Role Extension For The Radiographer In The New Millennium

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Role extension

“Taking on new non-traditional necessary roles. Entail re-evaluation, restructuring, retraining & redeployment”

- Philosophy (why)
- Policy (what)
- Practice (How)
- Procedure (when)

WHY ROLE EXTEND?

“THERE IS A GLOBAL SHORTAGE OF RADIOLOGISTS AND AFRICA IS HIT THE HARDEST”

Distribution of radiologists in Saharan Africa

- For most countries, most of radiologists are in urban and semi-urban areas (North and South Africa are no exception).
- Medical facilities in rural Africa which serve the majority of population don’t have radiologists although they may have US & X-ray services

List of Sub-Saharan African countries with established training programs for radiologists

- West Africa
  - Cameroon
  - Ghana
  - Nigeria
  - Sierra Leone
- East Africa
  - Kenya
  - Tanzania
  - Uganda
- Southern Africa and central
  - South Africa
  - Zimbabwe
  - Malawi
  - Mauritius
  - Mozambique

Ratio of radiologist to population in African countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Radiologist to population</th>
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<tbody>
<tr>
<td>USA, Europe, Canada</td>
<td>Approx 1: 50,000</td>
</tr>
<tr>
<td>South Africa</td>
<td>1:100,000</td>
</tr>
<tr>
<td>Kenya</td>
<td>1:400,000</td>
</tr>
<tr>
<td>Uganda</td>
<td>1:1,000,000</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1:1,500,000</td>
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Up to 14 African countries have no radiologist. Most have less than 30 radiologists.
Radiologists in less developed countries work longer hours, face challenges of constant machine breakdowns, low supply of consumables, poor infrastructure, and complex disease conditions.

**Situation of radiology practice in Africa: Uganda as case study**
- Less than 20 out of approx 230 health facilities with X-ray/US have radiologists, however, they all have radiographers.
- Most X-rays films are not reported, wrong diagnoses made by non-trained clinicians may be misleading and at times dangerous to the patient.
- There has been a rapid influx of US some is performed by non-trained personnel.
- CT and MRI are catching up.
- Radiographers are increasingly called on to manage departments, teach, research.

**Radiologist’s work can be overwhelming**

**WHAT DO WE DO? INNOVATE APPROPRIATE SOLUTIONS TO AFRICA’S URGENT IMAGING NEEDS**

**Solutions to shortage of radiologists**
- Train more radiologists, but this is at times, a rat race due to fast growing populations, attrition, brain drain.
- Import radiologists.
- Reduce imaging tasks for radiologists: simply do non-critical examinations.
- Tele-imaging.
- Role extension to radiographers.

**HOW DO WE GET ABOUT REROLE EXTENSION?**
**Steps in role extension**

- Reevaluate/research: Are we meeting needs efficiently?
- Restructure/reorganize: Policies, standards, guidelines, protocols defining the new roles. This must be an evidence-based participatory process.
- Retrain for new roles
- Redeploy
- Reevaluate

**TRAINING FOR ROLE EXTENSION**

**To what level should we train radiographers so as to take up new tasks?**

“If one is to train radiographers to carry out new roles like US, interpret films etc, this must be to a level of competence, thorough enough so as to provide the referring clinician with adequate information to influence therapy decisions”.

**AN INTENSIVE TRAINING PROGRAMME**

**Training of radiographers to take up new roles: the way to go**

- Curriculum development for various roles
- Relevance of curriculum to local health needs/technology
- Adequate training infrastructure and resources
- Comprehensive curriculum
- Sufficient depth
- Adequate hands-on
- Efficient assessment
- Certification
- Registration

**ADEQUATE TRAINING INFRASTRUCTURE FOR COMPETENCE**
TRAINING IS GOVERNED BY LOCAL CURRENT AND FUTURE NEEDS

What are the major areas of role extension

- Ultrasound
- X-ray pattern recognition

WHY
- These take up over 80 percent of the imaging requirements in most health facilities in Africa

ALSO TO NOTE
- Equipment maintenance an increasing requirement: train biomedical technicians

Training for Role extension: courses offered at ECUREI

Courses currently offered:
- X-ray pattern recognition (1 yr)
- Diagnostic ultrasound (6 months-1yr)
- Biomedical technology (3yrs)

New course slated for this year
- Masters in diagnostic imaging (CT, MRI, etc)
- Masters in ultrasound

All masters course have management, entrepreneurship, research and informatics in addition to basic sciences, pathology, clinical medicine and image interpretation

X-RAY PATTERN RECOGNITION CLASS SDL SESSION

ULTRASOUND IS ANOTHER IMPORTANT NEW ROLE

U/S HANDS-ON SESSION AT ECUREI
Training in image interpretation: is it realizable?

Understanding stages of image interpretation is important if we are to effectively train for the report writing role.

Steps in image interpretation

- **Observation** (pattern recognition)
- Analysis
- Interpretation
- Report writing

- The first step is look for “shadows” and group these into a “pattern” this usually takes the largest proportion of time compared to subsequent steps, but does not necessarily require background training in clinical disciplines. It is “an art”, not a science.
- Radiologist reporting time would be greatly shortened if this step was delegated to competent assistant who does not have to be a doctor/physician.

Developing observation skills

- Health workers who have a background of gross anatomy can ably develop this skill.
- Perfecting the skills requires repeated exposure to images and practice.
- Interacting with mentors, peers, and through discussion groups may speed up the learning curve.

The observation stage

- This is the first stage in interpreting an image.
- It requires observation skills.
- It is more of an art/talent and may be developed earlier on in life right from infancy.
- One should be able to recognize shadows and how they differ from each other and the normal.
- One may compare both sides of the body or one may rely on a prior knowledge of the normal.

The analysis stage

- This involves piecing together the various pattern to come up with a postulated pathological diagnosis e.g. “homogenous shadow + air bronchogram + silhouette = lobar pneumonia.
- The step requires a medical analytical skills.
- Skills are developed through equipping practitioner with basic sciences of anatomy, physiology, and pathology.
- This may be by lectures, personal reading, discussions, and tutorials.
Developing analytical skills

- For adults, reading around a problem and understanding the pathological process underlying the medical problem, then sharing this out with peers in a discussion group/tutorial is an ideal way.
- This underscores the advantages of problem based learning and self-directed learning over classroom lectures.

Interpretation stage

- This 3rd stage involves relating the pathological impression obtained at the analysis stage to the epidemiology, clinical features and other information like lab, then hypothesizing a possible cause.
- An example:
  - lobar pneumonia, in a young man, plus cough and chest pain for one week, most likely streptococcal pneumonia
  - a large rounded mass, with spiculated margins in a chronic 50 yr male smoker is most likely bronchogenic carcinoma
- The stage requires interpretation skills which necessitate training in clinical subjects plus relevant sciences like biostatistics and epidemiology.

Developing interpretation skills

- Individuals with prior clinical exposure like doctors, clinical officers are at an advantage.
- One have an idea of disease prevalence, clinical presentations & laboratory findings for a particular disease.
- For adults, reading around a problem and understanding the epidemiology, clinical features and expected laboratory findings, then sharing this out with peers in a discussion group/tutorial is an ideal way.

Teaching radiographers to take up new roles
The report writing stage 1
- This 4th stage involves writing down the observations, and findings at the analysis and interpretation skills in a systematic and clear style as a means of communication to the referring doctor.
- It requires writing/reporting skills.
- The report should have identification details, a descriptive section, a conclusion and at times recommendations.

The report writing stage 2
- This stage requires competence in the English language.
- The skill is independent of prior clinical/medical exposure, apart from a mastery of descriptive and imaging terminology.

Developing report writing skills
- Knowledge on the format of a report is crucial.
- A template may be given out and the student explained the rationale of the template and how to use it.
- The student should as much as possible stick to the template till he/she has acquired reasonable experience.
- Interaction with the mentor/supervisor and reading out reports for correction is an ideal way of improving the skill.

TO WHAT DEPTH SHOULD WE TRAIN THE RADIOGRAPHER?
“Go all the way”

Why go all the way?
To enable imaging report to influence pt. management decisions

Going all the way
- The results of imaging should be informative enough so as to enable the clinician to modify the therapy.
- They should significantly alter disease probability i.e. refine the diagnosis.
- In the absence of a radiologist, especially in a peripheral health unit, the referring doctor will greatly value a comprehensive and detailed and conclusive report, and not just a description of shadows and patterns.
To what depth should the radiographer be trained in image interpretation?

- A report in form of pattern or description of shadows may not be so useful, for a clinician who does not have adequate exposure to imaging. This will further be worsened by the unfamiliar imaging terminology.
- What the clinician requires is a report which depicts all the stages of descriptive observations, analysis and interpretation.

**TRAINING TO A DIPLOMA/DEGREE LEVEL IN THE NEW ROLES**

**Summary**

- Rising demands on imaging strain the existing human resources. The radiographer is well suited and can ably take up these roles. Training is the major prerequisite.