HOW IS BRACHYTHERAPY APPLIED IN THE TREATMENT OF CERVICAL CANCER?

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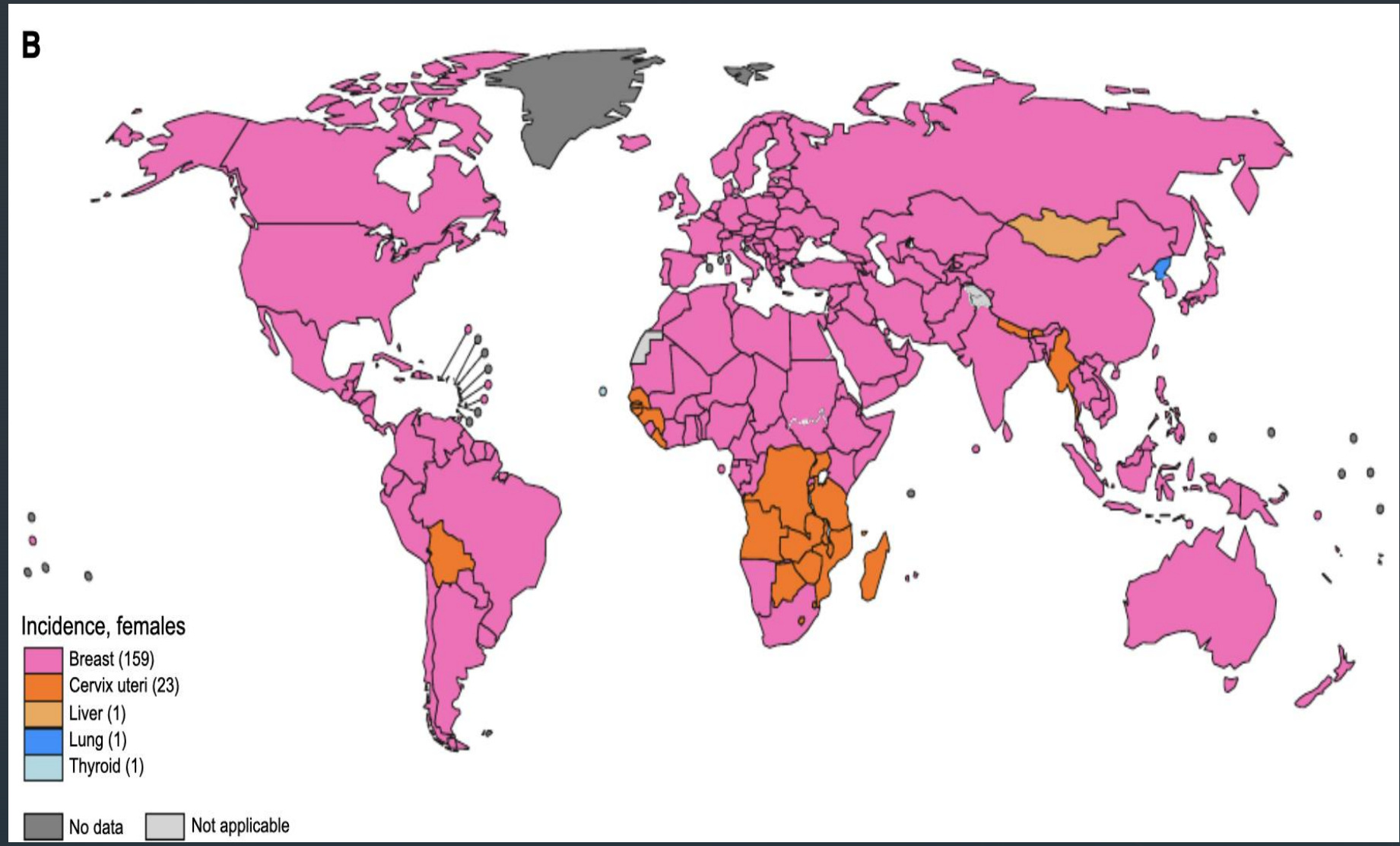
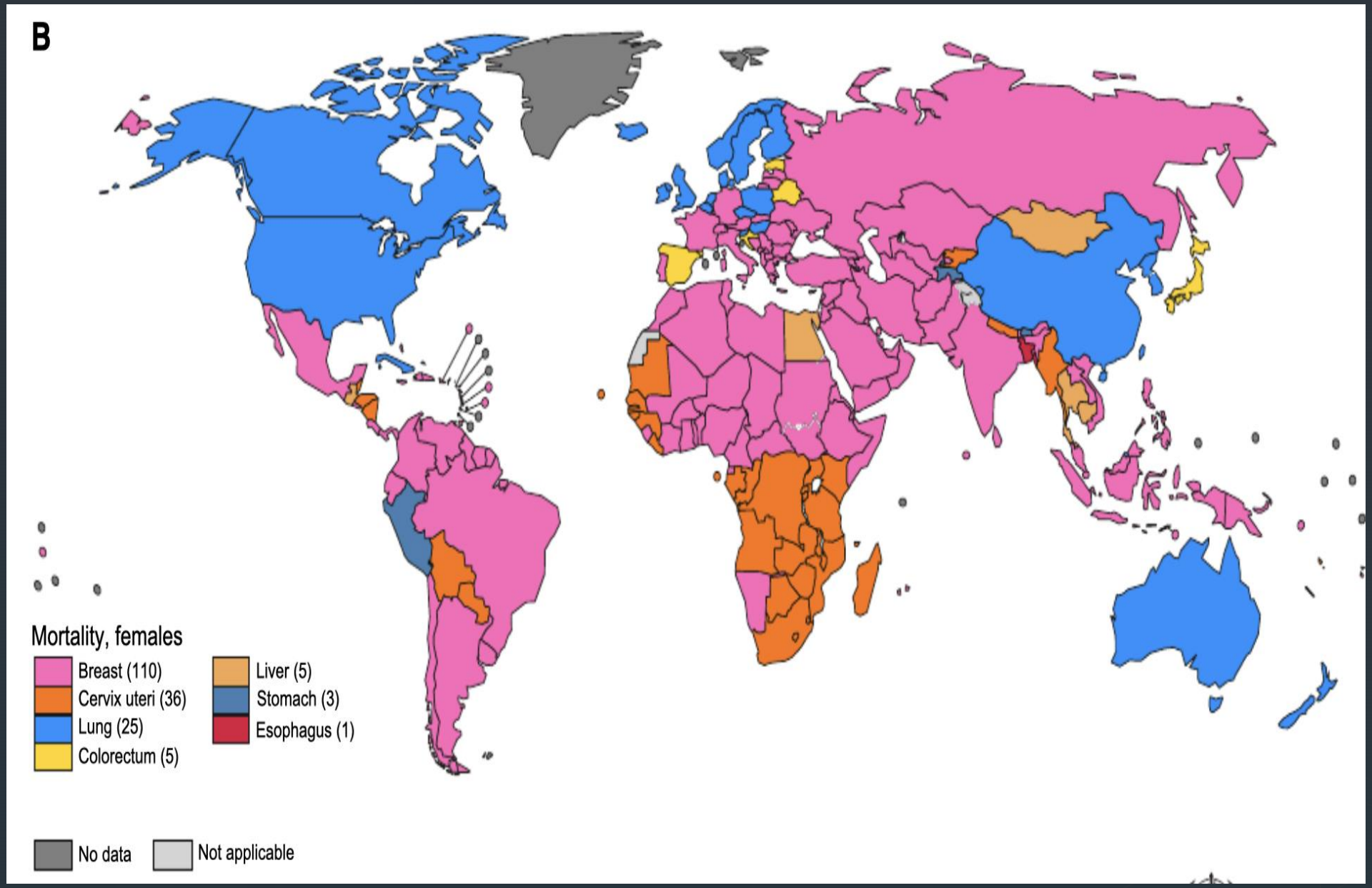
CERVIX CANCER IN SOUTH AFRICA

- Incidence 36.4/100 000 women
- Annually 12,983 new cases with approximately 5600 deaths
- 65% HPV related
- >70% present stage 2- 4
- Screening (papsmear & HPV testing):
    - Public: 30’s, 40’s, 50’s
    - Private: yearly
- Majority of our patients seen in public sector
- HPV vaccine: approximately 44% young girls vaccinated



GLOBOCAN 2020



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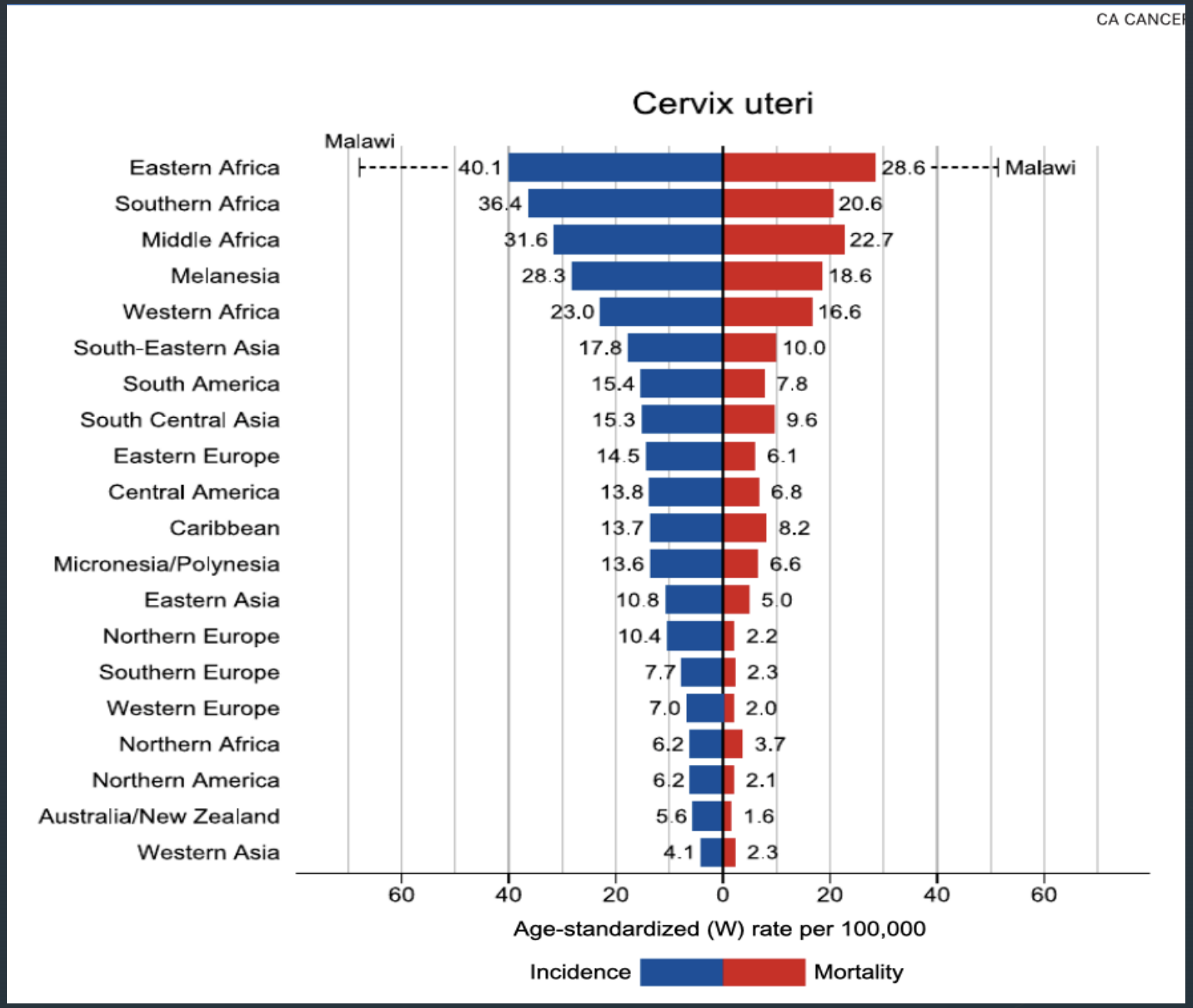


GLOBOCAN 2020

Why is incidence and mortality so high in South Africa?

- ✓ Challenges in screening / vaccination
  - Lack of awareness/education
  - Low budget allocation for screening,equipment & infrastructure
  - Competing health needs with HIV, TB
  - No demand on public therefore no political will
- ✓ Challenges is treatment
  - Accessibility to treatment
  - Lack of effective referral system
  - Availability of treatment / limited resources
  - Availability of adequately trained staff

Cervix Cancer Treatment

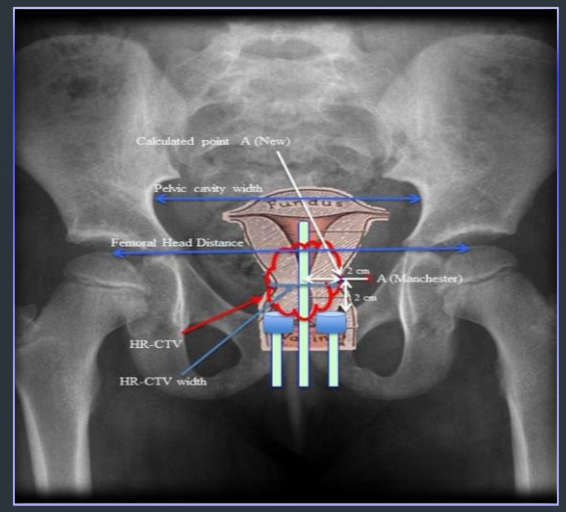
- ✓ Combination of surgery +/- adjuvant radiotherapy or chemoradiotherapy

- ✓ Definitive chemo radiotherapy (External beam and brachytherapy)
  - Stage 1B3 – IVa
  - For **definitive, curative** treatment doses of 80-90Gy required
  - Max 50Gy given with external beam

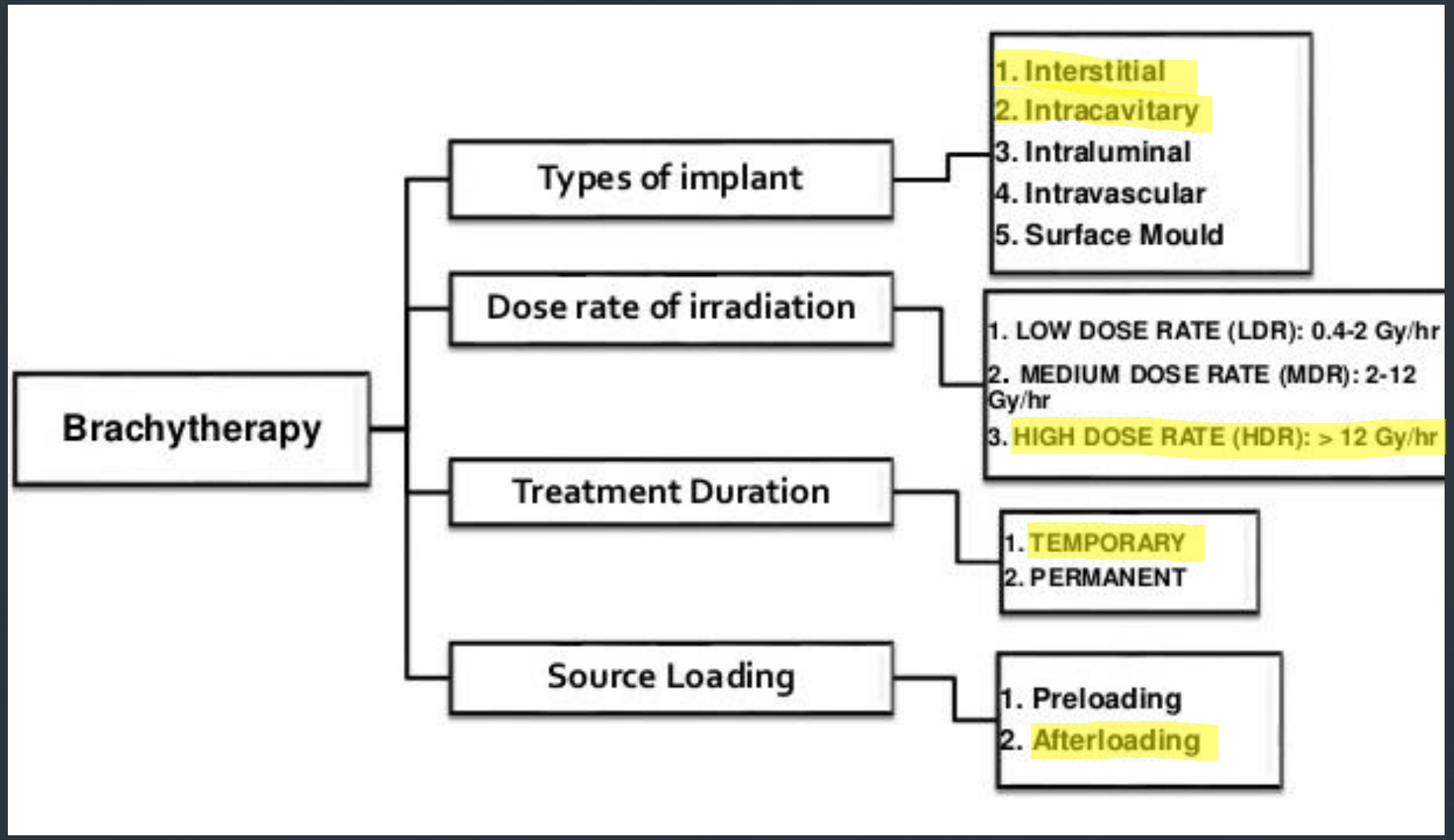
- ✓ Palliative chemotherapy or radiotherapy

Brachytherapy

- Essential part of definitive chemo radiotherapy with CURATIVE intent
- Place a brachytherapy source in close proximity to tumor
- Allows a high dose of radiation to the target and minimizes the dose to nearby sensitive organs
- Making it both safer and more effective than external beam alone.
- Iridium / cobolt source
- Radiation oncologist with expertise in brachytherapy, medical physicist with expertise in brachytherapy and dosimetrist or RTT as treatment unit operator.



Types of Brachytherapy



Brachytherapy

Advantages of HDR:

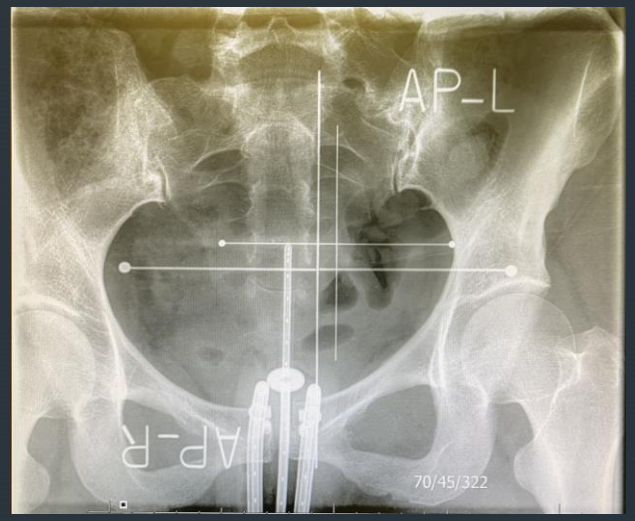
- ✓ OPD
- ✓ Small source/applicators
- ✓ Allows for dose optimization
- ✓ Increased patient comfort
- ✓ Staff safety

Disadvantages of HDR:

- ✓ Increased expertise
- ✓ Frequent source change
- ✓ Reliable power supply
- ✓ Specific training and knowledge of afterloader

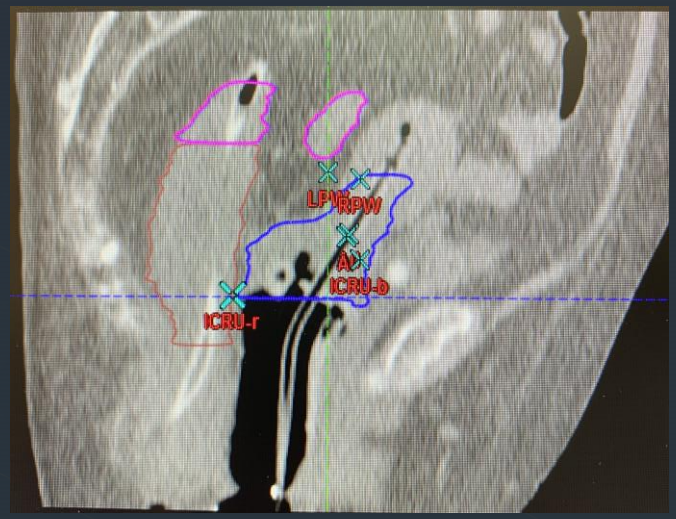
Planning techniques

2D Brachytherapy



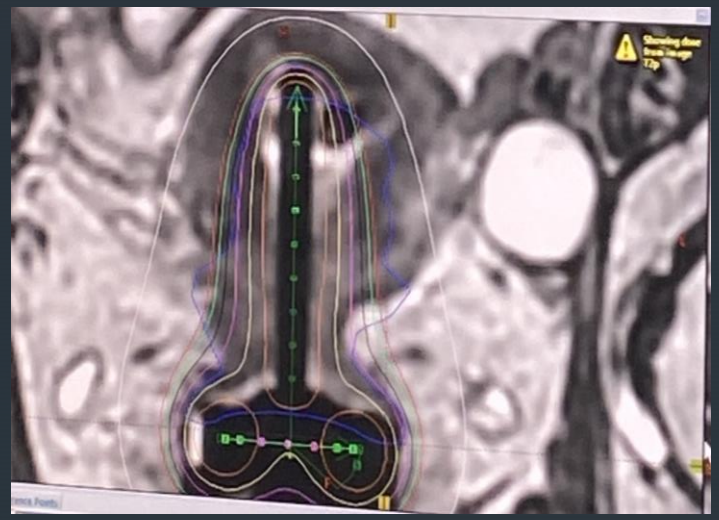
- ✓ Prescribe to point A
- ✓ Cannot see soft tissue

3D Brachytherapy



- ✓ Better visualization of soft tissue esp OAR

MRI Brachytherapy +/- interstitial



- ✓ Even better visualization of soft tissue, especially tumour

MV/MeV

Afterloaders

Challenges in Africa

- Commissioning of equipment can be quite complex.
- QA of equipment and source requires expertise which is not always available.
- Radioactive sources not allowed into some countries in Africa.
- Lack of funding for expensive supplies and equipment
- Poor infrastructure support including needed equipment and unreliable sources of power
- Inadequate staffing- anaesthetists, nurses, doctors, physicists

Grover S, Longo J, Einck J, et al. The Unique Issues With Brachytherapy in Low- and Middle-Income Countries. *Semin Radiat Oncol*. 2017;27(2):136-142. doi:10.1016/j.semradonc.2016.11.005

In South Africa…

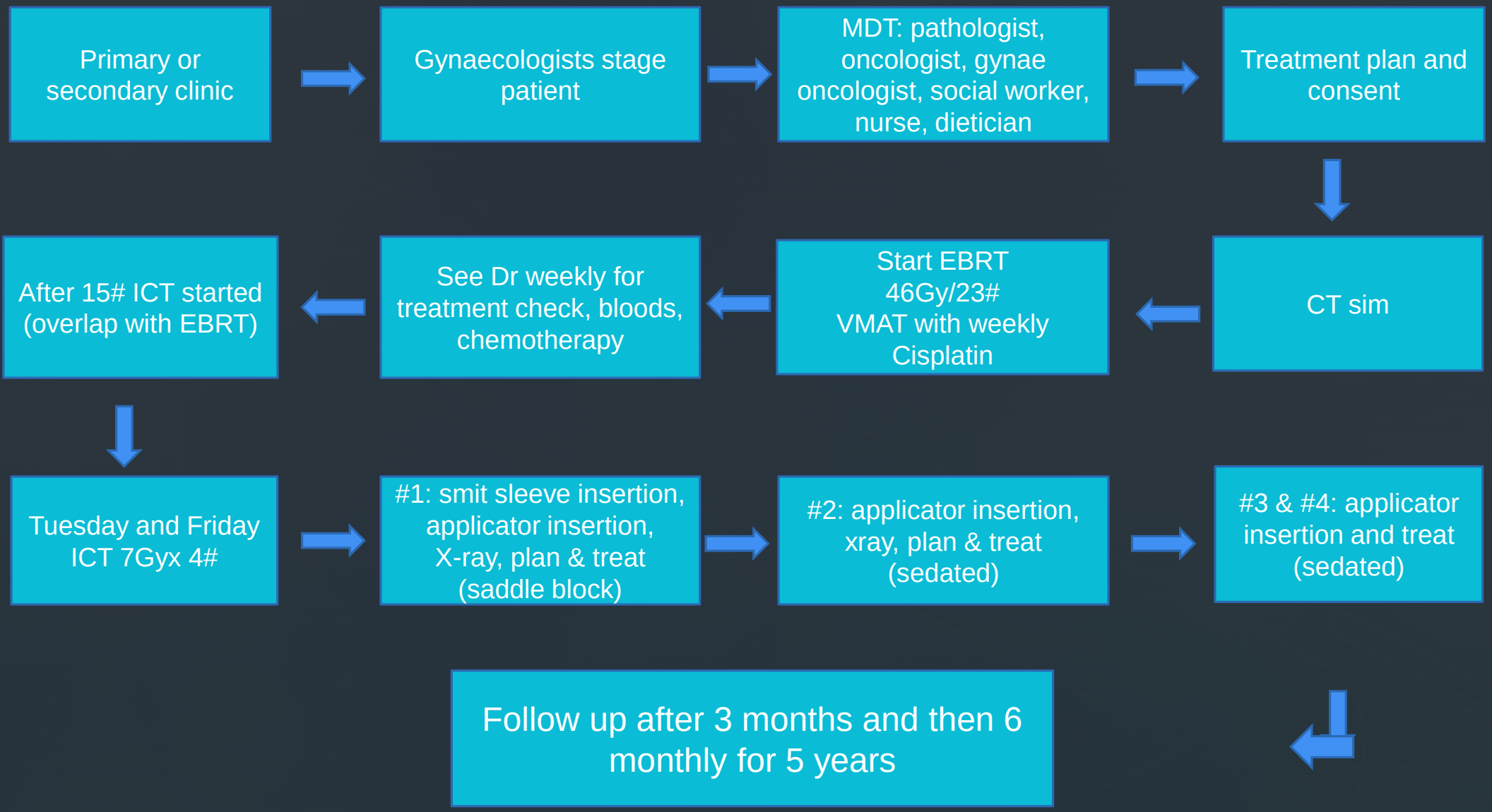
- All units do HDR intracavitary brachytherapy, no interstitial brachytherapy
- Tandem and ovoid or tandem and ring applicators
- Most use 2D planning with AP and lateral Xray imaging, prescribing to point A
- Some use CT simulator with 1st session brachy but due to financial constraints they cannot do it with each session. Prescribe to a fixed dose.
- Some do CT imaging with each brachy session, but the after loader is not in the CT bunker so patient needs to be moved. Used to delineate OAR.
- 2 practices do insertion of applicators on CT bed and the after loader is in the same room.

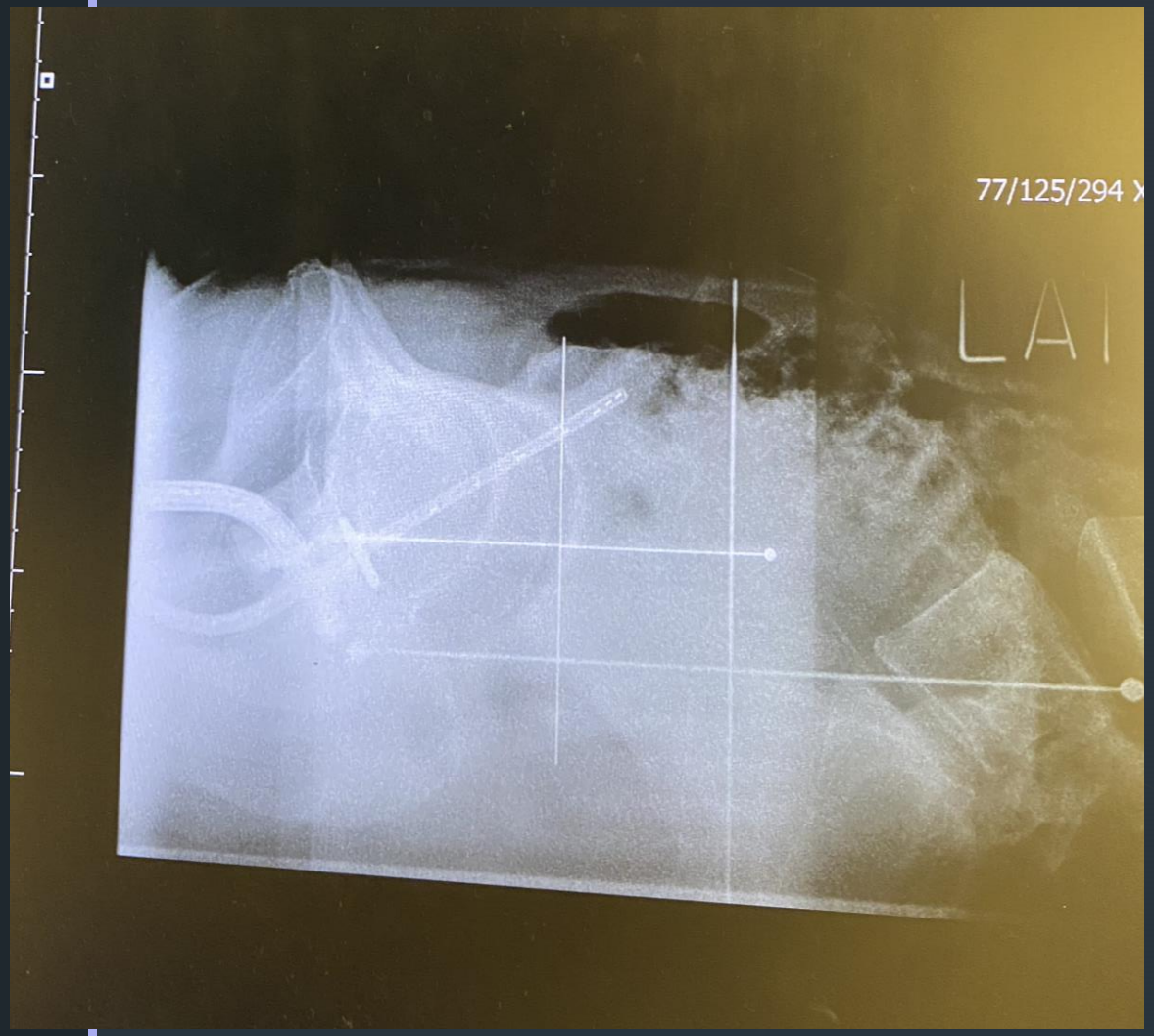
Prof Alicia Sherriff

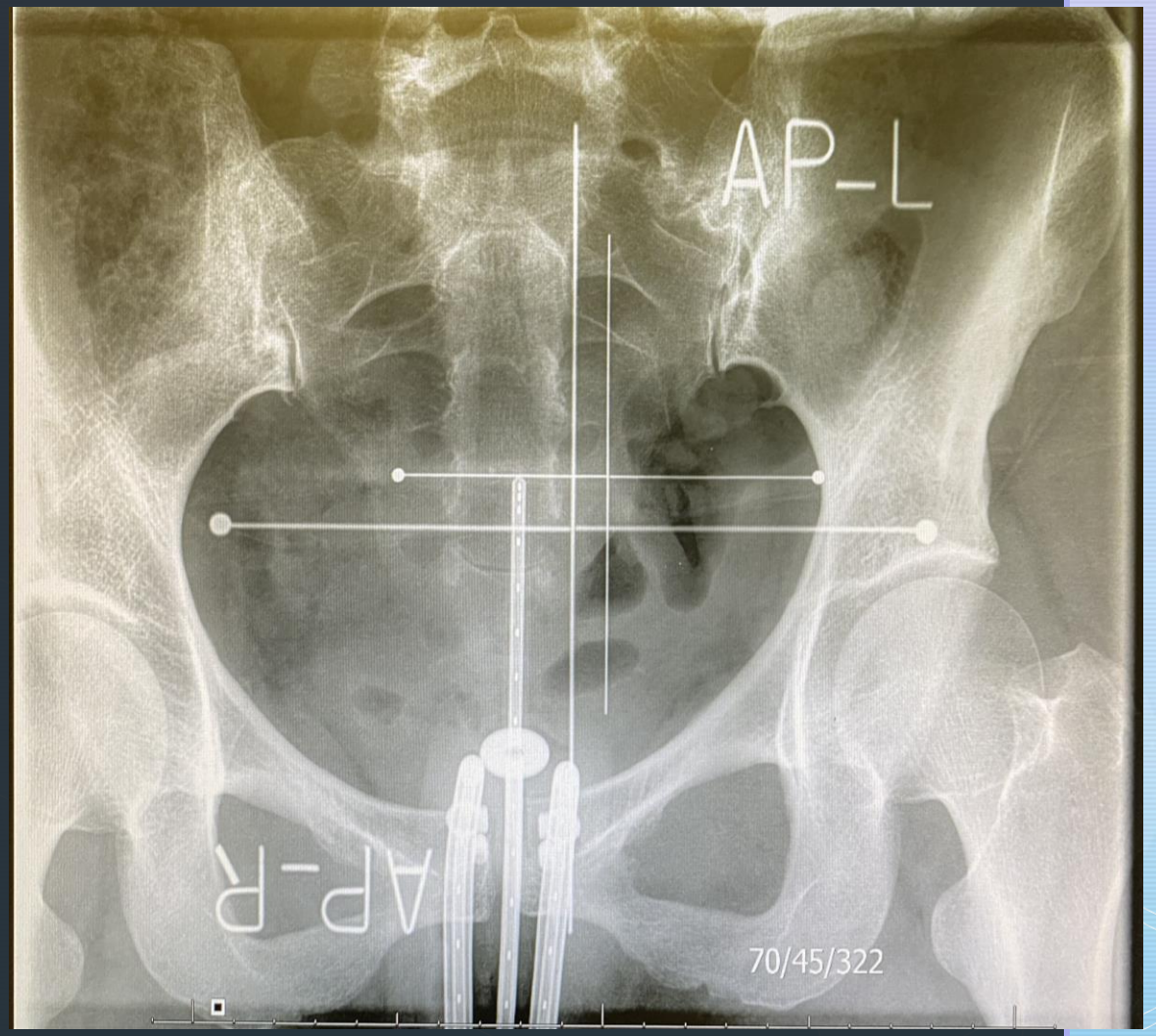
At Groote Schuur Hospital…

- In 2020: we saw a total of 258 cervix cancer patients with 150 requiring brachytherapy
- We have 4 LINACS (3D & VMAT) and 1 afterloader
- 2 Radiation oncologists that has gynae brachytherapy expertise, 5 physicists with brachy expertise, 3 RTTs with brachy expertise
- HDR with after loader using an iridium source
- Use 2D planning for brachytherapy because we do not have a CT scanner near the bunker. There are plans to upgrade to 3D planning.

Workflow


Primary or secondary clinic
Gynaecologists stage patient
MDT: pathologist, oncologist, gynae oncologist, social worker, nurse, dietician
Treatment plan and consent
CT sim
Start EBRT 46Gy/23# VMAT with weekly Cisplatin
See Dr weekly for treatment check, bloods, chemotherapy
After 15# ICT started (overlap with EBRT)
Tuesday and Friday ICT 7Gyx 4#
#1: smit sleeve insertion, applicator insertion, X-ray, plan & treat (saddle block)
#2: applicator insertion, xray, plan & treat (sedated)
#3 & #4: applicator insertion and treat (sedated)
Follow up after 3 months and then 6 monthly for 5 years


77/125/294
LAT


AP-L
AP-R
70/45/322


WISENET

Specific Challenges at Groote Schuur Hospital

Patient factors:

- ✓ Social issues therefore do not attend sessions
- ✓ Lack of insight and cultural/community misbeliefs
- ✓ Co-morbidities eg HIV, TB
- ✓ Advanced disease so failure to insert equipment into uterus

Treatment factors:

- ✓ 2D imaging
- ✓ Due to Covid- No imaging
- ✓ Bunker is far from the CT scanner and rest of department
- ✓ Limited time: only 2 mornings per week with high volume of patients
- ✓ Staff shortages: oncologist, physicist, RTT
- ✓ No dedicated theatre staff that understand brachytherapy

Advancements at Groote Schuur Hospital

- Training courses for staff on site and internationally
- Sound commissioning and QA protocol
- Recent acquisition of new equipment, applicators, source contract
- Technician is in same city
- Plan to move to new bunker in radiotherapy department, near CT scanner however funding is limited.

THANK YOU


SWABS
MOPPING
PACKING
DISS LARGE
SMALL
PLUGS THROAT
VAGINAL
TOWEL CLIPS
BRAVOS
BRAVOS