THURSDAY 12 APRIL, 2018

07:00 – 8:00 REGISTRATION

08:00 – 8:30 PRE-CONGRESS WORKSHOP (ASRT)
Bonn Call to Action 2017 – ISRRT Global Assessment of Progress
Speaker: Donna Newman B.A. RT (R) CNMT F.A.S.R.T.
Director of Professional Practice ISRRT

08:30 – 9:00 Radiation Protection in Africa - The Journey So Far
Speaker: Elizabeth Balogun, Regional Coordinator for Professional Practice in Africa

09:00 – 9:30 Radiation Protection and Safety Panel Discussion on
Bonn Call for Action assessment around the world (Participation and Feedback from Audience)
Moderator and Panellists: Stewart Whitley, Donna Newman, Christopher Steelman and Elizabeth Balogun

09:30 – 9:45 Break

09:45 – 10:45 Radiation Protection in Medical Imaging: A Holistic Overview
Speaker: Michael Latimer M.S.R.S., R.T., FASRT, ASRT Chairman of the Board

10:45 – 11:45 Radiation Protection for Paediatric Imaging
Speaker: Michael Odgren B.S., R.T., RPA

11:45 – 13:00 ASRT Sponsored Lunch

13:00 – 14:00 Radiation Safety in Radiation Therapy
Speaker: Sandra Hayden M.A., R.T., FASRT

15:00 – 16:00 OPENING CEREMONY
HUTCHINSON LECTURE
Why Well Skilled Radiological Technologists and Radiographers are needed more than ever to face Public Health Challenges
Speaker: Dr. Pablo Jimenez, Pan American Health Organization (PAHO)

17:00 – 20:00 EXHIBITION OPENING & WELCOME RECEPTION
FRIDAY 13 APRIL 2018

08:15 – 9:00 REGISTRATION

08:30 – 9:30 PLENARY SESSION
What Makes an Effective Leader
Dr. Melissa Jackowski R.T. (R) (M), ASRT President Elect

9:30 – 10:30 BREAK

10:30 - 12:30 EDUCATION SEMINAR
Chair: Gabrielle Baptiste

10:30 The Development of Critical Thinking in Diagnostic Radiography
Aarthi Ramla
University of Hertfordshire, UK

10:50 The Use of Digital Storytelling to Teach Evidence Based Breast Imaging to Radiography Students: Translating Reality into Best Practice: A Case Study
Cynthia Cowling
Monash University, Australia

11:10 Implementing the Flipped Classroom in Radiation Safety
Dr. Timmeri Cohen
Virginia Commonwealth University, Richmond, Virginia

11:30 Promotion of Improved Standards of Radiography Education through Transition Management
Karen Finlay
Central Queensland University, Australia

11:50 Perceived Benefits of Near Peer Teaching and Learning with 2nd Year Radiography Students at Monash University
Lori Boyd
Monash University, Australia

12:30 – 13:30 LUNCH

13:30 – 15:00 QUALITY MANAGEMENT
Chair: Anzar Nasrudeen

13:30 Establishing a Radiology Outpatient Clinic for Renal Tumor Biopsy Patients
Bo Mussmann
Odense University Hospital, Denmark

13:50 Using “Timeouts” to Promote Quality and Efficiency during Vascular Interventional Radiography Procedures
Craig St. George
American Society of Radiologic Technologists, USA
### Apr 13th Cont’d

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chair/Presenter</th>
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</table>
| 13:30 – 15:00 | **QUALITY MANAGEMENT**<sup>RM.1</sup>  
Chair: Anzar Nasrudeen                                                                 |                                                                |
| 14:10    | Transforming Radiology: Applying the LEADS Framework as a Change Management Tool to Achieve Results.<sup>QM1-3</sup>  
Nicole Dhanraj  
Guam Memorial Hospital, United States |                                                                |
| 15:00 – 15:30 | **BREAK**                                                                                  |                                                                |
| 15:30 – 17:00 | **HEALTH & SAFETY**<sup>RM.1</sup>  
Chair: Jade Tucker                                                                 |                                                                |
| 15:50    | Patient as Observer: Practical Steps to Launching a Hand Hygiene Quality Assurance Program in the Medical Imaging Outpatient Setting<sup>HS1-1</sup>  
Jean Nash  
University Health Network, Canada  
Institute of Medical Education & Research, India |                                                                |
| 16:10    | How does a Radiographer’s Job Satisfaction Influence their Body Posture to cause Back Pain<sup>HS1-2</sup>  
Adrian Sampath  
COSTAATT, Trinidad & Tobago |                                                                |
| 10:30 – 12:30 | **COMPUTED TOMOGRAPHY**<sup>RM.2</sup>  
Chair: Kavita Seedarinee                                                                 |                                                                |
| 10:30    | National Survey of Computed Tomography Radiation Doses in Nigeria<sup>CT1-1</sup>  
Idris Garba  
Nigeria |                                                                |
| 10:50    | Effective Dose and Cancer Risk Estimates from Diagnostic Computed Tomography Procedures in Jamaica<sup>CT1-2</sup>  
Barrington Brevitt  
Apex Radiology, Jamaica |                                                                |
| 11:50    | STORIES FROM THE FRONTLINE: Identifying Challenges and Solutions for Improper CT Colonography Patient Preparation Using a Case Study Approach<sup>CT1-3</sup>  
Tracy Wakeford  
Mount Sinai Hospital, Canada |                                                                |
| 12:10    | The Use of MIYABI Angio-CT for Diagnosis and Treatment of Lower Gastrointestinal Bleeding Commonly Seen in Emergency<sup>CT1-4</sup>  
Wei-Yao Kao  
Veterans General Hospital Taipei, Taiwan |                                                                |
<p>| 12:30 – 13:30 | <strong>LUNCH</strong>                                                                                 |                                                                |</p>
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<tbody>
<tr>
<td>13:30</td>
<td>WE CARE</td>
<td>RM.2</td>
<td>Chair: Sheila Legall</td>
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<tr>
<td>13:30</td>
<td>Understanding the role of Perception in Communication in a clinical environment: Grounded Theory</td>
<td>WC1-1</td>
<td>Niekeisha Garrette, COSTAATT, Trinidad &amp; Tobago</td>
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<tr>
<td>13:50</td>
<td>Leadership</td>
<td>WC1-2</td>
<td>Anushka Kattick-Mahabir Singh, Infomed Solutions &amp; Supplies Ltd., Trinidad &amp; Tobago</td>
</tr>
<tr>
<td>14:10</td>
<td>Radiographer Perceptions of Professionalism</td>
<td>WC1-3</td>
<td>Mrs Tiina Kukkes, Tartu Health Care College, Estonia</td>
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<tr>
<td>15:00</td>
<td>BREAK</td>
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<td>15:30</td>
<td>GENERAL IMAGING</td>
<td>RM.2</td>
<td>Chair: Alexander “Sandy” Yule</td>
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<td>15:30</td>
<td>Balancing the Spine</td>
<td>GI1-1</td>
<td>Dr. Kimani White, EWMSC, Trinidad</td>
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<td>10:30</td>
<td>ULTRASOUND</td>
<td>RM.3</td>
<td>Chair: Nikeisha La Croix-Simon</td>
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<tr>
<td>10:50</td>
<td>A Case Study: Diagnosis of Heterotopic Pregnancy in an Emergency Situation</td>
<td>US1-1</td>
<td>Yonella Demars, Virginia Commonwealth University, Richmond, Virginia</td>
</tr>
<tr>
<td>11:10</td>
<td>Ultrasound of an Adult Meningocele</td>
<td>US1-2</td>
<td>Denise Choong Ai Wen, National University Hospital, Singapore</td>
</tr>
<tr>
<td>11:30</td>
<td>Ultrasound Safety, Mechanisms of Harm and Possible Side Effects</td>
<td>US1-3</td>
<td>Peters Ehiwe, Scarborough General Hospital, Trinidad and Tobago</td>
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<tr>
<td>12:30</td>
<td>LUNCH</td>
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13:30 - 15:00  **RADIATION PROTECTION**  
Chair: Keya Crichlow  

13:30  
**Assessment of Occupational Radiation Doses for Medical Workers Based on Job Categories in United Arab Emirates**  
Dimitris Katsifarakis presenting for Wiam Elshami  
University of Sharjah, UAE  

13:50  
**Measurements of Radiation Exposure of Radiography Students during their Clinical Training using Thermoluminescent Dosimetry**  
Christopher Steelman presenting for Mohamed Abuzaid  
University of Sharjah, UAE  

14:10  
**The Use of Local Alternative Materials as Structural Shielding for Diagnostic Radiological Facilities**  
Schimze Sagon  
University of Guyana, Guyana  

**BREAK**  

15:00 – 15:30  

15:30 - 17:00  **PROFESSIONAL DEVELOPMENT**  
Chair: Niquesha La Croix-Simon  

15:30  
**Social Media: The Future of Formal Professional Development for Medical Radiation Practitioners in Canada and Australia**  
Lori Boyd and Dr. Celeste Lawson  
Monash University Clayton Campus, Australia  

15:50  
**Emotional Intelligence: A Literature Review of the Need to Increase Radiology Professionals’ Emotional Intelligence as a Method to Cope with Workplace Adversity**  
Nicole Dhanraj  
Guam Memorial Hospital, Guam  

16:10  
**Core Competencies of Radiographers Working in Rural hospitals of Kwazulu-Natal South Africa**  
Mung’omba Bernard  
Mosvold Hospital, South Africa
Apr 13th Cont’d

10:30 -12:30  **RADIOThERAPY**
Chair: Vernessa Gaines-Cuffy

10:30  **Inter-Professional Work in Early Detection of Breast Cancer: An Integrative Review**  RT1-1
Bergliot Strøm
Western Norway University of Applied Sciences, Norway

10:50  **Interdisciplinary Collaboration in Radiation Oncology**  RT1-2
LeShell Palmer Jones
Grand Valley State University, United States

11:10  **Australian and New Zealand Medical Radiations Research Network: Fostering Collaboration and Research across a Rapidly Evolving Workforce**  RT1-3
Nigel J Anderson
Principal Research Radiation Therapist, Australia

11:30  **Professionalism in Radiation Therapy: What Should It Look Like?**  RT1-4
Kristin Berry
Juravinski Cancer Centre - Radiation Therapy Department, Canada

11:50  **The Alberta, Canada Ocular Brachytherapy Program. Utilizing Patient Feedback to Guide Improvement.**  RT1-5
Wendy Read
Cross Cancer Institute Edmonton, Canada

12:30 – 13:30  **LUNCH**

13:30 -15:00  **ADVANCED PRACTICE**
Chair: Aleth Bruce

13:30  **A New Model for Image Interpretation Training? Early Outcomes from an Academy Pilot**  AP1-1
Bev Snaith
University of Bradford, UK

13:50  **Evidence Based Practice: A Survey to Establish Factors that Influence its use within Radiographers’ Professional Practice in Uganda**  AP1-2
Dorothy Irene Nalweyiso
Mulago National Referral Hospital, Uganda

14:10  **Status and Development of Advanced Practice for Radiographers in Norway**  AP1-3
Haakon Hjemly
The Norwegian Society of Radiographers, Norway

15:00 – 15:30  **BREAK**
## Radiotherapy

**Chair:** Devi Jankie

**15:30 - 17:00**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>15:30</td>
<td>Differentiation of Types of Breast Cancer on Mammogram using Artificial Neural Network (ANN)</td>
<td>Sundaran Kada, Western Norway University of Applied Sciences, Norway</td>
</tr>
<tr>
<td>15:50</td>
<td>Application of an External Interception Device to Enhance Radiation Therapy Beam Delivery to Target Sites</td>
<td>Kushnanan Harmarine, Anamayah Memorial Hospital, Guyana</td>
</tr>
<tr>
<td>16:10</td>
<td>An Evaluation into the Effectiveness of the Structural Radiation Shielding Barriers of a Radiation Therapy Facility in Guyana</td>
<td>Parmeshwarie Seodat, Cancer Institute of Guyana, Guyana</td>
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## MRI

**Chair:** Aleitha Bruce

**10:30 - 12:30**

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<tr>
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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Eight Year Interim Results of a 20-Year Observational Study of Transrectally Delivered, MRI-Guided Laser Interstitial Thermal Therapy of Prostate Cancer in an Outpatient Setting</td>
<td>Bernadette Greenwood, Desert Medical Imaging, USA</td>
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<tr>
<td>10:50</td>
<td>Genomics</td>
<td>Bernadette Greenwood, Desert Medical Imaging, USA</td>
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<td>11:10</td>
<td>Axumin</td>
<td>Bernadette Greenwood, Desert Medical Imaging, USA</td>
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<tr>
<td>11:30</td>
<td>Normal Patterns of Left Ventricular Longitudinal Strain of Young Adults on MRI</td>
<td>Xiaojing Zhang, for Menglu Li, Chinese PLA General Hospital, China</td>
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<tr>
<td>11:50</td>
<td>How to deal with MRI artefacts</td>
<td>Catherine Muchuki, Kenyatta National Hospital</td>
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<td>12:30</td>
<td>LUNCH</td>
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<td>Time</td>
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<td>Speaker/Details</td>
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<tr>
<td>13:30</td>
<td><strong>DENTAL RADIOGRAPHY</strong></td>
<td>Chair: Naresa Mohammed</td>
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<tr>
<td>13:30</td>
<td>Enforced Conversion, Pioneers the Way for Digital Imaging into a Dental School</td>
<td>Diane Campbell, University of Otago, New Zealand</td>
</tr>
<tr>
<td>13:50</td>
<td>Patients' Perception of Dental Radiation in Trinidad And Tobago</td>
<td>Dr. Arlana Bissoon, School of Dentistry, The University of the West Indies, Trinidad and Tobago</td>
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<tr>
<td>15:00</td>
<td><strong>BREAK</strong></td>
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<tr>
<td>10:30</td>
<td><strong>MULTIMODALITY</strong></td>
<td>Chair: Fauzia Khan</td>
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<tr>
<td>14:30</td>
<td>Engage and Participate: A Practice Council for Medical Imaging Professions</td>
<td>Jean Nash presenting Harinder Grewal, Mount Sinai Hospital, Canada</td>
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<tr>
<td>10:50</td>
<td>Interesting Cath Lab Case- Permanent IVC Filter Removal</td>
<td>David Richards, Caribbean Heart Care, Trinidad and Tobago</td>
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<tr>
<td>11:10</td>
<td>Percutaneous Drainage of a Large Volume Deep Neck Space Abscess</td>
<td>Dr. Robbie Rampersad, Department of Radiology, Eric Williams Medical Sciences Complex, Trinidad &amp; Tobago</td>
</tr>
<tr>
<td>11:50</td>
<td>Spontaneous / Catamenial Pneumothorax due to Thoracic Endometriosis Syndrome</td>
<td>Dr. Fidel Rampersad, UWI Med Sci DM Radiology, Trinidad &amp; Tobago</td>
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<tr>
<td>12:10</td>
<td>IS THAT IT – Techniques to Ensure the Post-MRI Breast Ultrasound Finding</td>
<td>Aruna Mahabir, University Health Network- Princess Margaret Cancer Centre, Canada</td>
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<tr>
<td>12:30</td>
<td><strong>LUNCH</strong></td>
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13:30 – 15:00  **RADIATION THERAPY SAFETY**
Chair: Jael Cudjoe

13:30
**Strengthening the Safety Culture in Radiotherapy through the use of Incident Learning Systems from the IAEA perspective**
Maria Law
Director of Education, ISRRRT

14:15
**Role of Radiation Therapists in Creating a Patient Safe System in Brachytherapy Delivery**
Chek Wee Tan
Board Member, ISRRRT

15:00 – 15:30  BREAK

15:30 -17:00  **COMPUTED TOMOGRAPHY**
Chair: Rebecca Sahadeo

15:30
**Digital Training Platform for Chest Image Interpretation: An RCT**
Dr. Sonyia McFadden presenting for Laura McLaughlin
Ulster University, Ireland

15:50
**Enhancing Radiographer Threshold CT Competencies Through Clinical Simulation**
Maryann Hardy
University of Bradford, UK

16:30
**Drop-In CT for Intensive Care Patients**
Kim Storm Rasmussen
Odense University Hospital, Denmark
SATURDAY 14 APRIL 2018

8:15 – 9:00 REGISTRATION

9:00 – 10:30 PLENARY SESSIONS

Chair: Maria Law

9:00 – 9:30 From Radiographer to Teacher: Brains, Courage and Heart in Professional Borderlands
Professor Bobby Harreveld PhD, MEd, BEd, Dip Tch, DipT&AS, CQ University

9:30 – 10:00 Panel Discussions from Various Countries: From Radiographer to Teacher
Professor Bobby Harreveld, Ms. Wilma Collins, Christopher Steelman, Karen Finlay, Napapong Pongnapan

10:00 - 10:30 BREAK

10:30 -12:30 GENERAL IMAGING

RM.1
Chair: Rebecca Sahadeo, Trinidad & Tobago

10:30 Advances In Radiation in Guyana: Academic and Regulatory Perspectives
Petal Surujpaul
Georgetown Public Hospital Corporation, Guyana

11:10 Overview of Education, Licensing and Practice of Imaging Sciences in Latin America
Jose Rafael Moscoso-Alvarez
Universidad Central del Caribe, Puerto Rico

11:30 The “Doves” Among Radiography Examiners in the Inaugural Clinical Radiography Examination in Singapore
Chong Chun Meng
Tan Tock Seng Hospital, Singapore

12:30 – 13:30 LUNCH

13:30 -15:00 WE CARE

RM.1
Chair: Kushnanan Harnaire, Guyana

13:30 Because We Care
Cheryl Turner
ZDi Solutions, LLC, USA

Website: www.isrrt2018.org.tt Email: queries@isrrt2018.org.tt
13:30 -15:00  **WE CARE**
Chair: Kushnanan Hamarine, Guyana

13:50  **Ethics Presentations at CPD Events: Do We Care about the Patient?**
Hesta Friedrich-Nel  
Central University of Technology, South Africa

14:10  **Accreditation - Because 'We Care'**
Venice Gill  
Queen Elizabeth Hospital, Barbados

15:00 – 15:30  **BREAK**

15:30 -17:00  **WORKSHOP**
Chair: Alexander “Sandy” Yule

15:30  **The Paradox of the Radiographer: Who, What and Where are We?**
Cynthia Cowling, Susan Ward  
Monash University, Australia

10:30 -12:30  **QUALITY MANAGEMENT**
Chair: Jenny Lind Ulerie, Trinidad & Tobago

10:30  **Using the SS Methodology to Improve Quality and Efficiency in the Vascular Interventional Radiography Department**
Craig St. George  
American Society of Radiologic Technologists, USA

10:50  **Analysis of Radiology Examination Request Forms from four Hospitals in Dar es Salaam, Tanzania**
Stephen Samson Mkoloma  
Ocean Road Cancer Institute, Tanzania

11:10  **Study of Factors Affecting Service Quality of Main Radiology Department of the National Hospital of Sri Lanka**
Vitharana Gamage Wimalasena  
National Hospital of Sri Lanka, Sri Lanka

11:30  **Delay Of Reporting Of Film in the Radiology Department**
Jalila Keens Douglas  
COSTAAT, Trinidad & Tobago

11:50  **Musculoskeletal Injuries among Radiographers in Trinidad and Tobago**
Jendayi Tull  
COSTAAT, Trinidad & Tobago

12:30 – 13:30  **LUNCH**
Apr 14th Cont’d

13:30 - 15:00  PROFESSIONAL DEVELOPMENT  
Chair: Keya Crichlow

13:30  
Factors that Drive Continuing Professional Development in Radiographers of Trinidad & Tobago  
Anushka Kattick-Mahabirsingh
Infeemed Solutions & Supplies Ltd., Trinidad & Tobago

13:50  
We Care: We are RTs  
Stewart Whitley  
Treasurer, ISRRT

14:10  
Reflective Practice  
Justin Mahabirsingh
Infeemed Solutions & Supplies Ltd., Trinidad & Tobago

15:00 – 15:30  BREAK

15:30 - 17:00  COMPUTED TOMOGRAPHY  
Chair: Anzar Nasrudeen, Guyana

15:30  
Optimisation in Abdominal CT: Comparison of Image Quality between Filtered Back Projection and a Model-Based Iterative Reconstruction.  
Bharti Kataria
Department of Medical & Health Sciences, Linköping University, Sweden

15:50  
The Study on the Personalized Scanning Protocol of Low-Dose Contrast Media with the Third-Generation Dual-Source CT for Coronary Computed Tomography Angiography  
Jie Liu
The First Affiliated Hospital of Zhengzhou University, China

16:10  
Comparing the Contrast Enhancement of Head & Neck CT Angiogram from the Left and Right Elbow Intravenous Contrast Injection.  
Edward Chan
The University of Hong Kong Shenzhen Hospital, Hong Kong

10:30 -12:30  ADVANCED PRACTICE  
Chair: Ramona Chanderballi, Guyana

10:30  
Implementing Advanced Practice: An Exploration of the Clinical Enablers  
Maryann Hardy
University of Bradford, UK

10:50  
Introduction of Reporting Radiographers in a Danish Department of Radiology - Professional Role Development, Management and Perspectives  
Pica Andersen
Hospital Little Belt, Kolding, Denmark

11:10  
Advanced Practice Coordinator- Emerging Practice in Radiology  
Sean Richardson
William Osler Health System; Humber River Hospital & University of Liverpool, Canada
### April 14th Cont’d

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<tr>
<td>10:30 -12:30</td>
<td><strong>ADVANCED PRACTICE</strong></td>
<td>RM.3</td>
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<tr>
<td>11:30</td>
<td>Awareness and Use of Diagnostic Reference Levels in Radiography: A Snapshot of Practice across Europe</td>
<td>Sonyia McFadden, Ulster University, Ireland</td>
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<td>AP2-4</td>
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<td>11:50</td>
<td>An Analysis of the Role of the Medical Dosimetry Educator</td>
<td>LeShell Palmer Jones, Grand Valley State University, USA</td>
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<td>AP2-5</td>
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<td>12:30 – 13:30</td>
<td><strong>LUNCH</strong></td>
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<td>13:30 -15:00</td>
<td><strong>RADIATION PROTECTION</strong></td>
<td>RM.3</td>
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<td>13:30</td>
<td>Awareness and Knowledge of Radiation Dose and Associated Risks Among Final Year Medical Students in Norway</td>
<td>Sundaran Kada, Western Norway University of Applied Sciences, Norway</td>
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<td>RP2-1</td>
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<td>13:50</td>
<td>Ward Invasion: An Investigation into the Fears of Radiation Exposure by Non-Radiological Staff</td>
<td>Akayla Khadija Springer, COSTAATT, Trinidad &amp; Tobago</td>
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<td>RP2-2</td>
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<td>14:10</td>
<td>The Relationship of Radiographic Techniques and Digital Radiography Exposure Index</td>
<td>Zhen Ong, Singapore General Hospital, Singapore</td>
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<td>RP2-3</td>
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<td>15:00 – 15:30</td>
<td><strong>BREAK</strong></td>
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<td>15:30 -17:00</td>
<td><strong>RISK ASSESSMENT</strong></td>
<td>RM.3</td>
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<td>15:30</td>
<td>Risk Assessment - An Introduction</td>
<td>Justin Mahabirsingh, Infeemed Solutions &amp; Supplies Ltd., Trinidad &amp; Tobago</td>
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<td>RA1-1</td>
</tr>
<tr>
<td>15:50</td>
<td>Medical Physicist Risk Assessment in Diagnostic Radiology</td>
<td>Rosanna Beharry, University of the West Indies, Trinidad &amp; Tobago</td>
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<td>RA1-2</td>
</tr>
<tr>
<td>16:10</td>
<td>Medical Physicist Risk Assessment in Radiation Therapy</td>
<td>Nadira Nandial, Napanima Boys’ College, Trinidad &amp; Tobago</td>
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<td>RA1-3</td>
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10:30 - 12:30 RADIOTHERAPY  
Chair: Karene Martin, Trinidad & Tobago

10:30 Evaluating Secondary Thyroid Dose in Total Breast Irradiation  
Melanie Dempsey
Virginia Commonwealth University, USA

10:50 Dosimetric Comparison of Left-Sided Breast Cancer Radiotherapy between Self-Held Respiration Monitoring Device (SHRMD) For Deep Inspiration Breath Hold (DIBH) and Free Breathing (FB)  
Yin Ping Ng
Hong Kong Sanatorium & Hospital, Hong Kong

11:10 The Quest for Excellence in Radiation Therapy Education: The Effectiveness of Patient Education in a Classroom Setting  
Marcia Smoke
Juravinski Cancer Centre - Radiation Therapy Department, Canada

11:30 Augmenting a Radiation Therapist Research Culture across a Multi-Campus Service  
Nigel J Anderson
Principal Research Radiation Therapist, Australia

11:50 Barriers in Voluntary Error Reporting in Radiotherapy: A Case of an Oncology Centre in Botswana  
Sindiso Nleya
National University of Science and Technology, Zimbabwe

12:30 – 13:30 LUNCH

13:30 - 15:00 GENERAL IMAGING  
Chair: Lynette Laloo, Trinidad & Tobago

13:30 Position of Radiographers in Quality Control Programmes in Tanzania  
Stephen Samson Mkoloma
Ocean Road Cancer Institute, Tanzania

13:50 From an Osteoarthritic Knee and Hip, to the Conformis CT Protocol to the Customized Knee Implant  
Didier Nussbaumer
ConforMIS, Inc, USA

14:10 Bauman’s Angle: A Relevant Tool in the Radiological Assessment of Bone Alignment in Reduced Supracondylar Fracture of the Humerus in Children  
Elizabeth Balogun
National Orthopedic Hospital, Nigeria

15:00 – 15:30 BREAK
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<th>Time</th>
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<th>Presenter(s)</th>
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<tr>
<td>15:30</td>
<td>RADIOTHERAPY</td>
<td>Predicting Feeding Tube Needs in Head and Neck Radiotherapy Patients: Independently Validating a Feeding Tube Prognostic Tool</td>
<td>Nigel J Anderson</td>
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<td>Quantification of Inter- And Intra-Fraction Positioning Errors in Patients Of Hepato Cellular Carcinoma with Portal Vein Tumor Thrombosis Treated with Linac Based SBRT using Active Breath Coordinator System</td>
<td>Teekendra Singh, Dr. T. Kataria, Dr. K. Narang</td>
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<tr>
<td>16:10</td>
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<td>Optimization of Radiation Exposure to the Eye Lens in Stereotactic Radiosurgery</td>
<td>Kohei Kawasaki, Medanta - The Medicity, India</td>
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<tr>
<td>10:30</td>
<td>GENERAL IMAGING</td>
<td>Chiropractic Radiography - Essential Expectations</td>
<td>Brendan Corr, Canadian Memorial Chiropractic College, Canada</td>
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<tr>
<td>10:50</td>
<td></td>
<td>Digital Imaging &amp; Social Media &quot;What Happens in the Hospital Doesn't Always Stay in the Hospital&quot;</td>
<td>Tosca Bridges Taylor, John Muir Health, USA</td>
</tr>
<tr>
<td>11:10</td>
<td></td>
<td>Smartphone Use in Healthcare Facilities: A Review of the Literature on Benefits and Associated Risks</td>
<td>Lori Boyd and Dr. Celeste Lawson, Monash University, Australia</td>
</tr>
<tr>
<td>11:30</td>
<td></td>
<td>Technological Innovation - Friend or Foe? What if we did nothing at all?</td>
<td>Elen Moyo, University Health Network, Canada</td>
</tr>
<tr>
<td>11:50</td>
<td></td>
<td>Health Care Technology Today: A Living and Breathing Ecosystem</td>
<td>Stacy de Gale, Petrotrin, Pointe-a-Pierre, Trinidad &amp; Tobago</td>
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<td>12:30</td>
<td>LUNCH</td>
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<th>Institution</th>
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<tr>
<td>10:30</td>
<td>COMPUTED TOMOGRAPHY</td>
<td>Shielding in CT – An Update for 2018</td>
<td>Daniel DeMaio</td>
<td>University of Hartford, USA</td>
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<td>11:10</td>
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<td>Diagnostic Reference Levels in Routine Adult and Paediatric Computed</td>
<td>Idris Garba</td>
<td>Bayero University Kano State, Nigeria</td>
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<td>Tomography Examinations: A Systematic Review</td>
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<td>11:30</td>
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<td>Interest of MRI in the Diagnosis of Osteo-Articular Pathologies at</td>
<td>Nwedjiwe Nana Narcisse</td>
<td>Hospital General de Douala, Cameroon</td>
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<td>General Hospital DOUALA</td>
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<td>11:50</td>
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<td>Contrast Medium Optimization for Low Dose by Prospective ECG-</td>
<td>Jie Liu</td>
<td>The First Affiliated Hospital of Zhengzhou</td>
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<td>Triggering Coronary CT Angiography using 256-MDCT</td>
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<td>University, China</td>
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<tr>
<td>13:30</td>
<td>MRI</td>
<td>A case study: Agenesis of the Corpus Callosum in a 24-year-old male</td>
<td>Joseph Mosca presenting for Nadia Johnson</td>
<td>COSTAATT, Trinidad &amp; Tobago</td>
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<td>14:10</td>
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<td>Chair: Aleth Bruce, Trinidad &amp; Tobago</td>
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<td>15:00</td>
<td>BREAK</td>
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<tr>
<td>15:30</td>
<td>IMAGING INFORMATICS</td>
<td>From Analogy Imaging to Improvised Teleradiology</td>
<td>Adam Francis Zuberi</td>
<td>Muhimbili University of Health and Allied Science, Tanzania</td>
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<tr>
<td>15:30</td>
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<td>Anomalous Coronary Arteries – An Incidental Find</td>
<td>David Richards</td>
<td>Trinidad &amp; Tobago</td>
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<td>15:50</td>
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<td>How Can Cloud-Based RIS / PACS Revolutionise Patient Care?</td>
<td>Dr. Jamaal Brown</td>
<td>Consultant Radiologist, VEPRO, Trinidad &amp; Tobago</td>
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### Apr 14th Cont'd

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**12:30 – 13:30**  
**LUNCH**

**13:30 -15:00**  
**ULTRASOUND**  
Chair: Jenny Lind Ulerie

**13:30**  
*The Role of Duplex Doppler Ultrasound in the Assessment of Patients with Abdominal Pain*  
Peters Ehiwe  
Scarborough General Hospital, Trinidad & Tobago

**13:50**  
*Renal resistive index values among patients with hydronephrosis in Zimbabwe*  
Bigboy Tendai Rakata  
National University of Science and Technology, Zimbabwe

**13:50**  
**MAMMOGRAPHY**  
Chair: Jenny Lind Ulerie

**13:50**  
*Solving the Challenges of Technically Difficult Stereotactic Image-Guided Breast Biopsies: Lessons from the Frontline*  
Aruna Mahabir  
University Health Network- Princess Margaret Cancer Centre, Canada

**15:00 – 15:30**  
**BREAK**

**15:30 -17:00**  
**MRI**  
Chair: Brandon Pierre, Trinidad & Tobago

**15:30**  
*Consistency Study of 3D-ASL and DSC-PWI in Assessment of Hemodynamics of Patients with Moyamoya Disease*  
Jinge Zhang  
West China Hospital, China
SUNDAY 15 APRIL 2018

8:15 – 9:00  REGISTRATION

PLENARY SESSION
Chair:

9:00 – 9:30  Imaging in Radiation Therapy: A blend of Science and Art
Dr. Dylan Narinesingh MBBS, MMed, FCRadOnc, Executive Medical Director NWRHA, Trinidad

9:30 - 10:00  The MR-Linac explained: the challenges and clinical experiences.
Andrew W. Beavis
PhD, BSc, FIPEM, FBIR, MInstP, MioD  Head of Radiation/ Medical Physics

10:00 - 10:30  BREAK

10:30 -12:30  MAMMOGRAPHY  RM.1
Chair: Gabrielle Baptiste, Trinidad & Tobago

10:30  Perceptions of Breast Cancer and Utilization of Mammography in Ghana
Terry Konn-Karangwa
Brookdale College, USA

10:50  Image Quality and Patient Radiation Dose in Mammography at a
Major Nepali Hospital
Ganesh Bahadur Pokharel
National Academy of Medical Sciences, Nepal

11:10  Challenges in Mammography Education and Training Today:
The Perspectives of Radiography Teachers/Mentors and Students in Five European Countries
Bergliot Strom
Western Norway University of Applied Sciences, Norway

11:30  A Self-Directed Learning Intervention for Radiographer Rating Mammography
Breast Density
Evelyn Wasike
Kenyatta National Hospital, Kenya

12:30 – 13:30  LUNCH
Apr 15th Cont’d

10:30 -12:30  **COMPUTED TOMOGRAPHY**  
Chair: Kavita Seedarnee, Trinidad & Tobago

10:30  
**Hemodynamic Changes in Patients with Ecmo Demonstrated by Contrast Enhanced CT-Implication for Image Acquisition Technique**  
Nithiya Jayamani  
Singapore General Hospital, Singapore

11:10  
**Variations in Renal Vasculature: A CT Angiography Case Study at a Private Centre**  
Simbarashe Gashirai  
National University of Science and Technology, Zimbabwe

12:30 – 13:30  **LUNCH**

10:30 -12:30  **ADVANCED PRACTICE**  
Chair: Jenny Lind Ulerie, Trinidad & Tobago

10:30  
**Developing Evidence Based Practice: Experiences from the SEPRADD Project**  
Bev Snaith  
University of Bradford, UK

10:50  
**Diagnostic Imaging and Physical Therapy**  
Stacy de Gale  
Petrotrin, Pointe-a-Pierre, Trinidad & Tobago

11:10  
**Interprofessional Collaboration about Patient Safety in Medical Imaging-Preliminary Results**  
Lise-Lott Lundvall  
University Hospital Linkoping, Sweden

12:30 – 13:30  **LUNCH**
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**Apr 15th Cont’d**

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<tbody>
<tr>
<td>10:30</td>
<td><strong>RADIOThERAPY</strong></td>
<td>Karene Martin</td>
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<tr>
<td>10:30</td>
<td><strong>Skin Care for Radiation Therapy Patients</strong></td>
<td>Angela Cashell</td>
<td>University of Toronto, Canada</td>
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<tr>
<td>10:50</td>
<td><strong>Evaluating the Effect of Linens on Surface Skin Dose and Patient Perspectives on Respect and Dignity in Radiation Therapy</strong></td>
<td>Marcia Smoke</td>
<td>Juravinski Cancer Centre - Radiation Therapy Department, Canada</td>
</tr>
<tr>
<td>11:10</td>
<td><strong>Stereotactic Body Radiotherapy as an Alternative to Brachytherapy in Gynaecologic Cancer</strong></td>
<td>Ebison Chinherende</td>
<td>The Cancer Centre Eastern Caribbean, Antigua</td>
</tr>
<tr>
<td>11:30</td>
<td><strong>Assessment of Personnel Dosimetry in Radiotherapy at Cancer Institute Guyana</strong></td>
<td>Basmattie Sawh</td>
<td>University of Guyana, Turkeyen Campus, Guyana</td>
</tr>
<tr>
<td>11:50</td>
<td><strong>Presentation Trends of Cervical Cancer Patients: A Case Study of a Radiotherapy Centre in Zimbabwe</strong></td>
<td>Polite Mukwada</td>
<td>National University of Science and Technology, Zimbabwe</td>
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<tr>
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<td><strong>LUNCH</strong></td>
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<td>13:30</td>
<td><strong>CLOSING CEREMONY</strong></td>
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COMPUTED TOMOGRAPHY

P1  The effect of heart rate on the pulmonary artery angiography with low contrast agent CT
    Weiguo Zhang
    Department of Radiology, Beijing Chaoyang Hospital, China

P2  Low-Dose CT Thorax: A Comparison of X-CARE, an Organ-Based Tube-Current Modulation
    and Bismuth Shielding.
    Mikael Oseberg
    Akershus University Hospital, Norway

EDUCATION, MANAGEMENT, PROFESSIONALISM

P3  Study on Cerebral Blood Flow of Youth Auditory Cortex under different frequent sound
    stimulation using Arterial Spin Labeling Perfusion Weighted Imaging.
    Xiaojing Zhang
    Chinese PLA General Hospital, China

P4  Factors contributing to lack of occupational radiation monitoring in Southern Malawi
    Cowles Chilingulo
    Malawi

P5  Aggressive pseudotumor tissue reactions, long term complications of total hip replacement
    Mabel Zelicovich
    Tel Aviv Sourasky Medical Center, Israel

P6  The Challenges of Relying on Patient-reported Medical History in a Breast Imaging Program
    Sheena Chung
    Joint Department of Medical Imaging - Women's College Hospital, Canada

P7  A comparative analysis of diagnostic radiographers’ emotional intelligence across sub-
    specialities and against other Allied Health Professions at a tertiary teaching hospital in Asia
    Shiu Suwn Yeo
    Singapore General Hospital, Singapore

P8  Educating Globally in Medical Imaging using eLearning and INTEREST-PBL
    Carmen Saunders-Russell
    California State University Northridge, United States

P9  Educating Globally in Medical Imaging using eLearning and INTEREST-PBL
    Carmen Saunders-Russell
    California State University Northridge, United States

P10 Approaching Development of a new education programme in Diagnostic Radiography
    Alexandra Partner, University of Derby, UK
P11 Back to basic: With modern technology, personal touch is the brilliance of human connection
Jacqueline Umali
National Healthcare Group Diagnostics Singapore, Singapore

GENERAL RADIOGRAPHY, RADIATION PROTECTION

P12 Dental Radiological Practice in Trinidad and Tobago: A Pilot Project
Dr. Arlana Bissoon
School of Dentistry, University of the West Indies, Trinidad and Tobago

P13 Quality improvement on plain radiographs by obligatory internal course held by reporting radiographers
Marie Midtgaard
Kolding Hospital, Denmark

P14 External exposure dose of F-18 FDG PET assessed by using a semiconductor personnel dosimeter to protect workers from radiation
Yasuyuki Takahashi
Hirosaki University, Japan

RADIOThERAPY, RADIATION ONCOLOGY

P15 Pattern of geometric changes of parotid gland in conventional and intensity modulated radiotherapy in nasopharyngeal cancer patients
Dr. Vincent WC Wu
Hong Kong Polytechnic University, China

P16 Evidence or tradition? A Canadian review of the management of radiation induced skin reactions
Angela Cashell
Princess Margaret Cancer Centre, Canada

P17 Role of examination request form in Radiation Dose Reduction
Charles Omondi Okello
Ministry of Health Headquarters, Kenya

ULTRASOUND

P18 The effectiveness of ultrasound-guided intra-abdominal drainage of abscesses and abnormal fluid collections at the Georgetown Public Hospital, Guyana.
Ramona Chanderballi
Guyana
EDUCATION SEMINAR

The Development of Critical Thinking in Diagnostic Radiography

Aarthi Ramlaul
Principal Lecturer and Programme Leader, Diagnostic Radiography and Imaging, School of Health and Social Work, University of Hertfordshire, United Kingdom

Purpose: Critical thinking, including rational evaluation, is essential to student radiographers’ success in meeting the ever-changing demands of clinical practice. The vital role of critical thinking skills is reflected in competency frameworks across radiography and the health professions. However little is known about how critical thinking develops within radiography Higher Education. The aim of this study was to explore students’ and tutors’ perceptions of how critical thinking develops during an undergraduate radiography university degree programme.

Methods: The study was undertaken via a qualitative methodological design employing semi-structured face-to-face interviews. Data was analysed using thematic and conceptual analysis of core emergent themes.

Findings: Participants perceived that written assignments and problem-based learning tasks helped to develop the higher order cognitive skills of analysis and evaluation at university. Clinical placement learning, however, was found to play the greater part in the development of critical thinking skills. Progression of learning from year 1 to year 3 fostered opportunities for the development of critical thinking skills. However, the learning trajectory was found to be a non-linear process. Both students and tutors acknowledged challenges, which hindered the development of critical thinking skills.

Conclusion: Although clinical placement learning was profound, it was evident that students’ generally lacked the facility to develop a critical thinking attitude. The largely instruction-led nature of practice coupled with protocol driven examinations created impediments to developing critical thinking skills. Challenges to developing critical thinking, both in university and in clinical placement, have implications for pedagogy and practice, and require further exploration.

Key words: critical thinking, decision-making, evaluation, judgment, reasoning.

The Use of Digital Storytelling to Teach Evidence Based Breast Imaging to Radiography Students: Translating Reality into Best Practice: A Case Study

Cynthia Cowling¹, Susan Bower²
¹Senior Lecturer, Monash University, Australia; ²Executive Producer, Bowerbird Productions

Purpose: The sensitive and emotive environment of breast imaging involves an integrative approach encompassing the technical and psycho-social, which is challenging to replicate for teachers of student radiographers, whilst maintaining an appropriate level of pedagogy. Audio/visual teaching resources are available that share the personal, emotive experiences of breast cancer patients or practical radiographic techniques, anatomy and pathology, but none than combine all. The challenge was to engage both male and female students within an academic environment at a more complex level, incorporating the highest level of technical knowledge and ability with the real life emotions frequently encountered in this discipline.

Method: A high quality video production featuring a woman undergoing breast imaging was produced in a digital storytelling format, for presentation to third year Medical Imaging students. It included her anxieties, experiences, interactions with medical and health staff, and relationships with family and friends. The video was complemented and integrated with short online visual lectures which incorporated anatomy, pathology, technique, communication, special procedures, biopsies and latest advances, self-review opportunities for students, practical hands-on sonography labs using breast phantoms and a final exam.

Results: The video illustrated how tensions, pressures and anxieties of the patient can be ameliorated through best practice techniques. Students were surveyed. A strong preference for module was revealed. 70% enjoyed the module and were engaged by the story-line. Only 5% found it a distraction. There was 100% pass rate for this component of the course. Interest was sustained in fourth year by three students pursuing research projects in Breast Imaging

Conclusion: Although there is no shortage of general radiographers currently, there has been a sustained lack of interest, particularly among younger professionals in Mammography. As well as meeting the requirements for practical experience in the clinical workplace for student radiographers, this innovative pedagogic approach integrating knowledge, behaviour and attitudes, created significant interest in the field.
Implementing the Flipped Classroom in Radiation Safety  
Dr. Timmeri Cohen  

Department of Radiation Sciences, Virginia Commonwealth University, Richmond, USA  

Purpose: The purpose of this endeavor was to engage and empower radiation science in the subject of radiation safety.

Methods: For over twenty years’ radiation safety at Virginia Commonwealth University has been taught in a traditional lecture style classroom. In an effort to promote radiation safety and student engagement instructors adopted a flipped classroom for radiography, radiation therapy, and nuclear medicine students. The flipped classroom provided students with lecture materials prior to classroom time. Classroom time is devoted to in-class discussions, worksheets, and project presentations. The goal of the flipped classroom was to encourage radiation science students to practically apply the knowledge they obtained prior to in person sessions with the instructor.  

Results and Conclusions: The creation of a dynamic innovative classroom allowed students to practically apply radiation safety principles to their clinical environments. Classroom projects included student led presentations exploring radiation safety initiatives such as Image Gently (pediatrics), Image Wisely (adults), and Choose Wisely (avoiding unnecessary imaging exams).  

Key words: flipped classroom, radiologic sciences, clinical education, clinical preparedness

Promotion of Improved Standards of Radiography Education Through Transition Management  
Karen Finlay1, Julie Fleming, Bobby Harreveld  

1Senior Lecturer, Central Queensland University, Australia

Purpose: How do radiographers navigate the space between the clinical role and the educational role to become comfortable in the teaching environment? Exploration of this question is crucial if the profession is to realise its aim of achieving improved standards of education for future generations of radiographers and radiological technologists. Once employed in a higher education institution, healthcare practitioners begin a transition from their clinical role to becoming healthcare educators and navigation of this transition can be problematic.  

Methods: This presentation considers initial findings from qualitative research exploring the experiences of healthcare practitioners on their transition to becoming healthcare educators, specifically in the discipline of radiography. Data were collected from literature that specifically considered the transition of radiographers to radiography educators. Such data were found to be sparse. Thematic analysis investigated the facilitators and barriers of transition. Themes related to the transition to teaching in higher education institutions were developed.  

Results: A brief history of radiography educator training provides the context for the traditional transition of radiographers to radiography educators. Further, the qualifications required to teach radiography in Australia and the United Kingdom offers an insight into the support required to manage this transition. A number of barriers were found. They include identity, work role, confidence and self-perceived competence.  

Conclusion: Findings demonstrate that further education, support and mentorship, and tapered workloads allow time for professional learning to manage the transition.

Perceived Benefits of Near Peer Teaching and Learning with 2nd Year Radiography Students at Monash University  
Lori Boyd1, Dr. Celeste Lawson, Natalie Nguyen  

1Senior Lecturer, Monash University, Australia

Introduction: The combination of increased accessibility and technological advancement has encouraged the prevalence of smartphone usage amongst the medical community, which in turn, has changed the landscape of how healthcare is practiced. A review of the literature was conducted to evaluate the influence of smartphone adoption on the delivery of care, and in particular, to identify the benefits and associated risks with smartphone use. An analysis of potential risk mitigation strategies was also performed.
Methods: A systematic review of literature published after 2012 was undertaken using keywords on Scopus and Ovid MEDLINE databases. Applying exclusion criteria resulted in 33 relevant articles that were reviewed and analysed for the purpose of this review.

Results: Smartphone apps provide healthcare practitioners improved access to medical resources and more options for efficient communication compared to traditional pagers. There are risks associated with smartphone use in clinical settings, such as cross-transmission of nosocomial pathogens or as a source of distraction, although risks can be managed through regulation and guidelines.

Conclusion: Smartphone use in a clinical setting provides benefits for patients, provided risks are adequately managed. This systematic review revealed that there are no studies that assess the direct implication of these on patient outcomes. Future studies should therefore endeavour to quantitatively correlate smartphone use with patient-related clinical outcomes.

COMPUTED TOMOGRAPHY

National Survey of Computed Tomography Radiation Doses in Nigeria

Idris Garba¹, F. Zarb, M.F. McEntee, S.G. Fabri
¹Radiographer (Lecturer), Department of Radiography, Bayero University Kano State, Nigeria

Introduction: Radiation dose surveys help recognise variations of radiation doses from different Computed Tomography (CT) centres where the same examination is carried out, justifying the need for optimisation of CT protocols.

Methods: A CT radiation dose survey was carried out on 23 CT facilities across Nigeria. Permissions were sought and obtained from the National Research Ethics Committee of Nigeria and Research ethics committee of the University of Malta.

Results: The study established diagnostic reference levels (DRLs) in terms of CT dose index (CTDI) and dose length product (DLP) values for adult patients at the 75th percentile as 69 mGy and 1827 mGy*cm for head CT; 16 mGy and 850 mGy*cm for chest CT and 20 mGy and 1592 mGy*cm for abdomen CT. Paediatric head DRLs were also established as 42 mGy and 1220 mGy*cm for <5yrs and 61 mGy and 1851 mGy*cm for 5-10yrs of age.

Conclusion: DLP values for adults and paediatrics did not compare well with established data from other countries. Variation in doses between CT centres was noted, and centres having high radiation dose values were identified. Scan parameters impacting on dose indices were also identified. This calls for optimisation of the scan protocols to be in line with the As Low As Reasonably Achievable (ALARA) principle.

Effective Dose and Cancer Risk Estimates from Diagnostic Computed Tomography Procedures in Jamaica

Barrington Brevitt¹, Dr. Peter Johnson², Prof. Mitko Voutchkov³
¹Radiographer, Apex Radiology, Jamaica; ²Consultant Radiologist, University Hospital of the West Indies, ³Department of Physics, University of the West Indies, Mona

Introduction: This research was conducted to determine the effective radiation dose (ED) delivered during computed tomography examinations of the brain, chest and abdomen in three major Jamaican radiology centers between January and December 2016.

Methods: Retrospective review with the guidance of a Radiologist, of CT dose reports for patients referred for CT evaluation of the brain, chest and abdomen in 2016. 180 patients age 30 and under were targeted. A sample size of 60 was chosen at each facility using the formula \( n = \frac{(z\alpha/2)^2 \sigma^2}{E^2} \) where \( n \) is sample size, \( z\alpha/2 \) is the significance level, \( \sigma \) is the standard deviation with \( E \) the margin of error. The following equations were used to determine the ED:

\[
\text{Dose Length Product (DLP) (mGy/cm)} = \text{SCAN LENGTH (cm)} \times \text{Computed Tomography Dose Index (CTDI) (mGy)} \\
\text{ED (mSv)} = \text{DLP (mGy/cm)} \times K \text{ (AAPM correction factor) (mSv mGy}^{-1} \text{ cm}^{-1})}
\]
Results: There were variations of effective dose among facilities conducting CT examinations of similar anatomic areas ranging from 8.03 mSv to 23.2 mSv. In excess of 50% of the cases reviewed reported normal radiological findings. This raises the issue of diagnostic efficacy, was there a need for a CT scan to be done?

Conclusion: There is a need to manage and document effective dose delivered to patients during CT procedures as accumulated radiation exposure increase the risks for cancers and other genetic anomalies.

STORIES FROM THE FRONTLINE: Identifying Challenges and Solutions for Improper CT Colonography Patient Preparation Using a Case Study Approach

Tracy Wakeford¹, Jaqueline Razik, Feng Chen
¹CT Technologist, Mount Sinai Hospital, Canada

Purpose: A CT colonography (CTC) is a viable alternative for those patients who cannot complete a traditional colonoscopy. CTC requires intensive and very specific patient preparation that differs significantly from colonoscopy. Large numbers of patients attend for CTC improperly prepped. This results in frequently cancelled appointments, and extends the number of days of “clear fluid” diet for patients. The aim of this abstract is to describe the most common reasons for, and potential solutions to, inadequate CTC patient prep using a case study approach.

Methods: The CTC practice for a busy urban, multi-cultural hospital was reviewed over 4 weeks. Patients who were inadequately prepped were identified, and their clinical history, images and the course of communication between healthcare professionals was reviewed. Four case studies were identified that were most illustrative of the spectrum of potential causes of inadequate patient prep.

Results:
Case 1: Out-patient attending for a routine CTC. Technologist screened and consented the patient, who stated prep was followed as directed. Upon completing primary imaging, it became apparent that the patient had not understood or followed the prep. The patient was re-instructed about the prep, and remained on a clear liquid diet for an additional day.

Case 2: CTC booked following a failed colonoscopy. The technologist is told by the medical team that the patient is prepped, and should have the CTC that afternoon as they were still fasting. The medical team is not aware of need for specialized prep for CTC and became angry with the technologist for not completing the study with the patient as is.

Case 3: Patient with long standing history of constipation arrives for CTC. This information is not noted on the requisition. Patient asks the technologist if the laxative preparation was correct, as they have yet to have a bowel movement in the last day. A scout image is completed and determines that the patient’s bowels are not clean. The patient must endure an additional day of clear liquid diet.

Case 4: An online request was created for an inpatient to have CTC. After several days of phone calls between the multiple members of the patient’s medical team, nursing floor, radiologists, and technologists, the patient had yet to receive appropriate preparation. During this time, the patient was kept on a restricted clear fluid diet.

Conclusions: Improper patient prep for CTC causes problems for patient care, and inefficiencies within the healthcare system. The most frequent causes of improper prep were: 1) patients not understanding the instructions; 2) patients receiving prep for the wrong examination; 3) the medical need for non-standard prep; 4) miscommunication between healthcare professionals. It is possible to solve many of these challenges through improvements in communication and information availability.

The Use of MIYABI Angio-CT for Diagnosis and Treatment of Lower Gastrointestinal Bleeding Commonly Seen in Emergency

Wei-Yao Kao¹, Chieu-An Liu
¹Radiographer, Department of Radiology Veterans General Hospital Taipei, Taiwan

Purpose: The diagnosis or treatment of lower gastrointestinal bleeding is one of the common situation by emergency angiography. How to improve the diagnosis positive rate, in order to avoid the situation that after several times of intermittent bleeding still cannot find the bleeding location.
**Methods:** Using MIYABI Angio-CT to examine patients with lower gastrointestinal bleeding, and using the contrast injection to improve the diagnosis of bleeding and its location. This procedure can also help using microcatheter to catch the blood vessels and thus improve treatment rate and reduce operation time.

**Results:** Use several cases of lower gastrointestinal bleeding patients to confirm the use of MIYABI Angio-CT helps finding bleeding location and then treating it. It is recommended to use this method for cases that are not able to find bleeding locations after repeated intermittent bleeding.

**Conclusion:** With the advancement in technology, equipment is also more advanced. The use of MIYABI Angio-CT to examine lower gastrointestinal bleeding patients can improve diagnosis rate, but also provide more comprehensive treatment plans. Although the amount of radiation may rise, for such critical situation is still a viable recommendation.

**ULTRASOUND**

**A Case Study: Diagnosis of Heterotopic Pregnancy in an Emergency Situation**  
Yonella Demars  
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**Purpose:** The purpose of this case study is to inform sonographers on the diagnosis, treatment, ultrasound appearance, and outcomes of heterotopic pregnancies.

**Methods:** Using both the transabdominal and transvaginal approaches to exclude ectopic pregnancy in a woman over 30 years of age, the rare diagnosis of heterotopic pregnancy was established. The role of the sonographer, when excluding ectopic pregnancy, cannot be suboptimal when an intrauterine pregnancy (IUP) is confirmed. Further in depth evaluation of the adnexas is mandatory to exclude a heterotopic/ectopic pregnancy.

**Results:** After the diagnosis of a heterotopic pregnancy, the patient underwent a diagnostic laparoscopy with right salpingectomy. The 8-week intrauterine pregnancy was carried to term.

**Conclusions:** Heterotopic pregnancy is a rare occurrence, accounting for 1/30,000 spontaneous pregnancies. The role of sonographer in excluding an ectopic pregnancy cannot be limited when an IUP is identified. A thorough examination of the adnexas during the transvaginal ultrasound allows for timely intervention on the patient’s behalf.

**Key words:** ectopic pregnancy, heterotopic pregnancy, ultrasound

**Ultrasound of an Adult Meningocele**  
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**Introduction:** Meningoceles are herniations of meninges, through an embryological defect in the neural arches of the vertebrae. Classified as spina bifida cystica, meningoceles are a rare type of closed neural tube defect, which is covered by skin. This case study demonstrates the possible ultrasound findings of an adult meningocele. Methods and results: A 39 year old male presented at the emergency department with a palpable, tender mass on his left lateral chest wall. He stated that this was a new swelling and complained of unexplained weight loss over the last 6 months. He has a history of spina bifida. Ultrasonography revealed a complex cystic mass with internal septations and soft tissue components. Colour Doppler interrogation demonstrated minimal vascularity within the soft tissue components and pulsation artefacts within cystic portions of the mass. Additionally a solid fingerlike projection was identified at the inferior aspect of the mass. Due to posterior shadowing from the spine, the deep extension of the mass could not be fully evaluated.

**Discussion:** A previous renal computed tomography scan reported an incidental finding of a meningocele 5 years prior. Most meningoceles are detected and surgically treated in the antenatal or perinatal stages. Adult meningoceles are much rarer and patients often present with pain or neurological symptoms. Ultrasound is useful for assessing cyst contents which may include fibrous bands, aberrant nerve roots or glial nodules. Sonographers should be aware of normal pulsations of cerebrospinal fluid which can differentiate meningoceles from other complex cystic lesions.
Conclusion: While ultrasound can be useful here, it is difficult to assess the entire extent of the mass. In addition to plain spine radiographs, magnetic resonance imaging is often recommended for its superior anatomical visualization and would contribute to a more definitive diagnosis. Surgical treatment for adults is considered when there are severe symptoms of paraparesis or bladder dysfunction.

Keywords: Ultrasound, meningocele, spina bifida

Ultrasound Safety, Mechanisms of Harm and Possible Side Effects
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Purpose: This paper discusses the main mechanisms for harm associated with the use of ultrasound, and their consequences.

Background: The term "ultrasound" applies to all sound waves with a frequency above the audible range of normal human hearing which is about 20 kHz. The frequencies used in diagnostic ultrasound are typically between 2 and 18 MHz. Waves of this high frequency can cause some damage to the human body, and perhaps even more to a foetus.

Ultrasound therapy is used for treating many conditions such as cancers, tumours, dental conditions, etc. In most of these, ultrasound is used physically to establish diagnosis providing an image of certain internal organs or parts of the human body, making it easy to track down abnormalities or possible illnesses. Ultrasound can also be used in fighting tumours though these cases are far less frequent.

With ultrasound imaging we transmit energy into the body via the transducer (probe). With increasing power output there is a potential of inflicting harm.

Conclusion: At the end of this presentation participants will be sensitized in line with the thermal effects (e.g. cavitation, gas body effect and streaming) and biological effects (e.g. teratogen, intestinal petechiae, in vitro degradation of the DNA) of ultrasound. The ramifications and recommendations with respect to thermal index and mechanical index on ultrasound scanners will be reflected upon.

RADIOTHERAPY

Inter-Professional Work in Early Detection of Breast Cancer: An Integrative Review
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Purpose: To identify how inter-professional roles of health care staff, and each role-taking part in the detection and diagnosis of breast cancer have been described.

Methods: A comprehensive search was performed to identify relevant studies focused on the different roles health care professionals play in early detection and diagnosis of breast cancer. To structure the literature search and support the inclusion and exclusion criteria, the Population Intervention Context Outcome (PICO) strategy was used. A list of Medical Subject Headings (MeSH terms) was developed and supplied with a broad set of keywords. The following databases were searched: CINAHL, MEDLINE, Embase, Web of Science, ERIC and The Cochrane Library. A shortened version of STROBE checklist ensured evaluation of all the types of studies in this integrative review. The different design of studies allowed the use of thematic analysis to present the results.

Results: The 21 included studies resulted in three main categories describing the role of health care professionals; (1) Communication such as health promotion, information and support; (2) The Professional’s tasks such as role expansion and qualifications; (3) Inter-Professional Teamwork such as efficacy for the professions, individuals, health care team, and patient.
Conclusion: Results and conclusions will be available at the end of 2017. However, the preliminary conclusion seems to show the need for more extensive integrative reviews and the improvement of inter-professional collaboration regarding the overlapping of some described tasks.

Interdisciplinary Collaboration in Radiation Oncology
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Purpose: The purpose of this information is to provide participants with a better understanding of the Radiation Oncology process. Radiation Oncology is a highly technological, multidisciplinary process. Many healthcare professionals are involved with a cancer patient’s treatment. Now, Radiation Oncology treatments have become more complex, the field has become even more interdisciplinary.

Objectives:
- Have a better understanding of the Radiation Therapy process
- Know the key professionals that are involved in the Radiation Therapy process
- Be familiar with the steps of Radiation Therapy simulation and treatment
- Be familiar with the Generational differences experienced in Radiation Therapy clinics

Methods/Results: This presentation is not a research project. The information to be presented is about professional interactions in Radiation Oncology.

Conclusion: The field of Radiation Oncology has evolved and advanced so much over the last few years and will continue to do so due to the technological advances and will continue to be one of the most interdisciplinary fields in healthcare.

Australian and New Zealand Medical Radiations Research Network:
Fostering Collaboration and Research across a Rapidly Evolving Workforce
Nigel J Anderson, Australian and New Zealand Medical Radiations Research Network Steering Group
Principal Research Radiation Therapist, Peter MacCallum Cancer Centre, Australia

Purpose: Medical radiations led research has long been embedded in the practice of Australian and New Zealand (ANZ) professionals. Research engagement and participation continues to transcend formalised PhD and Masters Programs for suitably qualified professionals, through to innovative clinical research initiatives driving improved patient care for our patients and professional growth for our teams. In 2012, the Australia and New Zealand Medical Radiations Research Network (ANZMRRN) was established following a recognised appetite from ANZ Medical Radiations professionals. Initially driven by a steering group of radiation therapists, ANZMRRN membership has grown rapidly to in excess of 280 professionals- capturing membership (in addition to radiation therapists) from medical imaging, academia (educators and students), radiation oncology medical physics alike. Members are spread far and wide across the six states of Australia and both the north and south islands of New Zealand, encapsulating a vast yet complementary skill set.

The network aims to support and promote research within the medical radiations professions across ANZ, through facilitating collaboration across the many disciplines. A freely available network, the ANZMRRN objectives include:

i) Improving the quality of research activities
ii) Establishing multi-centre research projects
iii) Improving patient care and treatment outcomes.

The diverse ANZMRRN membership creates a platform for knowledge transfer, international networking and mentorship to provide resources- both material and human- to translate an idea into outcomes. Sharing of conference presentations, member profiles and an online journal club facilitate ongoing interaction. The aim of this presentation is to share the ANZ experience with the global medical radiations community, to help derive further collaborative links amongst the wider international workforce, creating exciting, meaningful opportunities for continued professional development to enable optimal care for our patients.
Professionalism in Radiation Therapy: What Should It Look Like?

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Purpose: The aim of this study was to compare perceptions of professionalism among radiation therapists and patients at a large, academic, Canadian Cancer Centre. The study included patients undergoing radical radiation treatment as well as radiation therapists with differing levels of experience.

Methods: A quantitative survey was developed after conducting a comprehensive literature review. Using a five-point Likert scale, participants were asked to rate the importance of 22 traits and behaviours as they relate to the professionalism of a radiation therapist. Participants were also asked to indicate which behaviours they felt were most important and which were least important. Participation was on a volunteer basis with 28 radiation therapists and 73 patient participants. Data were analyzed using the Mann-Whitney and Kruskal-Wallis tests with a significance level α=0.05 to determine if there were any significant differences in the median responses between the two participant groups as well as among varying demographic traits.

Results: The results indicated that as compared to radiation therapists, patients attributed a higher level of importance to traits surrounding empathy and compassion, communication, positive work atmosphere and confidentiality. Both radiation therapists and patients agreed that competence was the most important behaviour and that appearance of the radiation therapist was the least important trait to professionalism. There were no significant differences among varying demographics except for patient gender. Female patients valued behaviours related to communication and respect for authority more than male patients.

Conclusion: This study suggests that for quality patient care, professionalism policies should place more emphasis on radiation therapist competency and should include communication traits. Future research could benefit from a qualitative approach to gather the unique perspective of patients and radiation therapists allowing for thematic analysis. Qualitative research could address why there is a difference between patients’ and radiation therapists’ perceptions of professionalism.

The Alberta, Canada Ocular Brachytherapy Program. Utilizing Patient Feedback to Guide Improvement

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Purpose: Uveal melanoma is the most common primary adult ocular tumor (iris, ciliary body and choroid). It accounts for just 5% of all melanomas. Patients face a poor prognosis, with a serious threat of visual loss and the consequences associated with that impaired function. Historically, treatment was by enucleation, providing a histological diagnosis and effective tumor treatment. These benefits however, were obtained at the cost of immediate complete visual loss. In an effort to preserve both vision and globe, episcleral plaque brachytherapy has become an effective treatment alternative. The objective of this project was to measure, evaluate, and report on the care experiences of patients who were treated at the Alberta Ocular Brachytherapy Program. A knowledge gap currently exists with patient experience and satisfaction during treatment. By objectively measuring these experiences, the clinical team can improve their delivery of patient-centered care.

Methods: The validated Consumer Assessment for Healthcare Providers and Systems (CAHPS) Adult Surgical Survey was modified to include questions assessing brachytherapy care. Patients were chosen from the program’s clinical database. Two mail outs were sent 4-15 months post-surgery. Data was collected using the RedCap (Research electronic data Capture) website.

Results: 25 surveys were used for analysis. Response rate 62.5%. Overall patients were satisfied with the quality of care. Ratings were lowest for: communication regarding the post-operative course while the plaque was in place and post-operative pain management. Functioning ability during treatment was explored. Vision was affected in 52% of respondents, mood-28%, sleep-36%, driving ability-62.5%, reading ability-60% and ability to perform daily care-20.8%.
**Conclusion:** The survey showed that overall patients were satisfied with the care they received. The responses highlighted two areas for improvement: communication regarding the post-operative course while the plaque is in place and post-operative pain management.

**MRI**

Eight Year Interim Results of a 20- Year Observational Study of Transrectally Delivered, MRI-Guided Laser Interstitial Thermal Therapy of Prostate Cancer in an Outpatient Setting

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¹Chief Research Officer, Desert Medical Imaging, USA

**Purpose:** In the United States alone, new prostate cancer cases for 2016 were estimated at 180,890 and deaths at 26,120. Focal therapies for low risk and intermediate risk localized prostate cancer are increasingly being explored. Additionally, new treatments for patients in a salvage setting are being studied. Our objective is to investigate the efficacy of using MR-guided laser focal therapy for MR visible prostate cancer utilizing a transrectal approach for laser applicator placement and therapy delivery in an outpatient setting. Lasers have been used for soft tissue necrotization for decades. A commercially available MR-guided biopsy system accommodates insertion of a 980nm laser fiber for insertion into biopsy proven cancerous lesions facilitating ablation of MR-visible tumor.

**Methods:** All MRI-guided therapy was delivered using a 1.5 Tesla Philips Achieva XR system (Philips Healthcare, Best, The Netherlands) for both image acquisition and real-time thermometry. DynaCAD and DynaLOC (Invivo, Orlando, FL, USA) software were used for image analysis and laser fiber placement planning. Laser focal therapy was delivered using a Visualase (Medtronic, Minneapolis, MN, USA) 15W, 980 nm diode laser applicator introduced transrectally using the DynaTRIM (Invivo, Orlando, FL, USA). MR imaging was used to monitor energy deposition and coagulation necrosis.

**Results:** Under IRB-approved, HIPAA-compliant protocol, 98 men were treated. 138 cancer foci were treated. Total procedure time was between 1.5 and four hours MRI volume of coagulation necrosis ranged from 0.6 to 38 cc (average 7.7cc). No serious adverse events or morbidity were reported. Of the 30 positive 6 mo. Biopsies, 23 were of the treatment regions, consistent with residual or recurrent cancer in 23% of biopsies performed of the treatment site at 6 mos. post therapy. We observed a 45% decrease in mean PSA at 12 months post therapy and no statistically significant change in IPSS and SHIM scores.

**Conclusion:** Our data indicate that outpatient, transrectally delivered MRI-guided laser focal therapy for prostate cancer is both safe and feasible. In the current climate of cost-reduction and emphasis on minimally-invasive treatment of cancer, focal treatment of prostate cancer may be an attractive option. The precision and controllability achieved under MRI-guidance may have favourable results for cost effectiveness and quality of life without eliminating the possibility of whole-gland treatment in the patient’s future. We will continue to follow these men for twenty years as part of an IRB-approved clinical trial (NCT# 02243033)³.

**Genomics**

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**Axumin**

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Normal Patterns of Left Ventricular Longitudinal Strain of Young Adults on MRI

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Purpose: The left ventricular (LV) longitudinal and transverse strains of the young adults on different segments and planes using feature tracking technology (FT) on cardiac MR cine imaging were measured to setup the normal patterns of strain peak and its time-to-peak (TTP).

Methods: Twenty-nine young healthy volunteers aged 24~34 years were enrolled in the study. On Philips MRI scanner Multiva 1.5T, the cine imaging of three LV long-axis planes, including 2-chamber, 3-chamber and 4-chamber views, were acquired. The peaks and TTPs of the LV strain and displacement were measured using TomTec software based on feature tracking technology. The patterns of strain and displacement on apical, middle and basal levels (by 16-AHA segments) and three long-axis planes were investigated.

Results: The LV longitudinal and transverse displacements increased from apical to middle to basal levels, which was consistent with visual inspection. Compared to the displacements, the longitudinal strain were homogeneous in 2-chamber, 3-chamber and 4-chamber views, the global longitudinal strain was (-22.44±3.48), F=1.441, P=0.243, while the transvers strain was not. The strains and displacements had the same TTPs on different levels or planes, (9.83 ± 0.94) TU (time unit: 1/24RR interval).

Conclusion: The LV global longitudinal strain had homogeneous peak and TTP on different planes for reference.

How to deal with MRI artefacts

Catherine Muchuki
Kenyatta National Hospital

Purpose: Many different artefacts can occur during magnetic resonance imaging (MRI), some affecting the diagnostic quality, while others may be confused with pathology. An artefact is a feature appearing in an image that is not present in the original object. Artefacts can be classified as patient related, signal processing-dependent and hardware (machine) related. Artifacts include signal loss, pile-up artifacts, geometric distortion, and failure of fat suppression.

Materials & Methods: Information was collected on patients undergoing MRI examinations on 1.5 T Philip machine recording any kind of artefact during examination. The consent form was also used as a measure of the accuracy of information the patients record. Some of the questions asked on the consent form is the presence of any dentures, orthopedic device any other metallic objects.

Results: Most of the artifacts noted were motion artifacts, metallic foreign bodies, orthodontic braces and orthopedic artifacts. Various methods were applied of eliminating them such as increasing the field of view (FOV), use spin echo sequences (SE) with a short echo time (TE) and use of oversampling techniques to reduce aliasing amongst others.

Conclusion: Knowledge of different types of artifacts and their origin, and of possible foreign bodies is necessary to eliminate them or to reduce their negative influence on MR images by adjusting acquisition parameters. It is also necessary to take them into consideration when interpreting the images.
MULTIMODALITY

Engage and Participate: A Practice Council for Medical Imaging Professions

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Purpose: Working in a large medical imaging department sectioned by specialty and by location often generates inconsistencies in clinical practice. Variation in clinical practice can be detrimental to the quality of patient care. To address this challenge, a practice council was created to improve practice consistency and provide a forum to discuss professional issues that transcend modality specialization. The goal was to create a forum where staff could engage, participate and represent each imaging specialties across all locations to advance practice, education, research development and quality. The purpose of this abstract is to highlight the challenges and opportunities of developing an inter-professional Practice Council for medical imaging professionals.

Methods: The 20 member Practice Council has met regularly since June 2015, consisting of technologists, sonographers and nurses from all imaging specialties and across all locations of our large, multi-site department. They are primarily responsible for defining consistent practice criteria but also for envisioning, developing and communicating practice changes.

Results: In the first year, the Practice Council focused on two main areas identified as important by staff: hand hygiene and technologist image quality peer review. Discussions were rich and dynamic, resulting in innovative yet practical ideas for improvement. In its second year, the council focused on eliminating patient identification incidents and the implementation of modality-specific journal clubs, all while sustaining the initiatives from Year 1. Although there have been challenges gathering frontline practitioners together and maintaining the momentum of initiatives already implemented, the council has been supported by the management team.

Conclusions: The practice council has already made significant impact on the consistency of clinical practice across a department sectioned by modality and location. It has also provided a unique forum that empowers imaging professionals to engage and participate in the provision of excellent patient care in a complex healthcare environment.

Interesting Cath Lab Case- Permanent IVC Filter Removal

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Purpose: The Cath Lab is a very versatile environment which lends itself easily for a wide range of procedures, although the most frequently done procedures are cardiac catheterisation. Procedures that can be done range from but not limited to, Perm Cath placement, Pacemaker/ ICD/ CRTD implants, EVAR, peripheral angiograms and angioplasties, cerebral angiograms and coiling. During these various studies interesting cases are encountered.

Methods: We present interesting cases encountered in the Cath Lab at Caribbean Heart Care Medcorp Ltd, St Clair Medical, St Clair, Trinidad. Incidental finding and two attempts to repair a giant aneurysm and Permanent IVC filter removal.

Results: Giant aneurysm: Its repair using a flow diverter was unsuccessful and the aneurysm had to be coiled. IVC Filter was successfully removed.

Conclusion: The Cath Lab is a very versatile environment where a broad spectrum of medical diagnostic and therapeutic procedures can be done. Some are very serious and life threatening but are done via minimally invasive procedures and significantly reduces the risks when compared with conventional surgical approaches.

Objectives:
1. Report our findings.
2. Awareness that these procedures are available locally
3. Education
Percutaneous drainage of a large volume deep neck space abscess

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Introduction: Deep neck space abscesses represent a clinical scenario of infection of the fascial spaces of the neck. They are regarded as head and neck emergencies and can result in significant morbidity and potential mortality if not treated appropriately. The removal of pus can be done by intraoral or extraoral approaches and each is fraught with its individual risks. Contemporary technology now affords the option of percutaneous drainage of the infected material, with proven decreased risk when compared to open approaches. This approach has been used to drain unilocular, small abscesses. We present a case where drainage was done for a significantly larger abscess than has been previously noted.

Care Report: A previously well twenty (20) years old male, presented with a 5 days complaint of diffuse neck swelling. He had fallen off a bicycle one (1) week before presentation and struck his neck and chest after which he began experiencing neck swelling two (2) days after his fall associated with dysphagia to both solids and liquids, low grade fevers and decreased range of movement of the neck. There was no odynophagia. Examination showed a young man in no respiratory distress and there was diffuse swelling in the anterior aspect of the neck, that was mildly tender and erythematous. Oral cavity examination showed pharyngeal oedema but no obvious bulging, and normal appearance of the the tonsils and dentition. His white blood cell count was 17,000 with an 87.7% neutrophilia. He was prescribed intravenous antibiotics, intramuscular pain medication and a CT scan of the head and neck, that revealed hypo-densities in the anterior neck 0.8 cm (AP) x 7.6 cm (TS), involving both carotid, parapharyngeal and retropharyngeal spaces, extending from the fourth cervical vertebra body to the the right anterior mediastinum, measuring 12.6 cm (CC). There was also a 0.7 cm (AP) x 1.2 cm (TS) X 3.3 cm (CC) right retropharyngeal collection, with normal appearances of the thyroid gland and bony structures. These findings were suggestive of abscess collections. The patient had ultrasound guided placement of a size ten French (10F) drainage catheter under local anaesthetic with twenty-five millilitres (25 mLs) of purulent material aspirated. Intravenous antibiotic administration, consisting of co-amoxiclav and metronidazole continued, and daily charting of the drain output showed a total of three hundred and fifty-two millilitres (352 mLs) of purulent material was collected over a five day period with sequential decrease in output for each day. His white blood cell count decreased to 13,500 two (2) days after placement of the drain, with clinical improvement noted on day one (1) post drain placement - he had improved range of movement of the neck and no problems with his oral tolerance. He was subsequently discharged from hospital on oral antibiotics six (6) days after placement of the drain and followed in the outpatient clinic, where he had an uneventful recovery.

Discussion: Deep neck space infection is a term used to encompass infections within the potential spaces or fascial planes of the neck, with resultant cellulitis or abscess. They are usually bacterial infections that originate in the upper aero-digestive tract and spread to anatomically contiguous areas. In some cases, often rare ones, an infected neck space represents the presence of malignancy and open incision and drainage can produce spillage of tumour cells with the possibility of seeding. Percutaneous drainage of deep neck space abscesses was shown to be a safe alternative to open drainage with level Ib evidence by Biron et al, in 2013. The algorithm developed in that study advocated ultrasound guided drainage in patients who presented without airway compromise, such as with our patient. Thus far, the largest volume drained percutaneously was 35 millilitres by Niazi et al. Initial aspiration from our patient’s infected cavity produced 25 millilitres of pus with total drainage of 352 millilitres. Our report shows that it can be safely attempted in even larger abscess cavities than previously reported, once there is no airway compromise.
Spontaneous / Catamenial Pneumothorax Due To Thoracic Endometriosis Syndrome: A Case Series
Dr. Fidel Rampersad, Carina Aguilar, Ashton Ramsundar, Aaron Baldeosingh
UWI Med Sci DM Radiology, Trinidad & Tobago

Purpose: The presence of endometrial deposits in the thorax can lead to Thoracic Endometriosis Syndrome. These patients can present with a spontaneous or catamenial pneumothorax, and less likely with haemoptysis.

Methods: We report three cases of women presenting with spontaneous pneumothoraces (two of which presented with catamenial pneumothoraces, as they were menstruating at the time of presentation). Cross sectional imaging with CT, confirmed the presence of pneumothoraces and/or haemorthoraces on the right side, with cystic or soft-tissue density pleural deposits noted on the right hemidiaphragm.

Results: Diagnosis was confirmed by various methods including cytology of the pleural fluid, CT guided biopsy of the endometrial deposit and VATS.

Conclusion: Thoracic Endometriosis Syndrome is an uncommon condition, but is an important consideration for women presenting with spontaneous or catamenial pneumothorax. CT chest is useful in its diagnosis, especially when faced with the typical clinical scenario

IS THAT IT – Techniques to Ensure the Post-MRI Breast Ultrasound Finding Accurately Correlates with the Area of MRI Enhancement
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Purpose: Magnetic Resonance Imaging (MRI) is an extremely sensitive imaging modality to evaluate breast lesions, however it is limited in specificity. Areas of enhancement in breast MRI scans require further investigation and breast Ultrasound is frequently the modality chosen to correlate these MRI findings. As MRI and ultrasound are fundamentally different modalities acquired in different patient positions, considerable clinical expertise is required when performing ultrasound scans and correlating MRI areas of enhancement with sonographic findings. The purpose of this presentation is to describe some useful techniques for breast imaging technologists when performing post-MRI ultrasound examinations to determine whether sonographic findings correctly correlate with the areas of MRI enhancement.

Methods: Breast MRI images will be reviewed and techniques to correlate findings on ultrasound will be discussed. The appropriate MRI sequences which should be used by technologists when performing the ultrasound examination will be identified. Specific techniques to determine the appropriate quadrant, o’clock position, distance from nipple, proximity to landmarks, and enhancement characteristics suggesting correlation, will be presented.

Results: Developing spatial interpretations of MRI sequences can assist in correlating breast MRI and ultrasound findings. By viewing the axial and sagittal subtraction sequences, technologists can approximate which quadrant, o’clock position and distance from the nipple an area of enhancement corresponds to the MRI finding. Sonographic features can then be correlated to MRI images to locate the corresponding area of enhancement as well as provide information regarding the depth of the lesion and surrounding breast features.

Conclusions: Breast Imaging technologists routinely view mammography and breast ultrasound images. Familiarity of the presentation of pathology on breast MRI sequences can be beneficial for second look post MRI ultrasound examinations. Information presented in this presentation discussed techniques beneficial to technologists in interpreting MRI images and provided suggestions for accurate correlation under sonographic guidance, thus improving the ability of the technologist to contribute to an accurate diagnosis for the patient.
Using “Timeouts” To Promote Quality and Efficiency During Vascular Interventional Radiography Procedures

Craig St. George
Director of Education, American Society of Radiologic Technologists, USA

Purpose: The field of vascular interventional radiography is always advancing with new life saving techniques. Because of the complex nature of the VIR environment, patient safety must remain on the precipice of importance. I will discuss the simple technique, the pre-procedure timeout, which supports patient care techniques to improve individually focused care during a vascular procedure.

Methods: As a previous technologist supervisor for a high output provider I aim to provide evidence that adequately performing a thorough timeout requires very little time and can help to avoid wrong person, wrong procedure, and wrong site incidents. Videos were recorded before actual vascular procedures although; the videos cannot be shared during this presentation due to facility protected health information protocol. Photography will be used to demonstrate the appearance of the process and examples of a tool used to complete a proper timeout.

Results: Thorough time outs improve the overall accuracy of performing the correct procedure on the correct patient. There are very few requirements of information for each time out procedure of which can be extended. Including more information than is required in a time out only further improves the safety and efficiency of the procedure, and the procedure team, by eliminating the need to verify patient data intra-procedurally for uncovered topics, such as double-checking the patient’s chart for allergy details before administering a medication. The information is readily available on the time out board in clear view and on average the process takes only 37 seconds.

Conclusion: The key point is that it can take only a few extra seconds to stop adverse events in the health care setting. Taking the extra time to perform a thorough timeout can eliminate many errors. Additionally, making pertinent patient
information available before the procedure can save time during the procedure making the whole patient experience more positive.

**Transforming Radiology: Applying the LEADS Framework as a Change Management Tool to Achieve Results.**

**QM1-3**

Nicole Dhanraj  
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**Purpose:** Radiology is facing the need to do more with less. The current radiology environment is plagued with numerous issues to include the achieving improved quality outcomes, patient and staff satisfaction while operating with reduced budgets.

**Methods:** LEADS is a framework that has been used in the Canadian Health System to achieve results and transform systems. In this session, participants will understand what LEADS is, and its applicability to the US healthcare industry. In the session, participants will learn the components of the LEADS framework and how it can be used to promote behavioral changes to achieve results. Participants will also understand how the framework can be used to lead and develop oneself to be an effective leader in the whole system and as an individual within radiology. Participants will learn strategies to create and develop trust amongst the radiology team. They will also understand how LEADS can help support collaborative teams that can help support radiology initiatives as well as transform healthcare system as a whole.

**Results:**
- Learning Objective #1 Participants will learn the underpinnings of the LEADS framework and how to use it as an assessment tool.
- Learning Objective #2 Participants will understand the LEADS concept and to create trust and build coalitions to achieve employee and department results.
- Learning Objective #3 Participants will learn how to use LEADS to engage employees and promote an empowered work environment.

**Conclusion:** By the end of this session, radiology leaders will be equipped with a tool that can serve as their guide to go beyond being good leaders. The framework pushes leaders to think, plan and map the change initiatives needed to achieve results and ultimately system transformation.

**WE CARE**

**Understanding the Role of Perception in Communication in a Clinical Environment:**

**Grounded Theory**  
WC1-1

Niekeisha Garrette  
COSTAATT, Trinidad & Tobago

The association between misperception in the clinical environment and continuous complaints made by both students and radiographers has been suspected but not confirmed. Additionally, the excessive backlogs of clinical competencies and assessments which prevents students from successfully completing their undergraduate degree in Radiography within the stipulated time, over the years although addressed, hasn't been resolved. The purpose of this study provides an explanation for students and radiographers of each other's expectations and perceptions of each other. Therefore, interviews and observations will be used to investigate the role of perception in communication between students and radiographers alike. The data collected will then be analyzed through comparison of incidents, interactions, actions and consequences using the grounded theory methodology, then used to develop a theory to further facilitate learning. The theory formed will then be assessed on a new, smaller sample.

**Keywords:** communication, perception, grounded theory, clinical environment, radiography, students

**Leadership in Care**  
WC1-2

Anushka Kattick-Mahabirsingh  
Director, Infeemed Solutions & Supplies Ltd., Trinidad & Tobago
**Radiographer Perceptions of Professionalism**

**Tiina Kukkes, Kevin Aas, Valerie Challen, Zinaida Läänelaid**
*Radiographer, Tartu Health Care College, Estonia*

**Introduction:** Knowledge, skills and principles of regulating documents, professional standards, codes of ethics are obtained and implemented in daily work in case they have been internalised as personal understandings. Radiographer perceptions of professionalism are influenced by theoretical studies, work experience and roles models but also by the personal characteristics of professionals.

**Purpose:** To explore perceptions of professionalism and the factors influencing those perceptions amongst Estonian radiographers. Sample and methods: Qualitative research design involving focus group interviews with radiographers: 3 focus group interviews (6 to 10 participants per group) in different hospitals with the duration of each interview about one hour. A semi-structured interview scheme including four main questions: 1. How do you understand the term professionalism? 2. What influences the development of professionalism? 3. How do you understand the term unprofessionalism? 4. What skills/qualities do you need to develop to become a professional? Thematic analysis was used for data analysis.

**Results:** Four main areas of professionalism were explored, involving a number of themes and sub-themes: 1) characteristic features of professionalism were related to specialist skills (e.g. patient safety, good image quality etc.), general skills (e.g. communication and teamwork skills, etc.) and personal features (e.g. empathy, creativity, courage etc.); 2) factors influencing the development of professionalism involved practical work experience, education and training and personal features; 3) common manifestations of unprofessional conduct were related to specialist skills, general skills and personal characteristics; 4) developmental needs for the achievement of professionalism were also related to specialist skills, general skills and personal characteristics.

**Conclusions:** Radiographer perceptions of professionalism correspond to the requirements set in the Professional Standard and the Code of Ethics. Perceptions of professionalism develop in the course of time and they are influenced by education, training, professional experience, including the contextual factors, and role models as well as personal features of the particular professional.

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**RADIATION PROTECTION**

**Assessment of Occupational Radiation Doses for Medical Workers based on Job Categories in United Arab Emirates**

*Dimitris Katsifarakis presenting for Wiam Elshami¹, MM. Abuzaid¹ O. Mira², M. Hameed²*

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**Introduction:** Long-term exposure to low doses of ionizing radiation constitutes a major risk to medical workers in the workplace. Monitoring of occupational radiation doses received by medical personnel should be given serious consideration. Thus, analysis of occupational radiation dose and radiation safety is vital to examine changes, trends and establish protective measures.

**Purpose:** This study aims to evaluate the occupational radiation dose based on job categories for medical workers exposed to ionizing radiation in Kuwait and Al-Qassimi hospitals, Sharjah, UAE.

**Methods:** A cross-sectional study of 317 medical personnel exposed to ionizing radiation for a period of five years (2012-2016). Dose records were extracted from the National Radiation Protection Centre in the Ministry of Health, UAE. Dose records document radiation dose for each worker throughout his career. The average annual effective dose was calculated and analyzed based on jobs category and the accumulated dose over five years (2012-2016) calculated. The doses were measured using Thermo-Luminescence Dosimeters (TLD-100 (LiF:Mg,Ti)) placed over the lead apron at the chest level in all types of workers except for Cath’s lab in which the TLD placed at the thyroid protective collar. For nuclear medicine, a hand dosimeter was used to measure the hand dose distribution.
Results: Annual average effective dose and accumulated dose over five years (2012-2016) for medical workers were found to be below the international recommended dose limit of 20 mSv. However, nuclear medicine and operating theater are receiving higher doses compared to other job categories.

Measurements of Radiation Exposure of Radiography Students during their Clinical Training using Thermoluminescent Dosimetry

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2International Society of Radiographer & Radiological Technologist (ISRRT) - Regional Coordinator of Professional Practice for the Americas

Purpose: The assessment of the radiation dose received by the radiography students during their academic clinical training is an important component of their practice. This practice fosters the development of their knowledge and provides the opportunity for students to develop their approach to personal radiation safety. Radiography student's present special safety concerns among existing staff due to their inexperience, therefore, quantifying their radiation exposure is crucial. The objective of this study is to assess the effective radiation dose incurred by the undergraduate students during their clinical training.

Methods: 312 students were monitored using thermoluminescent dosimetry (TLD) during the years of 2009-2015. The TLDs were analyzed using a Harshaw™ TLD reader after a 16-week working period to evaluate the whole-body doses HP (10) and skin dose HP (07).

Results: The results establish that the values of radiation dose received by the students are well below the annual average dose recommended by national and international authorities.

Conclusions: The occupational exposure dose to students did not reach the value of 1 mSv. This study demonstrates that current radiation protection measures are acceptable and there was no risk of overexposure.

Keywords: Thermoluminescent dosimetry, Occupational exposure, Occupational Dose, Clinical Training, Radiation, Effective dose

The Use of Local Alternative Materials as Structural Shielding for Diagnostic Radiological Facilities

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Purpose: X-ray radiation shielding is based on the principle of attenuation, which is the ability to reduce the initial intensity of radiation through a barrier material. The research aimed to obtain the most efficient shielding material to attenuate ionizing radiation in the diagnostic range (0-150 kV) using locally available clay soil, lateritic soil and white sand combined with Portland limestone cement.

Methods: A mix design was used to determine the mix ratio that would attain the highest density and compressive strength, hence more suitable for radiation protection. Sample blocks of dimensions 20cm x 15cm and thicknesses 4cm, 8cm, 12cm, 16cm and 20cm were prepared. Using a RayMax Medical Corp conventional x-ray machine and RaySafe X2 dosimeter, in narrow beam geometry, kerma readings were obtained at energy potentials of 50kVp, 70kVp, 90kVp, 110kVp, 130kVp and 145kVp without the presence of any block, then with blocks in the path of the beam. The percent transmission and attenuation coefficient for each block type and thickness were calculated. Half value layer (HVL) and tenth value layer (TVL) were extracted from a graph which plotted percent transmission against block thickness.

Results: Blocks that preserved a lesser cement to aggregate ratio attained a higher density and compressive strength. Percentage transmission was reduced to below 10% at the tested x-ray energies for all mixture types and block thicknesses. As the block thickness and x-ray energy increased, the linear attenuation coefficient decreased. HVL ranged between 1.7 cm and 2 cm, while TVL ranged between 3.3 cm and 4 cm.

Conclusion: Blocks composed of cement and white sand and cement and clay soil, with mix ratios of 1:3 for the former and 1:3 and 1:4 for the latter can be used as structural shielding. Of the mixtures, cement and white sand attained the
highest density and compressive strength, however, cement and clay soil proved to be most stable, both in its engineering properties and attenuating ability.

**ADVANCED PRACTICE**

**A New Model for Image Interpretation Training? Early Outcomes from an Academy Pilot**

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**Purpose:** Radiographers have been extending their scope of practice in image interpretation internationally, with some embedding definitive reporting in new roles. Training has traditionally been clinically based underpinned by formal academic education programmes at masters level. Clinical workload pressures and workforce shortages have been identified as challenges to the development of staff. Further, inconsistencies in mentorship and support result in variation in scope of practice and report standards. In 2017 a collaborative training environment (Academy) for the development of advanced radiographer practitioners was developed in the UK to provide intensive accelerated training. This presentation outlines the development and its evaluation to date.

**Method:** Trainees attend the academy part time, with transition to the clinical workplace training after 4 months. Training is provided by experienced clinical educators, with input from radiologists and other specialists. A baseline electronic survey of trainees and clinical sites was undertaken. Initial and midpoint formative image interpretation assessments evaluated reporting skills development. Final end-point image bank test, trainee focus groups and interviews with mentors are planned.

**Results:** The trainees (n=8) experience varies (1-14 yrs; mean 6yrs). Initial confidence was higher for image interpretation than report writing. The expectations from trainees focus on the peer support offered by training in a group, with a more structured programme. Opportunities for report standardisation, growth in reporting capacity and trainee support were identified by mentors and managers.

**Conclusion:** Early outcomes suggest this is a transferrable model of clinical training which releases capacity in the workplace and provides standardisation in skill development.

**Evidence Based Practice: A survey to establish factors that influence its use within Radiographers’ Professional Practice in Uganda**

Dorothy Irene Nalweyiso
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**Purpose:** Evidence Based Practice (EBP) has led to the evolution of provision of clinical care from basing on opinions of established order to guide practice to use of evidence derived from robust researches (Wilkinson, et al., 2012). The main aim of the study was to establish factors that influence the use of EBP within radiographers’ practice with a view to generate information to contribute to the body of knowledge to inform policy in Uganda.

**Methods:** A cross-sectional survey was conducted among 83 radiographers who were conveniently selected to participate in the study. Data was collected using a modified version of information literacy for evidence based nursing questionnaire which was provided to the participants through an email. The response rate in this study was 32%.

**Results:** There were more males (69.5%) than females in this study and majority (84%) were aged below 40 years. Most of the radiographers (73.5%) had not worked for more than 10 years and majority had a diploma. At bivariate analysis, radiographers with postgraduate education were about twice more likely to use EBP in their practice than the undergraduates (Crude OR, 95%CI: 2.25, 1.12-9.03). Those who attend to many clients per day (>15 clients per day) were about 20% less likely to report use of EB. Radiographers who reported themselves to have high knowledge of EBP were 10 times more likely to use EBP than those with low knowledge. With binary logistics regression analysis, knowledge emerged as the only factor that was significantly associated with use of EBP among radiographers in Uganda, (Adjusted OR, 95%CI: 9.89:3.54, 27.64).
Conclusion: Overall this study found high knowledge levels of EBP and high use of EBP among radiographers in Uganda. However, majority of radiographers had negative attitude towards use of evidence based practice.

Status and Development of Advanced Practice for Radiographers in Norway

Haakon Hjemly  
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Purpose: Development of the professional role of radiographers in Norway has been substantial since the profession was established in the early 70s. In parallel with the development and academising of radiography education, there has been a gradual change in the tasks previously performed by other groups, as well as continuous supply of new tasks as a result of the great advances in computing and technology in diagnostic imaging and radiation therapy. My presentation will focus on current status of the scope of practise for radiographers in Norway, ongoing education and projects and near future developments. What are the drivers and barriers for radiographers to take greater responsibilities in diagnostic imaging? What does the Government want? What does the radiographers and the radiologists think about the issue? Results from my MSc study on role development for radiographers in Norway will be presented.

DENTAL RADIOGRAPHY

Enforced Conversion, Pioneers the Way for Digital Imaging into a Dental School

New Clinical Services Build

Diane Campbell  
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Purpose: A new Clinical Service Building CSB under construction at the Dental School, University of Otago, New Zealand is due for completion September 2018 offering a full range of dentomaxillofacial digital x-ray systems, housing 35 x-ray imaging machines, tended by a sole vendor. The central Radiography location will house 8 machines, the rest will be distributed throughout various clinic locations in the CSB. Premature failure of non-digital x-ray equipment in the existing building, necessitated installation of digital equipment into an unprepared Radiography, lacking infrastructure to support the process.

Methods: The transition to enterprise-wide extraoral and intraoral digital imaging is planned for in the new CSB build, due to go live January 2019. Another separate ancillary self-contained clinical environment, is due to commence operating with digital intraoral equipment in December 2017. However the unplanned, unorthodox, introduction of digital extra oral imaging into the existing Dental School has identified more by chance than by planning, many issues and challenges. These include: IT, technical support, data storage, back-ups, viewing, training clinicians and students, as well as acceptance and confidence in using digital systems. This paper will discuss issues and challenges of clinical implementation of digital imaging into this unique environment, as a precursor to implementation into a planned environment.

Results: Identified barriers to acceptance by clinicians and students requesting digital x-rays, were mainly due to inadequate viewing facilities and unfamiliarity with these systems. The phased intraoral digital rollout includes training for all users promoting adoption testing the ability to view, retrieve and archive images remote from this location.

Conclusion: This unconventional process of introducing digital imaging has proved a huge learning curve presenting many challenges and has identified many obstacles to overcome towards an enterprise-wide rollout of intraoral and extraoral digital imaging in the new CSB Dental School.
Patients' Perception of Dental Radiation in Trinidad and Tobago

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Purpose: The aim of this study was to identify the current standards of radiological practice in Trinidad in relation to international ionising radiation regulations with respect to dentistry.

Methods: A 32 point questionnaire that was previously tested was administered to 55 dentists who practice in different regions of Trinidad. The survey aimed to gather information on demographic factors, types of radiographic equipment, techniques and processing and radiation protection measures.

Results: The majority of dentists (61.8%) were not aware of the technical details of their equipment. Thirty-three dentists did not know the kVp of their machines and 17 dentists were not aware of the intraoral film speed that they utilize. Of the respondents, 85.5% used rounded collimators. The most common technique for periapical radiography was the paralleling technique (64%). Many respondents own panoramic X-ray units, but the majority of them (90.9%) did not take panoramic radiographs on all patients regardless of the dentist’s working environment. This was proven to be statistically significant (p<0.05). All dentists reportedly used some form of radiation protection, but only 8 respondents properly disposed of their radiographic waste by incineration. Lead aprons were utilized by 65.5% of respondents.

Conclusion: The results of this study indicate that current radiological practices utilised by dentists in Trinidad and Tobago need improvement in some areas and there is a dire need for the development of national ionising radiation guidelines specific to dentistry if best practice is to be maintained.

RADIATION THERAPY SAFETY

Strengthening of Safety Culture in Radiotherapy through the Use of Incident Learning Systems from the IAEA Perspective

Maria Law, ISRRT, Director of Education

Purpose: Radiation safety is an element of quality in healthcare and is a WHO global initiative. Strengthening radiation safety culture in healthcare is also one of the 10 actions in the “Bonn Call for Action” which is a joint position statement by the IAEA and WHO. A safety culture needs to be promoted in the practice of radiation therapy as a flawed safety culture is a significant contributing factors to adverse outcome. Better safety culture is associated with lower risk of patient safety issues.

Methods: Radiation therapy is complex and complicated and involves multiple disciplines. One method to strengthen the safety culture is through information exchange utilizing Incident Reporting and Learning Systems. Reporting of incidents may be mandatory or voluntary depending on its nature and the severity. In addition to reporting, the tendency is shifted to non-punitive and non-judgmental exchange of information in order to encourage reporting and thus learning from the incidents. The IAEA organized an international meeting with major professional organizations and countries worldwide in October 2017 to share their experience in the use of incident learning systems.

Results: Many countries organized their own incident reporting systems which are restricted to use within their own countries. However, major organizations utilized a shared approach where incidents can be shared between countries. Such open systems include the SAFRON (Safety in Radiation Oncology) from the IAEA, the RO-ILS (Radiation Oncology Incident Learning System) from the ASTRO and AAPM, the ROSEIS (Radiation Oncology Safety Education and Information System) from the ESTRO. The primary purpose of these systems is to enable the sharing of lessons learned to prevent similar mistakes from happening again.

Conclusion: Radiation therapy incidents, causality and corrective actions can be learned from the incident learning systems. The lessons learned will help strengthen the safety culture in radiation therapy.
Role of Radiation Therapists in Creating a Patient Safe System in Brachytherapy Delivery  
Chek Wee Tan  
ISRRT, Board Member

**Purpose:** Brachytherapy is a type of radiotherapy where sealed radioactive source is placed inside the patient for treatment. It is a treatment procedure which can be used for different body sites especially for cervical, breast, prostate and skin cancer. Brachytherapy enables higher doses of radiation to be delivered to more specific areas of the body compared to conventional radiotherapy. With the recent advances in radiotherapy technology, brachytherapy has also advanced from 2D brachytherapy using orthogonal x-ray films to more sophisticated treatment application using more sophisticated applicators and CT and MRI images for treatment planning to allow for better accuracy in targeting malignancies.

Although the roles of radiation therapists vary from countries to countries in brachytherapy, radiation therapists are however the ultimate gatekeeper in the delivery of radiation dose to patients. Radiation Therapists need to be vigilant and careful during delivery and need to understand their role in the safety and emergency procedures in brachytherapy. It is also important for radiation therapists to be equipped with training, continuing education development to be able to perform and managed the change in treatment techniques and the sophisticated equipment effectively.

**HEALTH & SAFETY**

Patient as Observer: Practical Steps to Launching a Hand Hygiene Quality Assurance Program in the Medical Imaging Outpatient Setting  
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¹Practice Leader, Medical Imaging, University Health Network, Canada

**Purpose:** As a multi-hospital medical imaging department with 500+ staff performing 450,000+ imaging exams annually, we are faced with the daily challenge of ensuring compliance with hand hygiene policies. To quantify compliance, the “Patient As Observer” approach to auditing staff hand hygiene was selected based on its cost effectiveness, easy translatability to clinical practice and the opportunity to engage and empower our patients.

**Methods:** The “Patient As Observer” program was designed based on recently published literature and aligned with an existing program at one of our five hospitals. Departmental executive and practice leaders were tasked to create a single program inclusive of our technologists, nurses, physicians, students and support staff. A target of 90% compliance was set to meet standards published by the World Health Organization. Processes to facilitate hand hygiene were implemented once best practice standards were defined. The program was created involving design of the patient audit form, development of a volunteer training package and communication leading up to and post launch.

**Results:** While the “Patient As Observer” program was developed with input from all the hospitals involved, the launch was phased by location over an 8 month period of time. During the audit time period February 2015 to June 2017, 1384 patient audit forms were collected. Overall, patients told us our hand hygiene compliance rate was 75.6%. That this number varied significantly by hospital and by specialty. Challenges encountered with the program included difficulty retaining volunteers, the workload associated with collecting and transcribing paper surveys, and difficulty sustaining patient engagement.

**Conclusion:** The “Patient As Observer” method has provided a cost effective method to audit staff hand hygiene practices in a large department, spread over five hospitals. Although there have been challenges maintaining commitment to the program, strategies are being developed to re-energize the program.
How does a Radiographer’s Job Satisfaction Influence their Body Posture to cause Back Pain
Adrian Sampath
Student Radiographer, COSTAATT, Trinidad & Tobago

Introduction: During my experience as a student radiographer, I have noticed a constant outcry of back pain with radiographers I trained with. My research was designed to identify the causes of the outcry, help health care professionals become aware of the possible outcomes of poor body posture and help remedy with a simple exercise routine.

Methods: A check list from the Clinical Human Factor Groups (CHFG) was modified to the scope of this research. Using observational methods to obtain how radiographers interact with general x-ray equipment to obtain high quality x-ray images, the findings were compared to what the recommended body postures are on the checklist. In addition, questionnaires were used to help identify if radiographers have any unforeseen reasons or could justify themselves for practicing poor body posture.

Results: A simple exercise routine was developed based on the findings. Recommendations were also included with respect to a radiographer’s attire, posture and interactions with general x-ray equipment.

Conclusion: Causes as to why radiographers practice poor body posture was identified and an exercise routine developed with sufficient recommendations that could aid in the reduction of the likelihood of poor ergonomics which contributes to back pain.

GENERAL IMAGING

Balancing the Spine
Dr. Kimani White
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Purpose: Sagittal balance describes the alignment of those static and dynamic factors in the body designed to maintain an efficient, stable stance and gait. Since its recognition, it has become an increasingly important topic in any pathology that has the potential to disrupt balance, but especially in thoracolumbar spinal surgery, and particularly in the management of adult spinal deformity. Pelvic morphology is a critical component, influencing regional, segmental and global balance and serving as the coupling link between the weight bearing, mobile lower limbs and the dependent spine.

Methods: A variety of techniques exist for the evaluation of balance, including force-plate analysis and radiographic analysis. While the former is perhaps more accurate, the latter is far more practical, useful and hence common. From these analyses emerge an ever-increasing multitude of diverse parameters, quantifying aspects of balance. These include linear and angular relationships between different anatomic structures. While each parameter has its own merit, recent studies have identified the most clinically significant parameters by virtue of their impact on standardized quality of life measures.

Results: Using these parameters, normal spines can be classified, pathological and compensatory patterns identified and the potential for realignment assessed. Values such as the Pelvic Incidence, Pelvic Tilt, and Sagittal Vertical Axis have emerged as pivotal, and hence these values are used for diagnosis and as a guide for rehabilitation and surgical intervention. The values have also been used in understanding older pathologies such as spondylolisthesis and the evolution of the degenerative cascade in the transformation of the aging spine.

Conclusion: An understanding of the principles of Sagittal balance is thus critical in the management of spinal pathology. Application of these principles, customization to the patient variables, a multidisciplinary approach, can produce an optimal outcome.
PROFESSIONAL DEVELOPMENT

Social Media: The Future of Formal Professional Development for Medical Radiation Practitioners in Canada and Australia
Lori Boyd¹, Dr. Celeste Lawson, Natalie Nguyen
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Purpose: At the ISRRT World Congress in Seoul, South Korea in 2016 we presented preliminary data into online professional development (PD) by medical radiation practitioners in Canada and Australia, which indicated a trend towards online self-directed learning. This presentation will present the findings in full. Significantly, our research established that social media provides a cost-effective opportunity to incorporate formal PD for radiographers, radiation therapists and nuclear medicine technologists in Australia and Canada.

Method: In 2016, members of the Canadian Association of Medical Radiation Technologists (CAMRT) and the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) were invited to complete an online survey regarding their personal use of online platforms for PD. The survey collected data about current use, satisfaction, and future use of online professional development tools. There were 239 responses.

Results: All respondents used online tools to access PD, mostly the internet and intranet. This use, however, was often not initiated in a time relevant manner, with some PD requiring participants to schedule their attendance at certain times. The methods of choice were those that could be conducted at a time that suited the individual rather than PD that required lead-in time. Radiation therapists, in particular, were receptive to the idea of formal PD using social media such as blogs, LinkedIn, Twitter, apps and online journal clubs. The platforms preferred offer speed and ease of access regardless of timing, geographical location or occupation. Respondents acknowledged the risks associated with online professional development and the use of social media, and felt well equipped to manage those risks.

Conclusion: This research is now exploring the types of professional development that could be modified and accessed via these platforms in a manner that affords appropriate evidence for recognition by registration bodies and professional associations.

Emotional Intelligence: A Literature Review of the need to increase Radiology Professionals’ Emotional Intelligence as a method to cope with Workplace Adversity
Nicole Dhanraj
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Introduction: Radiology Professionals are faced with many stressors in their daily work that impact their ability to bounce back or cope successfully. These issues include caring or dealing with terminal patients, very ill pediatric patients, emotional and distraught families that need to make critical decisions, severe personality differences amongst our colleagues, working with varying leadership styles from management and managing the impact of the stresses from our home/personal life. These high stress situations impact a professional’s ability to cope and maintain a caring, empathetic demeanor. Radiology professionals are bombarded to improve their clinical skills constantly. Continuing Education is often mandatory. However, most continuing education focus on the professional’s clinical skills, and little to none focus on developing the professional personally. Consequently, these professionals are left to handle their emotions on their own. Intense emotions that arise from these situations can significantly impact an employee’s effectiveness, lead to termination or contribute to a major sentinel event.

Methods: This literature review provides radiology professionals evidence-based strategies to help recognize and understand emotions, how to react and manage emotions in the workplace, how to harness emotions to maintain professional stability and be an effective employee and prevent burnout.

Results: Emotional intelligence is a popular concept as psychologists believe that anything that impact a person’s mind, also impacts the organization they work for, therefore impacting retention. The results of the paper discusses the benefits of increasing one’s emotional intelligence as well as the importance establishing a support system to increase one's emotional intelligence that will ultimately result in more successful and resilient Radiology professionals that are better equipped to cope with the demands inherent to the profession.
Conclusion: It is imperative that the radiology professional seek methods to increase their emotional intelligence to cope with the stressors faced within the workplace so that they can maintain empathy and understanding especially toward patients. Increasing one’s emotional intelligence improves resiliency and consequently increases an employee’s effectiveness. Consequently, it is of equal importance to develop not only the professional’s clinical skills but personal skills.

Core Competencies of Radiographers Working in Rural Hospitals of KwaZulu-Natal, South Africa

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Introduction: The contribution of general diagnostic imaging in the diagnosis and clinical management of patients in rural hospitals of South Africa is enormous. Rural radiographers require, over and above traditional radiographic expertise, additional competencies which to a certain degree are unique however not limited to rural practice. Previous studies however have focused more attention primarily on other rural health professionals such as doctors and nurses leaving a research need in this field. This paper focuses on the additional competencies that may be required for rural radiographers.

Purpose: of the study was to investigate and identify additional core competencies required by radiographers working in rural hospitals of KwaZulu-Natal in order to propose a CPD strategy aimed at rural radiographers.

Methods: An exploratory sequential design was utilised with qualitative (Phase I) and quantitative (Phase II) strands involving 7 participants and 109 respondents respectively. Only radiographers working in rural KZN hospitals were included in the study. The four major themes and categories identified in Phase I was used to develop data collection instrument for Phase II of the study.

Results: Collectively, the results revealed that there were a number of additional core competencies such as, but not limited to, teamwork, ability to do basic obstetric ultrasound scans, leadership, management and reporting on plain radiographs, all of which are required by rural radiographers. In 2014 when these competencies were checked against a single curriculum it was found that majority of them were either partially covered or not at all covered.

Conclusion: The study provides additional information on context-specific core competencies and, therefore may act as a catalyst to influence the future of radiographers working in rural areas of South Africa.

RADIOTHERAPY

Differentiation of types of Breast Cancer on Mammogram using Artificial Neural Network (ANN)

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Purpose: The most common invasive breast cancers include invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ICL). About eight of ten invasive breast cancers are invasive (or infiltrating) ductal carcinomas (IDC) and about one invasive breast cancer in ten is an ILC. As for carcinoma in situ, ductal carcinoma in situ (DCIS) is the most common non-invasive type taking up 80-90% of carcinoma in situ. Mammography is the common non-invasive screening method of breast cancer. Mammography has a high false negative and false positive rate. Computer aided diagnosis (CAD) systems have been commercialized to help in micro-calcification detection and malignancy differentiation. Yet, little has been explored in differentiating breast cancers with artificial neural network (ANN), one example of CAD systems. The aim of this study is to develop a CAD system to differentiate different types of breast cancer and to evaluate the feasibility of CAD application in clinical practice.

Methods: 160 mammograms were collected (including IDC, ILC and DCIS were of equal number (each type of cancer 40images)) plus 40 control images. All cancers were screened by the mammography unit and further proven by biopsy histologically between November 2012 and November 2015. Mammograms were analysed with a CAD system and Image Feature Assessment Program. CAD system determines the possible regions of interest (ROI) which are then used for feature extraction.
Results: The accuracy for detection of IDC against normal is 97.5% (N=40, normal 20, abnormal 20), for ILC against normal is; 97.5 % (N=40, normal=20, abnormal =20); for DCIS against normal is 76.9 % ( N=39, normal =20, abnormal=19) respectively. One image for DCIS is omitted due to the image quality did not meet our program criteria.

Conclusion: Our study indicated that using image feature detections of IDC and ILC are excellent while for DCIS it is very good.

Application of an External Interception Device to Enhance Radiation Therapy Beam Delivery to Target Sites

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Purpose: Radiation therapy has been one of the major methods for the treatment of cancer patients with over 50% patients receiving radiation therapy during their course of illness. Significant improvements have been made to the first linear accelerator and computer technology, however, there are still some gaps that could be filled as it relates to the conventional linear accelerators. The Linac model of interest is a Siemens Mid Energy Primus, since this is the only Linac available to treat patients in Guyana. The main objective of this project is to optimize the dose of radiation delivered to patients during treatment by reducing the occurrences of hot spots and promoting organ sparing.

Methods: This paper is a theoretical proposition which proffers a mathematical model for optimizing the doses delivered to the target site. Radiotherapy was used as the main method of exposure where Elekta and Varian Linacs were simulated for dose verification using a computer based software PRIMO. The dose profiles were obtained from the trial simulations and were analyzed.

Results: The proposed shape for the device will take the morphology of a frustum, which has two openings at both opposite ends, therefore, allowing the radiation beam to enter and exit the device. This device will be lined with selected nanoparticles that possesses the properties to attenuate the scattered photons. It was proven by experiment that materials besides lead, in their nanoparticle state are more effective than that of a lead equivalent thickness for various energy range.

Conclusion: Optimizing the dosage of the radiation delivered to patient can be done by incorporating composite nanoparticles, which will reduce the occurrences of hot spots and directly promote organ sparing outside of the treatment field.

An Evaluation into the Effectiveness of the Structural Radiation Shielding Barriers of a Radiation Therapy Facility in Guyana

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Purpose: This project thoroughly investigates the integrity of the structural radiation shielding barriers, built in 2006, of the Cancer Institute of Guyana (CIG) which houses a 6 MV Linear Accelerator (LINAC). A retractable beam stopper renders all barriers of the bunker as secondary. However, the barriers receiving the beam's primary incidence at the gantry angles 900 and 2700, Walls A and B, are annotated as primary. A phantom was used for the other barriers to measure for scatter.

Method: This study aims to validate the effectiveness of the structural radiation barriers through measurements and computations of the Instantaneous, Time Averaged and Weekly Dose Rates of the barriers and the attenuation coefficients using the Tenth value layer of the concrete. A Fluke Biomedical Ionization Chamber was used to record the Instantaneous measurements. The results gathered serve as a basis for comparison to the Institute’s Commissioning Report and the International Standards.

Results: The results of the project determined the radiation shielding barriers at CIG very effective. The time averaged, weekly dose rates and the existing barriers’ instantaneous dose rates recorded by the ionization chamber were significantly lower than those calculated. Scattered radiation measured less than 0.1% of the primary beam, the international standard. However, calculations for barrier thicknesses required were more than existing barrier thicknesses, a result of the LINAC’s field size parameter maximum being utilized.
Conclusion: These verifications of the radiation shielding barriers' effectiveness were within the stipulated standards and well below calculated outcome.

COMPUTED TOMOGRAPHY

Digital Training Platform for Chest Image Interpretation: An RCT

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Purpose: Time delays and errors exist within image interpretation which lead to delays in patient care and misdiagnosis. However, little research has tested training guides and no research has been performed on chest image interpretation training based on eye tracking technology.

Methods: Reporting radiographers interpreted 20 chest images during pre and post intervention interpretation sessions (n=320). Participants within the intervention group had access to a digital training platform for nine months following their initial assessment. The training platform included a digital search strategy training tool and an educational multimedia tool to communicate the search strategies using eye tracking technology. The interpretation sessions were completed using eye tracking technology and whilst thinking aloud. An online survey gathered feedback on the platform.

Results: Both groups increased true negative (TN) rates following the test period. Intervention group TN’s increased from approximately 54.5% to 65% and control group increased from 47.7% to 77.5% (p=0.015). True positive (TP) rate increased within the intervention group from 30.6% to 47.5% following the test period, whereas the TP rate of the control group decreased following the test period from 44.4% to 30.0%. False positive (FP) rate decreased for both groups, in the intervention group from 45.5% to 35.0% and in the control group also from 52.3% to 22.5% following the test period (p=0.006). Both groups were more confident in their provided diagnosis following the test period, this increased most in the intervention group, increasing from a mean of 4.4/10 to 5.4/10. Participants found the training platform useful however they commented on the difficulty in finding time to use it.

Conclusion: Confidence increased most in the intervention group. Some improvements were noted in participant performance following access to the tool, however the training platform needs to be tested with a larger group of participants.

Enhancing Radiographer Threshold CT Competencies through Clinical Simulation

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Purpose: The last decade has seen extensive growth of Computed Tomography (CT) place greater expectations on radiographers to participate in CT image acquisition early in their careers. Pre-qualification technical skills development is achieved through the integration of academic and clinical learning but pressures on health service capacity limit opportunities for students to obtain practical experience. Practice simulation has been shown to be beneficial to learning but limited opportunities exist in relation to CT skills development. This proof of concept study explore whether a bespoke CT simulation web platform could increase student confidence and competence in non-contrast head acquisition.

Methods: Supported by funding from Health Education England, an integrated CT simulation programme distributed through the internet was developed. This programme reflected current clinical CT practice taking the student from patient registration through to discharge requiring decision making on image acquisition and reconstruction processes. Both practice and assessment modes were incorporated into the programme for monitoring student CT skills development and errors in decision-making.
Results: The CT simulation programme enabled students to practice their clinical skills and see the consequences of errors in parameter choice on image quality. Students reported greater confidence in CT processes prior to clinical placement and ability to question clinical radiographers from a wider knowledge base.

Conclusions: CT simulation technologies that enable errors in judgement to be made, and consequences appreciated, increase fundamental knowledge and understanding of the technology. Expansion of the CT simulation programme to include chest imaging is being explored.

Drop-In CT for Intensive Care Patients
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Purpose: CT examinations in critically ill patients demand coordination between the intensive care units (ICU) and the radiology department and often the ICU will interrupt ongoing medical treatment to allow the patient to be scanned when a time slot is open at the radiology department. Furthermore, the scanner will be blocked while the patient is being transported to the radiology department. Thus, the scanner capacity is not used effectively. The primary purpose of the study was to establish a procedure where the CT examination would not interfere negatively with the treatment plan. The secondary purpose was to evaluate if the patients were scanned without waiting time and to evaluate the use of the scanner capacity.

Methods: We introduced a drop-in system where the ICUs prepare the patient when appropriate with regard to the treatment plan. Without prior notice the ICU calls the CT booking office and announces that the patient arrives in CT within 10 minutes. The CT-team will then finish the current examination and prepare for the ICU scan.

Results: During 5 months we scanned a total of 91 ICU patients (39 CT-head, 39 chest/abdomen and 13 miscellaneous) none of which had any waiting time. 2 Time spent on one patient dropped from approximately 40 to 20 minutes on average. The radiology department spent very little time coordinating, except when the ICU staff were unfamiliar with the new procedure and called in advance to arrange specific time slots for CT. In a few cases two patients arrived at the same time, but they were still scanned immediately because it was possible to clear another scanner.

Conclusion: Drop-in CT works well for ICU-patients and the procedure meets the needs of both ICU and radiology departments. ICU-patients can be scanned without waiting time and the scanner capacity can be more effectively used.

GENERAL IMAGING

Advances in Radiation in Guyana: Academic and Regulatory Perspectives
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Purpose: A four-year intense journey through the various advancements and challenges faced in Guyana as we transcend from initiating academic emphasis on a Bachelors of Science in Medical Imaging, towards obtaining membership from the IAEA, and now developing regulatory requirements for both medical and industrial sectors. Newer more solicited aspects include extensive aspects of diverse research, along with the student's and collaborative institutional inputs. Regulatory requirements are not yet formally in existence for Industrial radiography and radioactive sources use, but have been recently implemented in radiotherapy for the health sector. The mining areas are predominant users of radioactive sources which have now pushed the government to place some much needed emphasis on regulatory requirements for transport, handling, storage and use of same. IAEA’s strategic input has been a guidance tool in implementing radiation protective measures by first starting with the radioactive source inventory, detection methods, radiation emergency preparation and capacity building for port health and occupationally exposed workers.
There are currently two local committees that address the short comings of radiation safety and emergencies in Guyana, i.e. via the International Health Regulations (IHR) and the National Committee on the Management of Radiation. The former is guided by Pan-American Health Organization (PAHO), whilst the latter is guided by the government of Guyana through the Ministry of the Presidency, formerly Ministry of Natural Resources.

**Method:** A non-technical oriented verbal presentation aimed at promoting and developing focus on radiation protection and knowledge in Guyana, which is new at moving forward with these aspects. Since this is not a Research based presentation, there are no direct results to present.

**Conclusion:** Suggestions on the way forward, and development of collaborative efforts with both the ISRRT and SRTT.

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**Overview of Education, Licensing and Practice of Imaging Sciences in Latin America**

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**Purpose:** This presentation describes the levels of technology in practice and radiography education offered in Central and South America. Latin America is comprised of some 20 independent countries with the commonality of speaking in Spanish and Portuguese.

**Methods:** As part of the exploration, a description of the differences in curricula and academic requirements is summarized for each country. The credentials and licenses in use, if any, are also shared as well as comparing the levels and differences in perspective among professional colleagues.

**Conclusion:** We conclude describing the professional experience in Peru, a country judged by some to be more advanced in practice in medical imaging.

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**The “Doves” among Radiography Examiners in the Inaugural Clinical Radiography Examination in Singapore**

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**Purpose:** The Bachelor in Diagnostic Radiography by the Singapore Institute of Technology (SIT) is new and the first undergraduate radiography programme in Singapore. A 2-part summative clinical examination was organised to assess Year 1 students’ clinical and reasoning skills: Part 1 assesses the student’s ability to perform a radiographic examination for a real patient and Part 2 is a structured oral examination conducted by a clinical examiner. The test-centric Angoff method is used to set the pass-mark. After the exam the examinee-centric Borderline Regression method (BRM) is also used to calculate the pass-mark as a quality assurance measure. This study aims to determine the correlation between the pass-marks determined by each of the methods and student performance.

**Methods and Results:** Eight senior radiographers with many years of teaching non-bachelor radiography students are appointed as clinical examiners. They complete an examiner training and calibration session before using the Angoff method. One week before the exam, the senior radiographers determined a pass-mark of X% for the clinical examination and Y% for structured oral examination using Angoff method. The students performed much better than expected, scoring a mean of X+51.5% (standard deviation SD 5.3%) for clinical examination and Y+33.6% (SD 10.8%) for oral examination i.e. all of them passed based on the Angoff pass-marks. Using BRM the pass-mark was X+49% and Y+25% for clinical and oral examination respectively. The BRM pass-marks would have led to 23.6% and 14.5% failure rate for clinical and oral examination respectively.

**Conclusion:** An interesting phenomenon of radiography examiners being too lenient with standard setting has been identified. The examiners were inexperienced with the examination format and with the first cohort of bachelor students and hence may have underestimated the students’ capabilities. The BRM pass-marks are useful as quality assurance measures to help fine-tune the examiners. As far as the question of hawks versus doves is concerned, the radiography examiners are definitely doves!
QUALITY MANAGEMENT

Using The 5S Methodology to Improve Quality and Efficiency in the Vascular Interventional Radiography Department
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Purpose: Vascular interventional radiography is a technologically advanced field that consistently offers new life saving techniques which often leads to advances in equipment and inventory technology. Because of the complex and fast nature of the VIR environment, patient safety is essential where any means of eliminating waste and errors should be considered. I will discuss a Six Sigma Methodology that is used to organize the physical exam room and the providers working in the exam room to coordinate better, more accurate, and individually focused care before and during a vascular procedure.

Methods: As a previous technologist supervisor for a high output health care provider I will share research and six sigma methodology studies that improved efficiency and therefore the quality of care in VIR. The 5S program was implemented in each exam room to improve consistency and accuracy for storing inventory.

Results: Keeping exam rooms organized improves procedural efficiency. Inventory is easy to locate and post-procedure cleanup is conducted quickly because everything has a place. The 5S projects do tend to invoke some irritation by those who are not part of the project team. Change and learning a new system is not always accepted openly which makes sustaining changes more difficult and therefore much more important. A surprising amount of clutter was eliminated by the project team which led to an equally surprising increase in job satisfaction among the majority of VIR personnel. Most individuals were enthusiastic about the newly cleaned and organized exam rooms.

Conclusion: Implementing quality initiatives, such as a 5S program, in the department also can improve efficiency by limiting time spent searching for inventory items or running around trying to turn over the room for the next patient. When wheels-in and wheels-out time improves, department throughput improves leading to increased employee satisfaction and more importantly patient satisfaction.

Analysis of Radiology Examination Request Forms from Four Hospitals in Dar es Salaam, Tanzania
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Purpose: To evaluate the adequacy and relevance of patient data and clinical information transmitted to the radiology and imaging section by the referring doctors in view of the justification demands according to International Atomic Energy Agency standards.

Methods: A retrospective quantitative study was employed where rating scale was developed. 100 request forms from each hospital accessed from patients’ files were evaluated to see if the proper completion of the form was adhered by referring clinicians. A total of 400 patients’ form were involved. Statistical analysis was made using SPSS version 20.

Results: It is observed that 99.5% of forms had the name of patient documented, 83.3% documented the age and 96.5% documented gender of the patient. Also, 53.3% of forms had satisfactory clinical history, 35.7% were unsatisfactory while 11% didn’t have clinical history. Diagnosis was documented satisfactorily in 70.5% of the forms, 2.8% were unsatisfactory and 26.8% had no provisional or confirmed diagnosis. In terms of previous radiation examination information, 88% not documented and 12% the information was not applicable, and only 2.5% documented of LMP while 49% didn’t have information and 48.5% were male patients hence the criteria was not applicable.

Conclusion: properly filled request form is vital if we want to acquire precision in radiological reports, however, the inadequate presentation of patient information such as history, LMP and age on request form can easily mimic proper justification of exposure dose to patients by radiographers. Researcher recommends that clinician must insist in complete compliance to needed information for proper radiology reports and radiation safety.

Key Words: Radiation safety, justification, request form, diagnosis, x-ray examination, ultrasound, referring doctor, Exposure.
Study of Factors Affecting Service Quality of Main Radiology Department of The National Hospital of Sri Lanka
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Purpose: The National Hospital of Sri Lanka (NHSL) is the major government hospital situated in Colombo. It has a bed capacity of 3294. The NHSL is the national referral hospital to which the patients can be referred from any hospital within the island. The patients from different clinics and wards are referred for radiology examinations to the Main radiology department. Patient satisfaction is a criterion for determining quality of a service. It is an important and useful quality improvement tool for healthcare services. In this study radiography service of Main radiology department of the National Hospital of Sri Lanka (NHSL) was considered. The research was designed to identify the factors affecting patient satisfaction and therefore the service quality of the main radiology department of National Hospital of Sri Lanka (NHSL). The study was a descriptive cross-sectional study. The quality influencing factors as described by Lee et al. (2016) were selected. They are: Infrastructure (space, cleanliness, toilet, environment), people (timeliness, willing to listen and help) and accessibility (access to the department, appointment system), empathy (politeness, explanations, listening, responsiveness, knowledge), tangibles (cleanliness, convenience, advancement of equipment and knowledge, staff uniform), safety (safety and comfort of the department, accuracy and proficiency of staff, free of infection), efficiency (waiting time for imaging procedure and receiving report), improvement of care (accuracy of diagnosis, disease prevention measures) were considered.

Method: A sample of Clinic patients (40) were selected for the study. Data was collected through a questionnaire. Data was analyzed with a 5 point Likert scale of SPSS version 16, Cronbach's alpha, descriptive statistics, correlation and regression models and ANOVA was applied for data analysis.

Result & Conclusion: Infrastructure (waiting hall space, cleanliness, toilet, environment) was at disagree level. Therefore, waiting hall space, cleanliness, toilet, environment are seen as unsatisfactory level. Responses with regards to the other factors are in neutral level. Even though there is a slightly improvement in improvement of care, all the other factors are having negative response.

Delay of Reporting of Film in the Radiology Department
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Purpose: A radiographic examination is an integral part of clinical management and care of a patient in a hospital. Improving patient care has become a priority for all health care providers with the overall objective of achieving a high degree of patient satisfaction. The purpose of this study was to investigate the delay in reporting of film in the radiology department.

Methods: This research was carried out for four months. Data collection began on January 11th and data collection was finished by late April. The distribution of questionnaires was carried out on Monday, Wednesday and Friday where observation of the radiographers’ daily routines and how they handle patients and equipment in the department can be recorded. Data from the patient suggestion boxes would also be obtained on these days and visual observations conducted.

Results: The measurement of turnaround times is the most commonly adopted performance metric to gauge the success of radiology service today. While TAT is a very important part of the equation, it should not be the only measure since it is does not appropriately account for report accuracy. When measuring report TATs, it is critical that all hospitals across a health system track performance against a common set of measurement criteria to ensure they are delivering a consistent level of service. Radiology providers should therefore be held accountable to these service levels as part of their contract. The Radiology Quality Institute recommends the following standards for final report TATs: At the Eric Williams Medical Sciences Complex a monthly and quarterly reports for the system will be created in order to gauge the overall performance of their radiology enterprise and identify areas that need improvement. End-to-end turnaround times involve many stages including ordering the scan, sending the scan, validation and reading. The turnaround times shown below are defined as “Validate to Read” which is the time from validation to the radiologist performing the read.
Conclusion: In conclusion, there is a delay in reporting as shown in the table above. From the collected data it is evident that there exists a major delay in turnaround time throughout all modalities at the department, especially that of MRI. When interviewed radiographers themselves had stated that patients often complain about the length of time they are made to wait to receive MRI reports. This is evidence that the problem does indeed exist. As mentioned before, the research was conducted by means of a checklist of fourteen questions which was distributed amongst fifteen radiographers and five radiologists at the Eric Williams Medical Sciences Complex.

Musculoskeletal Injuries among Radiographers in Trinidad and Tobago
Jendayi Tull
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Purpose: Musculoskeletal injuries among radiographers in Trinidad and Tobago pose as a concern to both the individual and health institution. In the radiology department, there is an increase in the number of injuries among radiographers due to manual labour and repetitive motion. These injuries can become intense and may lead to a reduction in productivity among workers in the department. It may also cause an increase in the amount of sick days taken by radiographers and may even cause them to retire earlier than expected. This is not beneficial to the radiographer and poses as a problem to any health institution.

Method: A 20-item, structured questionnaire was used for this study. The questionnaire used was formatted with close ended and open ended questions to assess the link between radiographers and musculoskeletal injuries. Items covered included possible symptoms that may be experienced by radiographers in the course of their job performance. A second method of choice was the use of a checklist. The checklist was utilized to evaluate and prioritise the hazards within the department, and to decipher whether the risk of musculoskeletal injuries do exist.

Results: In collecting the data, it was shown that radiographers are at risk and do suffer from musculoskeletal injuries. The study reveals serious problems faced by radiographers such as heavy psychological strain in the work place, physical workload, poor workplace ergonomics, and the lack of ergonomic awareness. The most commonly affected area was the lower back, with a prevalence of 35%. The study also displayed that 70% of the radiographers responded that time was taken off work due to either pain or injury.

Conclusion: Musculoskeletal injuries do occur among radiographers in Trinidad and Tobago. Musculoskeletal injuries varied based on years working in the profession and the modality practiced.

ADVANCED PRACTICE

Implementing Advanced Practice: An Exploration of the Clinical Enablers
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Purpose: Advanced radiographer practice is well established in the UK but its implementation has been inconsistent. Published studies have identified barriers to the adoption of advanced practice and skills mix in clinical practice but no study has explored the enablers of advanced practice adoption.

Methods: Using a grounded theory approach, this study explores the factors necessary for the enablement of advanced radiographic practice. Data from NHS benchmarking, supplemented by data from a previous study exploring advanced practice across the UK, was used to identify positive deviant clinical sites (those where advanced radiographic practice was established and widespread). Key individuals responsible for service design within these organisations (e.g. lead radiologist; service manager) were invited to participate in the study. Consent to participate was recorded as part of interview process and all participants were provided with an audio copy of interview and full transcription.

Results: Data analysis is ongoing but key factors are beginning to emerge as potentially essential factors for enabling the adoption of advanced practice.

Conclusions: While much work has been undertaken comparing radiographers with other professions and identifying the barriers to the clinical implementation of advanced radiographic practice, no identified study has explored the key...
factors necessary for successful advanced radiographic practice adoption. The findings of this study will provide key criteria necessary for the successful adoption of advanced practice that can be applied to clinical practice environments.

**Introduction of Reporting Radiographers in a Danish Department of Radiology - Professional Role Development, Management and Perspectives**

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**Purpose:** Due to a shortage of Radiologists in Scandinavia, many Departments of Radiology already have, or are considering educating, Radiographers to report plain musculoskeletal radiographs. The Society of Radiologists has shown resistance towards the concept and this resistance has caused conflicts locally. The number of plain radiographs, CT and MRI scans is constantly increasing at Kolding Emergency Hospital, making it necessary for to educate Reporting Radiographers to meet the demands for rapid reporting of examinations.

**Methods:** We began educating our Reporting Radiographers in 2009 at Birmingham University and at The University of Southern Denmark. Initially we experienced resistance prior to and during the introduction. We also had varying difficulties during implementation that are often seen when introducing new concepts like professional role development.

Five years after introduction of Reporting Radiographers we performed interviews with the musculoskeletal Radiologists at our department to uncover their views on Radiographers reporting. To gain information with greater detail and depth unstructured interviews with open ended questions was performed.

**Results:** The department now employs 4 Reporting Radiographers. The interviews with the Radiologists showed that the Reporting Radiographers are of great value to the department and that their work is appreciated. They report radiographs and acts as a link between Radiologists and Radiographers bringing a greater understanding of each other’s work. Consequently communication and collaboration is enhanced which improves image quality beneficial to the patients. Furthermore the Radiologists now have more time to report and focus on MRI and CT scans.

**Conclusion:** Kolding Department of Radiology has experienced ups and downs in the process of educating Reporting Radiographers and now experience success. We wish to share our experiences and the “do’s and don’ts” from a management perspective to other departments whom are considering implementing reporting radiographers, and perhaps help them get an easier start.

**Advanced Practice Coordinator- Emerging Practice in Radiology**

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**Purpose:** The increased demands for medical services concomitant with the shortage of healthcare personnel has forced a change in the delivery of healthcare services. From a radiological perspective there are a number of approaches that have been instituted to address the changing healthcare system. One such approach is the emerging practice of Advanced Practice Coordinator (APC), successfully instituted at three healthcare institutions in Ontario Canada.

The Advanced Practice Coordinator role was designed to optimize imaging services by delegating certain radiological responsibilities once performed by radiologists to specially trained imaging technologists. The original responsibilities included, but are not limited to, working with inpatient programs and other team members to resolve issues, triage and scheduling inpatient referrals and expediting patient transportation. However, this role continues to evolve.

The APC plays a pivotal role in the provision of appropriate patient preparation for requested imaging procedures by using clinical expertise, leadership and understanding of the organization, medical directives and decision-making to improve access and quality of care. Applicants to this position (APC) must possess a professional designation in one of the imaging professions along with a minimum of 5 years recent relevant clinical experience in Diagnostic imaging, ability to implement and evaluate planned changes, ability to define specific areas of practice, ability to supervise others...
and evaluate the needs of the department as they relate to the role, ability to lead a team and work within a team, ability to be self-directed, interact and adapt effectively with other professionals in complex, dynamic situations, and ability to transfer knowledge, coach and mentor others. Additionally, the practitioner should demonstrate clinical leadership, advanced judgment and a high level of knowledge, skills, ability and personal attributes as well as professional autonomy and responsibility to ensure effective and efficient patient throughput and care.

Awareness and Use of Diagnostic Reference Levels in Radiography: A Snapshot of Practice Across Europe
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Purpose: Use of Diagnostic reference levels (DRL) has been shown to reduce the overall radiation dose and the range of doses observed in clinical practice however the ways DRL are being developed varies. Data from 2014 highlights that DRL for adult x-ray examinations have been established in 72% of the 36 European countries, whilst only 39% of the countries have established DRL for paediatric x-ray examinations. For adult DRL, 77% are based on national dose surveys in Europe while the rest are based on published values or recommendations e.g. EC recommendations. The aim of the study was to investigate current knowledge and use of DRL across Europe through the use of a questionnaire.

Methods: A random selection of 50% of countries (n=17) which were members of the European Federation of Radiographer Societies (EFRS) were selected from sealed envelopes. The educational institutions in each country were contacted via their contact details supplied on the EFRS website. Each educational institute identified clinical radiographers to complete a survey via SurveyMonkey. Descriptive statistics were performed with Excel and SPSS version 21.

Results: Completed questionnaires were returned from 12 out of the 17 different countries selected. The use and awareness of DRL was encouraging, with 74% of respondents using National DRL and a further 13% using LDRL, this equated to 87% using DRL. An additional 13% of respondents were not aware of DRLs in use.

Conclusion: Staff awareness of DRL needs to be increased to ensure DRL are adhered to both locally, nationally and internationally. Smaller countries without DRL can compare their typical patient dose quantities in present practice to DRL already established in other countries.

An Analysis of the Role of the Medical Dosimetry Educator
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Purpose: Medical Dosimetry is a relatively new field in the allied professions that has gained significant recognition in radiation oncology. Medical Dosimetrists work very closely with other medical professionals in the management of cancer. Individuals desiring to enter the profession have several options for education. Medical Dosimetry educators have the responsibility of teaching students the skills they need to function as entry level dosimetrists.

Methods: Design: -The study was conducted using survey methodology to analyze the role of the medical dosimetry educator
Project Sample: -Consisted of 19 JRCERT accredited medical dosimetry programs. There were 13 respondents, which yielded a 68% response rate.
Survey Questionnaire: -The survey was divided into 5 areas: Program Information, Medical Dosimetry Educator Information, Roles & Responsibilities of Medical Dosimetry educators & recommendations for preparation, Recommendations for Future Medical Dosimetry educator preparation and Perceptions of new educational requirements
Project Steps: -An e-mail was sent to the medical dosimetry educators explaining the purpose of the study and asking them to complete the survey. The survey was administered on SurveyMonkey. Approximately 2 weeks after the initial e-mail was sent, a follow-up e-mail was sent.
Results: The survey tool analyzed the data and gave percentages for the questions, with the exception of the open-ended questions and responses.

Results: The Medical Dosimetry Educators reported they have experienced higher student quality and better student outcomes as a result of the new educational mandate. The educators also reported that they received the majority of the training to do their jobs while on the job but suggested that future educators obtain formal training.

Conclusion: While the educational requirements for medical dosimetrists have increased due to educational programs shifting from on-the-job training/certificate programs to university programs, the job demands for medical dosimetry educators have increased as well. As a result of this, educators reported having faculty roles at their sponsoring institutions. Lastly, medical dosimetry educators have stated that they feel that more formal training is needed for future medical dosimetry educators.

RADIOTHERAPY

Evaluating Secondary Thyroid Dose in Total Breast Irradiation
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Purpose: The aim of this research was to determine if thyroid dose during total supine breast irradiation can be reduced by using specific set-up methods. Research shows that there is indirect radiation dose to the thyroid gland during total breast treatments. The thyroid gland is relatively radiosensitive and exploring the indirect radiation dose to the gland with the use of common supine breast set-up methods could inform therapists how to decrease scatter dose to the thyroid gland.

Methods: Using an adult anthropomorphic phantom with breast attachments six common supine breast techniques were simulated, planned, and treated using 3-D conformal plans. Each treatment technique was performed on a 6MV linear accelerator with thermoluminescent dosimeters (TLDs) placed in the thyroid location of the phantom. This was repeated seven times for each treatment method. The TLD readings to the thyroid area were compared between each type of treatment method (Half Beam Blocked, Pin and Shift, Single Isocenter, Field in a Field, Half Beam Blocked with a supraclavicular field, Pin and Shift with a supraclavicular field, and Three Field Single Isocenter).

Results: When comparing total breast irradiation methods without the supraclavicular field, the Field in a Field plan had the lowest scatter reading to the thyroid area of the phantom. The highest scatter reading was with the Pin and Shift method. When plans were compared that included a supraclavicular field, the Pin and Shift method again had the highest scatter reading to the thyroid area. The lowest scatter reading when comparing three field breast methods was the Half Beam Blocked method.

Conclusion: When considering specific treatment methods for breast cancer, avoiding the Pin and Shift method for tangents-only treatments and three field methods which include the supraclavicular nodes, may be a viable way to reduce scatter dose to the thyroid gland. Using the Field in a Field method for breast tangents-only is a feasible way to reduce scatter dose to the thyroid. The Half Beam Blocked method demonstrated lower thyroid scatter readings when compared to the other three field methods. More research is needed concerning scatter dose to the thyroid gland in breast cancer patients. This study hopefully will add practical knowledge about reduction of scatter dose to the thyroid gland breast cancer patients.

Dosimetric Comparison of Left Sided Breast Cancer Radiotherapy between Self-Held Respiration Monitoring Device (SHRMD) for Deep Inspiration Breath Hold (DIBH) and Free Breathing (FB)
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Purpose: Reduction of cardio-pulmonary radiation doses can be achieved using DIBH in radiotherapy for patients with conserving surgery of left breast cancer. Our team in the Hong Kong Sanatorium & Hospital has designed a monitoring device which can trace the respiration motions of patients during radiotherapy. This SHRMD provides light signal with
sound notification to guide the patient during their breathing cycle, it assists both patients and therapists by notifying that the breathing threshold is within the optimal range. This study is to evaluate the potential dosimetric benefits by using the SHRMD for DIBH compare with FB.

**Methods:** 16 Left breast cancer patients who underwent breast conservative surgery and planned for irradiation of chest wall with tangential beams only were selected. Two sets of planning CT scan were acquired with FB and DIBH respectively. Tangential opposed treatment plans with FB and DIBH were generated for each patient. Dosimetric parameters including Dmax, Dmean and D50 of the heart and left anterior descending coronary artery (LAD), Dmean and D50 of the left lung were compared. Non-parametric signed rank test was used to estimate statistical significance of the differences between dosimetric values of the above OARs for the two breathing techniques.

**Results:** DIBH showed that there was:

1. **i)** reduction of heart Dmax (29.9%, SD 15.6%, *p*=0.00024), Dmean (16.6%, SD 9.9%, *p*=0.00024) and D50 (7.3%, SD 4.2%, *p*=0.00012)
2. **ii)** reduction of LAD Dmax (41.6%, SD 18.3%, *p*=0.00024), Dmean (31.9%, SD 32.9%, *p*=0.0081) and D50 (27.5%, SD 31.2%, *p*=0.001)
3. **iii)** no difference in Dmean and D50 of lung between DIBH and FB

**Conclusion:** This study demonstrated the potential for DIBH to reduce the risk of cardiac mortality for the common technique of adjuvant irradiation after conservative surgery for breast cancer.

**The Quest for Excellence in Radiation Therapy Education: The Effectiveness of Patient Education in a Classroom Setting**

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**Purpose:** Patients actively seek information prior to radiation therapy. An effective patient educational program should incorporate different teaching strategies in order to accommodate a variety of learning preferences such as written material, audio-visual aids and facilitation of group discussion during teaching sessions. The purpose of this study was to determine the effectiveness of prostate patient teaching sessions in a classroom setting.

**Methods:** A 5-point Likert scale survey was designed and distributed to prostate cancer patients undergoing curative radiation therapy. Twenty-four prostate cancer patients participated in the study. Patients received two surveys to complete; one before and one after the group teaching session. The pre-teaching survey contained 5 questions to measure a baseline of patients’ knowledge of radiation therapy and their psychological well-being. The post-teaching survey contained 13 questions that assessed patient satisfaction of the group teaching session. Survey results were tested for statistical significance using a Sign-test (p value<0.05 considered to be significant) and the Kruskal-Wallis test.

**Results:** Survey responses highlighted the impact of the group teaching sessions on patients’ psychological state, understanding of radiation therapy, information retention, and the overall learning experience. Patients indicated that anxiety levels were reduced after the group teaching session, and that they were more aware of treatment-related side effects. Patients stated that the classroom setting created an effective learning environment for receiving information and engaging in group discussion.

**Conclusion:** This study indicates that group teaching sessions are an effective model for delivering radiation therapy patient education. Overall, prostate cancer patients were satisfied with the group-based education session. Most notably, it was determined that group sessions were effective in reducing anxiety levels in patients receiving curative intent radiation therapy. Furthermore, patients expressed an increase in awareness of potential treatment-related side effects and the management of these effects after attending the group teaching session.

**Augmenting a Radiation Therapist Research Culture across a Multi-Campus Service**

Nigel J Anderson
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**Purpose:** Peter MacCallum Cancer Centre (Peter Mac) is Australia’s largest public radiation therapy provider, operating five campuses across metropolitan Melbourne and the state of Victoria. Radiation therapy technician-driven research is critical to drive innovation, professional development and improve patient outcomes. However, providing an integrated research approach to a diverse Peter Mac workforce of 200+ radiation therapy technicians poses many challenges. The sheer weight of staff numbers, geography and differing priorities was fragmenting effective research pathways.

In late 2015, a new research model was introduced to respond to these challenges. The vision for radiotherapy driven research within the new model was to develop an equitable, integrated and transparent environment to enable multi-level radiation therapy technician engagement across the organisation, regardless of previous research experience.

**Methods:** Numerous initiatives have resulted from the research model, including:

i) An overarching, ethics-approved retrospective treatment planning study protocol, to facilitate expedited evidence based technique development.

ii) A standardised research project initiation pathway with a central project repository, enabling accountability and cross-campus transparency.

iii) An automated publication bulletin of current literature to facilitate ongoing professional development and currency of practice.

**Results:** In the 2 years since the introduction of the new research model, research outputs have increased significantly. Currently, 19 radiation therapy technician-driven projects are active, with many enjoying cross-campus collaboration. Externally delivered presentations have increased from 6 in 2016 to 20 in 2017, with a further increase forecast for 2018. Furthermore, many are on track for publication translation.

**Conclusion:** This aim of this presentation is to detail Peter Mac’s newly-formed research structure, to provide insight into potential application in the wider radiation therapy community, and scope for international collaborative links across our rapidly evolving profession.

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**Barriers in Voluntary Error Reporting in Radiotherapy: A Case of an Oncology Centre in Botswana**

Sindiso Nleya¹; Linnet Nhari; Godfrey Azangwe; Polite Mukwada and Lidion Sibanda

¹National University of Science and Technology, Zimbabwe

**Purpose:** Voluntary error reporting is an important cyclic audit tool used in radiation oncology to promote a radiation safety culture. Identification, evaluation and ratification of barriers to voluntary reporting forms the three pillars of the process. Although there was an error reporting policy framework at the research site anecdotal evidence showed that errors were under reported. Tentatively, the aim of this study was to explore barriers to voluntary error reporting in order to evaluate circumstances leading to their occurrence and their subsequent handling.

**Methods:** Data was collected using both passive and active data sources through a prospective naturalistic observation and a survey method. Observation of practice during external beam therapy and brachytherapy were conducted to elicit any errors in the treatment application processes and the reporting practices. A semi-structured questionnaire was used to solicit the opinions of the radiographers pertaining to errors in reporting.

**Results:** There was overwhelming statistical evidence (p=0.07) that errors were underreported. Identified barriers included extra work involved in generating a report (88%), staff shortage (84%), interrogative investigation (78%), fear of disciplinary actions (50%), lack of objectivity in the assessments of error reports (72%), lack of positive feedback on reported errors (84%) and lack of motivation to report errors (50%) and lack of team spirit (50%).

**Conclusion:** It can be concluded that main causes of underreporting errors can be addressed within the research site by socialising radiographers towards self-introspection and policy makers towards increased dialogue and implementation of policies supporting team spirit and professionalism.
GENERAL IMAGING

Chiropractic Radiography - Essential Expectations

Brendan Corr
Faculty Radiographer, Canadian Memorial Chiropractic College, Canada

Purpose: As Faculty Radiographer at CMCC, it is my responsibility to prepare students in Years 1 and 3 to understand the effective and legitimate use of radiography in diagnosis and treatment by chiropractors. I work very closely with chiropractic radiologists and we integrate our programs as closely as possible and remove "vertical silos" within the courses.

Methods: We started out by coordination subject content in year 1 by planning with Diagnostic Imaging and Anatomy to ensure students received fundamental instruction before challenging both radiographic performance and interpretation skills. This process is continued in Year 3 with detailed instruction in radiographic techniques, including practical assessment before students enter Year 4 and clinical experience.

Results: Chiropractors in Canada are authorized to request and perform radiographic examinations to aid in diagnosis and treatment of conditions which rely on spinal alignment and therapeutic manipulation to improve quality of life for the patient. These examinations are crucial to the chiropractic process but must be exercised cautiously to reduce patient exposure unnecessarily. By creating this awareness and knowledge-based practice, the needs of both patients and practitioners are being met.

Conclusion: As more chiropractors choose to request examinations through external imaging clinics, it is vital that those facilities understand chiropractic expectations in examination and interpretation.

Digital Imaging & Social Media “What happens in the hospital doesn’t always stay in the hospital”

Tosca Bridges Taylor
Education Coordinator/ Radiology Instructor/ Radiologic Technologist, John Muir Health, USA

Purpose: Digital imaging and social media have forever changed the landscape of how we communicate and transfer digital images and information. With the incorporation of the electronic medical record it has streamlined the process of sharing medical records and getting accurate diagnosis.

Methods: The methods of processing this information more expeditiously has come at a cost of increased patient privacy and confidentiality breaches.

Results: The results of the information highway have blurred the lines between what is medically and ethically acceptable for posting on social media and what is a violation of governmental laws set in place to protect the patients’ medical record.

Conclusion: To avoid consequences such as having your radiology license repealed, ruining an organizations reputation, or losing you job! We must stay diligent and responsible when posting images online.

Smartphone Use in Healthcare Facilities: A Review of the Literature on Benefits and Associated Risks

Lori Boyd1 and Dr. Celeste Lawson, Natalie Nguyen
1Senior Lecturer, Monash University, Australia

Purpose: The combination of increased accessibility and technological advancement has encouraged the prevalence of smartphone usage amongst the medical community, which in turn, has changed the landscape of how healthcare is practiced. A review of the literature was conducted to evaluate the influence of smartphone adoption on the delivery of care, and in particular, to identify the benefits and associated risks with smartphone use. An analysis of potential risk mitigation strategies was also performed.
Methods: A systematic review of literature published after 2012 was undertaken using keywords on Scopus and Ovid MEDLINE databases. Applying exclusion criteria resulted in 33 relevant articles that were reviewed and analysed for the purpose of this review.

Results: Smartphone apps provide healthcare practitioners improved access to medical resources and more options for efficient communication compared to traditional pagers. There are risks associated with smartphone use in clinical settings, such as cross-transmission of nosocomial pathogens or as a source of distraction, although risks can be managed through regulation and guidelines.

Conclusion: Smartphone use in a clinical setting provides benefits for patients, provided risks are adequately managed. This systematic review revealed that there are no studies that assess the direct implication of these on patient outcomes. Future studies should therefore endeavour to quantitatively correlate smartphone use with patient-related clinical outcomes.

Technological Innovation - Friend or Foe? What if we did nothing at all?
Elen Moyo
Director of Radiation Therapy, University Health Network, Canada

Purpose: The rate of change is speeding up exponentially across technologically-driven professions such as Medical Radiation Technologies. Some have argued that automation will transform healthcare professions just as powerfully as machine computing did at NASA. That organizations and professions struggle to cope with technological innovation is well documented in change literature. For Medical Radiation Technology professions, stakes are high for maneuvering quickly to add value to patient care. However, when professionals do not see the benefit of changing or prospects of success, they will resist adapting to technological innovation. To motivate radiation therapists at a large, North American cancer center to actively engage in adapting to technological innovation, small focus groups were conducted.

Methods: Focus group participants included management and radiation therapists who work in treatment planning, education, treatment delivery and advanced practice. Participants considered the question of ‘what if we did nothing at all about the changes brought by technological innovation?’ Four other questions were posed first in order to frame the main question. (What does all this mean to me? What excites me about all this? What concerns me if anything? What could I possibly do about this?) At each of the nine sessions, small group responses were taken up in a large group and are to be analyzed for themes before being communicated back to all radiation therapists within a month of the last focus group.

Results: The majority of the preliminary results reflect a measured excitement and anticipation of technological innovation as a friend, provided radiation therapists actively engage in shaping the change. A few responses report apprehensions about skill enhancement requirements, management support and potential displacement.

Conclusion: Engaging radiation therapists in considering technological innovation seems to create a healthy sense of urgency around the need to adapt.

Health Care Technology Today: A Living and Breathing Ecosystem
Stacy De Gale
Physical Therapist, Petrotrin, Pointe-a-Pierre, Trinidad & Tobago

Purpose: As all professions continue to expand their roles and functions; and patients/clients continue to demand faster and improved services; and employers demand increased accountability while expecting increased productivity in less time so as to satisfy the financial bottom line; discussion of improving standards in healthcare is necessary. With all these demands, we are expected to become more efficient with our time and at the same time, generate income. How can we realistically achieve this? Technology is the solution. We are sometimes afraid to utilize technology because of fear, resistance to change or because we think our work will become harder. However, technology is an ecosystem which we should not be afraid, but rather embrace the multiple numbers of possibilities it can provide.
**COMPUTED TOMOGRAPHY**

**Shielding in CT – An Update for 2018**

Daniel DeMaio  
Radiography Program Director, University of Hartford, USA

**Purpose:** This lecture begins with an overview of the current state of overall dose reduction initiatives in computed tomography (CT).

**Methods:** The current controversies regarding CT dose will be outlined. The primary focus will be the use of shielding during CT to reduce patient dose. The benefits and proper utilization of lead-equivalent shielding will be reviewed. The ongoing controversy regarding the proper use of bismuth in-plane shielding will also be discussed, including literature-supported best practices for the continued use of bismuth shielding.

**Results/Conclusion:** Participants will learn how to improve their utilization of shielding for appropriate CT examinations in their own practice.

**Diagnostic Reference Levels in Routine Adult and Paediatric Computed Tomography Examinations: A Systematic Review**

Idris Garba¹, F. Zarb, M.F. McEntee, S.G. Fabri  
¹Radiographer (Lecturer), Bayero University Kano State, Nigeria

**Purpose:** Different methods of establishing diagnostic reference levels (DRLs) exist. This review aimed to evaluate published studies establishing DRLs for the most common adult and paediatric computed tomography (CT) examinations worldwide and identify the methodologies applied to establish them.

**Methods:** Five publication databases (CINAHL, Medline, ScienceDirect, PubMed and Academic Search Complete) were searched in addition to grey literature manually searched using Google Scholar.

**Results:** Forty (40) articles were selected for final review. The main methodologies used to establish DRLs were based on either phantom or human measurements. DRLs established using human data are higher than those obtained using phantoms. Descriptive and inferential statistical analyses were performed on adult and paediatric DRLs indicating variations in DRLs which were only statistically significant for adult brain CT.

**Conclusion:** Further research is required to determine the cause of variations in DRLs between centres and countries for the same examination.

**Keywords:** CT; DRLs; adult; paediatrics

**Interest of MRI in the Diagnosis of Osteo-Articular Pathologies at General Hospital DOUALA**

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Senior Radiographer, Hospital General de Douala, Cameroon

**Purpose:** Osteo-articular pathology have more benefited from the all medical technique imaging in the particular from MRI which have any advantage in osteo-articular exploration. This method of imagery is recent in our country and its establishment is still rare there. Objective: evaluate the interest of MRI in the diagnosis of osteo-articular pathologies.

**Method:** cross-type descriptive study during four months about 34 patients. It was carried out in the Services of Radiology of the HGD and the CIMD. The acquisition of the images was done on two apparatuses IRM of Hitachi mark of 0.4T of intensity. The collected data were based on the analysis of a data sheet.

**Results:** Thus, 340 patients were retained for our study, 230 men and 110 women. The sex ratio was 2. The mean age was 37.6 with extremes between 6 and 61 years. The social strata were dominated by company executives (26,5%). Trauma and pain were the most frequent indications. The lower limb (85.3%) and particularly the knee (58.8%) were more realized than the upper limb (14.7%). The used protocol was specific to each segment and was based on SE (100%), FSE (82.4%), EG (47.1%), FS (55.9%) and IR (44.1%) sequences T1 (100%), T2 (100%), DP (67.7%) and T2 * (47.1%). 97% of IRM pathological and were dominated by traumatic pathologies (38,2%) and degenerative (20,6%), from where the agreement IRM- clinic was 97%.
**Conclusion:** MRI explores during the same exam all the osteo-articular system. It permitted to detect 97% of pathologies which affect this system. However, it availability is limited in our country.

**Keywords:** MRI, osteo-articular pathologies, Douala

**Contrast Medium Optimization for Low Dose by Prospective ECG-Triggering Coronary CT Angiography using 256-MDCT**

Jie Liu
Radiographer, the First Affiliated Hospital of Zhengzhou University, China

**Purpose:** To investigate the feasibility of reducing contrast medium (CM) for prospective ECG-triggering coronary CT angiography.

**Methods:** Ninety patients undergoing 100 kV Axial-mode prospective ECG-triggering cCTA were enrolled. The patients were included, if they had heart rate ≤ 100 bpm, cardiothoracic ratio ≤ 0.5, ejection fraction ≥ 55%. The patients were randomly assigned to 3 CM injection protocols: group A (n=30) 0.7 ml CM (Ultravist 370) per kg patient weight; group B (n=30) 0.6 ml/kg; group C (n=30) 0.5 ml/kg. In all groups, 50 ml saline was injected as chaser and injection speed of CM and saline was 5–6 ml/s. The CT values of superior vena cava (SVC), pulmonary artery (PA), ascending aorta (AA), left ventricle (LV), left main artery (LM) and proximal segment of right coronary artery (RCA) were measured. The image quality of coronary artery was evaluated with a 16-segment scheme on a 4-point scale (1-excellent, 4-non-diagnosis).

**Results:** The body weight of 3 groups was not significantly different (75±12, 75±9 and 76±13 kg, p = 0.819). The CT value of SVC was significantly different (145.8 ± 74.8, 103.2 ± 39.4, and 83.2 ± 27.6 HU, p < 0.001). The CT value of PA was significantly different (197.9 ± 104.6, 127.7 ± 50.4, and 91.6 ± 31.3 HU, p < 0.001). The CT value of LV was significantly different (445.7 ± 76.2, 428.2 ± 70.6, and 387.1 ± 82.1 HU, p = 0.018). However, The CT value was not significantly different on AA (456.1 ± 61.6, 451.9 ± 64.1, and 443.5 ± 78.2 HU, p = 0.738), LM (466.2 ± 82.2, 476.3 ± 75.7, and 455.0 ± 83.9 HU, p = 0.767), and proximal segment of RCA (453.8 ± 68.2, 453.6 ± 75.7, and 451.4 ± 75.2 HU, p = 0.981). The mean image quality score was 1.47 ± 0.01, 1.45 ± 0.02 and 1.44 ± 0.01 (p = 0.936). The volume of CM was 53 ± 8, 45 ± 8 and 38 ± 6 ml for 3 groups (p < 0.001).

**Conclusion:** CM can reduce to 0.5 ml/kg (185 mg Iodine/kg) for prospective ECG-triggering cCTA using 256-MDCT without compromise diagnostic image quality in selected patients. Clinical Relevance: Due to less than 1 s scan time of cCTA, CM can be reduced to 0.5 ml/kg, which can alleviate the burden of contrast induced nephrology.

**WE CARE**

**Because We Care**

Cheryl Turner¹, Adams, R., Brown, K., Jackowski, M.

¹Chief Learning Officer, ZDi Solutions, LLC, USA

**Purpose:** Current research demonstrates that radiation therapists oftentimes demonstrate signs of significant stress due to their working environments, citing incivility, poor team relationships, mismanagement, emotional trauma, and employee bullying. It was found that despite the overwhelming stressors associated with cancer care, patients served as motivating factors for radiation therapists’ continuance in the profession. Radiation therapists claimed that the emotional connections to their patients outweighed the burdens of associated stressors.

**Methods:** A phenomenological qualitative method was used to explore the experiences of radiation therapists in select regional cancer centers. The data collection process included individual interviews, online focus groups, and personal journaling by the participants, whom were chosen through purposeful sampling. Data analysis was conducted via a hermeneutic interpretive approach following a systematic analytical guide as detailed by previous qualitative researchers.

**Results:** Findings suggested that the radiation therapists experienced substantial stress in their work situations, which they most often attributed to uncontrollable job situations stemming from various sources; and, they struggled with methods of coping, likely choosing to continuing working through stressful situations in lieu of demonstrable coping.
However, the radiation therapists attributed their professional inspiration to be the caring relationships between themselves and their patients.

**Conclusion:** Some of the results were consistent with previous stress and burnout research; however, participants did not exhibit signs of depersonalization when interacting with patients. Instead, patients proved to be the greatest sources of motivation for RTTs returning to work each day.

**Ethics Presentations at CPD Events: Do we care about the patient?**

Hesta Friedrich-Nel¹, L Munro

¹Head of Department, Central University of Technology, South Africa

**Purpose:** The continuing professional development (CPD) guidelines of the Health Professions Council of South Africa (HPCSA) include ethics, human rights and medical law. Practitioners must obtain a specified number of ethics continuing education units (CEUs). Over the decades the Society of Radiographers of South Africa (SORSA) has offered on-going CPD activities for radiographers to obtain their mandatory ethics CEUs. To date no studies have been undertaken in South Africa to determine whether the content of CPD activities meets the HPCSA ethics guidelines in terms of whether radiographers do apply knowledge gained in their interactions with patients. In view of this gap in the literature this study aimed to determine whether South African radiographers are of the opinion that the content of ethics CPD activities enabled them to apply the information to benefit patients, indicating the ‘we care’ attitude.

**Methods:** A questionnaire was used to conduct a quantitative, descriptive, and exploratory survey. Invitations to participate in the online survey were placed on various regional branches’ SORSA Facebook pages, and the SORSA website. The questionnaire had three sections: demographic information, ethics as offered at CPD activities to meet the HPCSA guidelines, and the definition of ethics. The questionnaire was pilot tested before implementation.

**Results:** There was a 41% response rate. The majority (86%) of respondents stated they were familiar with the HPCSA CPD guidelines. Forty-six percent (46%) stated they were familiar with the topic of ethics (moral philosophy) being concerned with human character and conduct; 46% stated they could apply the principles in their workplace; and 27% were of the opinion they needed to learn more about the topic.

**Conclusion:** Gaps were identified for future CPD events so that we can attain the ‘we care for our patients’ goal.

**Accreditation - Because ‘We Care’**

Venice Gill

Queen Elizabeth Hospital, Barbados

**Purpose:** The external evaluation and management of hospital quality are two intimately related aspects of the same phenomenon: the need to improve the quality of health services and provide confidence of this quality to all stakeholders. Hospitals today are faced with a variety of challenges which include an increased demand for services, decreasing budgets, and a lack of available beds. Accreditation is a way to support the development of a sustainable culture of safety and quality improvement that becomes core to an organization. This drives quality improvement and patient safety to the benefit of patients, families, staff, stakeholders, and the community.

**Methods:** Accreditation is one of the most important tools health care and service organizations have in their toolbox to help providers save and improve lives. The Queen Elizabeth Hospital, Barbados has embarked on a comprehensive program to assess a broad range of services, such as governance, leadership, infection control and prevention, inpatient services, diagnostic imaging and more. In addition to improving our processes and systems, accreditation sends a strong signal to our community and marketplace that we take quality seriously.

**Results:** Staff engagement and communication across the organization has improved as a culture of quality and safety is developed. Quality improvement activities have been prioritized to improve patient safety. The process shows our commitment to a safe, patient-focused environment which decreases risks and associated liability costs. In an increasingly competitive environment, it differentiates our services from those of our competitors.
PROFESSIONAL DEVELOPMENT

Factors that Drive Continuing Professional Development in Radiographers of Trinidad & Tobago
Anushka Kattick-Mahabirsingh
Director, Infeemed Solutions & Supplies Ltd., Trinidad & Tobago

We Care – We are RTs
Stewart Whitley
Honorary Treasurer, ISRRRT

Radiographers and Radiological technologists play an important and pivotal role in the diagnosis and treatment of disease ad conditions.
This short presentation focusses on some of the professional aspects which Radiographers and Radiological technologists are committed to as well as exploring the challenges, privileges, responsibilities and the personal and team roles and qualities required of our profession.

Reflective Practice
Justin Mahabirsingh
Sales Director, Infeemed Solutions & Supplies Ltd., Trinidad & Tobago

Introduction: The capacity to reflect on action so as to engage in the process of continuous learning. The principles and approaches to reflective practice will be discussed together with the overall benefits of being a reflective practitioner.
Methods: An overview of the different approaches that can be used as a reflective practitioner is discussed. Each approach is reviewed from a theoretical and practical aspect. The importance of documentation to success as a reflective practitioner is also discussed.
Results: A sensitization of different approaches to reflective practice. Additionally, an understanding of practical methods for each approach will allow the reader to understand and apply in their own lives either professionally or personally.
Conclusion: Participants will have a better understanding of reflective practice and being a reflective practitioner.

RADIATION PROTECTION

Awareness and Knowledge of Radiation Dose and Associated Risks among Final Year Medical Students in Norway
Sundaran Kada
Associate professor, Western Norway University of Applied Sciences, Norway

Purpose: The number of medical imaging examinations that use ionizing radiation in Norway is increasing. For example, between 1993 and 2002 there was an overall increase of 15%. The number of computed tomography (CT) examinations doubled (11-21%) between 2002- 2008 and the total radiation dose from CT examinations was 79% in the year 2008 compared to 66% in 2002. The objective was to assess the knowledge of radiation dose and the associated risks with ionizing imaging examinations of medical students in their final year of training prior to graduating.
Methods: An online questionnaire was sent to all final year medical students from two universities. The questionnaire consisted of radiation dose and risk related questions, with multiple choices, only one of these choices was the correct answer. A ‘correct’ answer was given one mark and no mark was given for ‘incorrect/don’t know’ answers. The total mean score ranged from 0 to 11, with higher scores representing greater knowledge about radiation doses and the associated risks.
Results: Ninety-nine students completed and returned the questionnaire yielding a response rate of 45%. The total mean score was 3.91 out of possible 11. Only eighteen students scored more than five points (50%). Students who reported moderate confidence in their knowledge about radiation dose and risks, scored significantly higher than students who reported no confidence (p= 0.003). There was a moderate positive correlation between students that reported moderate confidence and radiation knowledge scores (rho= .301, p=.002).

Conclusion: Overall medical students’ knowledge of radiation dose and the risks associated with ionizing imaging examinations was reported to be low.

Ward Invasion: An Investigation into the Fears of Radiation Exposure by Non-Radiological Staff

Akayla Khadija Springer
COSTAATT, Trinidad & Tobago

Mobile x-ray units are specifically designed to be used in situations where patient that is to be examined cannot be transported to the hospital’s Radiology Department’s stationary x-ray equipment. There are special areas within the hospital (intensive care unit, recovery room and high dependency units) where the arrival of the mobile x-ray machine will be quite common, and for obvious reasons. The question is; are these x-ray units welcomed by staff in the aforementioned areas? On these wards, or as previously called ‘special areas’, the nursing personnel are often confronted and barraged with the sudden warning cry that signals the use of the x-ray machine, the cries often heard are of “x-ray”, “exposure” or a less clamorous cry of “get out of the way” by the radiographer.

There is no doubt about the benefits of x-rays for the patient, nor the need for it; however, nursing personnel, and other auxillary staff, whom work on these wards have a lot to worry about. The added stress created by the intrusion of the mobile x-ray unit is just “another nuisance”, as stated by a nurse. The worry then comes, about any risk or danger posed to him or her from these radiation emitting devices. The purpose of this research was to highlight any fears associated with mobile x-rays and derive a solution to those fears. Persons who are employed with healthcare institution, should be educated on the carrying methods in which to protect themselves from radiation, for there not to be fearful and render efficient care to their charges. To address the issue, an educational program or presentation was carried out at the Eric Williams Medical Sciences Complex to include all staff and civilians to eradicate the fears associated with mobile x-rays. The seminar encompassed the methods of radiation protection, the biological effects of radiation, as well as the long term and short term effects of radiation sickness.

The Relationship of Radiographic Techniques and Digital Radiography Exposure Index

Zhen Ong, Sim, W.Y. & Tan, X.W.

1Radiographer, Singapore General Hospital, Singapore

Purpose: Exposure index (EI) is useful in providing radiographers with an estimated exposure value received by the flat panel detector. However, EI is often under-utilised as no relationship between EI and radiographic technical factors has been established. Radiographers are unaware of how to utilise EI to benefit patients and optimise practice. Therefore, the study aims to investigate the relationship of various radiographic technical factors (kVp, mAs, collimation size, centring point, source-image distance (SID) and additional beam filtration) with EI.

Methods: The Alderson Rando phantom and Siemens Axiom Aristos and Ysio units with the Trixell detectors were used. Exposures were made on the phantom, and each factor was varied. Graphical relationships were plotted, and correlation analysis was performed on the data.

Result: Positive correlations between kVp and EI (r=0.988, p<0.05), mAs and EI (r=1.00, p<0.05), horizontal collimation and EI (r=0.988, p<0.05), vertical collimation and EI (r=0.897, p<0.05) were found. There were negative correlations between SID and EI (r=-0.990, p<0.05) and additional beam filtration and EI (r=-0.995, p<0.05). There was no correlation between upwards centring shift and downwards centring shift and EI. An increase in 2-5% kVp, or 10-12% mAs, or 1-3cm in horizontal collimation will result in a 10% increase in EI. An increase in 9-12cm in SID decreases EI by 10%. No significant changes were noted for the remaining parameters.

Conclusion: The technical competence of radiographers affects EI. Understanding this relationship is vital for radiographers to optimise radiographic factors to achieve images in the optimum EI range.
GENERAL IMAGING

Position of Radiographers in Quality Control Programmes in Tanzania
Stephen Samson Mkoloma¹, Hellen Kundasai Njau
¹Graduate Radiographer, Ocean Road Cancer Institute, Tanzania

Purpose: To establish the position and role of a radiographer in quality control programmes. No previous research was found in relation to Tanzania but researcher’s experience which is supported by various literature review reveal that radiographers are insufficiently used for quality control as well as quality assurance activities.

Methods: A quantitative cross-sectional design using a descriptive approach is used where a structured questionnaire developed by researchers using previous studies obtained through a literature review and in consultation with a statistician was sent to radiographers electronically via radiographers’ forums and e-mails. Radiographers who after being asked filled the questionnaire meant to automatically gave the consent, however information leaflet was attached with the question thereon. Statistical analysis was done using SPSS version 20 and Microsoft Excel 2003

Results: Majority of radiographers (78%) don’t participate in quality control activities in their respective hospitals, however 93% do only basic activities such as machine warm ups and dusting. 96% revealed that they don’t do it because of lack of equipment for the task and 72% need trainings.

Conclusion: Results show that radiographer have minimal role in Quality Control and Quality Assurance despite that they have that knowledge from their university studies. Also they reflected that they have zeal for it but supply of QA and QC equipment is challenging. We recommend provision of need equipment and trainings for radiographers. Without proper quality control measures, delivery of eminent and safe radiography may be compromised.

Key Words: Medical radiation, quality control, quality assurance, safe radiation, radiographers.

From an Osteoarthritic Knee and Hip, to the Conformis CT Protocol to the Customized Knee Implant
Didier Nussbaumer¹, Carolyn Bonaceto
¹Imaging Support Technologist, ConforMIS, Inc, USA

Purpose: Knee and Hip Anatomy, Knee Imaging, Knee Pathology.

Methods: Surgical Treatments, Conformis CT Protocol, Customized Knee Implant, CAD (computer-aided design).

Conclusion: Post-Surgical Radiographic Assessment, Patient Experience

Bauman’s Angle: A Relevant Tool in the Radiological Assessment of Bone Alignment in Reduced Supracondylar Fracture of the Humerus in Children
Mrs. Elizabeth Balogun¹, Dr. B.O Balogun, Dr.G.O Awosanya, Dr.G.T Adebule.
¹Radiographer National Orthopedic Hospital, Nigeria

Purpose: Supracondylar fracture of the humerus is the most common fracture of the elbow in children. Most are complete fractures and the diagnosis is usually obvious. A major problem in the post reduction management of these fractures especially after application of plaster, is the radiographic assessment of rotational and varus – valgus alignment. This study aims at comparing the Baumann’s angle between the injured and the uninjured side to assess the accuracy of reduction.

Methods: Radiographs of the elbow in 40 children receiving treatment for displaced supracondylar fractures of the humerus, 90% of which were due to falls from standing heights were analyzed at the fracture clinic of the National Orthopaedic Hospital, Lagos, Nigeria.

Result: 62.5% were males while 37.5% were females with mean age of 7.04 years. 95% of cases are extension fractures while 5% are flexion. The Baumann angle in the normal arm of the patients ranged between 60 to 76 degrees with a mean of 71.8. The Baumann angle at post-reduction best correlated well with that at follow-up greater than 5 degrees. Although excellent results were obtained in 60%, an overall satisfactory cosmetic outlook was obtained in a total of 97.5%.
Conclusion: Baumann’s angle is hereby recommended in displaced supracondylar fracture of the humerus. Comparative radiograph with the normal elbow is the best for a true Baumann’s angle.

MRI

Student Radiographer, COSTAATT, Trinidad & Tobago

This case study researches Agenesis of the Corpus Callosum in a 24-year-old male patient. This condition is considered to be partial or total absence of the Corpus Callosum in the brain. The patient had been involved in a Motor Vehicular Accident and arrived at a hospital. The doctors requested a Brain MRI with regular protocols to examine for any brain injuries. The condition was found accidentally, and it was astounding how the patient was functioning as normal before the MVA.

ULTRASOUND

The Role of Duplex Doppler Ultrasound in the Assessment of Patients with Abdominal Pain
Peters Ehiwe
Medical Imaging Scientist, Scarborough General Hospital, Trinidad & Tobago

Purpose: This paper discusses the potential role of ultrasound in assessing mesenteric compression and mesenteric ischaemia (used collectively to describe stenosis of the superior mesenteric artery, coeliac axis, and assume stenosis or occlusion of the inferior mesenteric artery) and their relation to abdominal pain in patients.

Background: Abdominal pain is a common condition and almost all patients that present for abdominal ultrasound with the clinical diagnosis: “abdominal pain, ?cause”, end up with ultrasound reports which read “normal study”. Despite the fact that chronic abdominal pain is a common complaint, ‘intestinal angina’ is diagnosed only infrequently. It is agreed that at least two of three splanchic vessels need to show haemodynamically significant or complete occlusion for symptoms to occur, and Doppler ultrasound has a role in selecting patients for more invasive investigations such as angiography.

Method: Using a pictorial essay I shall review the duplex Doppler findings of the mesenteric arteries, discuss the variations, the causes of these variations and the implications thereof.

Outcome: A great percentage of ultrasound scans performed on patients with abdominal pain are inconclusive. Most of the time the reports show no obvious visceral abnormality. At the end of this presentation participants will be sensitized in line with the causes of abdominal pain (intestinal ischaemia and angina, median arcuate ligament syndrome-MALS) when all abdominal viscera appear ‘normal’ on ultrasound. Participants will sensitized to porta hepatis haemodynamics, aortic flow haemodynamics, coeliac axis and superior mesenteric artery flow dynamics and the technical factors that affect the velocities in these vessels.

Keywords: Mesenteric ischaemia, intestinal angina, MALS (median arcuate ligament syndrome), angiography. Haemodynamics.

Renal Resistive Index Values among Patients with Hydronephrosis in Zimbabwe
Bigboy Tendai Rakata 1, Howard Mabari

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Purpose: Hydronephrosis, a condition that occurs when one kidney swells due to the failure of normal drainage of urine, can be of obstructive or non-obstructive origin. Hydronephrosis is one of the conditions diagnosed using ultrasonography. An effective diagnosis that differentiates obstructive from non-obstructive hydronephrosis must be done early to avoid a myriad of complications which can be caused by obstructive hydronephrosis. Grey scale
ultrasound is inconclusive in the evaluation of hydronephrosis. The renal resistive index (RRI) can accurately differentiate non-obstructive from obstructive hydronephrosis. RRI values vary according to race and ethnicity, however, no RRI had been established for the Zimbabwean population. In this study we determined the RRI values for a cohort of Zimbabwean patients.

Methods: A cross sectional study with quantitative data collection methods was done. A total of 89 patients, 57 with hydronephrosis and 32 with normal kidneys, were conveniently sampled. The determination of RRI values was done using colour Doppler. Spectral Doppler was used to demonstrate the arterial spectral waveform which was insonated using a 3mm Doppler gate. 3 RRI measurements were done in each kidney and the mean calculated to minimise operator error.

Results: The mean RRI values established were; 0.61±0.03 for normal kidneys, 0.79±0.05 for obstructive hydronephrosis and 0.63±0.03 for non-obstructive hydronephrosis. There were no significant differences between RRI values of the Zimbabwean cohort and that published for the American population. However, there were differences between the RRI for the Zimbabwean cohort and that published for the Korean population.

Conclusion: The findings of this cohort of Zimbabwean patients seem to agree with those of American population, further studies however, need to be done to generalise the findings to the entire Zimbabwean population.

Solving the Challenges of Technically Difficult Stereotactic Image-Guided Breast Biopsies: Lessons from the Frontline

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MM1-1

Purpose: New or developing micro-calcifications on mammogram are typically given a Breast Imaging Reporting and Data System classification of 4, and require further investigation. An effective method of obtaining histological samples is with the use of a stereotactic, image-guided biopsy. In clinical practice, several challenges occur when attempting to perform this complex examination, such as (i) difficulty positioning patients, (ii) appropriately positioning the micro-calcifications within the field of view, and (iii) troubleshooting inconsistencies between the clinical presentation of the micro-calcifications and the calculated target points. The aim of this presentation is to describe and illustrate various techniques to overcome some commonly seen obstacles using challenging clinical scenarios.

Methods: Adjustments to patient positioning, as well as various radiological techniques using a prone stereotactic device will be presented and illustrated using clinical case studies. This includes approaching the target from non-standard tube angles, as well as several innovative x, y and z axis error trouble shooting techniques.

Results: Developing a spatial understanding of the complex interplay between patient positioning and the position of the micro-calcifications relative to the stereotactic biopsy device, can assist in the positioning of the target area accurately within the imaging field of view. The case studies presented will illustrate commonly seen challenges, key points in the decision-making process, and associated mathematical as well as axes adjustments necessary to successfully obtain useful samples.

Conclusions: Stereotactic, image-guided biopsy is a vital component of an accurate diagnosis for many breast patients. This is however, a technically complex and demanding procedure that relies on the positioning skills and experience of the breast imaging technologist. This presentation used a case study approach to illustrate various techniques to overcome some common obstacles to successfully obtaining a viable histological sample.
WORKSHOP

The Paradox of the Radiographer: Who, What and Where are We?
Cynthia Cowling¹, Susan Ward²
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Purpose: At the completion of this workshop participants will:

- Explore their own work and psycho-social environment to determine and implement change
- Understand the factors that impact employee engagement
- Recognise the relationship between patient experience and radiography pride and self-esteem
- Identify strategies to improve inter-professional communications

Radiographers are essential to the effective provision of health care by supporting important diagnostic procedures that provide information for decision-making. This information can determine an entire course of treatment for a patient. They encounter patients at a time when they are vulnerable, often in pain and quite frequently worried as to what the imaging study will reveal. Given this context, radiographers should have intense pride about the care they provide and self-esteem about their profession.

Research would suggest that they do not always have high levels of self-esteem and feel under appreciated by their fellow healthcare associates. For example, they often work in a time managed environment which gives little time for the critical psycho-social aspect of their work and compromises interaction with the patient.

This workshop will explore the following topics in an interactive method:

- What can managers and radiographers learn from a recent cross-cultural examination of issues related to the sociological practice of radiographers
- How do elements of pride and self-esteem impact employee engagement? and what does that mean to the patient experience?
- How is employee engagement linked to quality patient care?
- How can health care organizations and Imaging Managers recognize radiographers to acknowledge their contribution and foster pride and engagement amongst the profession? What works—what doesn’t and how will you know?
- How can radiographers better inform other health care professionals about their knowledge, abilities, and role.

COMPUTED TOMOGRAPHY

Optimisation in Abdominal CT: Comparison of Image Quality between Filtered Back Projection and a Model-Based Iterative Reconstruction.
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Introduction: Collective effective dose from Multi Detector Computed Tomography (MDCT) is 70% although CT accounts for approximately 10-15% of all medical imaging procedures. CT of the abdomen delivers one of the highest radiation doses therefore compliance with radiation protection and patient safety principles is necessary. Iterative reconstruction (IR) may facilitate dose reduction without any impact on image quality.

Purpose: To estimate the dose reduction potential of IR by comparing visual image quality in an abdominal CT examination with filtered back projection (FBP) and IR strengths 3 and 5.

Methods: A selection of 50 patients undergoing a clinical abdominal CT examination were recruited. Siemens Somatom Force was used to obtain 3 data sets at 30%, 70% and 100% dose levels for each patient. Image quality was assessed using 4 image criteria from the European Guidelines for Image Criteria for CT as well as overall noise and...
image quality. Five radiologists with varying experience scored the images on a 5-point Likert-type ordinal scale. Visual Grading Regression (VGR) was used to determine the potential dose reduction and weighted kappa ($K_w$) to calculate inter-observer and intra-observer agreements. Significance level was set at $p = 0.05$.

**Results:** Log mAs values showed a significant strong effect of the iterative reconstruction algorithm with dose reduction potential of 22-47% at strength 3 and 34-74% at strength 5 compared to FBP ($p < 0.001$). Inter-observer reliability showed an agreement of 71-76% with a ($K_w$) ranging from 0.201 to 0.286. Intra-observer reliability ranged from 0.525 – 0.783 ($K_w$) with percentage agreement of 82-96%.

**Conclusion:** Improved image quality is obtained using model-based iterative reconstruction algorithm showing an increase in potential dose reduction with increasing strength compared to FBP for almost all criteria assessed.

**Key Words:** Dose, Computed Tomography, Iterative Reconstruction, Abdomen, FBP

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**Study on the Personalized Scanning Protocol of Low-Dose Contrast Media with the Third-Generation Dual-Source CT for Coronary Computed Tomography Angiography**

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**Purpose:** To evaluate the personalized scanning protocol of low radiation dose and low-dose contrast media by using third-generation dual-source CT scanner for coronary artery CT angiography (CCTA) with a prospective Turbo Flash scan sequence and comparing the different dosage of contrast media.

**Methods:** The DSCT with a prospective Turbo Flash scan sequence was performed in 60 patients whose heart rate was less than 80 bpm and BMI was unlimited. All the patients were randomized into two groups. The dosage of contrast media in group A was per kilogram of body weight multiplied by 0.5ml/kg and the flow rate was 5 mL/s (350 mgI/mL). In group B, the dosage was per kilogram of body weight multiplied by 0.6ml/kg, and the flow rate was the same. According to the Care Dose 4D technology of DSCT, the optimal voltage of each patient was selected automatically, and the raw data were reconstructed by ADMIRE iterative algorithms technique. The differences of age, BMI and heart rate of patients were compared, and the background noise, signal-to-noise ratio (SNR), radiation dose, CT value and contrast-to-noise ratio (CNR) of the aortic root and each segment of the coronary artery were measured and compared. The image quality of coronary artery in two groups was compared by the 4 points method (1~4 points, excellent ~ to nonassessable) segment-based.

**Results:** The image quality of two groups can meet the requirements of clinical diagnosis. There was no significant difference in the gender, age, BMI and heart rate of the patients in two groups. Similarly, there was no significant difference in the image noise, SNR, radiation dose and CNR of coronary artery in each segment in two groups ($p>0.05$). The mean effective radiation dose (ED) was 0.78±0.24mSv, the average dose-length product (DLP) was 56.01±17.70mGy*cm, the CT dose index (CTDI) was 3.40±1.02mGy, and there was a significant difference in the average dosage of contrast media in two groups ($p>0.05$; Group A: 36.2±6.1ml; Group B: 42.7±8.4ml). There was no significant difference in the CT values from the 3 main coronary artery and the proximal and distal segment in two groups ($p>0.05$), while the CT values from left atrial and left ventricular had significant difference ($p<0.05$) which was less in group A than B. The image quality of coronary artery in two groups had no significant difference (Group A,1.53±0.97, Group B,1.53±0.90, $P=0.81$). The rate of which the coronary artery could be evaluated in both group was more than 97%.

**Conclusion:** Use prospective Turbo Flash scan protocol in third-generation DSCT for patients with normal heart rate can obtain a satisfied clinical diagnostic image while the effective radiation dose is less than 1mSv. Calculate the dosage of contrast media with per kilogram of body weight multiplied by the 0.5ml/kg, can examine the CCTA in low-dose contrast media.
Comparing the Contrast Enhancement of Head & Neck CT Angiogram from the Left and Right Elbow Intravenous Contrast Injection.

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Purpose: The aim of this study is comparing the contrast enhancement of the head and neck CT angiogram that contrast injection is giving from either left or right antecubital vein, in order to evaluate which injection site is the best.

Methods: 40 cases of the head and neck CTA examination since 2016 were collected. Based on the location of intravenous injection, 20 left elbow cases and 20 right elbow cases were grouped. The measurements of contrast enhancement (CT number) in aorta arch, both common carotid arteries and both middle cerebral arteries were obtained. Contrast caused artifacts surrounding superior vena cava, brachiocephalic trunk, left common carotid artery and left subclavian artery were observed. The reflux length of the contrast medium in common jugular vein of the injection side was measured. The above data were used for statistical analysis to see which injection site was the best.

Result: The CT numbers of left common carotid artery of right antecubital vein group was higher than the left group (531.7±86.3 HU vs 462.0±100.3HU; P < 0.05), the similar results were observed in right common cerebral artery (471.7±54.2 HU vs 416.8±97.7HU; P < 0.05). The contrast enhancements of the other vessels were no significantly difference. In the number of contrast caused artifacts, right antecubital vein group was less than the other group (2.55 vs 2.1.45; P < 0.05). In the contrast of jugular vein reflux length, right antecubital vein group was shorter than the left elbow group (5.3±4.1 mm vs 17.6±11.4 mm; P < 0.05).

Conclusion: The intravenous contrast medium injection at right antecubital vein could give the best vessels enhancement when compared with the left-side intravenous injection in this study. It also displayed lesser artifacts to the surrounding anatomy, as well as shorter contrast agent reflux in the jugular vein than the left-side injection. Therefore, intravenous contrast injection at right antecubital vein could provide superior contrast enhancement for the Head & Neck CT angiogram.

RISK ASSESSMENT

Risk Assessment - An Introduction

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Introduction: Risk Assessment is the determination of the likelihood of an event taking place and the severity of outcome. It utilises five (5) key stages together with a risk matrix to help in analyse outcomes and controls.

Methods: A review of risk versus hazard will be reviewed followed by the stages of risk assessment. Part of this review will outline the hazard categories and hazard scenario. Following this will be a review of hierarchy of controls and how using the risk matrix helps is determination of areas of focus, identification of controls and the potential outcomes of the control measures.

Results: A sensitization of hazards and risks will be clear together with the steps involved in risk assessment that can be used in any areas of work.

Conclusion: Participants will have a better understanding of risk and hazards as well as the ability to perform a risk assessment in any job scope.

Medical Physicist Risk Assessment in Diagnostic Radiology

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Introduction: One of the main role and responsibility of a medical physicist is to protect and safe guard the patients, staff and public. One of the methods in which this can be done in a diagnostic radiology department is to develop a risk assessment for workers. By identifying hazards, safety procedures and protection techniques can be implemented.
Methods: A medical physicist perspective was taken when examining the roles and responsibilities of workers in diagnostic radiology, and various hazards were identified. These hazards were ranked as high-risk factors, medium-risk factors and low-risk factors based on severity and likelihood of occurrence. Finally, control measures were identified together with recommended mitigation measures.

Results: From the risk matrix, 41% of hazards were rated as high risk, 51% medium risk and 8% low risk. Hazards rated high risk included: ergonomics, ionising radiation, manual handling, work stress, mechanical, explosion and lead poisoning. Medium risk included: slips, trips and falls, manual handling, mechanical, burns, ventilation, occupational violence, air quality, ionising radiation exposure, cuts/abrasions and biological hazards, while, low risk factors found to be non-ionising radiation and temperature. Hierarchy of controls including elimination, substitution, isolation, engineering controls, administrative controls and personal protective equipment (PPE) were pinpointed for each hazard and associated solutions were proposed.

Conclusion: Highest risk factors found within a diagnostic radiology department were: ergonomics, manual handling and slips, trips and falls.

Medical Physicist Risk Assessment in Radiation Therapy
Nadira Nandial
Naparima Boys’ College, Trinidad & Tobago

Introduction: A Risk Assessment was done for the Medical Physicists job scope in Radiotherapy.

Methods: A risk matrix was used to identify the various hazard scenarios and frequencies to which a Medical Physicist is exposed to in the Radiotherapy Department. Suggestions of controls for the hazards identified were made and potential control after implementation

Results: Computer related hazards comprised eighty-three activities which had an associated risk of six to twenty. The most hazardous were electrical shocks, burns and bodily harm due to explosions. There were twenty-eight electrical hazards ranging from explosions which include corroded batteries, electrical shocks, electrical burns and fires. The associated risks for these ranged from sixteen to twenty and accounted for the largest risks in Radiotherapy. There were thirty-four measurement and field work hazards with associated risks ranging from six to sixteen. The most detrimental include: injury to head from falling debris, injury from falling from a ladder, hernia and back injury from lifting phantoms and slips, trips and falls.

Hazards of stress from workers or confrontational individuals are possible in five tasks and both have a risk factor of nine. Activities which include receiving Brachytherapy and Radiotherapy sources, spills and leaking sources account for nine potential hazard occurrences. These all have a risk factor of fifteen.

Conclusion: In Radiotherapy, risks were identified from electrical hazards, exposure to ionizing radiation, computer related duties, measurements and field work.

RADIOTHERAPY

Predicting Feeding Tube Needs in Head and Neck Radiotherapy Patients: Independently Validating a Feeding Tube Prognostic Tool
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Purpose: Head and neck cancer (HNC) and its treatment with radiotherapy (RT), are associated with dysphagia, malnutrition and weight loss. Enteral feeding via a feeding tube (FT) is a common method of patient nutrition supplementation during/immediately following RT. Advanced T-stage and level-2 nodal involvement (L2) have been internally associated with prolonged FT use. We have developed an easy-to-use prognostic tool to enable individualised FT prognostication based on these key clinical indicators. The aim of this study was to validate the prognostic value of this tool in predicting FT use.

Methods: Fifty-four patients (N=54) treated with definitive RT (+/-chemotherapy) were retrospectively analysed. T-stage, L2, prophylactic-FT insertion (Yes/No), FT-utilisation (weeks), and RT-inclusive percentage weight change were...
Quantification of Inter- and Intra-Fraction Positioning Errors in Patients of Hepato Cellular Carcinoma with Portal Vein Tumor Thrombosis Treated with LINAC Based SBRT using Active Breath Co-Ordinator System

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Purpose: With the technologic advancements in image guidance and dose delivery, stereotactic radiotherapy (SBRT) is being widely used in Hepato cellular carcinoma with Portal Vein Tumor Thrombosis (HCC with PVTT) cases as a noninvasive alternative to surgery. The purpose of this study was to evaluate the daily setup accuracy, inter & intra-fraction motion in these patients treated with Linac based SBRT using Active Breathing Co-ordinator (ABC), and to calculate the PTV margins required to account for the same.

Methods: 22 Treatment fraction datasets for 5 patients of HCC with PVTT treated with SBRT to a total dose of 40–60 Gy in 3-5 treatment fractions, were available. All patients were immobilized in supine position with Blue Bag cushion (Vacloc). Active Breathing Control (ABC) system was used for all patients to minimize tumor motion due to respiration. Pre- and post-treatment CBCT scans were registered with the bony anatomy of the planning CT to find inter- and intra-fractional patient positioning errors. These CBCT images were registered with the Gray Value (T+R) matching algorithm available in the XVI® CBCT software. The translational displacements in Medio-Lateral, Supero-Inferior and Antero-Posterior directions were recorded as X, Y and Z (cm) respectively while rotational displacements in pitch, roll & yaw directions were recorded as X/Y & Z (º) respectively for all pre and post CBCT scans. Mean and standard deviations were calculated for displacements in each direction, and resulting PTV margins were calculated based on Van-Herk formula.

Results: Total 44 (22 pre & 22 post) CBCT scans were analysed during the study. The pre treatment mean ± 1 SD translational displacements were 0.22±0.23cm left-right, 0.34±0.39cm supero-inferior and 0.32±0.27cm in antero-posterior direction, and rotation displacements were 0.79±0.62º pitch, 1.00±0.68º roll and 1.22±0.73º yaw, while the post-treatment (Intra-fraction) residual errors were 0.13±0.10cm left-right, 0.19±0.14cm supero-inferior and 0.22±0.14cm antero-posterior direction, and rotation displacements were 1.30±0.67º pitch, 1.20±0.80º roll and 1.20±0.97º yaw. The PTV margins were calculated based on post treatment residual errors using Van-Herk Formula and the evaluated margins were 3mm, 4mm & 4mm in Medio-Lateral, Supero-Inferior and Antero-Posterior directions respectively.

Conclusion: Both setup errors (pre-treatment displacements) and intrafractional movement (post-treatment residual error) exist to a finite degree during treatment of HCC patients with ABC technique. Online correction with CBCT image guidance should be applied to reduce pre-treatment displacements. The intrafractional movement can be accounted for by giving a 4mm uniform PTV margin. These measures may together help in accurate RT delivery and the minimization of toxicity.

References:

Optimization of Radiation Exposure to the Eye Lens in Stereotactic Radiosurgery
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Purpose: In 2012, International Commission on Radiological Protection (ICRP) published a threshold dose for cataract as 0.5 Gy. However, little evidence is available on determination of radiation dose to the eye lens in gamma knife radiosurgery (GKS). The purpose of this study was to confirm the fact of radiation exposure to the eye lens and produce an appropriate treatment plan for GKS.

Methods: From January 2015 to December 2016, 57 patients (39 women; age 27-84 years) with single lesion of meningioma were enrolled in this study. We retrospectively measured dose to the eye lens in the treatment plans that have been performed for these patients. To investigate whether a reasonable dose distribution could be designed we re-created dose plan regarding the eye lens as at-risk organ in the cases that lens dose exceeded 0.5 Gy. Then we compared treatment parameters between plans before and after re-planning. Statistical analysis was performed using Wilcoxon signed rank test. P values < 0.05 were considered to indicate significant differences.

Results: The maximum dose to the eye lens reached the threshold level for cataract in 13 cases. In re-created treatment plans for all of these cases, the maximum dose to the eye lens was reduced to less than 0.5 Gy although treatment time was prolonged by 11.6 minutes on average. There was no significant difference in dose covering 95% of the lesion volume (D95).

Conclusion: In 23% of patients who underwent GKS, the eye lenses were exposed beyond the ICRP threshold dose for cataract. Ophthalmological follow-up might be required in these cases. In addition, we could produce optimal treatment plan with reduced lens dose to less than the threshold dose for cataract while keeping D95 with acceptable prolongation of treatment time.

IMAGING INFORMATICS
From Analogy Imaging to Improvised Teleradiology
Adam Francis Zuberi
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Introduction: According to the Tanzania Radiology Society (TARASO), Chairman, Dr. Ramadhan Kazena, Tanzania possesses only 60 registered radiologists, with a population of approximately 50 million people, local experts are extremely overwhelmed. This was revealed during the second day of the 9th Pan African Congress of Radiology and Imaging (PACORI) done in 2017. However the hypothesis of the study done at ocean road cancer institute, Benjamin Mkapa and Muhimbili Nation Hospital also revealed that, 1. subspecialist radiologists can provide consultation effectively to general radiologist as part of routine clinical operations. 2. Teleradiology will improve the quality of the final radiological report in both urban and remote areas hence improve the care process, save money and patients life.

Methods: In 2016/2017 consecutive computed tomographic, magnetic resonance imaging and x ray studies, the initial interpretation provided by physicians were subsequently reviewed by specialist with final consensus report available, “Reality” was established by final consensus reports. To control for potential bias, 250 adult MR Imaging and 350 pediatric radiologic studies were interpreted initially by specialist and then generalists. Again, the reality was established by final consensus report.

Result: There was disagreement between generalist and specialist radiologist interpretations in 250 (31.3%) of the cases reviewed. These disagreements are stratified further by independent specialists, who graded them as important, very important. Differences were considered very important in 98% of the case reviewed.

Conclusion: Consultations by subspecialist radiologists improved the quality of the radiology reports studies and at least in some cases, improved the process of care by eliminating unnecessary procedures or suggesting more specific follow up examinations. Teleradiology service can be provided cost effectively from the payers’ perspective and may save additional cost when unnecessary procedure can be eliminated, also allows trained specialist to be available 24/7.
Anomalous Coronary Arteries – An Incidental Find

David Richards
Head Radiographer, Caribbean Heart Care, Med Corp. Ltd., Trinidad & Tobago

Purpose: Coronary Angiography is the goal standard in imaging the coronary arteries, which in tandem with other medical examinations, aid to determine further patient management. Normal coronary artery anatomy covers a wide range of subtle variations, ranging from caliber, length and trajectory of the individual vessels to number, size, distribution of the septal and diagonal branches, therefore no two angiograms are exactly the same. Coronary Artery anomalies however represent a significant deviation from the normal spectrum. These anomalies are usually discovered by autopsy or as incidental findings in medical imaging.

Methods: We present two case studies carried out on young men at Cath Lab at Caribbean Heart Care Medcorp Ltd., St Clair Medical, St Clair Trinidad. Both men exhibited symptoms in the absence of known risk factors for Coronary Artery Disease and a Coronary Angiogram was ordered in both cases. showing anomalous origins of the LCA from the Right Valsalva and one of the RCA from the Left Valsalva.

Results: One patient had a Left Coronary Artery arise from the Right Valsalva and the other had the Right Coronary Artery arise from the Left Valsalva. Both patients were referred for further imaging to determine the trajectory of the arteries to assess their risk of sudden cardiac death and possible treatment.

Conclusion: The importance of Angiogram and CT scan for investigation and risk analysis of each patient with coronary artery anomalies.

How can Cloud-Based RIS / PACS Revolutionise Patient Care?

Dr. Jamaal Brown
Customer Relationship Manager, Radiology Consultant, VEPRO, Trinidad & Tobago

Purpose: Diagnostic imaging is of paramount importance in the early detection, diagnosis and treatment of diseases. Consequently, medical imaging procedures are continuously increasing, creating a need for collaboration of healthcare professionals, and consolidating patient medical records from multiple locations and devices. Outdated Teleradiology solutions involving constant data tourism, and traditional RIS / PACS fall behind in terms of networking of locally available information with all healthcare stakeholders, and availability of multimedia patient data at any time, and anywhere. Internet and cloud-based Healthcare IT solutions can answer these emerging needs and enable improved patient outcomes with a timely diagnosis and at the same time significantly reduce costs.

Methods: The presentation will introduce the real-life use cases of Cloud-based RIS / PACS solutions, illustrating their role for shortening patient waiting times, sharing of tasks among healthcare professionals, and financial advantages.

Results / Conclusions: Cloud-based RIS / PACS brings together all healthcare stakeholders from different physical locations as one team and one workflow in real-time. With the increased engagement of stakeholders, patients have enhanced knowledge and understanding of their own health condition, leading them to take part in the health providers' decision-making process, ultimately results with improved care and communication. From the financial point of view, care providers are able to unlock these benefits without large capital investments since Cloud-based solutions offered as EaaS (Everything as a Service) model with monthly rental payments. While technology management is in safe hands, healthcare professionals have one main focus. The patient!
MRI

Consistency Study Of 3D-ASL and DSC-PWI in Assessment of Hemodynamics of Patients with Moyamoya Disease

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1Radiographer, West China Hospital, China

**Purpose:** Our study explored the consistency of 3D arterial spin labeling (3D-ASL) and dynamic susceptibility contrast-enhanced perfusion weighted imaging (DSC-PWI) in assessment of hemodynamics of patients with moyamoya disease (MMD).

**Methods:** 24 patients with MMD diagnosed by DSA who underwent vascular reconstruction operation were selected as MMD group. Images of 3D-ASL and DSC-PWI in the week before operation were retrospectively analyzed. Perfusion parameter were measured in CBF maps at operative side within middle cerebral artery territory and cerebellar hemisphere. Relative perfusion parameter (rCBF) was calculated. 17 patients without hypoperfusion and cerebrovascular disease were selected as the control group. rCBF of MMD group and control group were compared using independent sample t test. Paired t test and Pearson correlation analysis were performed between rCBF-PWI and rCBF-ASL in MMD group.

**Results:** Both rCBF-PWI and rCBF-ASL were significantly different between MMD group and control group (P < 0.05). In MMD group, there was significant difference between rCBF-PWI and rCBF-ASL (P < 0.05), but there was strong correlation between them (r=0.804).

**Conclusion:** As a non-invasive technique, 3D-ASL could provide perfusion parameters of patients with moyamoya disease without contrast medium, and the results were quite correlative and consistent with DSC-PWI.

PLENARY Session III

Imaging in Radiation Therapy: A blend of Science and Art

Dr. Dylan Narinesingh

MBBS, MMed, FCRadOnc, Executive Medical Director NWRHA, Trinidad

**Purpose:** Modern day radiation therapy continues to evolve by improving on the tumor control probability and minimizing normal tissue complications. Imaging plays a central role in the many steps of the radiation therapy pathway not just in tumor delineation. This presentation presents a brief historical overview and then looks at the modern day imaging techniques available in modern day radiation therapy department. This in itself can be an art as it is a science.

The MR-Linac explained: the challenges and clinical experiences.

Andrew W. Beavis

PhD, BSc, FIPEM, FBIR, MInstP, MioD Head of Radiation/ Medical Physics

**Purpose:** The clinical implementation of Image Guided Radiotherapy (IGRT) has demonstrated the clear benefit that daily on-line imaging offers to the accuracy and continued improvement of radiotherapy. Alongside of the advances in delivery (IMRT) that have dramatically improved the conformity of treatment it has allowed significant changes to the care delivered to our patients. However, the use of on-board x-ray (kV) imaging systems, planar or cone beam, has inherent limitations that eventually restrict the scope of the target verification. Typically the imaging must be undertaken before the treatment beams can be delivered and we end up treating pathology or anatomy that we verified, at minimum, several minutes earlier. Magnetic Resonance Imaging provides superior soft tissue contrast and can therefore be used to identify the position of the tumour itself, whereas x-ray imaging is less specific. Furthermore, it is possible to acquire these images whilst the beam is being delivered and therefore verifying treatment delivery truly in real-time.
Designs for an integrated MR-Linac were proposed as early as 2000, however treatment units have only just started to be installed and used clinically. Given the complexity of the engineering problems of combining an MRI system with a Linac development has been arguably slow. In 2014 the first MR-guided treatments were performed using on an MR-Cobalt system produced by ViewRay Inc., who developed the technology to gain momentum and clinical experience in MR-guided radiotherapy. In 2017 the first MR-Linac patient was treated as a ‘one off’ research protocol on an Elekta prototype system and quickly followed by the implementation of a clinical service using a ViewRay MR-Linac system. This presentation will introduce the rationale for the clinical use of MR-guided radiotherapy and give examples of clinical cases from the early adopters to illustrate the benefit it offers. The challenges of building an MR-Linac will be discussed and the engineering solutions will be presented without the use of complex equations! Attending this lecture will give the audience an excellent overview and appreciation of this new technology, how we expect it to benefit patients and its role in achieving daily on-table adaptive treatments and contributing to moving us towards a personalised radiotherapy approach.

MAMMOGRAPHY

Perceptions of Breast Cancer and Utilization of Mammography in Ghana

Terry Konn-Karangwa
Professor; Educational Consultant, Brookdale College, USA

Purpose: The presentation will share results of a recent study that examined the knowledge and perceptions creating opportunities and potential barriers to breast cancer education and initiation of earlier patient referrals to mammography and breast cancer services in Ghana. Introduction: Breast cancer is one of the most common cancers in Ghana, however preventative measures and diagnostic testing is not used regularly by Ghanaian women resulting in delays and late stage diagnosis, poor quality of life after diagnosis and lower survival rates.

Methods: More than 200 structured interviews with female patients, and nurses, physicians, and other health care providers responsible for direct patient care at local health centers were conducted to identify potential barriers with health education efforts and timely patient referrals to mammography and treatment.

Results: Results provide an insight into the influence health care providers have on patient decisions to seek care in a timely manner and the strengths and weaknesses of current health education practices.

Conclusion: Ghanaian women are not knowledgeable about breast cancer and methods of early detection and treatment and health care professionals lack training, educational resources and dedicated time to educate and counsel patients effectively. Radiologic Technologists must play a more active role in patient education.

Image Quality and Patient Radiation Dose in Mammography at a Major Nepali Hospital

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Tribhuvan University Teaching Hospital, 2University Hospital of North Norway, 3Norwegian Radiation Protection Authority, 4Gjøvik University College, 5Oslo University Hospital, 6National Academy of Medical Sciences, 7Nepal Radiological Society, Kathmandu, Nepal

Purpose: Good quality images are key in mammography to find small lesions at early stage which are crucial to cure a patient. Skilled radiographer and regular quality checks of dedicated radiographic equipment and chemicals used in developing process are important to ensure consistently superior images. The dose projected should be also taken care of since mammary glands are considered highly radiosensitive (ICRP 2007).

Methods: Since mammography has one of the most difficult projection technique, an experienced and a moderately experienced radiographer were employed and given daily instructions. Images of 4.5cm tissue equivalent phantom with common exposure settings (AEC) were taken two times a day. Under controlled temperature, images were exposed and a sensitometer strip was developed. These actions were performed for two weeks (fourteen days) starting with the change of chemicals in the first day. The contrast values obtained were compared with those that were recommended by Norwegian National Mammography Screening Program.
Results: We perceived significant decrease in speed and contrast. The difference in estimated Mean Glandular Dose administered to the patient was >4 times higher in end than the beginning of the 14 days period. The contrast values were higher than the recommended value on the 1st day, below the recommended value by the 7th day and decreased more below the that by the end of the fourteen-day cycle. The Optical Density immediately after chemical change was found to be 1.79 which decreased to 0.51 by the end of the cycle.

Conclusion: We realized that the fluctuations in the OD in the images which are caused by developer process and lack of a constant developer chemical concentration need to be addressed. If resources allow, the best solution would be to replace the analog technique with advanced Computed Radiography (CR), Direct Digital Radiography (DDR) mammography detectors or even three-dimensional Tomosynthesis Mammography.

Challenges in Mammography Education and Training Today: The Perspectives of Radiography Teachers/Mentors and Students in Five European Countries

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Purpose: This study aims to explore current challenges in mammography education from the perspectives of radiography teachers, mentors and students.

Methods: A qualitative study including two focus groups interviews, with radiography teachers/mentors (n=5) and student radiographers (n=5) exploring their perspectives on challenges in mammography education today. The content analysis methodology proposed by Graneheim and Lundeman was applied to the interviews.

Results: Three main categories were identified, each with subcategories identified as: (1) Building Bridges; Applying Theoretical knowledge in Practice, Performing Mammograms, Communication and Quality Assessment (2) State of the Art in Mammography; Personal Attitudes and Skills, Quality Awareness and Patient Care (3) Exploring the Curriculum; Time Constraints, Capacity in Clinical Placement, Multidisciplinary Field and Elective Course.

Conclusion: The short study period allocated to this discipline and lack of material resources were considered the main limitations in mammography education, both impacting on the development of students’ skills. Breast positioning, patient communication and quality control were considered key factors affecting mammography performance, patient experience and diagnostic outcome and should therefore be the core focus in mammography education.

A Self-Directed Learning Intervention for Radiographer Rating Mammography Breast Density

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Purpose: Subjective methods of mammographic breast density (MBD) assessment are prone to inter-reader variability. This work aims to assess the impact of a short self-directed learning intervention on radiographers’ reproducibility of MBD assessment.

Method: The study used two sets of images (test and intervention) containing a left craniocaudal and left mediolateral oblique views. The test set had MBD ratings from VolparaTM and radiologists using the fourth edition Breast Imaging and Data Systems (BI-RADS®). Seven radiographers rated the MBD of the test set before and after a self-directed learning intervention using the percentage descriptors in fourth edition BI-RADS® Atlas. The inter-reader agreement, agreement between radiographers and VolparaTM as well as radiologist was assessed using a Weighted Kappa (κw).

Results: Overall, radiographers’ inter-reader agreement (κw) was substantial (0.79; 95%CI: 0.70–0.87) before the intervention and almost perfect (0.84; 95%CI: 0.77–0.90) after the intervention. Before the intervention, radiographers demonstrated fair agreement with radiologists (0.24; 95%CI: 0.46–0.61) and VolparaTM (0.24; 95% CI: -0.41–0.59). A fair but slightly improved agreement was also observed between radiographers and radiologists (0.31; 95% CI: -0.33 – 0.64) as well as VolparaTM (0.28; 95% CI: -0.34 – 0.61) after the intervention.

Conclusion: Findings demonstrate that a short duration self-directed learning intervention reduces inter-reader differences in MBD classification, but has a negligible impact on improving the agreement between inexperienced and expert readers.

Keywords: Training; Mammography; BI-RADS®; Volumetric assessment; VolparaTM; Inter-reader variability
COMPUTED TOMOGRAPHY

Hemodynamic Changes in Patients with ECMO demonstrated by Contrast Enhanced CT-Implication for Image Acquisition Technique

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**Purpose:** Extracorporeal membrane oxygenation (ECMO) is an established tool for circulatory and respiratory support. ECMO patients often require computed tomography (CT) imaging to continuously monitor their condition. Contrast enhanced CT imaging for such patients poses many challenges. A thorough understanding of the different types of ECMO circuits and specific hemodynamic changes is essential for optimal image acquisition. However, specific hemodynamic changes associated with patients on ECMO determine the contrast-enhanced patterns. In CT, altered hemodynamics in ECMO patients require special considerations and handling in contrast injection and its timing. Therefore, this study is carried out to demonstrate the changes in hemodynamics in ECMO patients captured on contrast enhanced CT examinations. In this article, we determine the strategies for contrast injection in relation to the ECMO flow, cardiac function and the placement of ECMO cannulas.

**Method:** A retrospective review of studies related to CT imaging techniques used for ECMO patients in relation to physiological interactions of extracorporeal and spontaneous circulations was done. Several studies will be analyzed to evaluate the implication of this new technique in our current workflow.

**Results:** Based on literature review, several factors influence the distribution of contrast material and its delivery to the target structure. They include placement of ECMO cannula, ECMO flow rate, cardiac function and the route of the contrast injection.

**Conclusion:** It is recommended to take note of the following factors which will aid in obtaining satisfactory images for ECMO’s patients. They include temporary reduction of ECMO flow, selection of injection sites and increasing volume of the contrast medium are required. Since ECMO can be arranged in many configurations, there is no specific guideline in performing such CT examinations. A multidisciplinary team approach is needed to make an individual optimized and safe scan strategy for every ECMO patient.

Variations in Renal Vasculature: A CT Angiography Case Study at a Private Centre

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**Purpose:** Kidney vascular variations are important parameters in planning for surgical procedures such as nephrectomy and renal transplants. Variations in kidney vasculature have been reported to show social, ethnic and racial differences (Ozkan et al., 2013) hence the need to generate knowledge of anatomical variants for each population. Population based research on variations in renal vasculature enriches knowledge and provides referents in teaching and clinical practice. The aim of this study was to establish the variations in renal vasculature in patients that presented for CT Angiography (CTA) at a private radiology centre.

**Method:** The study was an exploratory and descriptive study that adopted both retrospective and prospective methods of data collection. 115 CTA examinations were reviewed from the PACS system. Axial sections, maximum intensity projection (MIP) and 3D volume rendered images were analysed for each patient. A structured form was used to capture information pertaining to level of origin, number of renal arteries and side of occurrence of arteries. Merklin and Michels classifications of kidney vasculature were used for the study. Descriptive statistics were computed using Microsoft excel 2010. Paired samples t test was used to compare prevalence based on demographic data.

**Results:** The majority of renal arteries (57.4%) originated in the region of L1–L2. Accessory renal arteries were present in 32 (27.8%) of the patients and were almost equally distributed between the left (14.7%) and the right (13%). Only 2 patients (1.8%) had bilateral multiple accessory renal arteries. Pre-caval arteries were observed in 3 patients (2.6%). Accessory renal arteries were likely to be present in men than in females (p= 0.07).

**Conclusion:** Accessory renal arteries were observed in 27.8% with an almost equal distribution on the left and right
sides. Prevalence of accessory renal arteries in this cohort of Zimbabwean patients is generally comparable to those in literature.

ADVANCED PRACTICE

Developing Evidence Based Practice: Experiences from the SEPRAIDD Project

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Purpose: Technology has advanced significantly over the last century, but many techniques have remained relatively unchanged since their inception. Referrer pressure to alter image acquisition parameters is often experienced, with limited evaluation of dose or technical factors. One example is the erect pelvis radiograph, which is gaining popularity amongst orthopaedic surgeons. This project aimed to develop a protocol for image acquisition of such radiographs, establishing the impact on image quality and dose. This presentation outlines the stages of development of a new evidence based technique and identifies the roles, criteria and research requirements.

Method: Following initial literature review and anthropomorphic phantom experimentation the research took place over 3 distinct phases. In phase 1 patients, stratified by body mass index, attending for a pelvis radiograph were recruited to undergo measurements of their trunk whilst supine and erect. This enabled modelling of anatomical soft tissue changes between the orientations. Phase 2 comprised a further phantom experiment to optimise patient specific image acquisition parameters. Phase 3 required patients to consent to an erect radiograph in addition to the standard supine examination.

Results: Variation in anatomical measures was noted with patient orientation changes, requiring adjustment of traditional exposures and techniques. This project has demonstrated a systematic approach to developing the evidence base for image acquisition technique.

Conclusion: Radiography requires a research-based approach to practice; clinical-academic collaboration supports changes in technique which require dissemination and embedding into change. Further research into the impact on clinical decision making and diagnosis is required for erect pelvis radiography.

Diagnostic Imaging and Physical Therapy

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Purpose: The provision of healthcare and health care payments are evolving with a greater need to be more consumer centered and value centric. Physiotherapy/physical therapy (PT) must therefore also evolve to meet a myriad of societal needs through more efficient and cost sensitive means, while still achieving optimal outcomes. The scope of PT practice has greatly evolved with many jurisdictions, states and countries having some form of autonomous practice or direct access. As a direct result of this access, there has been demonstrable enhanced quality of patient care, higher levels of patient satisfaction, lower wait times and reduced costs. A sometimes overlooked but vital function of the first-contact practitioner is referral to other clinicians in other areas of specialty, including IMAGING SERVICES. Imaging instructional content is now an integral part of at least 98% of all PT programmes internationally, thereby allowing basic competencies in imaging use and decision-making. This presentation serves to provide the history of the evolution of Imaging in PT practice and evidence to support the need for greater incorporation of imaging by PTs with facility for PTs to order images when deemed necessary.
Interprofessional Collaboration about Patient Safety in Medical Imaging-Preliminary Results
Lise-Lott Lundvall
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**Purpose:** Medical imaging incorporates patient safety risks with the examinations. Interprofessional collaboration is put forward as important for improving patient safety within health care. This paper presents preliminary results from an ongoing research. The aim of this study was to examine how different professional practices involved in medical imaging collaborate and ensure patient safety in practical work.

**Method:** Qualitative design with data collection by 14 open interviews. The interviewees were radiologists (N=5), radiographers (N=5) and physicists (N=4). All interviews were recorded and transcribed verbatim. Firstly an inductive analysis was made for each profession separately. Data concerning collaborative work was interpreted from a practice theory perspective.

**Results:** The three studied professions collaborated about issues related to image quality and prevention of risks for the patient with the radiological examination. It was both planned and non-planned activities. The planned activities involved all three studied professions. The non-planned activities mainly occurred in the workflow with imaging. The communication about issues related to patient safety was written communication through the IT-systems and verbal communication by telephone calls or physical meetings.

**Conclusions:** Interprofessional collaboration for securing patient safety in this context are activities for securing image quality, no patient harm or risk with the examination and diagnostic certainty with the examination.

**RADIOThERAPY**

Skin Care for Radiation Therapy Patients
Angela Cashell
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**Purpose:** Skin reactions from radiation therapy are one of the most common side effects and can affect a patient’s quality of life. In some treatments, a severe radiation induced skin reaction (RISR) may even limit the delivered dose, and potentially compromise treatment outcomes. There are some established best practices in this area but approaches to skin care and advice to patients appears to have changed little over the years and are often based on tradition rather than scientific evidence.

**Methods:** In this presentation, I will focus on the recent evidence that is available in the literature to support changes to our practice for pretreatment, treatment and post treatment care of the skin. I will discuss the variation in management by focusing on recent studies completed in the UK and Canada. I will also share some data from a qualitative study of the patient’s perspective and the impact of a skin reaction.

**Results:** Evidence on skin care management is incredibly diverse, and this presentation will look at what is currently available and compare that to what is currently happening in practice. I will identity gaps in the literature and suggest ways to address the changes in practice. New and innovative products will also be highlighted.

**Conclusion:** The overall goal of this presentation will be to review the evolution of skin care practice and to discuss the body of literature that supports change. The information presented will be useful to all practitioners involved in Radiation Therapy and of course, to the patients we treat. The goal will be to provide information that is evidence-based and ultimately serves to provide the patient with choices to ensure self-care and comfort during and beyond their treatment.
Evaluating the Effect of Linens on Surface Skin Dose and Patient Perspectives on Respect and Dignity in Radiation Therapy

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Purpose: This study investigates the effects of linens on surface skin dose. The study included a survey asking patients their perspectives on respect and dignity in radiation therapy (RT). The study site covers patients during treatment with a linen sheet but the actual treatment port is not covered.

Methods: Dose measurements were acquired using GafchromicTM EBT XD film and measured skin dose changes in the treatment port with towels, draw sheets, hospital gowns, and flannel blankets. Irradiations were performed on polystyrene phantoms and a RANDO® phantom. The level of significance for the physics data was determined using uncertainty calculations. A quantitative and qualitative patient survey was developed by the team of investigators. The patient survey asked about the patient’s perspective on the dignity and respect they received during treatment. A qualitative question asked patients for feedback on how radiation therapists could improve on patient care.

Results: Physics data showed that there is an increase in surface skin dose when a linen is used to cover the field. The greatest increase in surface dose was observed at lower megavoltage (MV) energies, and when covering with a towel. The physics data highlights the importance of considering surface skin dose when covering patients with linens. A total of 69 patients completed the survey and the data indicated that all patients felt they were treated with respect and dignity during RT treatments. The qualitative question revealed that patients felt that the radiation therapists provided exceptional patient care. No differences in responses were seen between age and gender groups.

Conclusion: Surface skin dose is increased when materials are placed as a cover to the treatment port. The study indicated that patients are comfortable with the current practice at the study centre in not covering the treatment port during radiation therapy treatment.

Stereotactic Body Radiotherapy as an Alternative to Brachytherapy in Gynaecologic Cancer

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Purpose: The standard treatment for locally advanced cervical and endometrial cancer patients combines chemotherapy (CTX) along with conventional external beam radiation therapy and brachytherapy boost (BB). BB is a valuable treatment option because it allows for a high dose to the tumour while maintaining a steep dose gradient sparing the nearby structures. To treat to a tumoricidal dose using EBRT alone would lead to significant dose to nearby normal structures (mainly rectum, small bowel and the bladder) which would entail a high likelihood of acute and late toxicity. However, some patients are unable to tolerate brachytherapy due to medical or other reasons. Stereotactic body radiotherapy (SBRT) offers an alternative form of treatment.

Methods: Patients were identified and retrospectively reviewed using departmental MOSAIQ Version 2.6, and Monaco TPS 5.10 databases. Eligibility criteria for the review included gynaecologic cancer patients who received an SBRT boost instead of a BB. All patients that were initially evaluated and had been recommended to undergo a BB, and for medical or other reasons, they were not able to have BB treatment and were thus treated with SBRT. A total of 5 gynaecologic patients who could not have brachytherapy received SBRT as an alternative for the treatment of their malignancies. Three patients required tandem and ovoid brachytherapy and two required a cylinder. Median SBRT dose was 20Gy in four fractions.

Results: For SBRT boost plans, the largest CTV volume was 126.1cm³ (range: 44-126.1cm³). Median PTV coverage was 99% (range: 97-100%). Median conformity index was 0.99 (range: 0.97-0.99). Maximum rectal point dose ranged from 18.626.7Gy (median: 21Gy); median rectal dose to 1cm³ was 20Gy (range: 17-26Gy) and median rectal dose to 2cm³ was 20Gy (range: 20-26Gy). Maximum bladder point dose ranged from 18.4-25.9Gy (median: 26Gy); median bladder dose to 1cm³ was 20Gy (range: 18-25Gy); and median bladder dose to 2cm³ was 20Gy (range: 17.8-24.6Gy). None of the patients included in this study experienced acute toxicity during SBRT. No grade 3 toxicity was reported on follow-up.
Conclusions: This study show acceptable SBRT dose distribution, and dose to organs at risk (OARs). This is also reflected by the fact that, none of the patients included in this study experienced acute toxicity during SBRT. Only one patient complained of bowel toxicity (grade 2) on 6 weeks follow-up.

Assessment of Personnel Dosimetry in Radiotherapy at Cancer Institute Guyana

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Purpose: The only radiotherapy facility in Guyana, located at Cancer Institute Guyana (CIG) has a linear accelerator, potential to produce photons of 6 Megavolts and 6 electrons energies (5, 7, 8, 10, 12 and 14 MeV). This research aims to monitor the amount of ionizing radiation retrospectively received by the OEP in the Radiotherapy facility at CIG for 5 consecutive years (2010 – 2014) and to assess the findings to the National and International Dose limits (20mSv/year), for both safety and regulatory purposes to avoid biological effects. The OEP are routinely monitored by the quarterly Genesis Ultra TLD dosimeter authorized by Sierra Radiation Dosimeter Service. Even though the results were well below the National and International dose limit, the results varied with the minimum mean Annual Dose being 0.264mSv and the maximum mean Annual dose being 2.353mSv. Each OEP dose readings throughout the years was below 5mSv/year. These results allows the researcher to conclude even though the Dose is well below 20mSv, the need for optimization still applies. Background radiation, cannot be removed completely, but continuous monitoring should be done to help keep allows for radiation dose As Low As Reasonable Achievable.

Keywords: Radiation Therapy, TLD, Ionizing Radiation, Dose, OEP

Presentation Trends of Cervical Cancer Patients: A Case Study of a Radiotherapy Centre in Zimbabwe

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Purpose: Zimbabwe is among countries with the highest incidence of cervical cancer in the world. According to the Ministry of Health and Child Care National Cancer Prevention and Control Strategy 2014-2018, cervical cancer is the commonest gynaecological cancer locally and constitutes 13% of all the cancers in Zimbabwe. The 5-year survival rate for stage II cervical cancer is about 60% while for stage III is about 35%. Elsewhere, literature on presentation trends of cervical cancer patients has been identified yet the important link into policy formulation and implementation has remained evasive. The aim of this study was to establish the central tendency and the reasons thereof regarding the stage at which cervical cancer patients present for treatment in order to make inferences on the recommended focal point for policy formulation.

Methods: Data was collected using both passive and active data sources through a documentary review method and structured interviews.

Results: The age range of participants was 30-80years with the peak at 51-60years. The most prevalent histological type was the squamous cell carcinoma, (80%). There was enough statistical evidence that patients present with late disease (stage III-IV: 87%). The main contributory factors to late presentation were cited as seeking alternative intervention before conventional treatment (73%); financial challenges (54%) and limited health education on cancer causes (100%), screening (90%) and available treatment options (96%).

Conclusion: It can be concluded that the observed late presentation is consistent with literature evidence of compromised chances of survival reported for low income settings. Strengthening of health education together with increased funding for cancer programs to improve cancer diagnosis and management strategies is recommended.
POSTERS

COMPUTED TOMOGRAPHY

The effect of heart rate on the pulmonary artery angiography with low contrast agent CT

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Objective: To investigate the effect of different heart rate on pulmonary artery angiography (CT) in pulmonary artery angiography with low dose contrast agent.

Method: According to the different heart rate of 64 patients who underwent CTPA were divided into two groups. Group A for low heart rate group, the heart rate less than 75 beats / min, group B for high heart rate group, heart rate more than 75 beats / min, using the same scanning method of CTPA scans, measured separately the two groups of data of the pulmonary artery trunk and left and right pulmonary artery and leaf artery the value of CT and seek average. The two groups and the main pulmonary artery and the left and right pulmonary artery and each lobe artery CT values were measured and calculated the mean CT value. Comparison between the two groups image quality score, the average CT value, signal to noise ratio (SNR), contrast to noise ratio (CNR), evaluation the influence of superior vena cava contrast agent residues to developing pulmonary artery and pulmonary embolism diagnosis positive rate difference.

Results: On the same scanning and drug injection methods premise. The average CT value of pulmonary artery in patients with A and B two groups were (327.62 ± 94.65) Hu, (221.01 ± 47.24) Hu, A group was significantly higher than that of B group t=5.27, P<0.05. The image quality scores of the two groups were (4.82 ± 0.39), (4.26 ± 0.68) t=4.06, P<0.05. Two sets of image signal to noise ratio (SNR) were (16.32 ± 4.35), (11.71 ± 2.98) t=4.91, P<0.05. The contrast noise ratio (CNR) of the two groups were (14.25 ± 4.05), (9.59 ± 2.73) t=5.35, P<0.05. Evaluation of residual of superior vena cava contrast agents x2=7.15, P<0.05. The positive rates of pulmonary embolism in two groups respectively were 15.15% and 19.45%, and there was no statistical significance between the 2 groups (x2=0.80, P>0.05).

Conclusion: Use low dose of contrast agent, CTPA examination in the same scan conditions, patients with slow heart rate the success rate and image quality is significantly higher than that of high heart rate, CTPA examination monitoring changes in heart rate, the appropriate adjustment of scanning parameters can improve the image quality

Low-Dose CT Thorax: A Comparison of X-CARE, an Organ-Based Tube-Current Modulation and Bismuth Shielding.

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Introduction: CT is a frequent examination conducted in Norway. Mammæ are a radiation sensitive organ who are exposed during a thoracic CT examination. Therefore, an optimization of protocols is necessary and X-CARE (organ-based tube-current modulation) or bismuth shielding can be applied during a CT examination. Will the two methods give a difference in the entrance surface dose (ESD) to mamma and the image quality of a low-dose thoracic CT examination?

Methods: Thirty spiral low-dose CT scans of which 10 was standard, 10 with bismuth shielding and 10 with X-CARE was performed on an Alderson phantom, combined with CARE Dose 4D and carried out on a Siemens SOMATOM Definition Edge 128. ESD was measured, CTDIvol and DLP were both obtained from the dose report. The image quality was objectively analyzed and assessed using three Region of Interest (ROI), placed in air, lung parenchyma and parietal pleura. SNR and CNR were later calculated from the ROI results.

Results: ESD to mammæ demonstrated a dose reduction compared to a standard low-dose CT. Respectively: 16.5 % dose reduction with bismuth shielding and 0.44 % with X-CARE. There was no difference in CTDIvol and DLP between the standard low-dose and the bismuth shielding scans. The scans with X-CARE gave an increase in CTDIvol and DLP by approximately 12 %. SNR and CNR in the lung parenchyma and parietal pleura were highest during the standard low-dose. Bismuth shielding increased the noise with 48 % and X-CARE with 26.4 %.
Conclusion: The ESD was significantly reduced during the low-dose CT examination with bismuth shielding, but it notably increased the image noise. X-CARE reduced the ESD minimally compared to the CT low-dose scans, and it also increased the image noise. The most efficient way to achieve an optimal thoracic CT examination is to use a standard low-dose protocol.

EDUCATION, MANAGEMENT, PROFESSIONALISM

Study on Cerebral Blood Flow of Youth Auditory Cortex under different frequent sound stimulation using Arterial Spin Labeling Perfusion Weighted Imaging.  
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Introduction: Auditory center is an important structure of brain, the perfusion of auditory center is related to auditory function. The purpose is to study the changes of cerebral blood flow (CBF) of auditory cortex under stimulation of different frequency of sound using arterial spin labeling (ASL) perfusion weighted imaging.

Methods: 13 volunteers were examined using the GE Discovery 750 3.0Tesla MR system with 32 channels head coil. The whole brains were scanned with 3D FSPGR. Non-stimulation ASL, under low, middle and high frequency sound to bilateral ears were acquired respectively. All the data were transferred to adw4.6 work station. CBF values of auditory cortex were measured. Paired t-test was performed with SPSS17.0 statistical software.

Results: The CBF value of right temporal lobe was 73.31±10.99 ml/min/100g with non-stimulation. The left was 73.10±10.72 ml/min/100g. There was no significant difference (p>0.05). The CBF values of left temporal lobe were74.33 ±11.76, 76.03±10.14 and 73.17±11.85 ml/min/100g corresponding to stimulating right ear with low, middle and high frequency sound. The CBF of right temporal lobe were70.46±11.52, 70.92±11.03 and 67.71±10.60 ml/min/100g corresponding to stimulating right ear with low, middle and high frequency sound. The CBF of left temporal with stimulation to right ear were higher than those of right (p<0.05).The CBF values of right temporal lobe were 78.17±9.84, 74.69±10.57 and 74.51±14.79 ml/min/100g with stimulation to left ear. The CBF of left temporal lobe were 73.53±10.07, 70.00±10.62 and 70.03±15.31 ml/min/100g with stimulation to left ear. The CBF of right temporal lobe were higher than those of left temporal lobe (P<0.05). CBF of left temporal lobe and right were 75.64±8.72, 75.52±8.93 ml/min/100g with bilateral stimulation (p>0.05).

Conclusion: The CBF difference of both temporal lobes with different frequent sound stimulation can be detected using ASL. The ASL technique can be used for measuring CBF in the auditory cortex with high reliability.

Factors contributing to lack of occupational radiation monitoring in Southern Malawi  
Cowles Chilingulo  
Malawi

Introduction: Eighty three percent of the x-ray facilities in the Southern region of Malawi lack occupational radiation exposure monitoring services which are supposed to verify whether radiation doses received by the radiographers are within internationally permissible limits and the effectiveness of the radiation protection measures being used. This study was embarked upon to describe the reasons why there is no enforcement of and non-compliance to radiation monitoring in x-ray facilities in Southern Malawi, assess radiation levels in the x-ray facilities and to determine the attitude of radiographers towards occupational radiation exposure monitoring.

Methods: Qualitative and quantitative data collection and analysis techniques were. In-depth interviews were conducted with three officials from Ministry of Health, Medical Council of Malawi and Ministry of Labor, and 14 hospital/medical directors. Radiation measurements were taken from two strategic positions in each of the 16 x-ray departments using RADEYE personal radiation detector. A self-administered questionnaire was distributed to 16 radiographers’ in-charge of x-ray facilities to determine their attitudes.

Results: The absence of radiation protection service through which government can enforce radiation monitoring and conduct dosimetry services, lack of an enforcement policy, non-availability of human resources and radiation monitoring equipment are some of the factors that contribute to lack of enforcement of radiation monitoring. Inadequate funds, lack of awareness by hospital managers, poor communication between radiographers and hospital managers, failure of the
regulatory body to enforce the requirements are the challenges leading to non-compliance. Radiation dose rates for occupational exposure are within normal limits in 75% of the x-ray facilities while dose rates for public exposure are exceeding normal limits in 56.3% of the x-ray facilities. All the radiographers showed positive attitude towards occupational radiation exposure monitoring.

**Conclusion:** There is a lack of organization and implementation of a national regulatory infrastructure governing protection against ionizing radiation. An effective radiation safety infrastructure which includes laws and regulations is required in the country.

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**Aggressive pseudotumor tissue reactions, long term complications of total hip replacement**

**P5**

Mabel Zelicovich

Tel Aviv Sourasky Medical Center, Isreal

**Introduction:** Aggressive pseudotumor is a condition of localized bone reabsorption in contact with prosthetic material. It is speculated to be a consequence of metal hypersensitivity or inflammatory reaction to excessive wear. Our case is about an 85 years old woman with bilateral total hip replacement. On the right side she passed twice: the first one was in 1993 and the second was in 2005.

**Methods:** She was hospitalized on September 2017 because of high fever and strong pain in her right hip. It was performed a pelvis x-ray, a CT scan of lower extremities, that found a fluid collection surrounded the RT hip. It was performed an ultrasound scan of the hip, and decided to make aspiration of the collection. It was taken 30 ml of fluid. The material was sent to pathology for analysis. Results yet to come.

**Conclusion:** We want to show through this case that a combine of imaging modes can be a tool of solve problems and give the exact diagnosis for this kind of pathologies.

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**The Challenges of Relying on Patient-reported Medical History in a Breast Imaging Program**

**P6**

Sheena Chung

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**Introduction:** Every year, millions of Canadian women undergo breast screening imaging as part of their routine health care. The patients' medical history is important in personalizing the approach to this care. This study evaluated the accuracy of patients' self-reported medical history and the patient experience with two iterations of the screening form used to collect that information.

**Methods:** This study used a single institution, two-phase design. Data accuracy was assessed by comparing patient-reported information (via blank screening forms) to information automatically captured in the electronic medical records of a consecutive cohort of 60 patients attending for a repeat visit. Then, study questionnaires were used to collect data on the patients' experience with a blank form versus a pre-filled form (65 consecutive new and returning patients).

**Results:** 40% of patients (n=60) could accurately recall when and where their last mammogram was performed. Significantly fewer patients could accurately recall the date of their last breast US (n=43) and breast MRI (n=20) (14% and 10%, respectively; p<0.003). Of those who had previous breast surgery (n=18), 100% were able to recall their benign or malignant diagnosis and 61% were able to accurately recall the year of the breast surgery. The majority of patients (90%) preferred the pre-filled screening form over the blank form. Qualitative comments highlighted that the pre-filled form decreased frustration associated with having to recall their medical history and resulted in feelings that the institution better understood their medical history.

**Conclusions:** Decisions about breast cancer screening are personalized based on patient-reported medical history. This study found that the use of a blank form is an inaccurate method of gathering that information, impacting patient care. Patient frustration and stress were decreased, while satisfaction and confidence in the organization were increased when that information was pre-filled for patient review and updates.
EDUCATION, MANAGEMENT, PROFESSIONALISM

A comparative analysis of diagnostic radiographers’ emotional intelligence across sub-specialties and against other Allied Health Professions at a tertiary teaching hospital in Asia

Shiu Suwn Yeo
Singapore General Hospital, Singapore

Objective: This study aims to assess diagnostic radiographers’ Trait Emotional Intelligence (EI) across seven sub-specialties (General Radiography, Ultrasound, Breast Imaging, CT, MRI, Interventional Radiology and Nuclear Medicine) and against three other Allied Health Professions (Occupational Therapists-OT, Physiotherapists-PT, and Radiation Therapists-RT) at a tertiary teaching hospital in Asia.

Method: A validated, self-reporting Trait EI Questionnaire (TEIQue-SF) by Petrides (London Psychometric Laboratory at University College London) measuring participants’ Trait EI in five categories, which include Global (general emotion functions) and four factor scores (Well-being, Self-control, Emotionality and Sociability), was distributed to all radiographers (n=240), and three other Allied Health Professions (n=258). Additional demographic data was gathered. Additional demographic data was gathered. Analysis was generated using ANOVA.

Results: Response rate was around 70%. There was no statistically significant difference in Global EI and its four factor scores amongst the seven sub-specialties in radiography, OT, PT and RT. A significant correlation was found between global EI and all Allied Health professions with more than 10 years of working experiences when compared with 1-3 years (mean difference 0.45, 95% CI (0.18, 0.72), p = 0.001) and 4-6 years (mean difference 0.39, 95% CI (0.09, 0.68), p = 0.01) of experiences. Global EI was significantly and positively related to married status (mean difference 0.27, 95% CI (0.07, 0.47), p = 0.007). Males had higher sociability scores than females (mean difference 0.32, 95% CI (0.05, 0.58), p = 0.02).

Conclusion: Findings of study revealed that specialty choice had no significant impact on EI. On the contrary, marital status and years of working experiences could greatly influence one’s Global EI level. Gender played a part, but only in sociability category where males scored significantly higher than females.

Educating Globally in Medical Imaging using eLearning and INTEREST-PBL

Carmen Saunders-Russell
California State University Northridge, United States

Professional development courses that focus on increasing knowledge and improving webinars to bridge the gap in professional development courses can be a successful undertaking for any agency if the program has a means for identifying areas in which the quality of the program content, implementation, and delivery could improve. The conceptual framework model, interest-problem-based learning (INTEREST-PBL) model, and Malcolm Knowles’s theory of adult learning can be used to ground as well as assess the effectiveness of an eLearning Webinar educational project. By utilizing research questions that are focused on the implementation of webinar courses, including an examination of, how effective the implementation was, and the identification of areas of strengths and weaknesses an eLearning webinar educational project can help to address the gap in medical imaging services availability as it currently exists. The World Health Organization (World Health Organization [WHO], 2011), has identified that approximately two-thirds of the population of the world have little to no access to life-saving radiology services. In developing and underprivileged communities, serious health disparities exist in the availability of medical imaging care, and services and the shortage of personnel to perform the procedures. Populations in remote or under-resourced settings separated from modern technology bear an increased burden of morbidity and mortality. The absence of access to medical imaging services is a major global problem. Cultural beliefs regarding medical care are strong within certain under-resourced communities. Governmental support for training programs is important, however, courses geared toward developing and cultivating knowledge in the field of medical imaging is important. Access to medical imaging services has a direct impact on international public health outreach programs. INTEREST-PBL is a method that can be employed to help bridge the educational gap as it relates to access and evaluate the educational programs effectiveness.
Approaching Development of a new education programme in Diagnostic Radiography

Alexandra Partner
University of Derby, UK

Back to basic: With modern technology, personal touch is the brilliance of human connection

Jacqueline Umali
National Healthcare Group Diagnostics Singapore, Singapore

Introduction: Missed health care appointments is a cause of significant concern for healthcare providers as these impact upon the health of the patient and treatment outcome. This quality improvement project aimed is to reduce the wasted ultrasound appointment in National Healthcare Group Diagnostics, Ang Mo Kio Polyclinic in Singapore. The international bench-mark for primary care clinics is 5-10%.

Method: This study applied a systematic method design based on the platform of CPIP (Clinical Practice Improvement) programme. The team crafted the mission statement which is to reduce the wasted ultrasound slots from 14% to 5% in six months’ time. The team drew a process map of how patients are given their appointments. A quantitative survey was conducted to patients, family members and care givers on the possible reason why patient missed their appointment and for not being prepared for the procedure, n=55. A qualitative component includes in-depth interviews and discussion with Patient Service Assistant and referring Clinicians. A fishbone was also drawn to analyse the root causes and 5 interventions were identified as suitable for PDSA (Plan, Do, Study, Act) which are: call patients 5 days before their appointment time, offer cancelled patients suitable rebooking schedule, increase one slot removed cancelled patients from the appointment system and replacing cancelled slots.

Result: After the 5th PDSA cycle, wasted ultrasound slots dropped to 8.75% in the post intervention period. The appointment waiting time reduced from 21 days to next day and all patients turned up well prepared for their procedure.

Conclusion: We conclude that an improved strategy for communications with patients is still the best bet so far.

GENERAL RADIOGRAPHY, RADIATION PROTECTION

Dental Radiological Practice in Trinidad and Tobago: A Pilot Project

Dr. Arlana Bissoon
School of Dentistry, University of the West Indies, Trinidad and Tobago

Introduction/ Objective: The aim of this study was to identify the current standards of radiological practice in Trinidad in relation to international ionising radiation regulations with respect to dentistry.

Methods: A 32 point questionnaire that was previously tested was administered to 55 dentists who practice in different regions of Trinidad. The survey aimed to gather information on demographic factors, types of radiographic equipment, techniques and processing and radiation protection measures.

Results: The majority of dentists (61.8%) were not aware of the technical details of their equipment. Thirty-three dentists did not know the kVp of their machines and 17 dentists were not aware of the intraoral film speed that they utilize. Of the respondents, 85.5% used rounded collimators. The most common technique for periapical radiography was the paralleling technique (64%). Many respondents own panoramic X-ray units, but the majority of them (90.9%) did not take panoramic radiographs on all patients regardless of the dentist’s working environment. This was proven to be statistically significant (p<0.05). All dentists reportedly used some form of radiation protection, but only 8 respondents properly disposed of their radiographic waste by incineration. Lead aprons were utilized by 65.5% of respondents.

Conclusion: The results of this study indicate that current radiological practices utilised by dentists in Trinidad and Tobago need improvement in some areas and there is a dire need for the development of national ionising radiation guidelines specific to dentistry if best practice is to be maintained.
Quality improvement on plain radiographs by obligatory internal course held by reporting Radiographers
Marie Midtgaard
Kolding Hospital, Denmark

External exposure dose of F-18 FDG PET assessed by using a semiconductor personnel dosimeter to protect workers from radiation
Yasuyuki Takahashi
Hirosaki University, Japan

RADIOThERAPy, RADIATION ONCOLOGY

Pattern of geometric changes of parotid gland in conventional and intensity modulated radiotherapy in nasopharyngeal cancer patients
Dr Vincent WC Wu
Hong Kong Polytechnic University, China

Introduction: This study aimed to compare the patterns of radiation induced parotid gland changes between conventional (ConRT) and intensity modulated radiotherapy (IMRT) in nasopharyngeal carcinoma (NPC) patients during and after a radiotherapy course.

Methods: A total of 56 adult NPC patients treated with IMRT (n = 28) or conventional radiotherapy (n = 28) were recruited. Kilovoltage CT scans of head and neck regions were acquired before radiotherapy, at 10th, 20th and 30th fractions, and 3 months after treatment. Parotid gland was delineated in the corresponding CT slices and its mean dose was calculated from the treatment planning system. The volumetric and geometric changes of the parotid gland at various time intervals were studied by comparing with the pre-treatment structure set. The pattern of changes was compared between the two techniques.

Results: The mean parotid gland dose of IMRT plans (37.5±9.5 Gy) was significantly lower than the ConRT plan (49.1±7.4 Gy). The parotid gland volume, DICE similarity coefficient and lateral dimension of patient head gradually decreased during the radiotherapy course and partially recovered in 3 months post-treatment. The extents of geometrical changes of parotid gland in the ConRT group were greater than that of the IMRT group. However the differences were not significant until at 3 month after treatment, where the IMRT group showed significantly better volume recovery.

Conclusion: Similar parotid gland size and location changes were observed during the treatment course in both ConRT and IMRT. However IMRT demonstrated better parotid volume recovery after treatment.

Evidence or tradition? A Canadian review of the management of radiation induced skin reactions
Angela Cashell
Princess Margaret Cancer Centre, Canada

Introduction: Skin reactions from radiation therapy are one of the most common side-effects and can cause distress to some patients. In some cases, a severe radiation induced skin reaction (RISR) may even limit the delivered dose and potentially compromise treatment outcomes. Despite some established best practices, approaches to skin care and advice to patients appears to have changed little over the years and are often based on tradition rather than evidence. Canadian departments use different products and approaches with respect to the prevention and management of RISR, although there has been little previous work to examine national practice patterns.

Methods: This study used a 42-item electronic skin care survey based on work by the UK Society and College of Radiographers. The categories were pre-treatment (assessment and prophylactic skin care), treatment (erythema, dry desquamation, moist desquamation), post-treatment and also other related practice issues (e.g. ongoing research).
The survey was distributed to an identified radiation therapist-registered nurse dyad at each radiation therapy department in Canada (n=44). The respondent dyad was selectively sampled to obtain a representative picture of interprofessional practice at each centre, and to capture potential practice differences between the two professional groups.

**Results:** 33 departments responded (75%). Results suggest a variation in management across the country. A number of departments continue to advise patients not to wash or use deodorant/antiperspirant despite evidence in the literature that supports its use. Additionally there seem to be unnecessary restrictions on how much product to apply and when, as well as conflicting post-radiotherapy instructions regarding sun exposure. New products that promote patient comfort or prolong the onset of reactions, were also identified at certain centres.

**Conclusions:** The results of the study will provide information to departments on how they compare to available best evidence, a baseline picture of Canadian practice and an impetus for change if necessary. This survey demonstrated that even when evidence exists there is still a wide variety of practice. Where there is little evidence, informed patient preference should be encouraged to minimise disruption to established routines.

**Role of examination request form in Radiation Dose Reduction**

Charles Omondi Okello  
*Ministry of Health Headquarters, Kenya*

**Methods:** poorly filled request forms were isolated based on: i) Request not specific to area of interest in keeping with radiographic anatomy ii) Inadequate or no clinical information provided iii) Use of non-conventional terms iv) Failure to use prescribed order form v) Failure to include critical information vi) Irrelevant request not indicated for that examination modality vii) Forms that do not comply with standard requests were set apart. The reason why the nature of the request would lead to unnecessary irradiation of patients was identified.

**Results:** 10% of the requests were not specific to the area of interest 35% of the forms had incomplete information 12% of the forms had unconventional terms 50% of the forms excluded critical information such as last menstrual period. 20% of the requests were not on prescribed forms 5% of the requests were not indicated for the chosen modality 7% of the requests were difficult to interpret

**Conclusion:** A large proportion of the requests were poorly filled out leading to unnecessary irradiation of patients. To eliminate the problem, it is proposed that requesting clinicians be trained on the importance of radiation safety and justification for examination requests. A printable electronic request form be designed with a software that introduces prerequisites while filling the form. The clinician should not be able to fill the next field before a critical field is properly filled.

**ULTRASOUND**

The effectiveness of ultrasound-guided intra-abdominal drainage of abscesses and abnormal fluid collections at the Georgetown Public Hospital, Guyana.

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