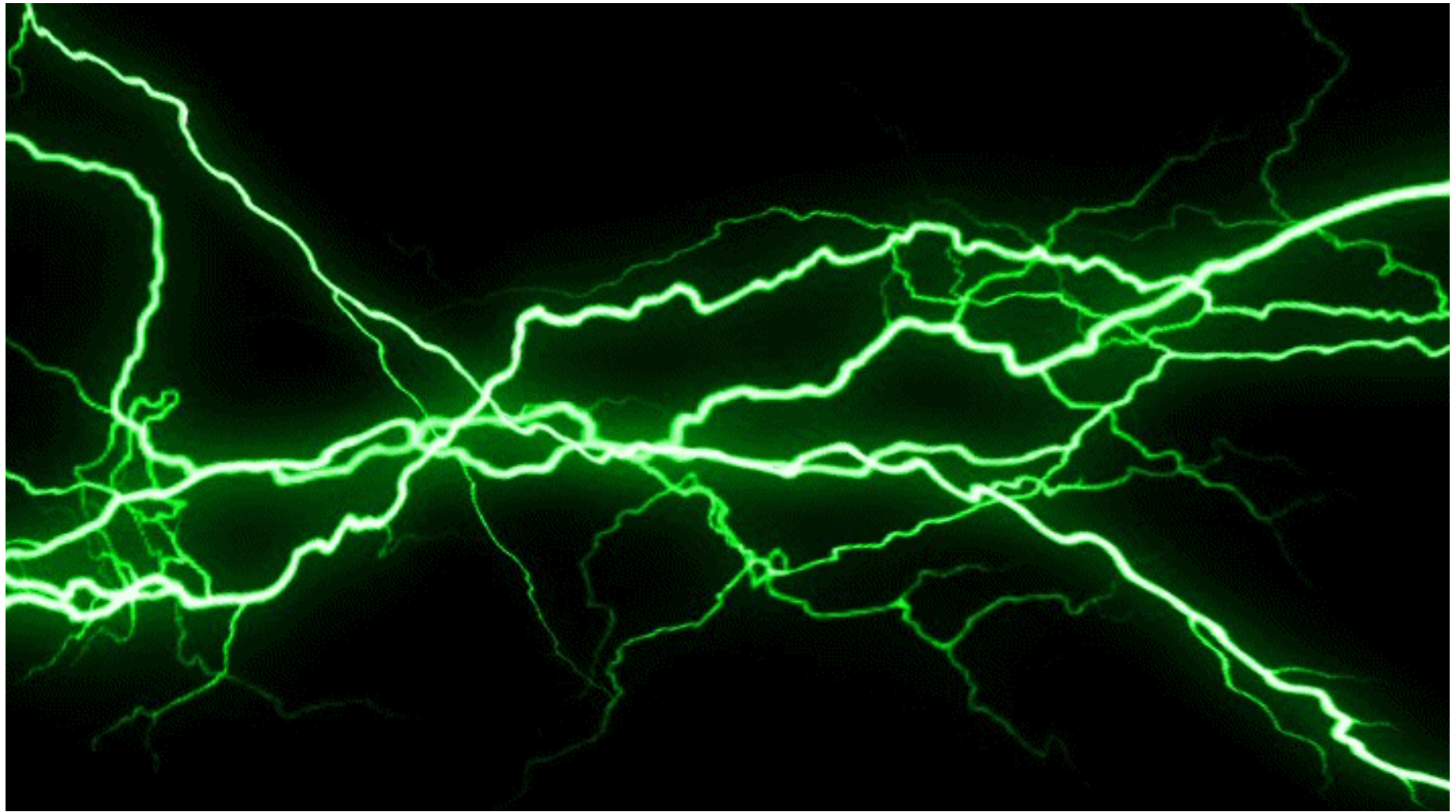


Cutaneous Lymphomas

Localized and Total Skin Radiation Therapy

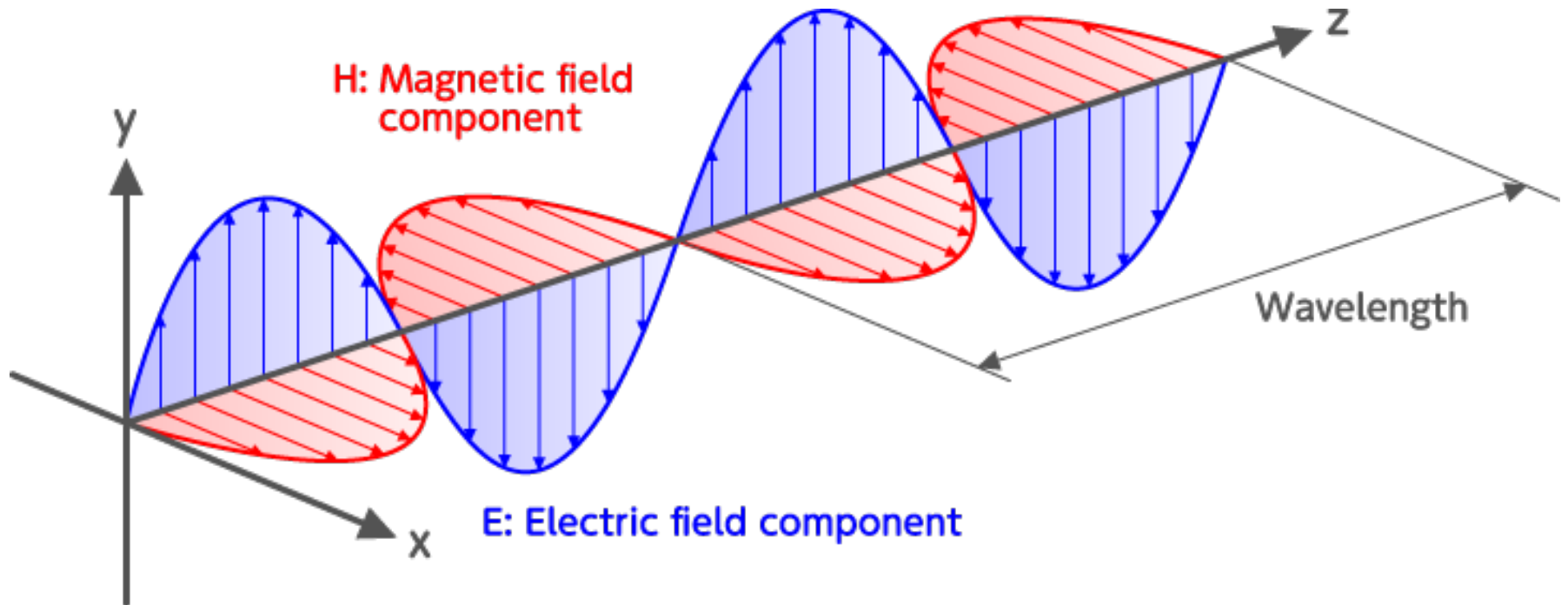
Chris Kelsey, M.D.
Duke University Medical Center





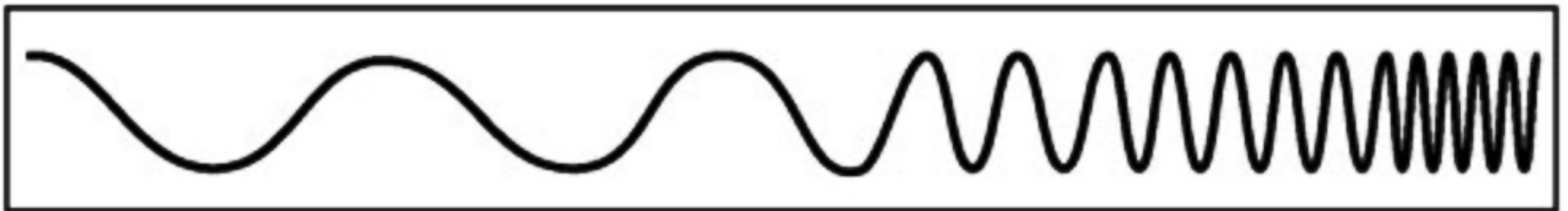
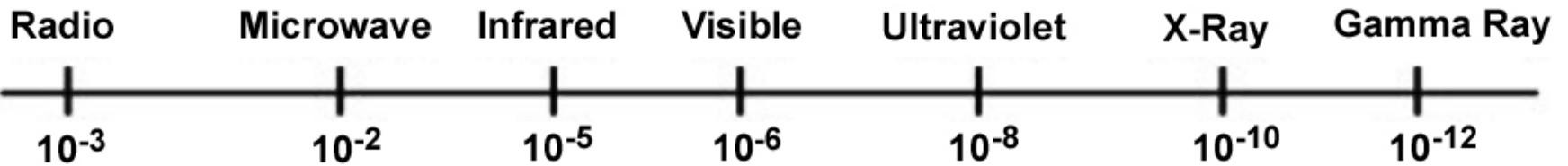
Radiation

(Electromagnetic Wave)



THE ELECTROMAGNETIC SPECTRUM

Wavelength (meters)



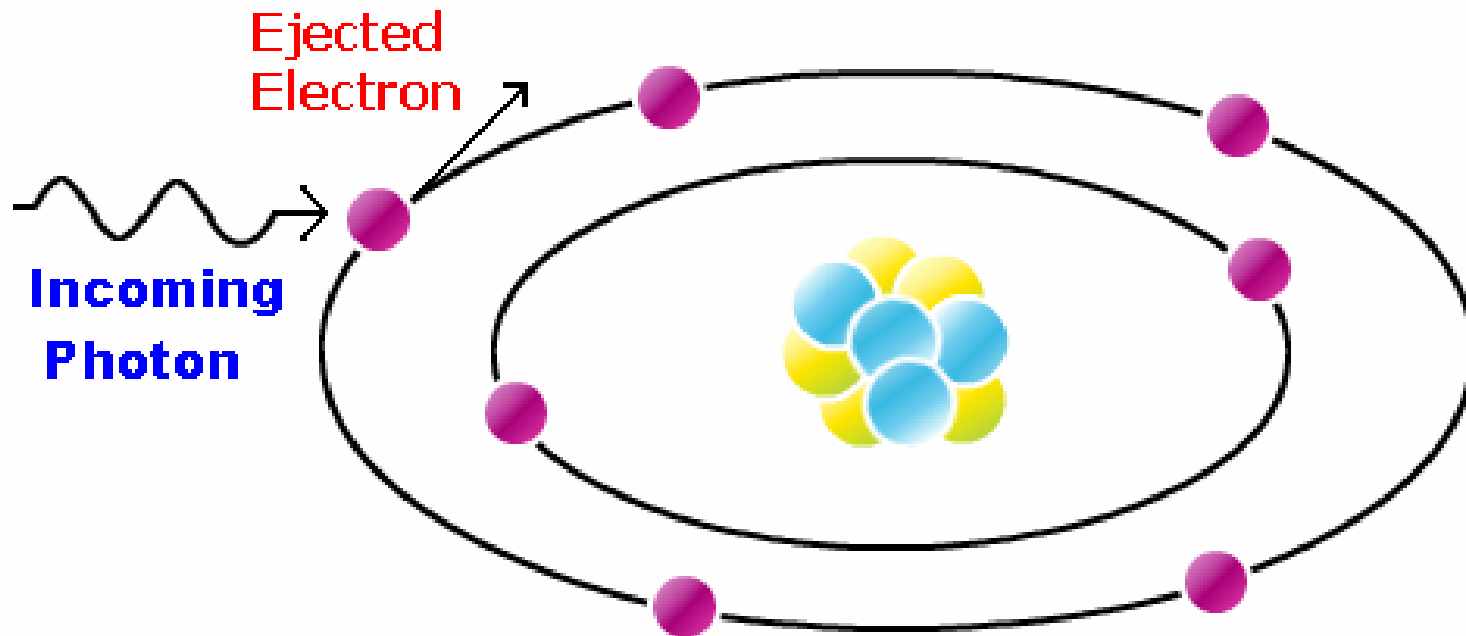
Frequency (Hz)



V I S I B L E L I G H T

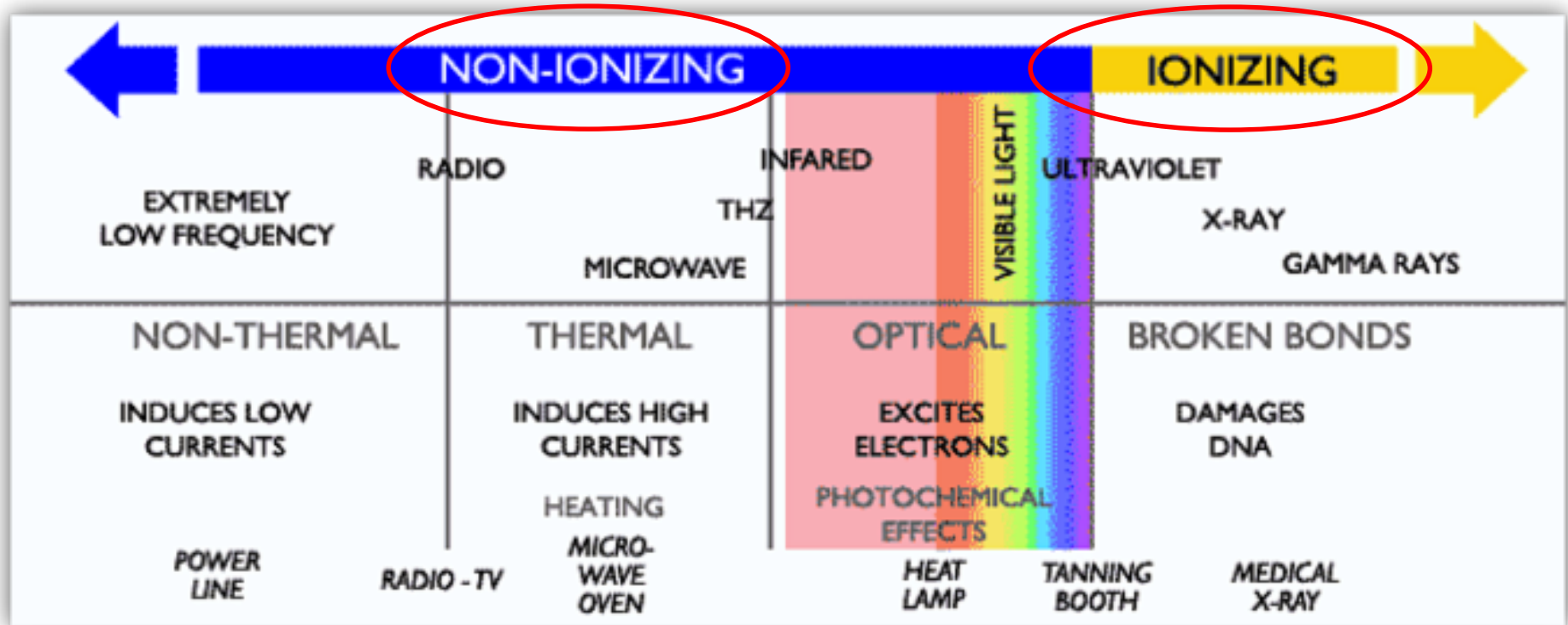
Ionizing Radiation

Radiation (particles, x-rays, gamma rays) with sufficient energy to cause ionization in the medium through which it passes



Radiation

Non-Ionizing vs. Ionizing



Background Ionizing Radiation

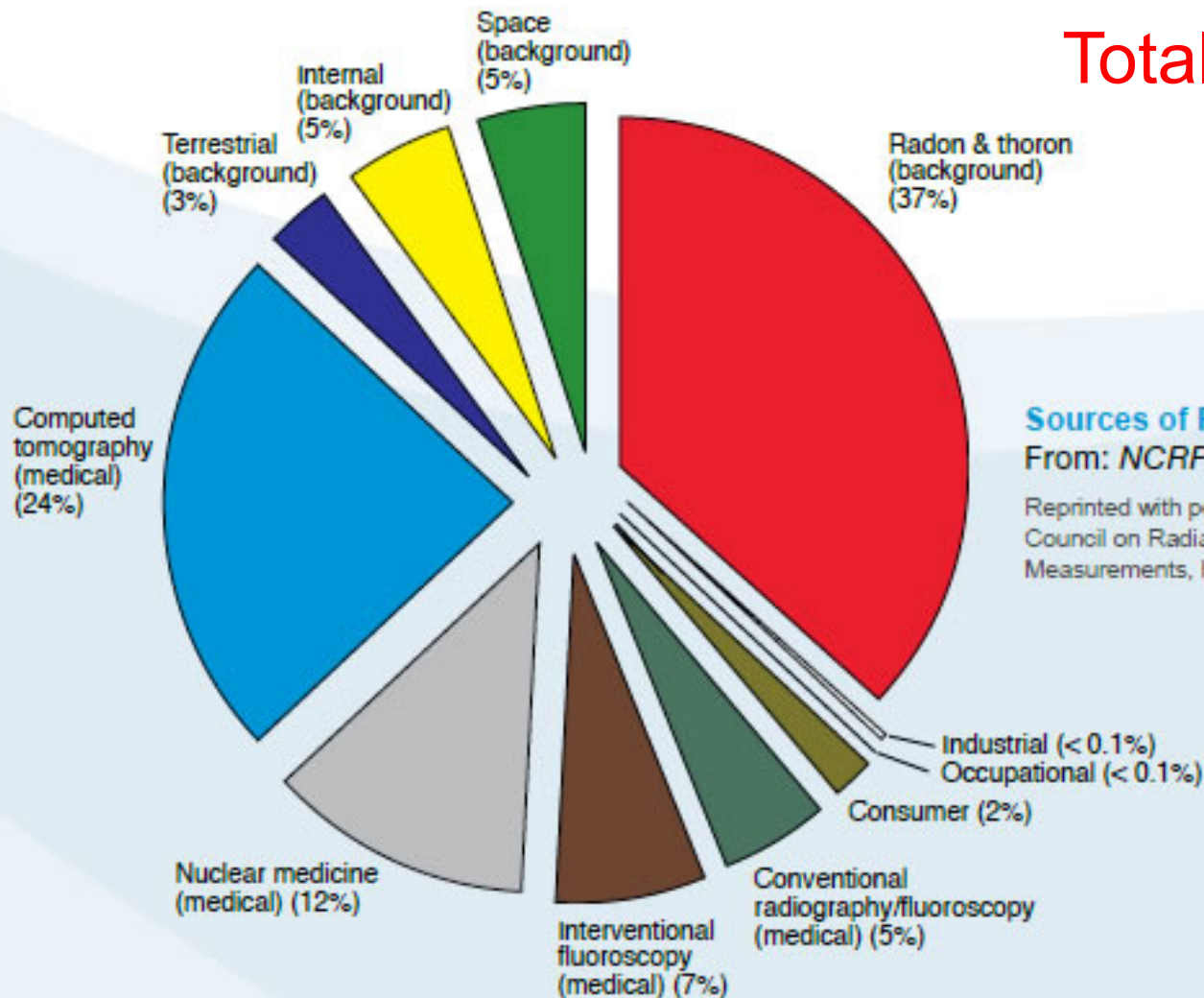
(Ubiquitous)

- Inhalation- Radon
 - 2.28 mSv
- Cosmic- Sun/Stars
 - 0.33 mSv
- Ingestion- Radioactive ^{40}K and ^{14}C
 - 0.28 mSv
- Terrestrial- Uranium, thorium, radium in soils and rocks
 - 0.21 mSv

TOTAL=- ~3 mSv/year

Radiation Exposure (Annual)

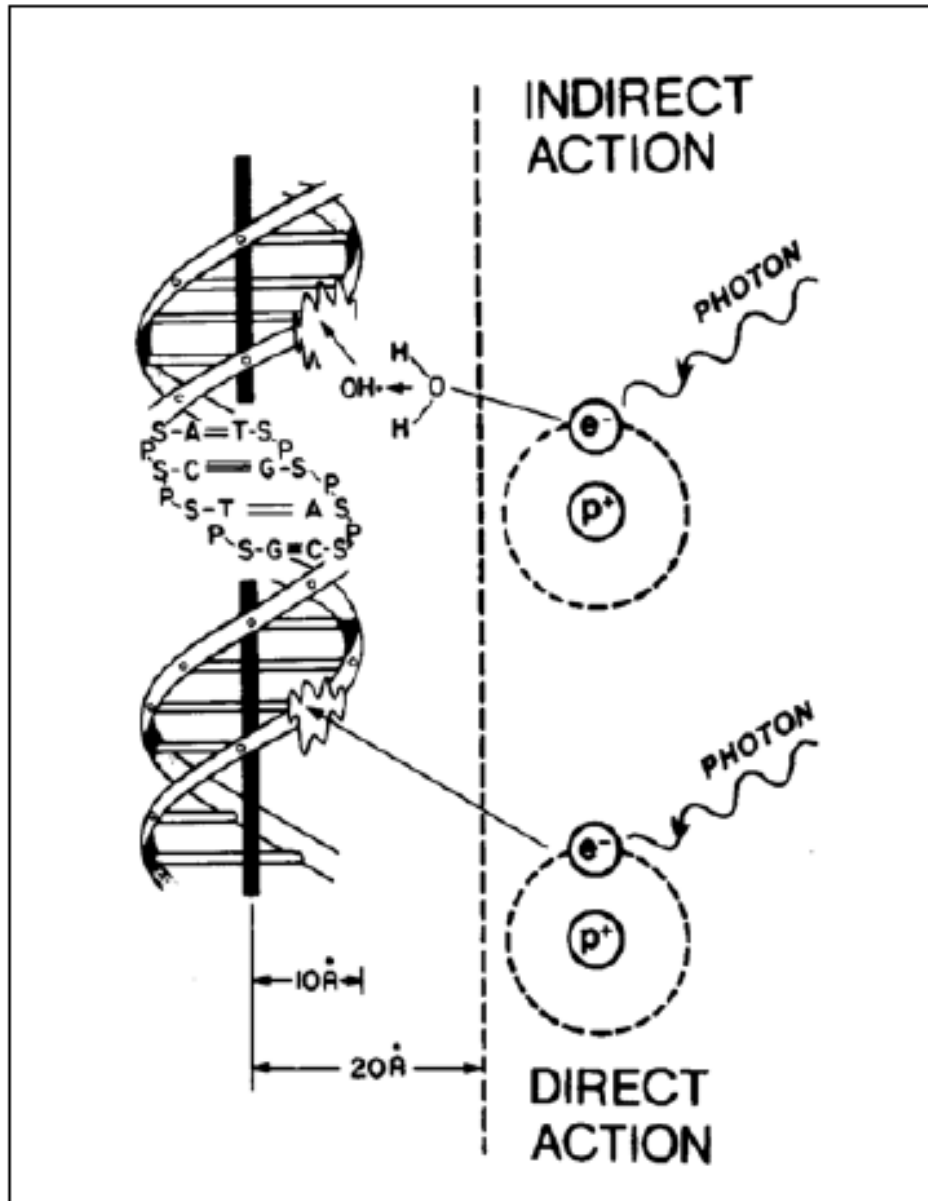
Total- ~6.2 mSv/year



Sources of Radiation Exposure
From: *NCRP Report No. 160*

Reprinted with permission of the National Council on Radiation Protection and Measurements, <http://NCRPonline.org>

Effects of Ionization



RT Steps

- Consultation
- Simulation
- Treatment Planning
- Treatment





Terminology

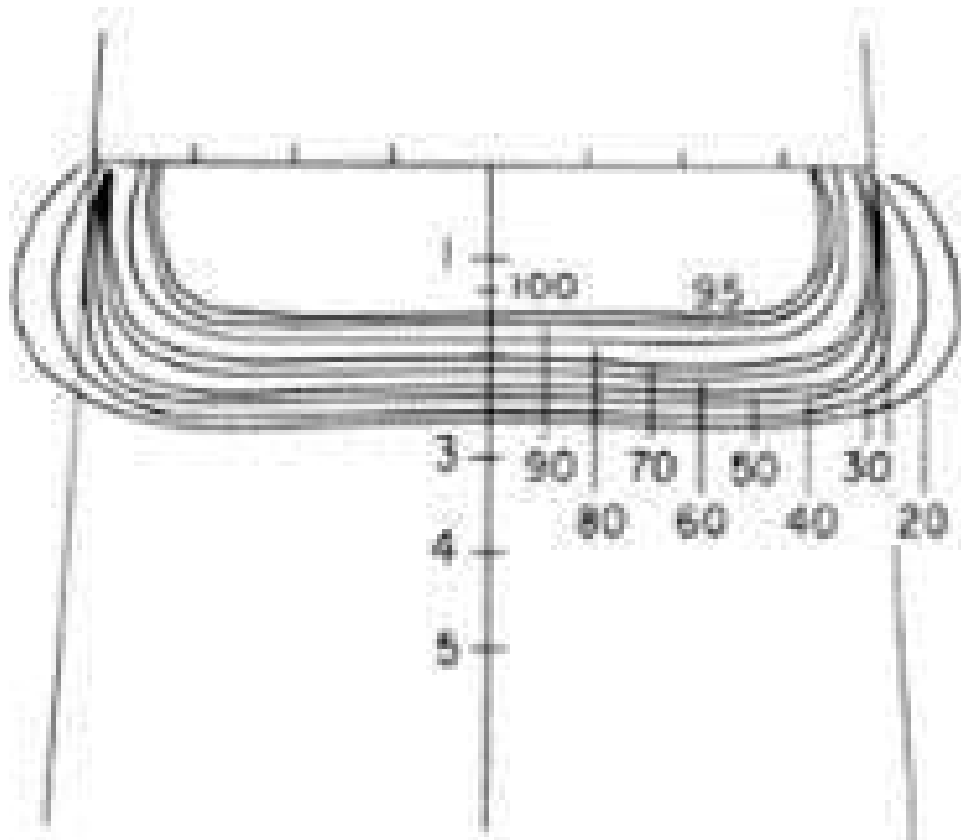
- Gy = “Gray” = unit of treatment
 - 2 Gy daily dose is typical
- Fraction = a treatment
 - 5 fractions/week standard (M-F)
- Primary cutaneous B-cell lymphoma
 - 2 Gy qd (daily) to 30 Gy
 - One 10 minute treatment a day for 15 days (M-F, 3 weeks)

Types of Radiation Therapy

Conventional RT

- Electrons
- Photons

Electrons



Case #1

“Curative”

- 43 year old male
- Noted “pimple” on left flank in 11/2010
- 1 month- lesion grew to ~5 cm
- Increasing pain
- Biopsy X 2- negative
- Topical and intralesional steroids- some regression

Case 1

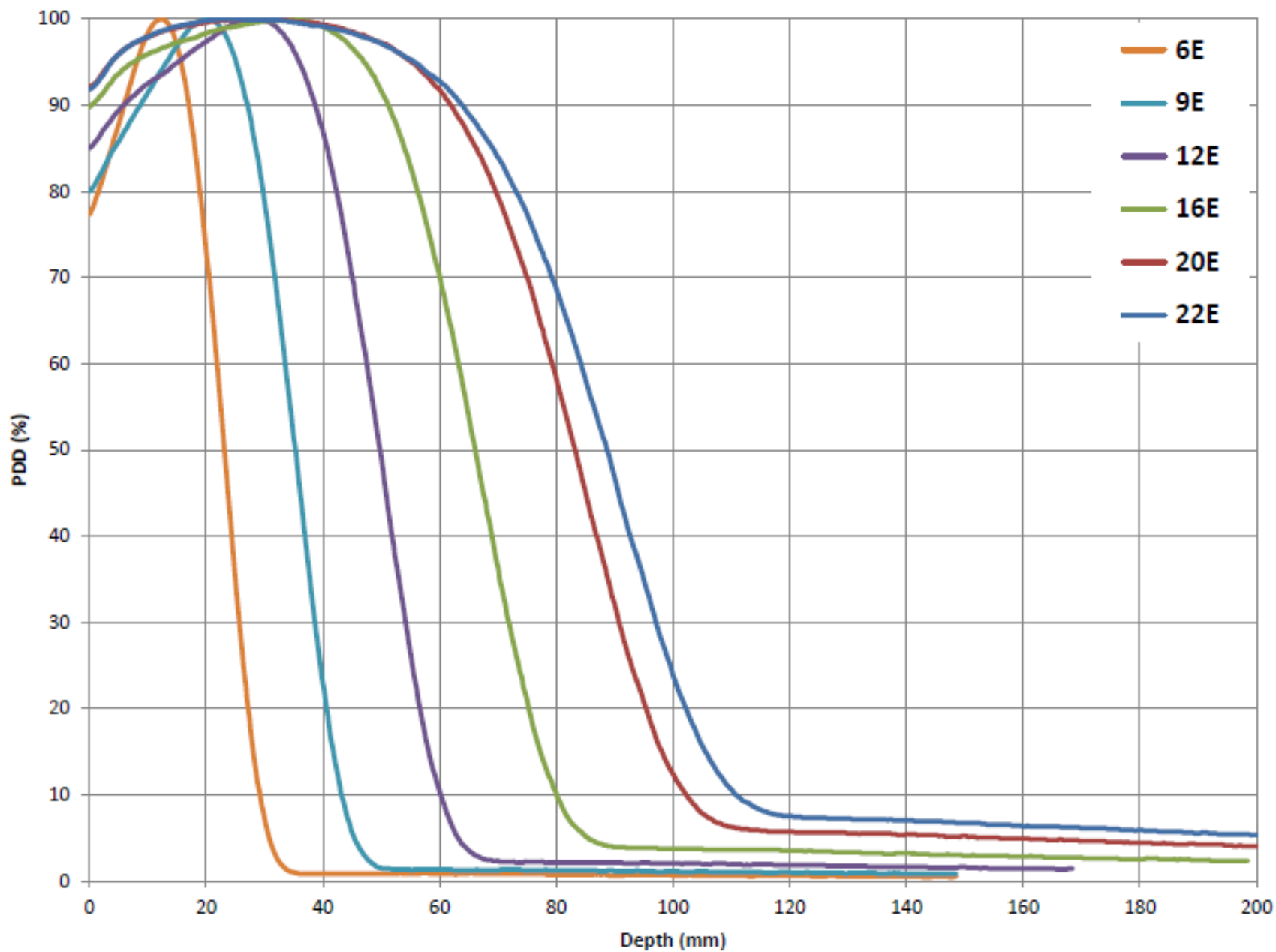


Biopsy- Primary cutaneous anaplastic large cell lymphoma



02/23/2011

Electron beam PDD - 15x15 Cone





Details

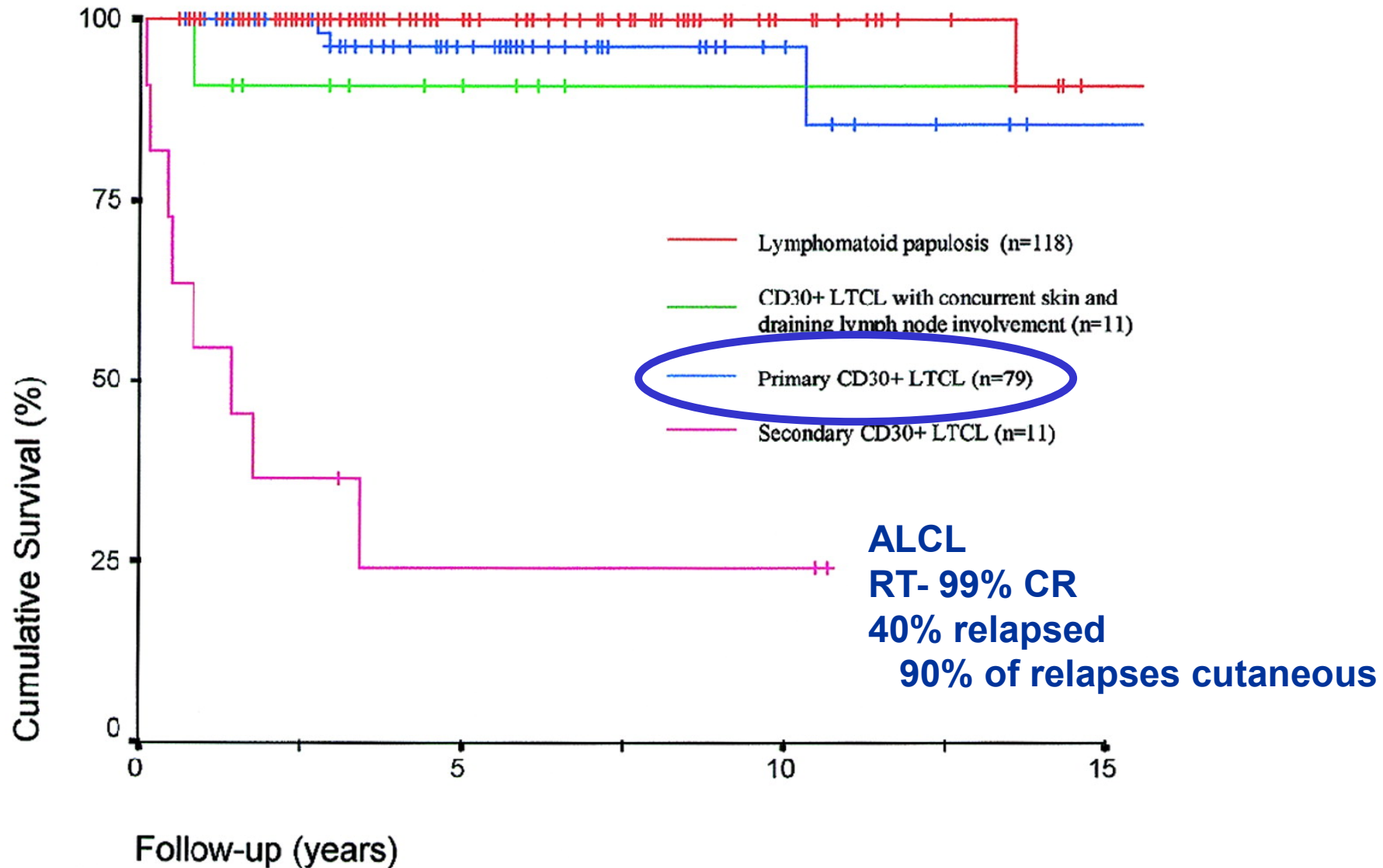
40 Gy (2 Gy daily, 5 days/week)

Duration- 15 minutes/day



Dutch Cutaneous Lymphoma Group

Blood 2000;95:3653-3661



Case #2

“Palliative”

- 42 y/o male with 1 year hx of erythematous “bumps” on his back, right shoulder, right arm
- Biopsy- Marginal zone B-cell lymphoma
- Topical steroids
 - Resolution of 4 lesions
 - Persistence of 1 lesion



2 Gy X 2



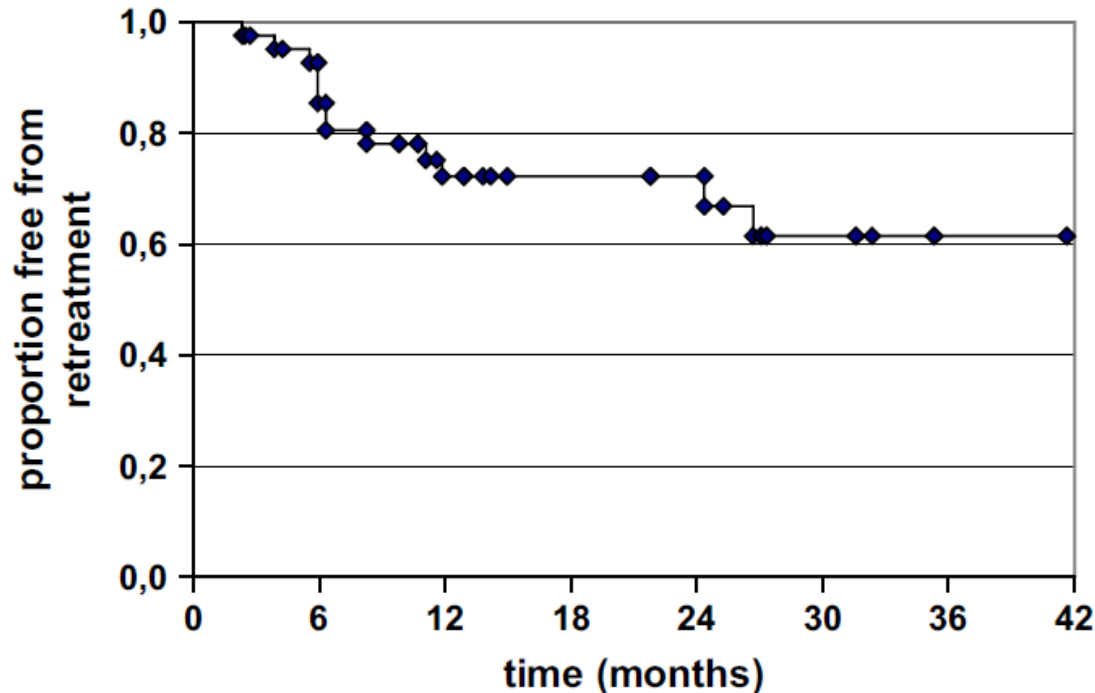
2 months



Dutch

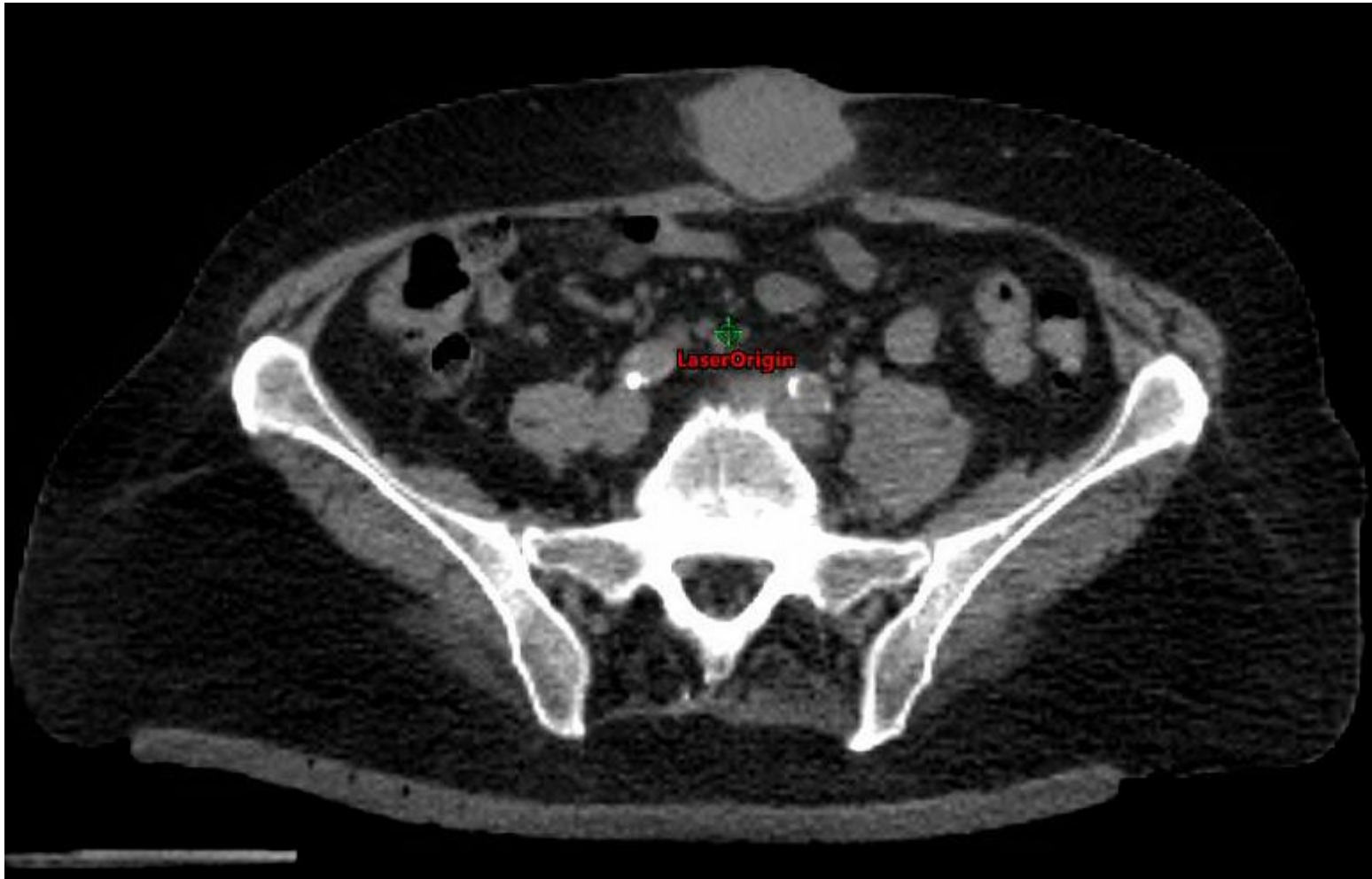
IJROBP 2009;74:154

- N=18 (44 lesions) PCMZL or PCFCL
- 2 Gy X 2
- CR 75% (CR + PR 86%)

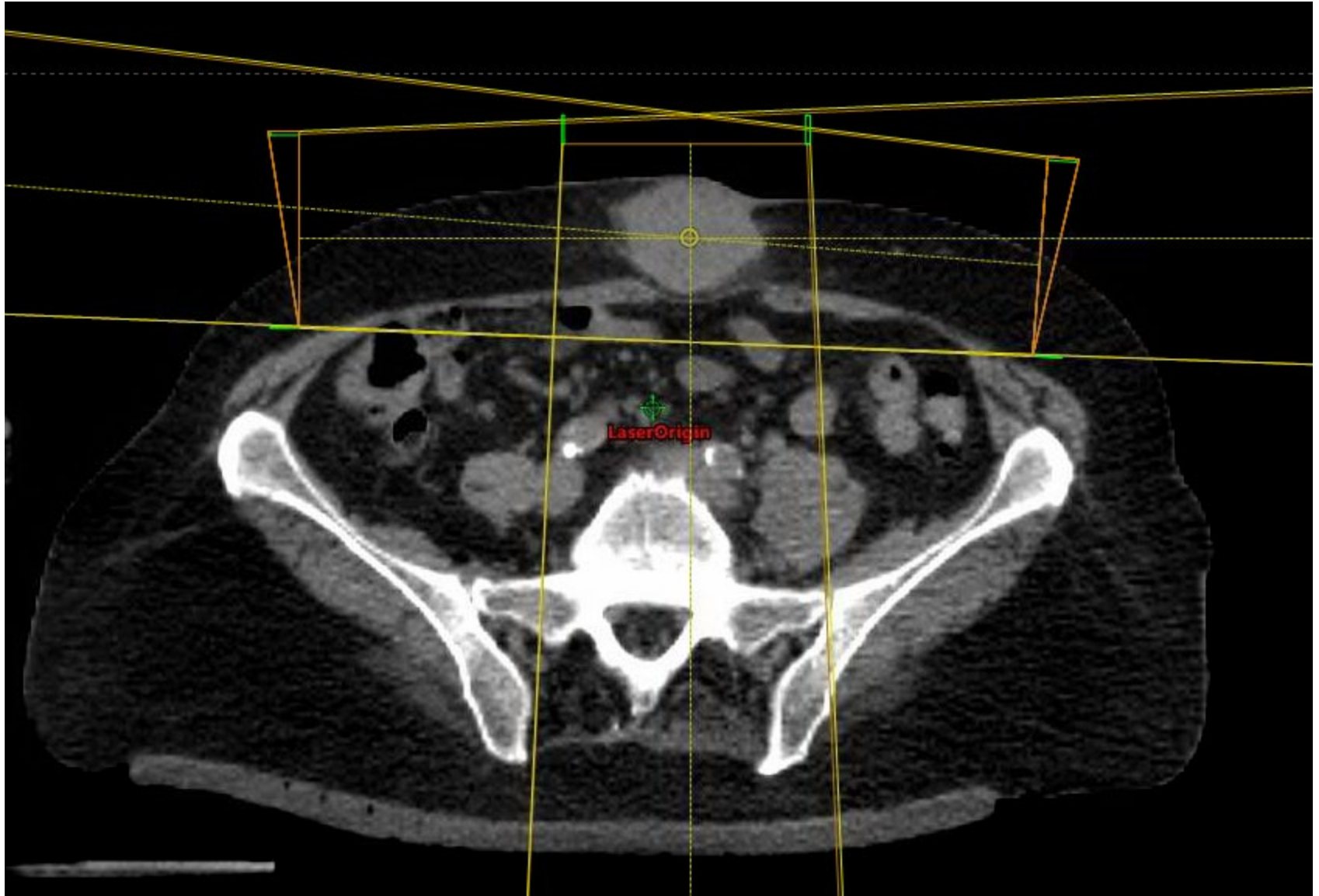


Photons

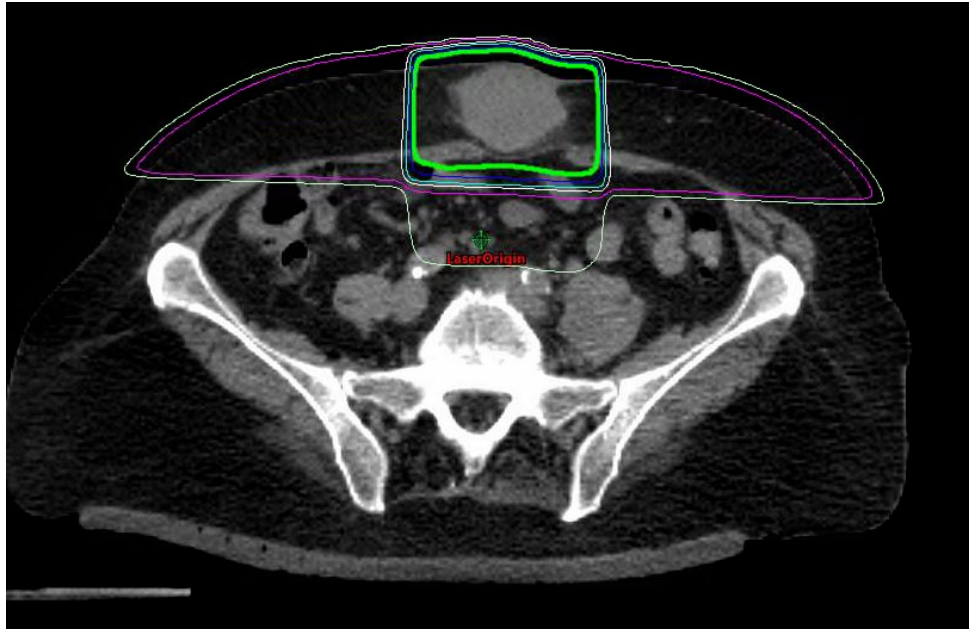
Mycosis Fungoides with Deep Tumor



Case #3



Case #3



Classification

- **T-cell (75%)**
 - Mycosis fungoides (70%)
 - CD30 positive lymphoproliferative disorders (30%)
 - Lymphomatoid populosus
 - **Primary cutaneous anaplastic large cell lymphoma**
 - Cutaneous peripheral T-cell lymphomas, rare subtypes
 - Primary cutaneous gamma-delta T-cell lymphoma
 - Primary cutaneous CD8 positive aggressive epidermotropic cytotoxic T-cell lymphoma
 - Primary cutaneous CD4 positive small/medium T-cell lymphoma
- **B-cell (25%)**
 - **Primary cutaneous marginal zone B-cell lymphoma (25%)**
 - Primary cutaneous follicle center lymphoma (60%)
 - Primary cutaneous DLBCL, leg type (15%)

Primary Cutaneous B-cell Lymphoma

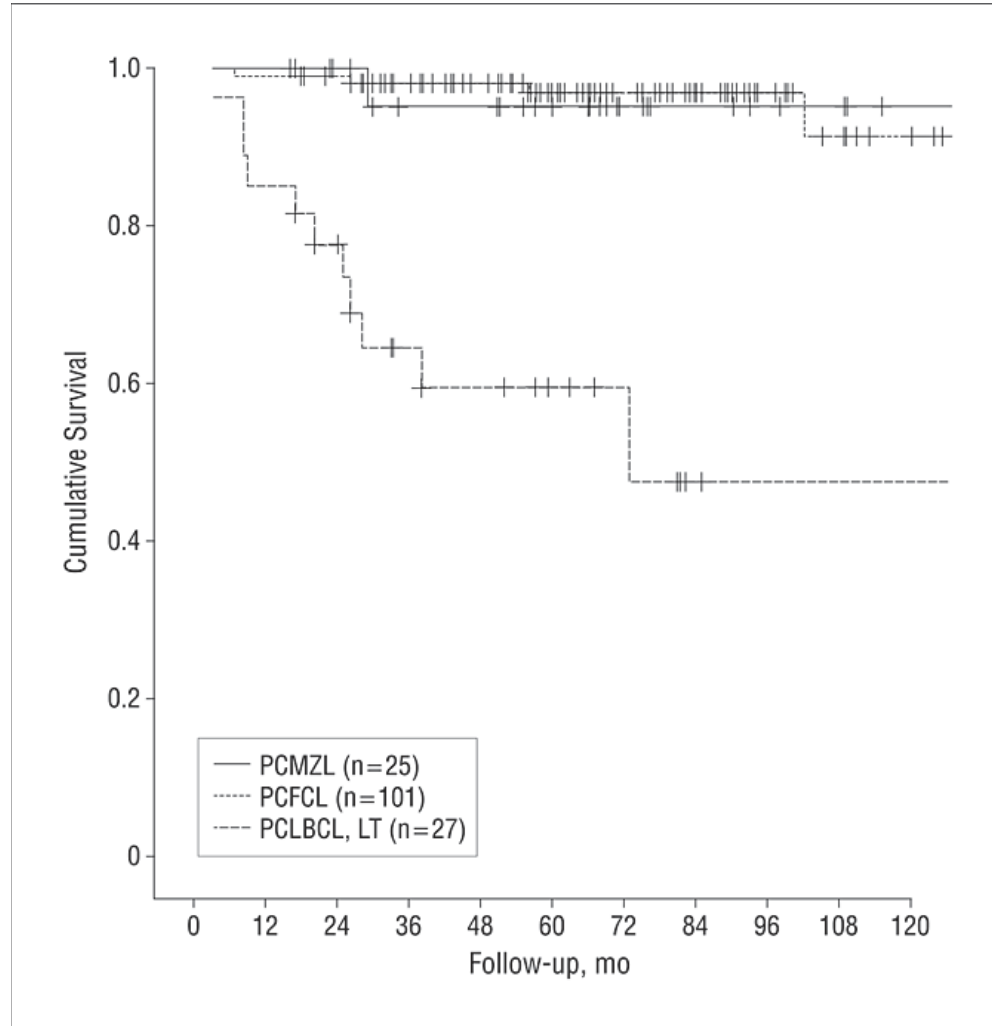
WHO Classification

- Extranodal marginal zone lymphoma of mucosa-associated lymphoid tissue **Good**
 - Stomach, eye, thyroid...skin
- Primary cutaneous follicle center lymphoma **Good**
- Primary cutaneous diffuse large B-cell lymphoma, leg type **Bad**

Dutch Cutaneous Lymphoma Group

Arch Dermatol 2007;143:1520

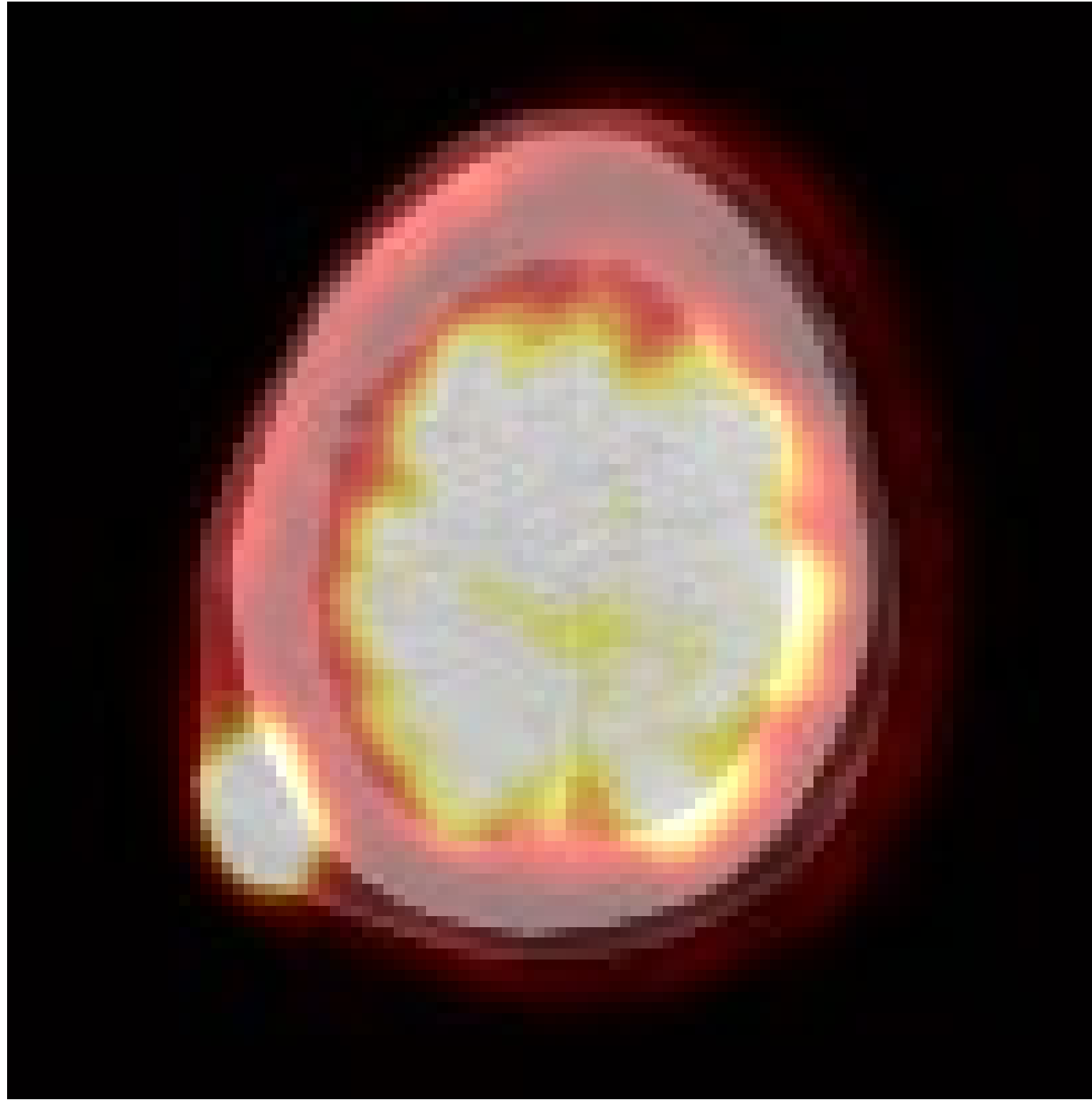
Disease-Specific Survival

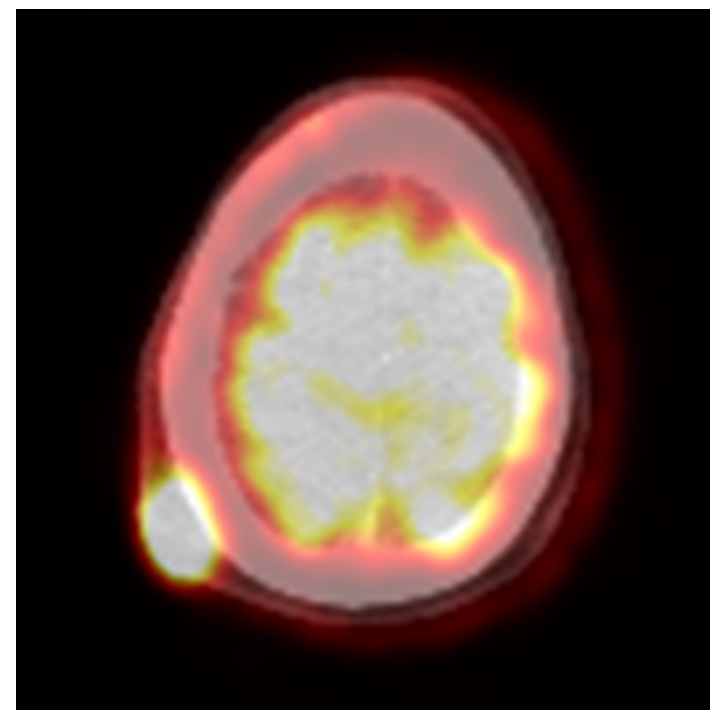


Case #4

- 54 y/o male
- “Small bump” on scalp in spring of 2011
- Punch biopsy- Wart
- Lesion began to slowly grow
- Biopsies: 3/14/2012 & 4/19/2012
- Lesion began to grow much more briskly after March biopsy
- Biopsy- Primary cutaneous DLBCL, leg-type

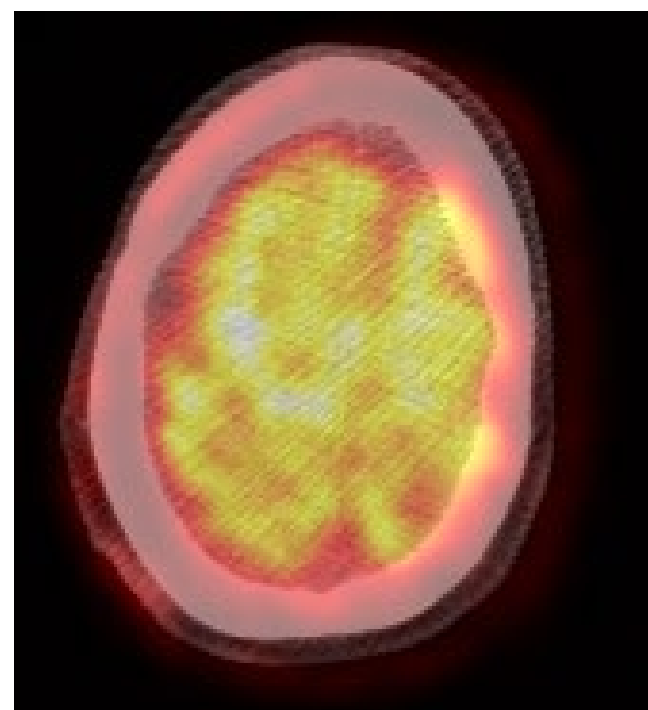






R-CHOP X 3

RT- 30 Gy



Classification

- **T-cell (75%)**
 - Mycosis fungoides (70%)
 - CD30 positive lymphoproliferative disorders (30%)
 - Lymphomatoid populosus
 - **Primary cutaneous anaplastic large cell lymphoma**
 - Cutaneous peripheral T-cell lymphomas, rare subtypes
 - Primary cutaneous gamma-delta T-cell lymphoma
 - Primary cutaneous CD8 positive aggressive epidermotropic cytotoxic T-cell lymphoma
 - Primary cutaneous CD4 positive small/medium T-cell lymphoma
- **B-cell (25%)**
 - **Primary cutaneous marginal zone B-cell lymphoma (25%)**
 - Primary cutaneous follicle center lymphoma (60%)
 - **Primary cutaneous DLBCL, leg type (15%)**

Mycosis Fungoides

Epidemiology

- Median age- ~57 years
- 5 cases/million (~50 cases/year in NC)
- Long duration from onset of MF symptoms to diagnosis (~4 years)
- More common in males and blacks
- Patches → Plaques → Tumors
- For all but earliest disease.....incurable

Mycosis Fungoides



Mycosis Fungoides

Patch/Plaque

Tumors/
Erythroderma

Nodal/
Blood

Metastases

IA

IB

IIA

IIB

IIIA

IIIB

IVA

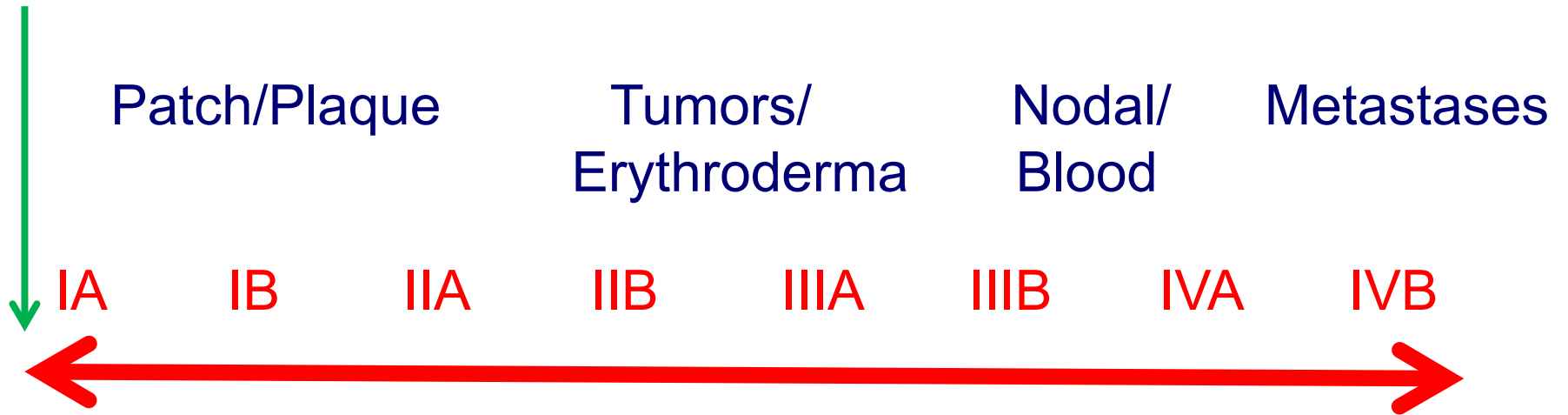
IVB



Radiation Therapy

- Local RT
 - “Cure”
 - Palliation
- Total skin irradiation (TSI)
- Transplant
 - Cytoreduction (local RT/TSI)
 - Conditioning (TBI)

Mycosis Fungoides



Case #5

- 45 y/o female presented with a slowly enlarging plaque on her left arm
- Biopsy- Mycosis fungoides
- PE- no other skin lesions. No enlarged LNs.
- CT- no peripheral adenopathy
- Unifocal IA mycosis fungoides

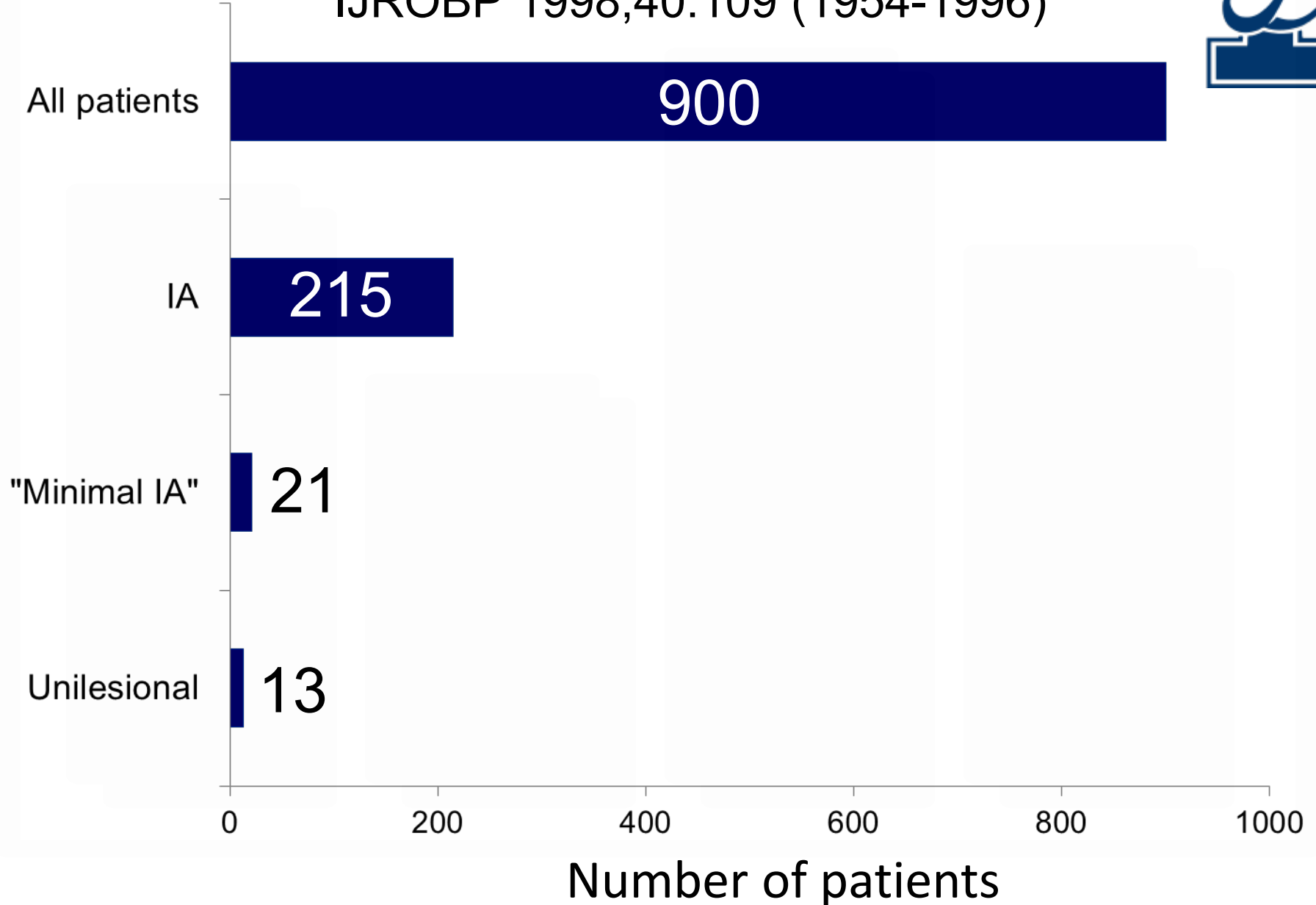


RT alone
30 Gy (electrons)

Yale



IJROBP 1998;40:109 (1954-1996)



Localized IA

IJROBP 1998;40:109



- 21 Patients with “minimal IA” disease
 - 1 lesion (n=13)
 - 2-3 lesions (n=8)
- CR 97% (one failure received 6 Gy)
- Three local failures (8 Gy, 20 Gy, 20 Gy)
- DFS (10) 64%
 - 91% for patients with 1 lesion and dose \geq 20 Gy

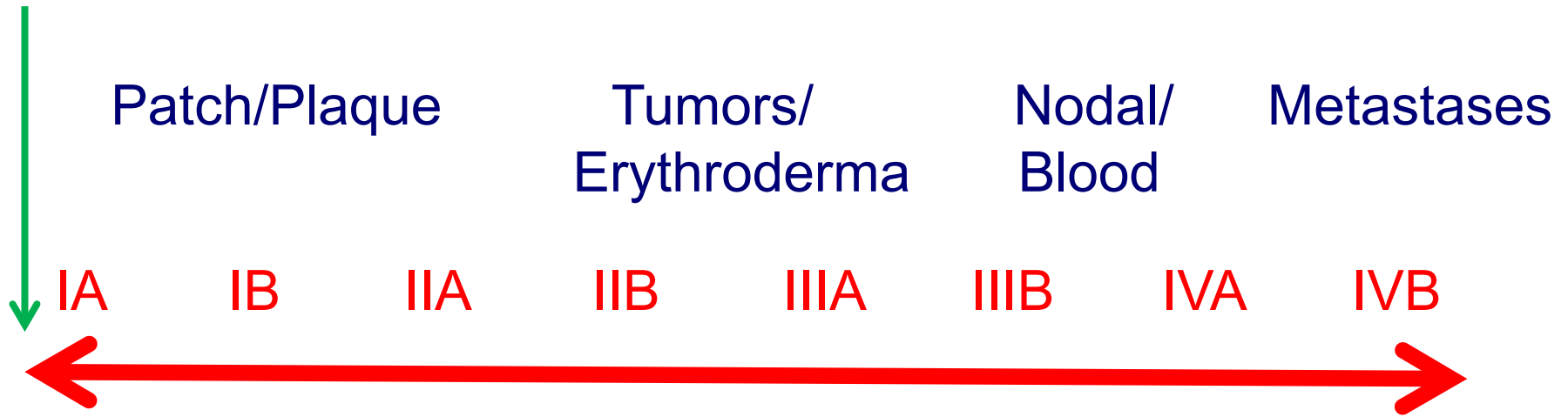
Localized IA

J Dermatol Treat 2009;20:165

- Milan (n=15 patients)
- 1-4 lesions in close proximity
- Median dose 22 Gy
 - CR 95%
 - Local control (5) 94%
 - RFS (10) 51%



Mycosis Fungoides



Localized MF.....RT (~30 Gy)

Case #6

- 62 y/o female
- Skin nodules X 1 year
- PCP- eczema
- ↑↑ in size
- Outside and Duke biopsies showed mycosis fungoides
- PE- large, ulcerated, bleeding tumors throughout the body

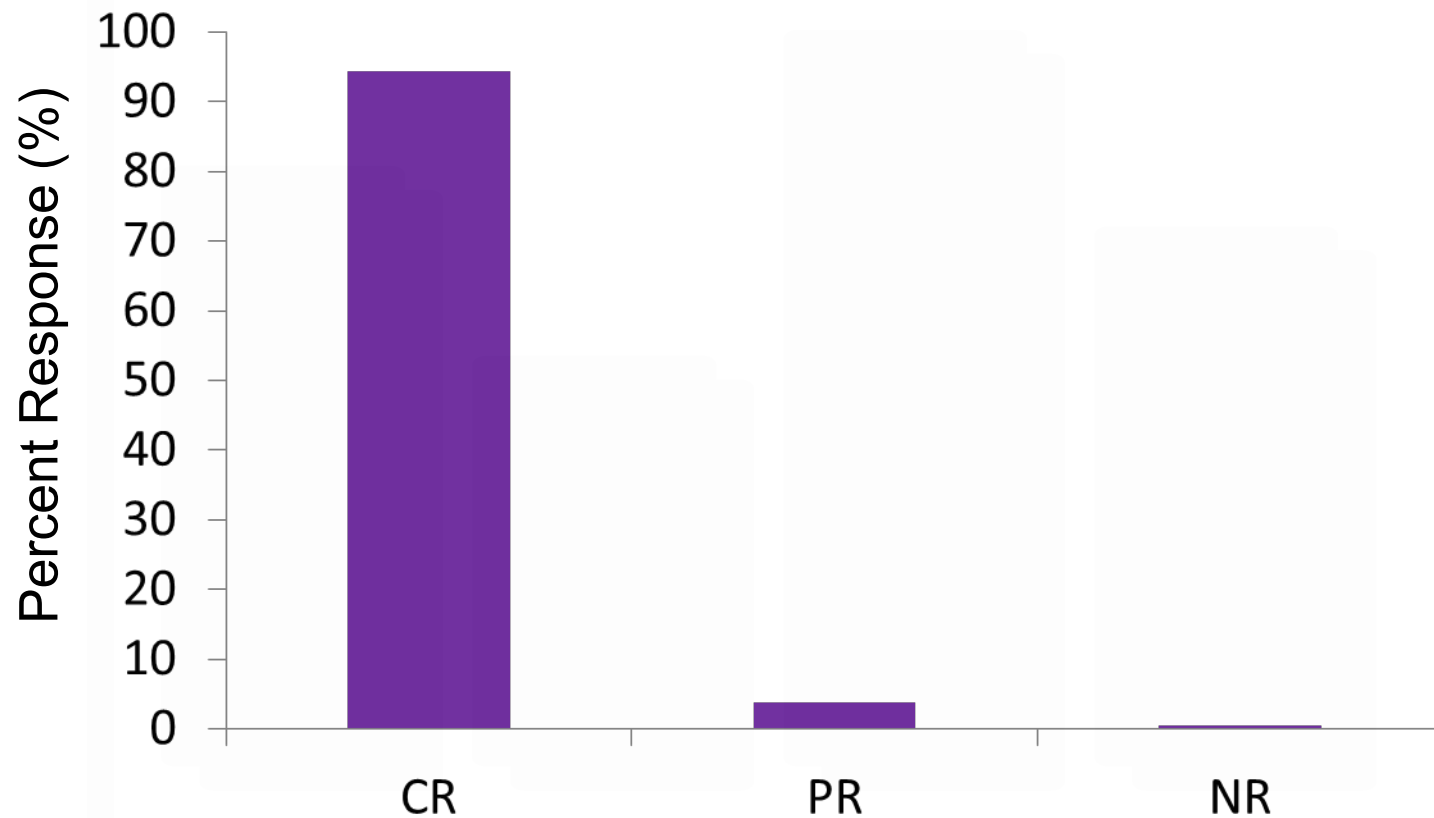


Local Palliation

IJROBP 2013;85:747

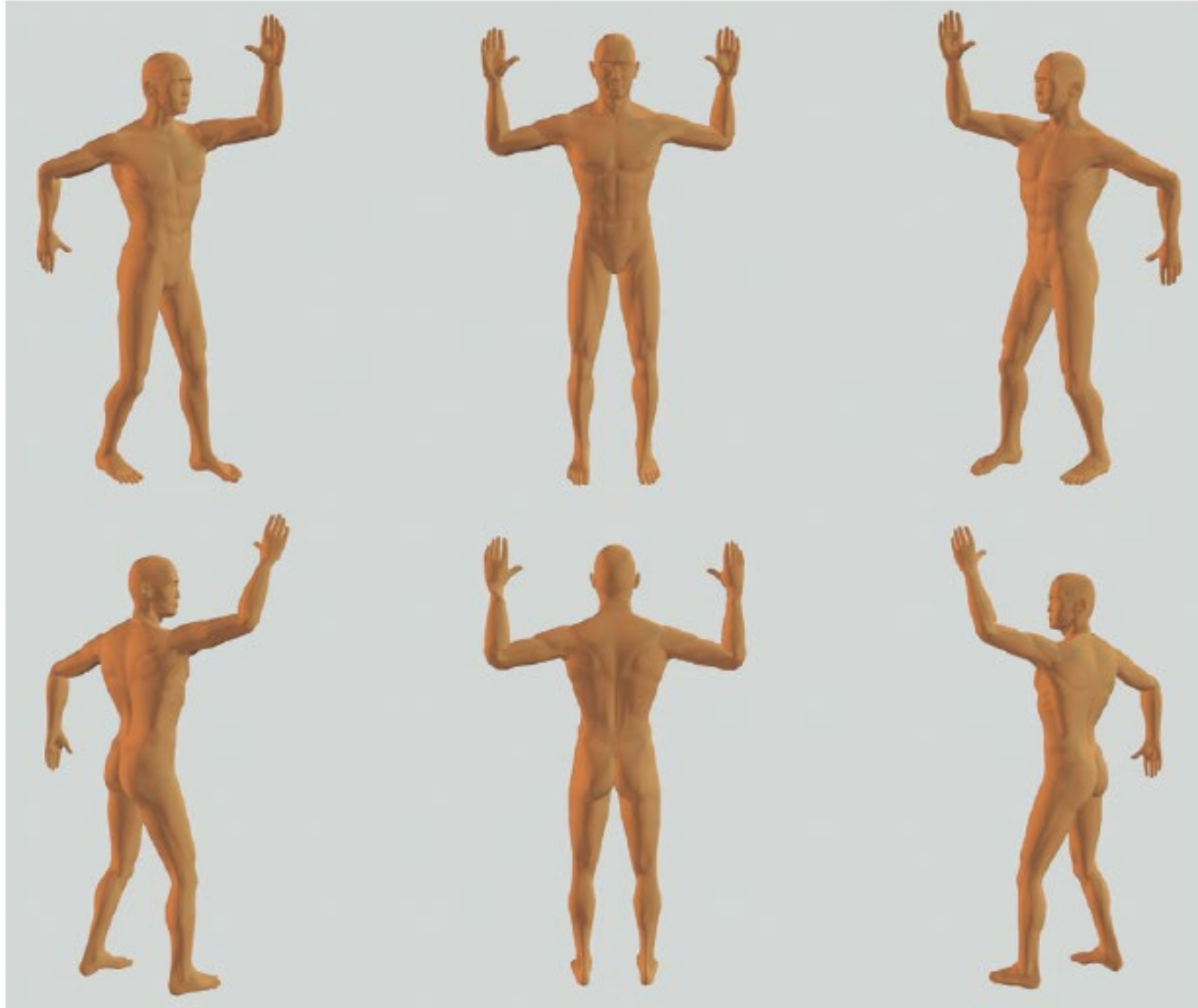


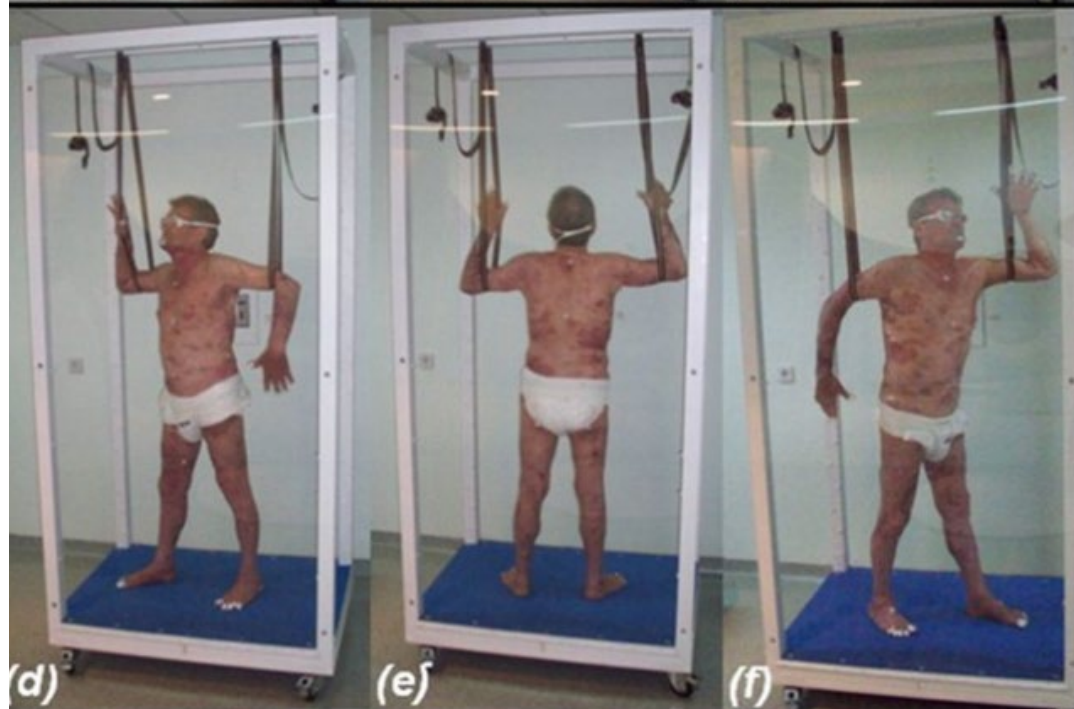
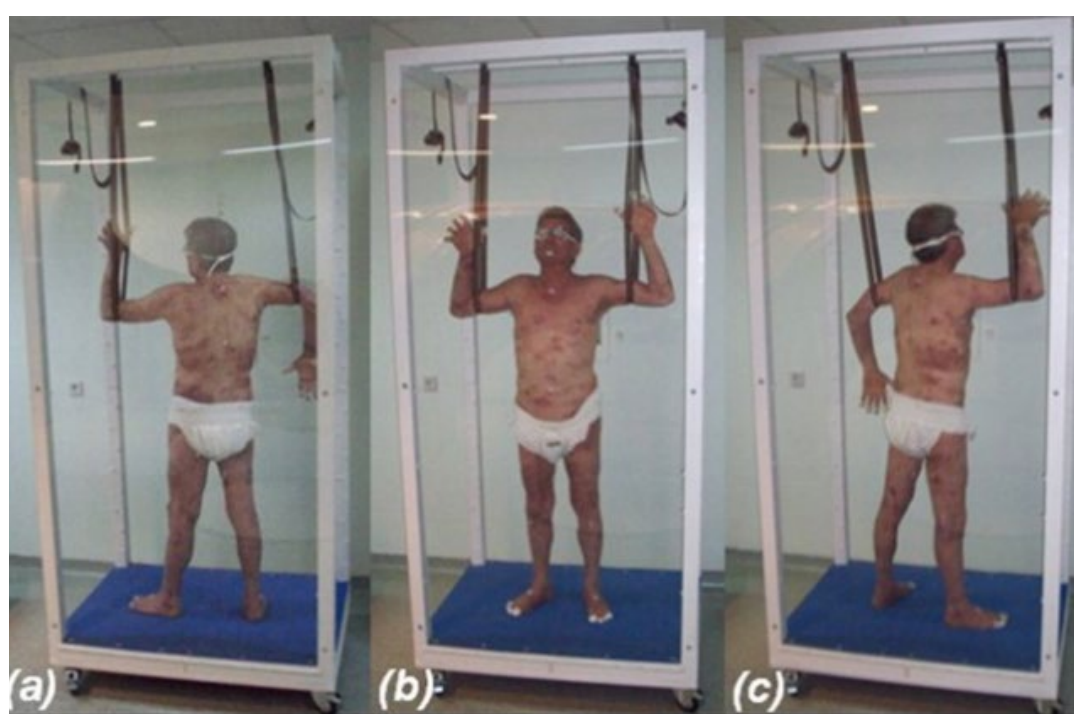
Patients (n=58) with CTCL lesions (n=270) s/p single fraction RT (7-8 Gy in 96%)



Mycosis Fungoides

Total Skin Irradiation





Total Skin Irradiation

- Optimal treatment for....
 - Widespread disease
 - Thick plaques or tumors
 - Poor response to other skin-directed therapies

Mycosis Fungoides

Total Skin Irradiation

- 1.5 Gy, 4X/week, to ~12- 36 Gy to total skin
- 1.8 Gy, 4X/week, to 18 Gy to hands/feet
- Internal or external eye/mouth shields
- Often need to boost underdosed sites
 - Perineum, vertex, inframammary fold, upper medial thighs, skin under pannus, tumors
- Sometimes need to shield sites
 - Forearms, face
- 10-14 day break often necessary ~24-30 Gy

Conventional Dose TSI

Arch Dermatol 2011;147:561



- Stanford (1970-2007); n=180
 - 30-36 Gy
- Generalized Patch/Plaque
 - 75% CR (median duration- 29 months)
 - 25% PR (ORR 100%)
 - Median survival (11 years)
- Tumor
 - 47% CR (median duration 9 months)
 - 53% PR (ORR 100%)
 - Median survival (5 years)

Summary

- Radiation therapy very effective in skin lymphomas
- Type of radiation and number of treatments based on presentation
 - Sometimes 1 treatment
 - Sometimes up to 24
- Fairly well tolerated
 - For most patients, fatigue and skin redness
 - For total skin irradiation- more side effects