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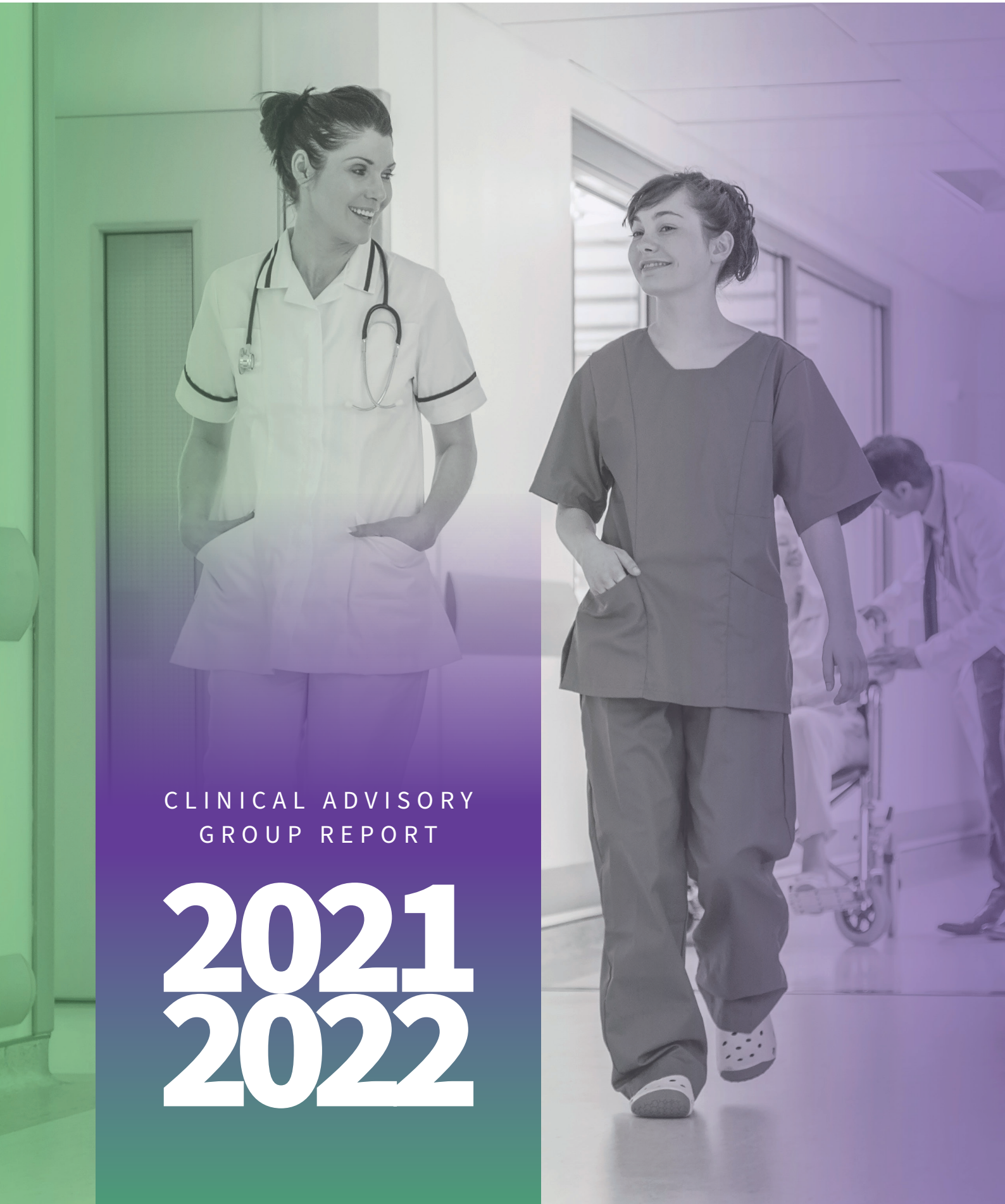

CLINICAL ADVISORY GROUP REPORT

2021 2022

Introduction

The Clinical Advisory Group (CAG) provides clinical and scientific advice to the Australian Clinical Dosimetry Service (ACDS) in relation to out of tolerance audits, development of audit methods and phantoms as well as evaluation of performance metrics. Membership is made up of representatives from the public and private sectors across the following professional bodies:

- radiation oncologists – The Royal Australian and New Zealand College of Radiologists (RANZCR)
- medical physicists – Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM)
- radiation therapists – Australian Society of Medical Imaging and Radiation Therapy/New Zealand Institute of Medical Radiation Technology (ASMIRT/NZIMRT)
- clinical trials – The Trans-Tasman Radiation Oncology Group (TROG).

The chair of CAG is usually a radiation oncologist reflecting the clinical advisory role of the group. Meetings are held quarterly. Additional meetings are rapidly convened to discuss ACDS out of tolerance findings of concern.

How audit findings have directly impacted patient care

Radiation therapy contributes to 40% of all cancer cures world-wide as well as improving the quality of life for many others (Radiation Oncology Targeting Cancer, 2020). One in 2 people with cancer will require radiation therapy at some point in their cancer journey (Radiation Oncology Targeting Cancer, 2020). Vast technological advances in radiation therapy have made life better for cancer patients in recent years by making treatments even quicker, more accurate and effective. Radiation therapy dosimetry audits are fundamental to delivering safe, high-quality care to people with cancer.

ACDS audits are a quality improvement tool and replicate the whole or parts of a patient's pathway from treatment planning through to treatment delivery as closely as possible. The ACDS may make recommendations or work with facilities to resolve unexpected results while positive audits give confidence to the facility and their patients.

Audits can identify potential harm to patients during pre-clinical tests and these may be remediated before any patients are treated. The ACDS works collaboratively with facilities, which encourages the uptake of new techniques and technologies by giving the facility confidence that an independent check has been performed. If results were not as expected, the ACDS provide advice and guidance on the rectification of any issues before a repeat audit is performed.

During FY 2021–22, 156 ACDS live audits were conducted. Of these, 15 out of tolerances were detected with 7 follow up audits arising from these performed in FY 2021–22. There were also 12 ACDS field trial audits conducted.

Clinical trials are fundamental in radiation oncology to test, develop and implement new technologies and techniques. Quality assurance (QA) in radiation therapy clinical trials remains vital in ensuring safety of participants, effectiveness of trial interventions and robustness of trial results. Radiation therapy trials require participating centres to demonstrate that they can deliver trial radiation therapy interventions to a high degree of accuracy. ACDS audits continue to be fundamental to this process, as they provide rigorous, independent auditing of contemporary radiation therapy techniques. We note the advice and expertise of the CAG TROG representative to the ACDS regarding clinical trial audits is ongoing.

Relevance of the existing suite

It is vital that the range of audits provided by the ACDS reflect the spectrum of clinical techniques utilised by radiation therapy providers across Australia and New Zealand. To ensure this, the audit suite offered by the ACDS is regularly reviewed and new audits are developed as needed. The CAG is consulted on these changes and make recommendations based on clinical experience.

In FY 2021–22, the CAG was consulted on the review of the existing audits and proposed changes, including streamlining audit procedures and software projects to improve workflow and data handling. The CAG deliberated over a new level III IMRT/VMAT scoring metric to allow full automation of the preparation and analysis processes and reduce dependence on facility treatment planning system (TPS) dose volume histogram (DVH) performance. The ACDS audit schedule and subscription pricing were also presented to and discussed by the CAG prior to presentation to the Stakeholder Engagement Group meeting held on 28 March 2022. The new cost model reflects the restructuring of the service provided, which now accommodates for the new specialist treatment modalities introduced into the audit suite and to address changes in the provision of radiotherapy services in Australian and New Zealand since 2015. This new model has been implemented since July 2022.

The inclusion of stereotactic ablative radiotherapy (SABR) techniques, including lung, soft tissue and spine, to the level III audit was of major clinical significance this financial year. SABR techniques are characterised by very high target doses with sharp dose gradients delivered over one or a few fractions, thereby necessitating extreme accuracy and precision. The inclusion of SABR to the audit suite reflects the widespread uptake of SABR across many facilities where previously it was limited to only a few specialist centres. Since going live on 1 July 2021, 26 level III audits were conducted that included SABR as well as two SABR-only audits. Out of tolerances were identified in 5 cases across 4 facilities and these were examined in detail by the CAG.

The ACDS has 3 field trial audits in the current audit suite; Stereotactic Radiosurgery (SRS), Magnetic Resonance Imaging (MRI) Linac and kilovoltage dosimetry (kV). The CAG has been closely involved in the development of tolerance levels for these field trials. While both SRS and MRI-Linac modalities are considered specialised treatments, kV is used at a large proportion of centres across Australia and New Zealand to treat skin cancer. The development of these field trials speaks to the commitment of the ACDS to stay current and relevant, and to monitor developments in new technology and clinical practice.

The resources required by facilities to participate in the audit program

Facilities are required to invest significant resources into each audit, in terms of people and time. Although this may not be part of the normal clinical workflow, facilities recognise the benefits of this investment, including compliance with national or state accreditation standards, assurance that patients are safely receiving the prescribed dose and motivation to safely develop new techniques. Further, the ACDS provides more than just an audit and report, it provides advice, repeat audits, help with problem solving and comparison with an extensive national database of results, from which facilities and patients benefit.

The ACDS proactively and systematically seeks formal feedback from facilities after each audit. Information was sought from facilities in FY 2021–22 regarding the time taken (in hours) for radiation therapist and physicists to complete the audits. The CAG has reviewed these data and deemed the results to be appropriate for the activities being undertaken and not unduly onerous on facilities. Feedback sought in FY 2021–22 continues to show that facilities continue to report confidence, satisfaction and improving safety culture because of their interactions with the ACDS. Details on the feedback findings are tabled and regularly reviewed at CAG meetings and provided in the report by ACDS.

How ongoing ACDS audit development will mitigate future clinical risk

Contemporary radiation oncology treatment has observed a shift towards increased complexity. Use of higher doses, delivered in fewer treatment sessions, with higher biological effect ('Stereotactic' body and intracranial radiotherapy) forms a core part of the emerging trend of increasing complexity. Historically stereotactic treatments were performed on specialised equipment by a handful of expert centres, however improvements in standard radiotherapy equipment and software have resulted in rapid uptake of stereotactic treatments in most radiotherapy centres in the past 3–5 years.

National and international best practice guidelines for quality and safety of high dose radiation treatment strongly recommend all institutions participate in external audits. Through consultation with customers and clinical trials organisations, the ACDS was proactive in developing stereotactic body radiotherapy and stereotactic radiosurgery audits, which are now offered in the standard audit rotation. These audits are some of the most advanced and comprehensive in the world and have a substantial impact in ensuring high-quality radiation therapy in clinical implementation, routine clinical practice and in clinical trials.

Respiratory motion management, MRI-linac, proton and adaptive radiation therapy are examples of emerging complex technology and techniques that utilise systems and technology with increasing levels of automation, vendor control and vendor configuration. These present new clinical risks to the radiotherapy community and consumers. The CAG welcomes the current and future development of ACDS audits in these technique spaces and strongly believe these will be key to ensuring quality and safety of service delivery to patients. We also note the ACDS actively undertakes formal research around audit development and accuracy. In FY 2021–22 the ACDS published two peer-reviewed articles in international high impact scholarly journals, which is reflective of continuous quality improvement within the ACDS (Shaw et al, 2021; Hughes et al, 2021).

ACDS audits meet the specific requirements of radiation oncology providers for regulatory approval (required in some jurisdictions), access to Health Program Grants (federal funding for treatment machines) and credentialing requirements for TROG and other clinical trials.

References

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Glossary

ACDS	Australian Clinical Dosimetry Service
ACPSEM	Australasian College of Physical Scientists and Engineers in Medicine
ASMIRT	Australian Society of Medical Imaging and Radiation Therapy
CAG	Clinical Advisory Group
DVH	Dose volume histogram
Field trial audit	An audit at preclinical development stage
IMRT	Intensity modulated radiation therapy
kV	Kilovoltage X-rays
Live audit	A scored audit part of the current audit program including levels I, Ib, II and III audits
MRI linac	Medical linear accelerator with magnetic resonance imaging capability
NZIMRT	New Zealand Institute of Medical Radiation Technology
RANZCR	Royal Australian and New Zealand College of Radiologists
SABR	Stereotactic ablative body therapy
SRS	Stereotactic radio surgery
TPS	Treatment planning system
TROG	Trans-Tasman Radiation Oncology Group
VMAT	Volumetric modulated arc therapy

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