- With digital imaging all shielding and protection schemes remain applicable
- Current systems are equivalent to ____ or ____ speed film screen combinations (400 is preferred)
- Digital capture devices have very high latitude and result in significantly fewer retakes due to exposure errors
- Due to very high latitude of capture devices patients may receive excessive dose (so use Supertech and TCFs)
- Images acquired on digital capture devices do not show a relationship between ____ and contrast (unlike film images)
- Image quality improves with aggressive collimation (just like film)
- Image quality improves with sectional ________ (just like film)
- Patient clothing artifacts are much more conspicuous on digital capture devices
- Patients must remove all clothing that may appear in the beam

- **Direct Radiography (DR)** = fast image display (< 10 sec), expensive, requires C-arm and mobile table or 2 receivers
- May require changes in __________ and could eliminate some views
- Examples include HCMI-IDC and Vieworks Camera

- **Computed Radiography (CR)** = slower image display (~ 1 min), less expensive, uses digital ________
- No changes in positioning required
- Examples include AGFA CR30 and Fuji Carbon XL2

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**Slideshow 14 – Quality Control 1**

- Optimizing exposure and film processing = ↘ dose, ↘ repeats, ↘ equipment workload, ↘ scatter exposure to doctor

  - **mAs Linearity** = make a minor exposure (50 kVp, 1-10 mAs) of any radiolucent object (step wedge, penetrometer); then expose at each mA station (change time to keep mAs constant); should get a _____ gray tone at each mA station; if one is lighter or darker that mA station is __________

  - **X-Ray Beam / Light Beam Agreement** = make a minor exposure (50 kVp, 1-10 mAs) of the entire film; collimate the beam to 4” x 4”; tape coins so they straddle each edge of the light beam; make another identical exposure; coin shadows should straddle edges of exposed area; if not the x-ray beam and light beam are __________

- **Darkroom Fog** = make a minor exposure (60 kVp, 0.1-0.2 mAs) of the entire film (want optical density (OD) of 0.8-2.0); cover film with cardboard in darkroom; uncover ¼ of the film for 15 s, then ½ for 15 s, then ¾ for 15 s, then all for 15 s; film should be uniformly gray; if steps of progressively darker gray tones show something in darkroom is fogging film

  - **Sensitometry / Densitometry** = expose film to sensitometer (creates a grayscale on film); process film; read density of each step of grayscale on densitometer; graph FB + F values, mid density values (_____), and density difference values (______); should see uniform values day to day; if speed or contrast values exceed baseline by +/- ___% (+/- 0.15 OD) STOP taking films and fix problem; if FB + F values exceed normal baseline by +/- ___% (+/- 0.05 OD) STOP taking films and fix problem

- **Patient Exposure Log** = patient name, exposure date, view, exposure info (kVp, mAs, FFD), comments, repeat status

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**Slideshow 15 – Quality Control 2**

- **Film Quality** = every film identified?; correct kVp for body part?; enough mAs to blacken film?; properly positioned?; grid lines visible?; x-ray beam / light beam agreement?; patient motion?; film and screen in contact?; fog?; pressure marks (crescent moon thumbnail)?; static electricity fog?; mAs linearity?; kVp accuracy?; consistent processing (sensitometry / densitometry)?; intensifying screens still “fresh”?

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**Slideshow 16 – Artifacts**

- **Pi Lines** = lines that run parallel to processor rollers; emulsion is “picked off” by roller high spots
- **Guide Shoe Marks** = lines that run perpendicular to processor rollers; guide shoes scrape emulsion on 180° turns
- Assorted objects on / in patients; poor film-screen contact; film-screen mismatch; oxidized developer, fog, old screens
Slideshow 17 – Radiographic Room Design

- How big is whole office? ➔ where is power / H₂O / drainage? ➔ choose room location and size ➔ design for patient and doctor to stand at opposite corners of room
- May need to estimate workload in mA minutes/week; learn about local shielding requirements

Slideshow 18 – Fluoroscopy

- Real time motion radiography in video format or projected on viewing screen
- Can view contrast material in transit
- Used for real time visualization during surgery
- Can view any body part in motion
- Continuous beam (high dose) or pulsed beam (lower dose)