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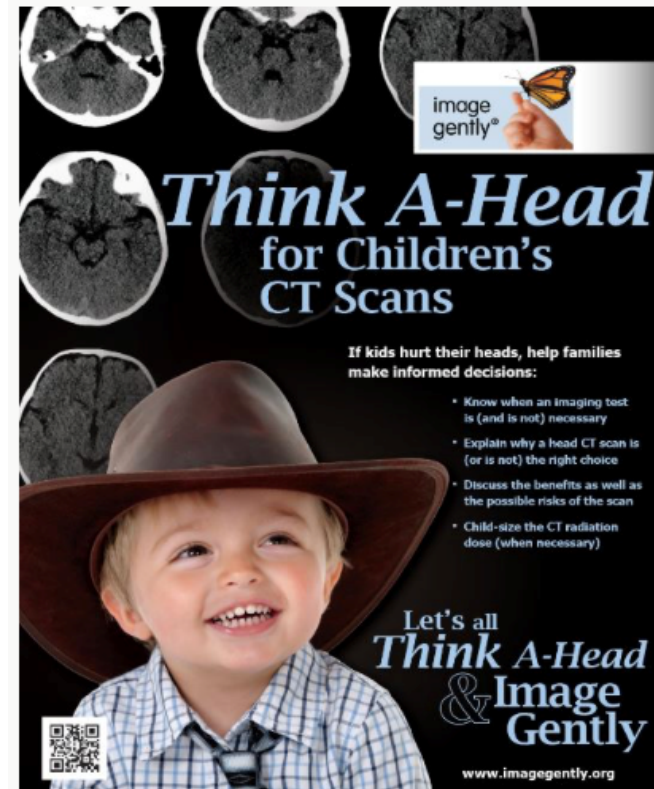# Attenuation-based auto prescription of pediatric head CT scan settings

Michael Zellner, University Children's Hospital Zurich

The hospital of the
Eleonore Foundation

Purpose

To implement and evaluate a feature that automatically selects exposure settings by patient size and attenuation for head CT in children.

Image Gently Alliance information for radiologic technologists

Material and Methods

147 patients (age 1 day to 17.7 years) received a head CT:

- Age based protocol: 68 patients
- Attenuation based auto prescription protocol: 79 patients

Auto prescription applies a new feature that automatically selects kV and mA based on attenuation information from scout images.

Comparison between two groups were made using non parametric tests.

Image quality:

- signal to noise ratio (SNR)
- contrast to noise ratio (CNR)
- subjectively rated by 5 different readers.

Material and Methods

Subjective image quality measurements by 5 readers using a scoring system:

Gray/white matter differentiation

(1 differences just depictable 2 diagnostic 3 very good differentiation 4 perfect differentiation)

Inner cerebrospinal fluid space

(1 visualization just possible 2 unsharp borders of pars centralis 3 very good visualization 4 perfect delineation)

Outer cerebrospinal fluid space

(1 visualization just possible 2 unsharp borders but diagnostic 3 very good visualization 4 perfect delineation)

Artifacts

(1 severe 2 moderate 3 mild 4 none)

Overall image quality

(1 unacceptable quality 2 limited quality 3 adequate quality 4 higher than needed quality)

16y old, CTDIvol 36,71 mGy / <u>age-based protocol</u>

3 - very good GWM differentiation
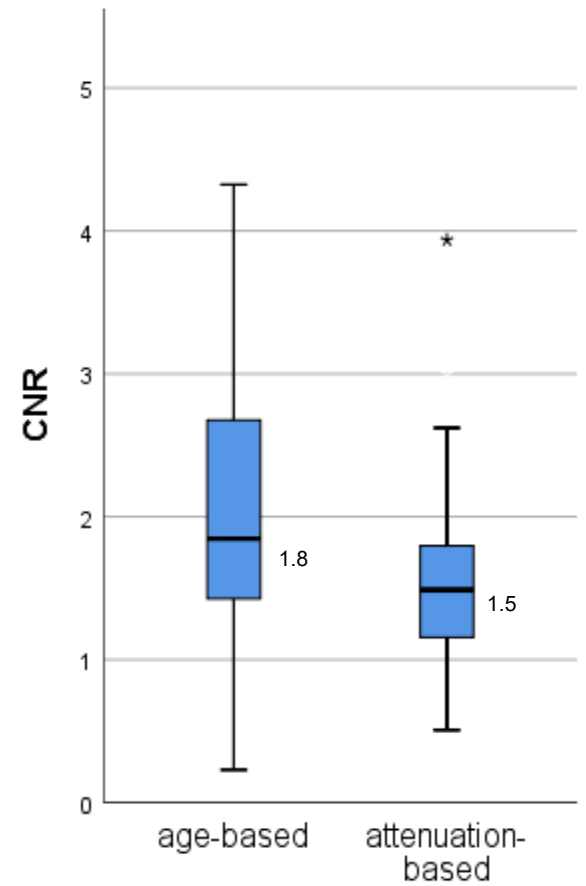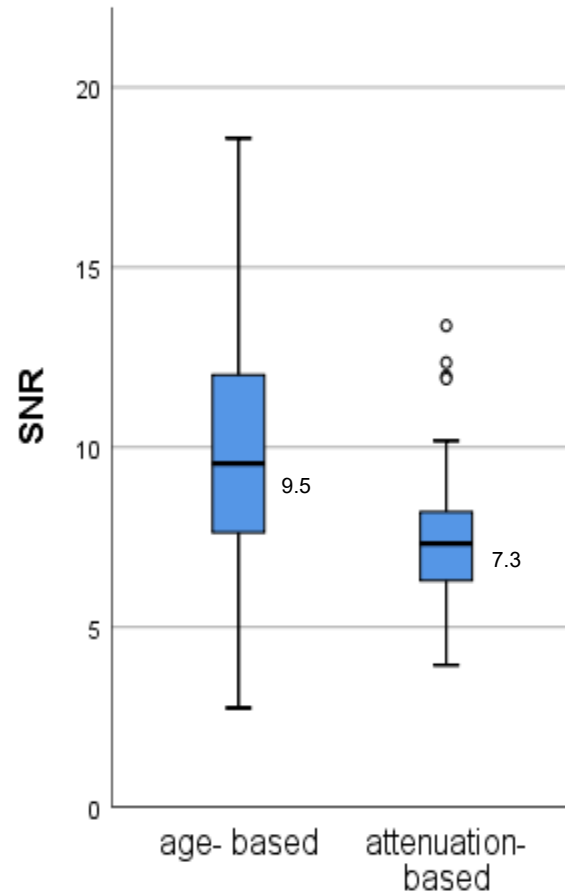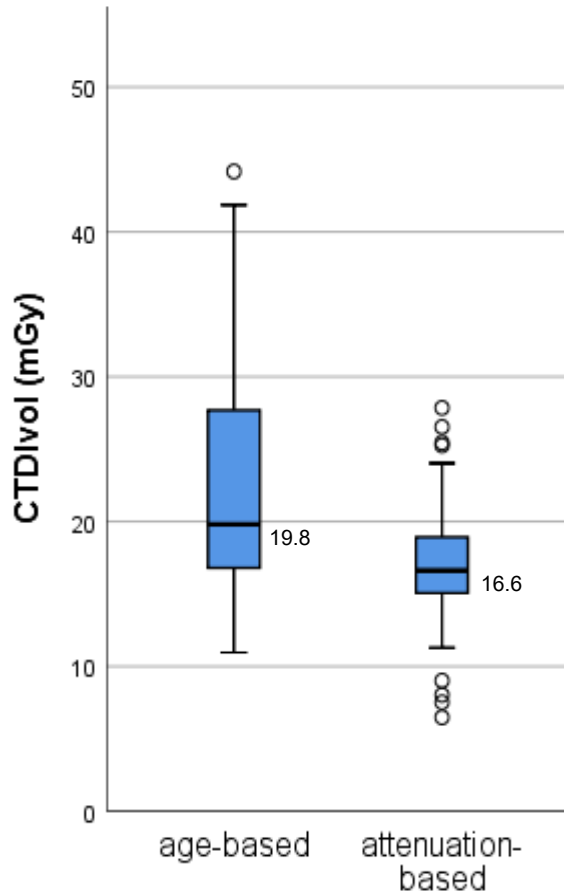
3 - adequate overall image quality
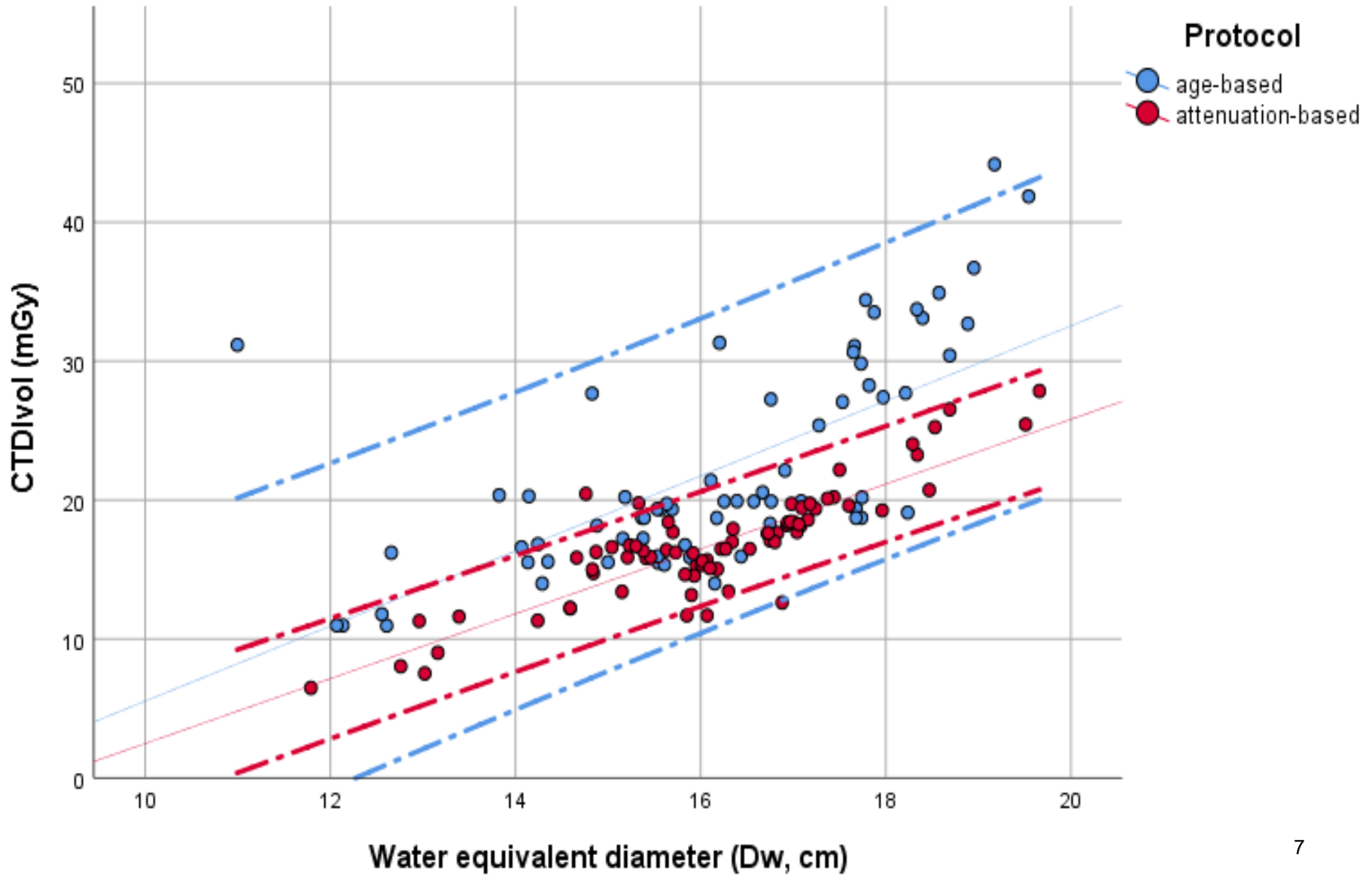
17y old, CTDIvol 20,21 mGy / <u>attenuation-based protocol</u>

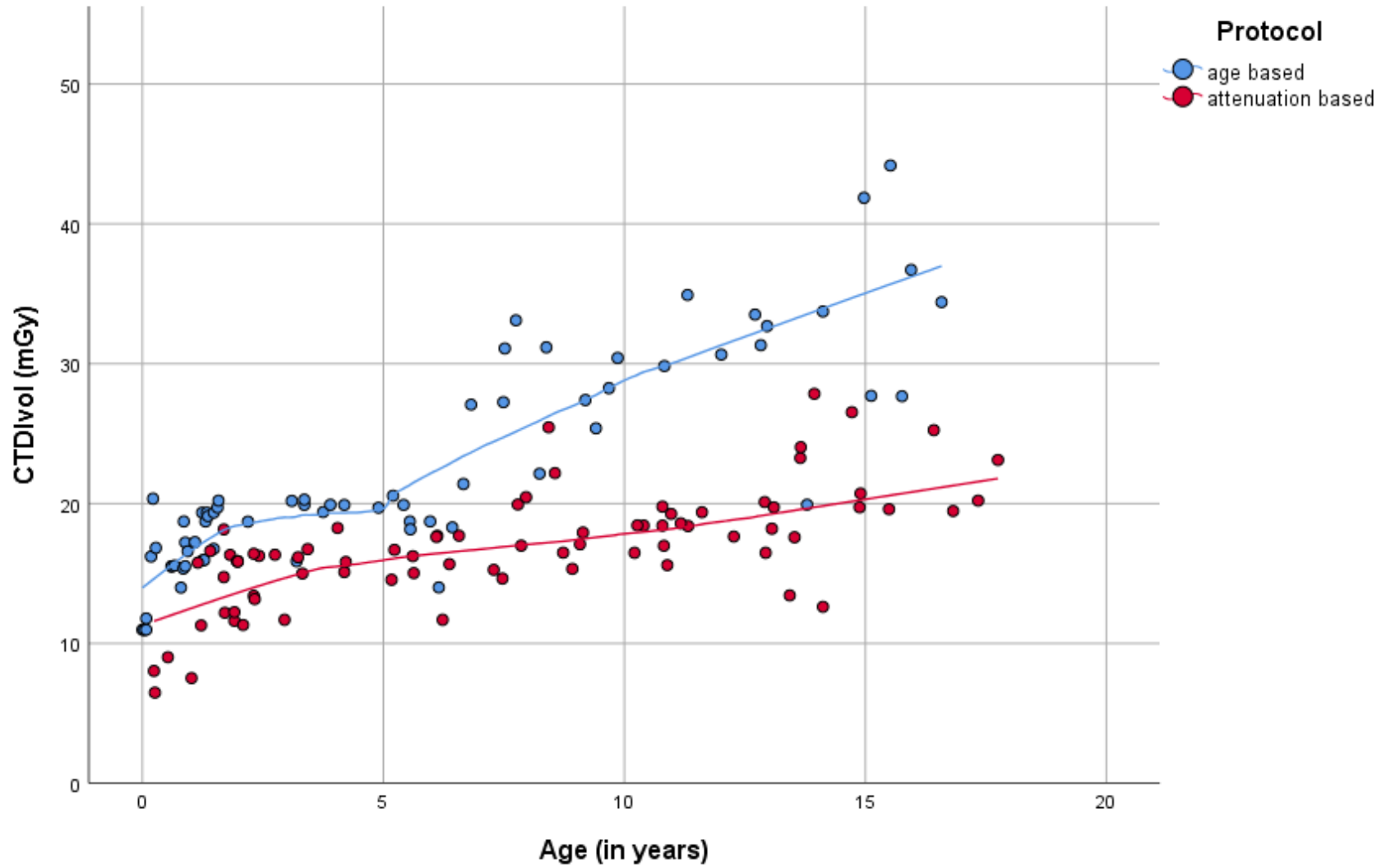2 - diagnostic GWM differentiation
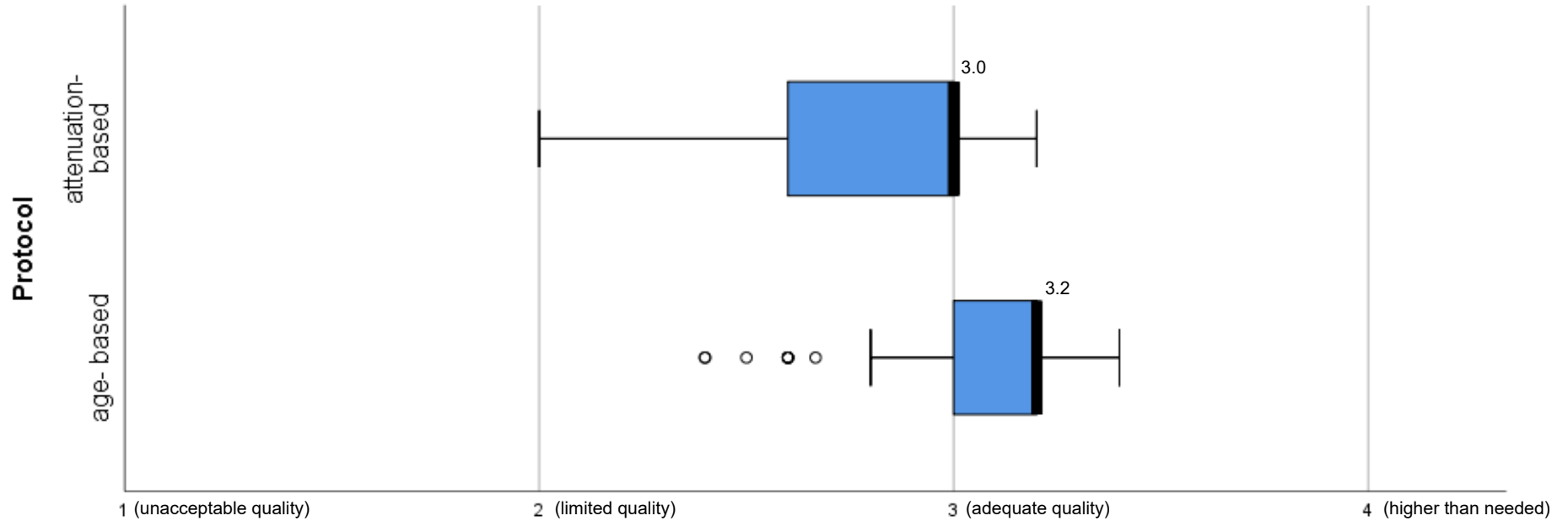
3 - adequate overall image quality

Results

Results

Results

Results

Image Quality (5 readers)

Mean image quality (5 readers)		
Features	**Age- based**	**Attenuation-based**
Gray/white matter differentiation	2.9 ± 0.4	2.7 ± 0.3
Inner cerebrospinal fluid space	3.3 ± 0.3	3.1 ± 0.2
Outer cerebrospinal fluid space	3.2 ± 0.4	2.9 ± 0.2
Artifacts	3.2 ± 0.3	2.9 ± 0.3
Overall image quality	3.0 ± 0.2	2.8 ± 0.2

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Conclusion

Attenuation- based auto prescription scan settings allow for balanced radiation dose and image quality in pediatric head CT resulting in lower dose than with age- based protocols

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Thank you for your attention