Findings from the NPCA - Performance indicators in radiotherapy https://www.npca.org.uk

Dr Alison Tree

Oncology Clinical Lead

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Learning Objectives

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1. How did the NPCA develop the radiotherapy performance indicators?

2. How did the NPCA validate performance indicators in radiotherapy?

3. How can outcome reporting of performance indicators demonstrate hospital variation?

4. Does public reporting improve care quality?

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Why all this work?

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The NEW ENGLAND JOURNAL of MEDICINE

SPEC

A Surgical Safety Che and Mortality in

Alex B. Haynes, M.D., M.P.I
William R. Berry, M.D.,
Abdel-Hadi S. Breizat, M.D
Teodoro Herbosa, M.D., Sudhir
Marie Carmela M. Lapitan, M.D., Ala
Krishna Moorthy, M.D., F.R.C.S., Rich
and Atul A. Gawande, M.D., M.P.H.,

Table 5. Outcomes before and after Checklist Implementation, According to Site.*

Site No.	No. of Patients Enrolled		Surgical-Site Infection		Unplanned Return to the Operating Room		Pneumonia		Death		Any Complication	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
							percent					
1	524	598	**4.0**	**2.0**	**4.6**	**1.8**	0.8	1.2	**1.0**	**0.0**	**11.6**	**7.0**
2	357	351	2.0	1.7	0.6	1.1	3.6	3.7	1.1	0.3	7.8	6.3
3	497	486	5.8	4.3	4.6	2.7	1.6	1.7	0.8	1.4	13.5	9.7
4	520	545	3.1	2.6	2.5	2.2	0.6	0.9	1.0	0.6	7.5	5.5
5	370	330	**20.5**	**3.6**	1.4	1.8	0.3	0.0	**1.4**	**0.0**	**21.4**	**5.5**
6	496	476	4.0	4.0	3.0	3.2	2.0	1.9	3.6	1.7	10.1	9.7
7	525	585	**9.5**	**5.8**	**1.3**	**0.2**	1.0	1.7	2.1	1.7	**12.4**	**8.0**
8	444	584	4.1	2.4	0.5	1.2	0.0	0.0	1.4	0.3	6.1	3.6
Total	3733	3955	**6.2**	**3.4**	**2.4**	**1.8**	1.1	1.3	**1.5**	**0.8**	**11.0**	**7.0**
P value			<0.001		0.047		0.46		0.003		<0.001	

Haynes et al, NEJM 2009

Methodological development

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- NPCA **methodological development** of clinically relevant toxicity indicators
- Use of **Objective clinical indicators** and **PROMS**
- Focus on mid-late toxicities and adverse events
- Consider impact on GI, GU and sexual function
- 2 to 3 years to develop with validation to compare practices of care

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Indicator development/validation

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BJUI
BJU International

Quantifying severe urinary complications after radical prostatectomy: the development and validation of a surgical performance indicator using hospital administrative data

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Clinical Investigation

National Population-Based Study Comparing Treatment-Related Toxicity in Men Who Received Intensity Modulated Versus 3-Dimensional Conformal Radical Radiation Therapy for Prostate Cancer

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GI Toxicity Indicator

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- Use of Hospital Episodes Statistics records (HES) linked to Cancer Registry, and Radiotherapy Dataset (RTDS) (**data linkage**)

- Based on assessment of frequency of **pre-specified procedure and diagnostic** codes for radiation toxicity

- A toxicity event requires :
  - evidence of both a diagnostic endoscopic procedure (eg, colonoscopy or sigmoidoscopy)
  - a diagnostic code consistent with radiation toxicity equivalent to **grade 2 or worse** according to the National Cancer Institute Common Toxicity Criteria for Adverse Events (CTCAE).

- Transparent mechanism for comparing the performance of providers

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Validation

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Validated and used to compare practices of care

- IMRT versus 3D conformal RT
- PROMs Hypo vs conventionally fractionated RT

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IMRT vs 3D Conformal Radiotherapy 2010-2013

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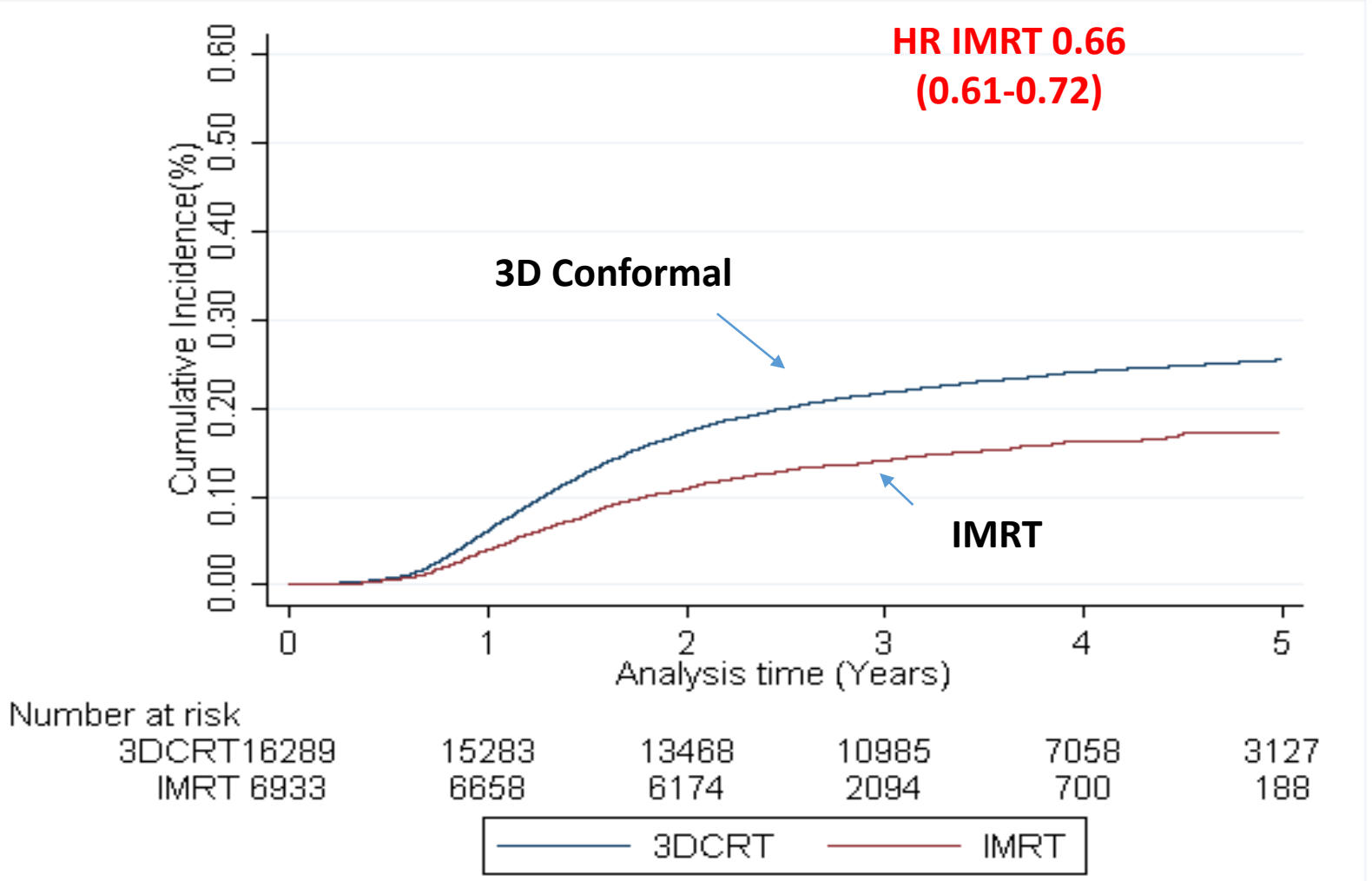

INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY · BIOLOGY · PHYSICS ASTRO

Sujenthiran et al, IJROBP 2017

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Patient-Reported Functional Outcomes After Hypofractionated or Conventionally Fractionated

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Key message - no difference in PROMS

TABLE 3. Relationship Between Patient-Reported Outcomes and Type of RT Regimen: Unadjusted and Adjusted Differences in EPIC-26 Domain Scores and EQ-5D-5L Score for Men Undergoing C-RT or H-RT

Outcome	Unadjusted Difference (95% CI) H-RT *v* C-RT, *P*	Adjusted Difference (95% CI) H-RT *v* C-RT, *P*
No. of patients H-RT *v* C-RT, 4,699 *v* 8,432 men		
EPIC-26		
Urinary (incontinence; MCID = 6-9)	−1.31 (−2.01 to −0.61); < .001	−0.46 (−1.25 to 0.34); .26
Urinary (obstructive/irritative; MCID = 5-7)	−1.38 (−2.03 to −0.72); < .001	−0.71 (−1.54 to 0.13); .098
Sexual (MCID = 10-12)	2.67 (1.88 to 3.46); < .001	3.32 (2.11 to 4.53); < .001
		↑ H-RT
Bowel (MCID = 4-6)	0.45 (−0.27, 1.16), .22	0.97 (−0.15, 2.08), .09
Hormonal (MCID = 4-6)	3.15 (2.26 to 4.04); < .001	3.20 (1.83 to 4.57); .001
		↑ H-RT
EQ-5D-5L	0.002 (−.005 to .009); .50	0.0006 (−.006 to .008); .87

17,058 men diagnosed in England 2014-2016

18/12 or more after diagnosis

77% response rate

Journal of Clinical Oncology®
An American Society of Clinical Oncology Journal

Nossiter et al, JCO 2020

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Public reporting of outcomes in radiation oncology: the National Prostate Cancer Audit

Ajay Aggarwal, Julie Nossiter, Matthew Parry, Arunan Sujenthiran, Anthony Zietman, Noel Clarke, Heather Payne, Jan van der Meulen

The public reporting of patient outcomes is crucial for quality improvement and informing patient choice. However, outcome reporting in radiotherapy, despite being a major component of cancer control, is extremely sparse globally. Public reporting has many challenges, including difficulties in defining meaningful measures of treatment quality, limitations in data infrastructure, and fragmented health insurance schemes. The National Prostate Cancer Audit (NPCA), done in the England and Wales National Health Service (NHS), shows that it is feasible to develop outcome indicators for radiotherapy treatment, including patient-reported outcomes. The NPCA provides a transparent mechanism for comparing the performance of all NHS providers, with results accessible to patients, providers, and policy makers. Using the NPCA as a case study, we discuss the development of a radiotherapy-outcomes reporting programme, its impact and future potential, and the challenges and opportunities to develop this approach across other tumour types and in different health systems.

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Hospital level performance

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- 51 Radiotherapy centres
- Incidence of ≥G2 bowel complications up to 2 years post radiotherapy for prostate cancer
- Funnel plots produced to compared RT centres
- Adjusted for age, stage, socioeconomic status and comorbidity
- Identifying outlier performance (alerts 3SDs from mean)
- https://www.npca.org.uk/provider-results/

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Development considerations

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- Does not aim to **rank centres** but assesses if performance further from the national average than would occur by chance alone

- Don't adjust for differences in radiotherapy practice as can inappropriately mask variation in outcomes (e.g. IMRT)

- Approach reduces the likelihood of **misclassification bias** by using a standardized coding approach for grading toxicity which is not dependent on individual clinician reporting

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State of the Nation 2023

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For men undergoing radical treatment between September 2019 - August 2020 in England and Wales

10% E
5% W

of men experienced at least one **gastrointestinal** complication requiring a procedural/surgical intervention within two years after **radical radiotherapy** in England (E) and Wales (W)

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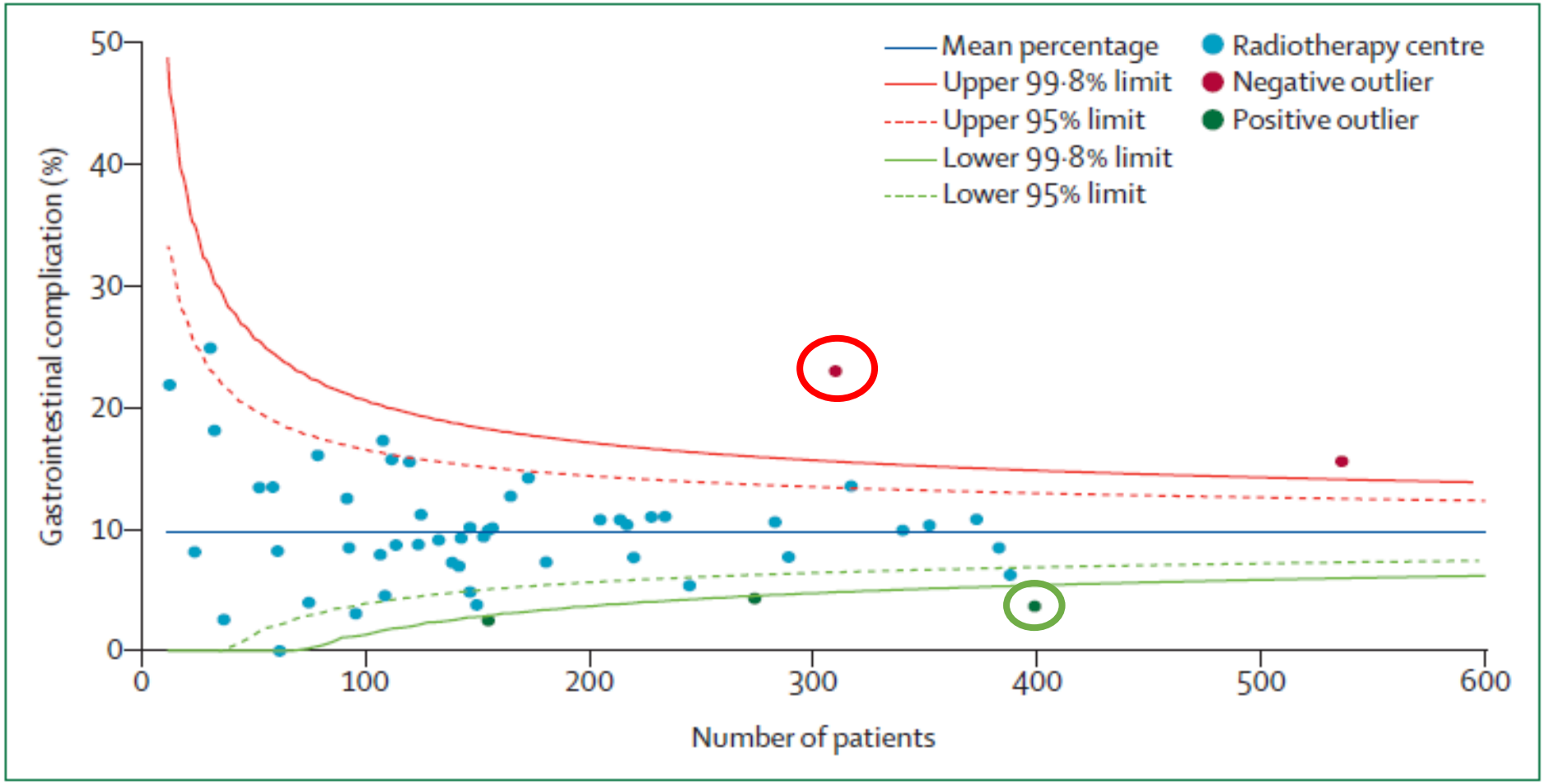
Variation in % of men with ≥G2 GI toxicity



https://www.npca.org.uk/provider-results/

How can the NPCA outlier programme facilitate quality improvement?

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- Review of outliers (both positive and negative) identified potential areas for improvement including:
    - Contouring
    - Margins
    - Set-up
    - Dosimetric constraints
    - Bowel and bladder protocols

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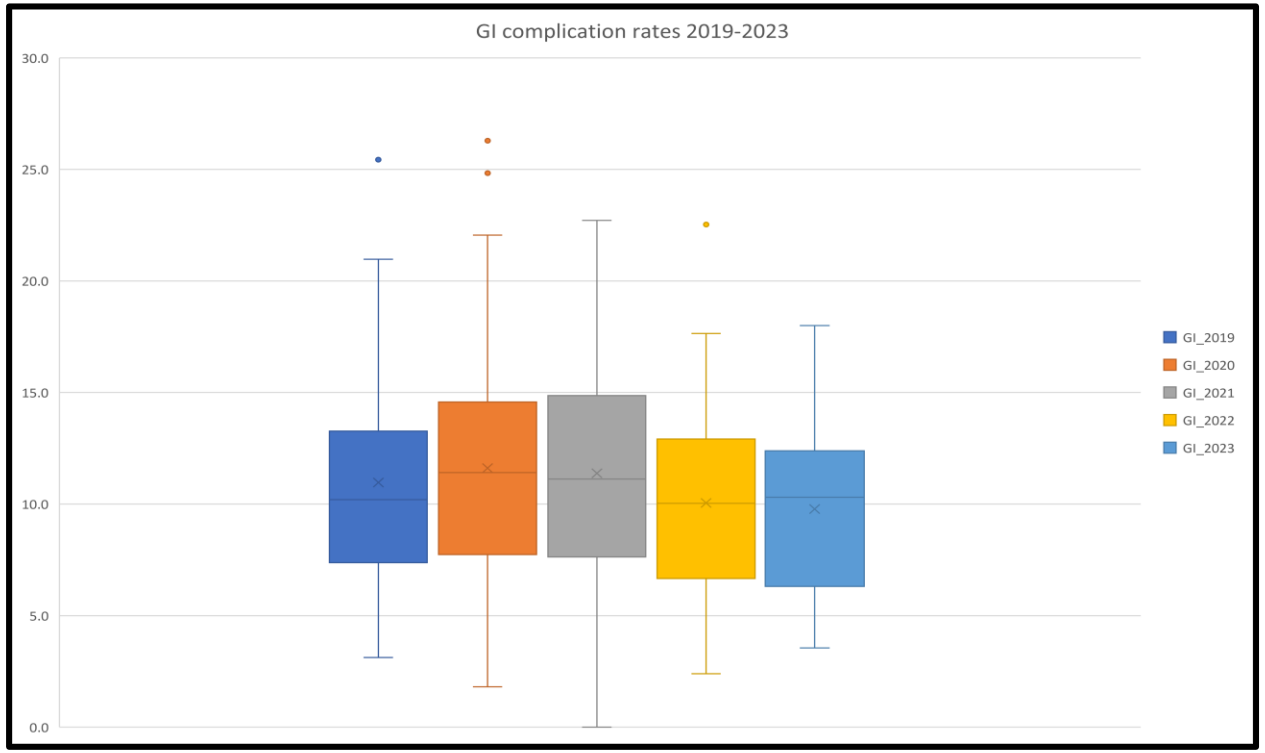
Impact of NPCA QI – current status

- This process has led to improvement in the centres identified as negative outliers
- Outliers on previous audits now no longer outliers



Panel 2: Quality improvement activities in response to public reporting of outcomes

- Communication: improved communication among staff members, both in radiation oncology groups and across disciplines (eg, radiation therapists, medical physicists, and dosimetrists)
- Quality improvement teams created: regular interdisciplinary meetings to discuss nuances of practice, including case selection, contouring, dosimetry, and follow-up processes
- Institutional guidelines: updates of local prostate cancer radiotherapy practice protocols (eg, dosimetry, margins, and bowel preparation)
- Internal audit of outcomes: audit of patients identified as having substantial toxicity to assess entire process of treatment delivery to establish where improvements could be sought; audit of treatment set-up and contouring to establish whether reductions in margins are feasible and if fiducial markers should be considered
- Peer review: implementation of routine peer review processes for contours and plans
- Dosimetry: improvement of dosimetric guidelines for tighter constraints guided by published research[47]
- Target localisation: evaluation of MRI guided planning
- Image guidance: programme started for fiducial marker insertion
- New technologies: consideration of perirectal spacers[48]
- Linear particle accelerator: comparison of treatment and dosimetry between treatment machines (eg, tomotherapy and volumetric modulated arc therapy) to establish if differences exist
- Patient-reported outcome measures (PROMs): PROMs programme created within individual centres to collate outcomes prospectively for patients who are having radiotherapy
- Training: improved training for staff members involved in patient assessment and follow-up

Ajay Aggarwal et al, Public reporting of outcomes in radiation oncology: the National Prostate Cancer Audit, The Lancet Oncology, Volume 22, Issue 5

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Thank you

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