manual block cutter			120.00	132.75	0.0	0.0	0.0	0.0
Workshop (patient accessories, devices, including 3D printers, etc)			230.00	480.00	0.0	0.0	0.0	0.0
SRT / SBRT / SRS / IORT equipment			450.00	1440.00	0.0	0.0	0.0	0.0
Other equipment (please specify)			540.00	960.00	0.0	0.0	0.0	0.0

Estimated ROMP FTE requirements	ROMP Clinical FTE	ROMP Non-Clinical	ROMP Equivalent FTE
	0.00	0.00	0.00

ARW Model

- Medians and quartiles were fed into the model, allowing user to model potential variations in departmental physics practices.

Clinical activity	Volume (cases)	Mean time (min)	Median by site (min)
2D	2,268	7.9	4.3
3DCRT	17,536	23.0	7.1
VMAT/IMRT/Tomotherapy	56,723	57.1	45.3
SXRT/superficial	2,467	22.8	20.5
Electrons	5,532	32.2	27.6
SABR simple (e.g. bony met)	2,580	103.7	102.3
SABR com			
SRS			
Adaptive			
TBI			
Motion m			
Simple pa			
Customise			
Complex			
Additiona			
Additiona			
Block cutt			
Advice fo			
Evaluation			
Brachythe			
Brachythe			
Complex insertion of intracavitary, endocavitary, intraluminal, endovascular applicators	230	286.3	277.5
Complex insertion of interstitial implants not requiring surgery w/ image guidance	264	249.1	225.0

Equipment	Count (units)	Mean QA time (hr yr^{-1})
Superficial x-ray therapy	36	84.8
Linear accelerator	211	192.4
CT simulator	91	52.5
HDR/PDR brachytherapy	24	102.4
LDR brachytherapy	17	18.3
Ultrasound	19	13.1
Cone beam CT	167	24.0
SRT / SBRT / SRS / IORT equipment	63	35.6
Other equipment	46	50.8

2. Clinical Activity Breakdown - Patient

EBRT (Simulation, Planning, QA measurement, QA Analysis, Treatment Delivery and IVD)	Volume of cases	Level of ROMP Intensity	Middle Romp Minutes per Case	ROMP Intensity Factor			*Estimated Minutes per case*
				Low	Mid	high	
VMAT/IMRT/Tomotherapy	1380	Low	45.3	0.55	1.00	1.83	25.0
VMAT/IMRT/Tomotherapy	1380	Mid	45.3	0.55	1.00	1.83	45.3
VMAT/IMRT/Tomotherapy	1380	High	45.3	0.55	1.00	1.83	83.0

ARW Model

- The model outputs an estimate of ROMP FTE requirements, indicating the number of registered physicists estimated to be required to handle defined workload.
- The potential contribution of unregistered physicists, TEAP registrars or physics assistants is left to the discretion of the user.

Estimated ROMP FTE requirements	ROMP Patient and Equipment QA FTE	*ROMP activities that are not patient or equipment QA specific*				ROMP Equivalent FTE
		Education	*Quality and Safety*	*Clinical and service development*	*Other professional activities*	
	3.23	0.60	0.99	1.22	3.70	9.74

Evaluation

Variable	Large department	Small department (1x networked, 1x non-networked)
ROMP activity (% of time)	31.3% on patient or equipment QA activity. 9.1% on education. 19.6% on quality and safety. 20.3% on clinical and service development. 19.7% on other activities (including research, CPD, document management, etc.)	37.6% on patient or equipment QA activity. 2.8% on education, with no TEAP training provided. 19.6% on quality and safety. 20.3% on clinical and service development. 19.7% on other activities (including research, CPD, document management, etc.)
Patient courses	1,800 external beam patients (89% VMAT/IMRT, 5.5% 3DCRT, 5.5% electrons). 300 stereotactic patients (33.3% SABR simple, 33.3% SABR complex, 33.3% SRS). 200 brachytherapy patients (25% simple insertion, 25% complex intra- or endo-cavity, intraluminal or endovascular, and 50% complex interstitial implants)	750 external beam patients (80% VMAT/IMRT, 6.7% 3DCRT, 13.3% electrons). 50 stereotactic patients (100% SABR simple).
Supporting activity (% of cases)	20% of cases require motion management 24% of cases require image fusion 5% of cases require block cutting and/or accessories 10% of cases require advice or measurements for implanted devices 5% require evaluation or advice during treatment	12.5% of cases require motion management 12.5% of cases require image fusion 12.5% of cases require block cutting and/or accessories 3.8% of cases require advice or measurements for implanted devices 2.5% require evaluation or advice during treatment
Major equipment	**4 linear accelerators with OBI/CBCT/SGRT** **1 stereotactic linear accelerator with non-orthogonal imaging** **1 linear accelerator being commissioned** 1 CT and 1 MR simulator 1 HDR and 1 LDR brachytherapy system 3 treatment planning systems	**2 linear accelerators with OBI/CBCT/SGRT** 1 CT simulator 1 treatment planning system

Evaluation

Registered ROMP equivalent FTE.

Department	ARW	F2000	IAEA	COMP
Large	11.0	23.1	19.4	9.4
Small, standalone	3.4	8.3	5.4	2.8
Small, networked	2.1	8.3	5.4	2.8

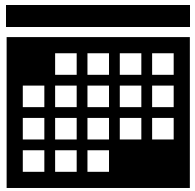
Department	ARW	F2000	IAEA	COMP
Large	1.8	3.9	3.2	1.6
Small, standalone	1.7	4.2	2.7	1.4
Small, networked	1.1	4.2	2.7	1.4

Registered ROMP equivalent FTE per MV EBRT unit.

(This is an experienced physicist estimate, not inclusive of registrars)

Lessons

The group was a good size for the project (n=10), and the combination of workforce consultants and subject matter experts worked well.



We were working to a number of timelines, relating to ACPSEM commitments. The timing of the release of the report was to support the release of the model. More data could have been possibly been analysed and included in the report.

There was a lack of control of activity classifications between member and facility surveys, preventing direct comparison. Classifications were taken from past surveys, and from IAEA model, respectively. Do staff and their directors agree on what work looks like?

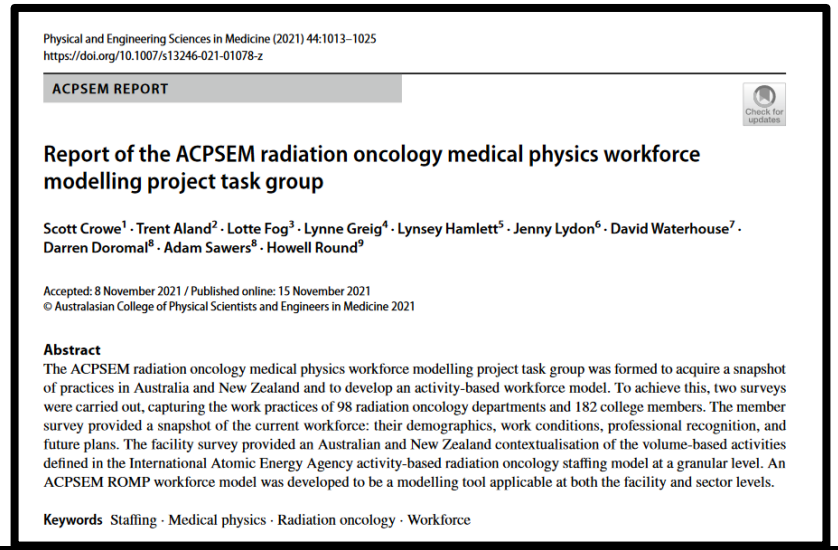
Lessons

While the snapshot was very useful for workforce modelling, it didn't do a great job at capturing information about trends and workforce concerns. The free form text answers were not written in a way conducive to thematic analysis.

The ACPSEM Diversity, Equity and Inclusion Working Group are planning a member survey that will capture perspectives of the ACPSEM membership, in terms of career experiences, aspirations, opportunities, and more!

Conclusion

- The workforce model and the report of the group (including lots of supplementary material) are available online. Please have a look!
  - https://link.springer.com/article/10.1007/s13246-021-01078-z
  - https://www.acpsem.org.au/Careers/The-ACPSEM-Radiation-Oncology-Medical-Physics-Workforce-Model
- It was very much a group effort – I want to acknowledge Venndelta, Howell, the task group, the office and the survey respondents.



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ACPSEM REPORT

Check for updates

Report of the ACPSEM radiation oncology medical physics workforce modelling project task group

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Abstract
The ACPSEM radiation oncology medical physics workforce modelling project task group was formed to acquire a snapshot of practices in Australia and New Zealand and to develop an activity-based workforce model. To achieve this, two surveys were carried out, capturing the work practices of 98 radiation oncology departments and 182 college members. The member survey provided a snapshot of the current workforce: their demographics, work conditions, professional recognition, and future plans. The facility survey provided an Australian and New Zealand contextualisation of the volume-based activities defined in the International Atomic Energy Agency activity-based radiation oncology staffing model at a granular level. An ACPSEM ROMP workforce model was developed to be a modelling tool applicable at both the facility and sector levels.

Keywords Staffing · Medical physics · Radiation oncology · Workforce