

# Rethinking Radiology: The Limited Value of Head CT Scans in Pediatric Seizure Diagnosis and Treatment

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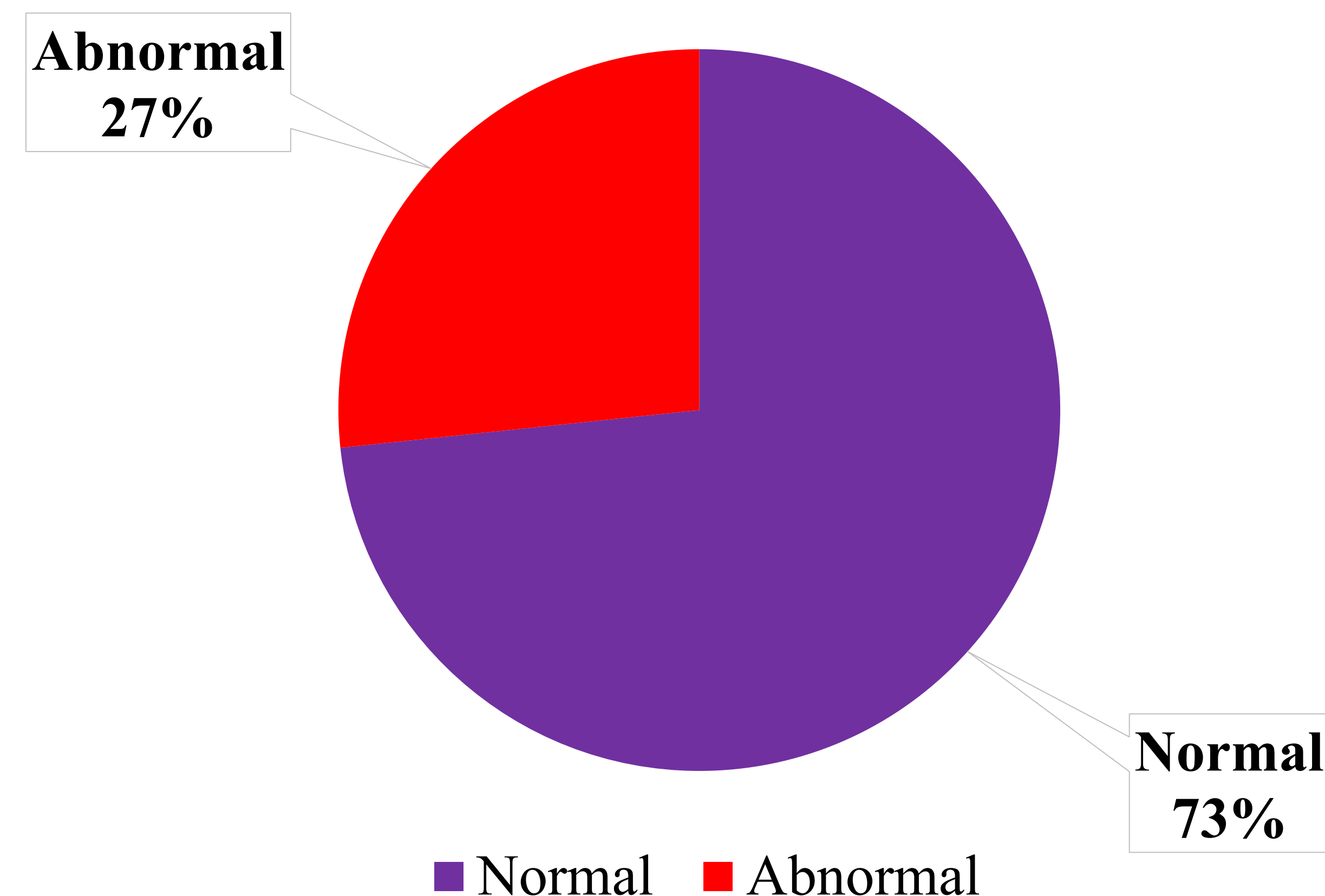
## Introduction

- Head Computed Tomography (CT) scans are frequently conducted in emergency departments to evaluate pediatric patients with seizure or seizure-like activity. While these scans can offer some insights, they often do not yield clinically significant findings and expose pediatric patients to potentially harmful ionizing radiation. Research shows that ionizing radiation can be especially harmful to pediatric patients due to their smaller body size, rapid cell growth and division, and increases the risk of developing radiation-related cancer [1].
- Despite these risks and limitations, the practice remains common, largely driven by parental concern and the desire for reassurance about their child's health. To better understand the actual value of these scans, this study evaluated the utility of head CT scans in providing diagnostic and treatment-relevant information for pediatric patients presenting with seizure or seizure-like activity.
- A retrospective chart review was conducted on 90 pediatric patients, aged one to 17 years, who presented with seizure or seizure-like activity at Our Lady of the Lake (LOL) Children's Hospital in Baton Rouge, Louisiana, and underwent a head CT scan. Data collected is shown below.

## Data Collected

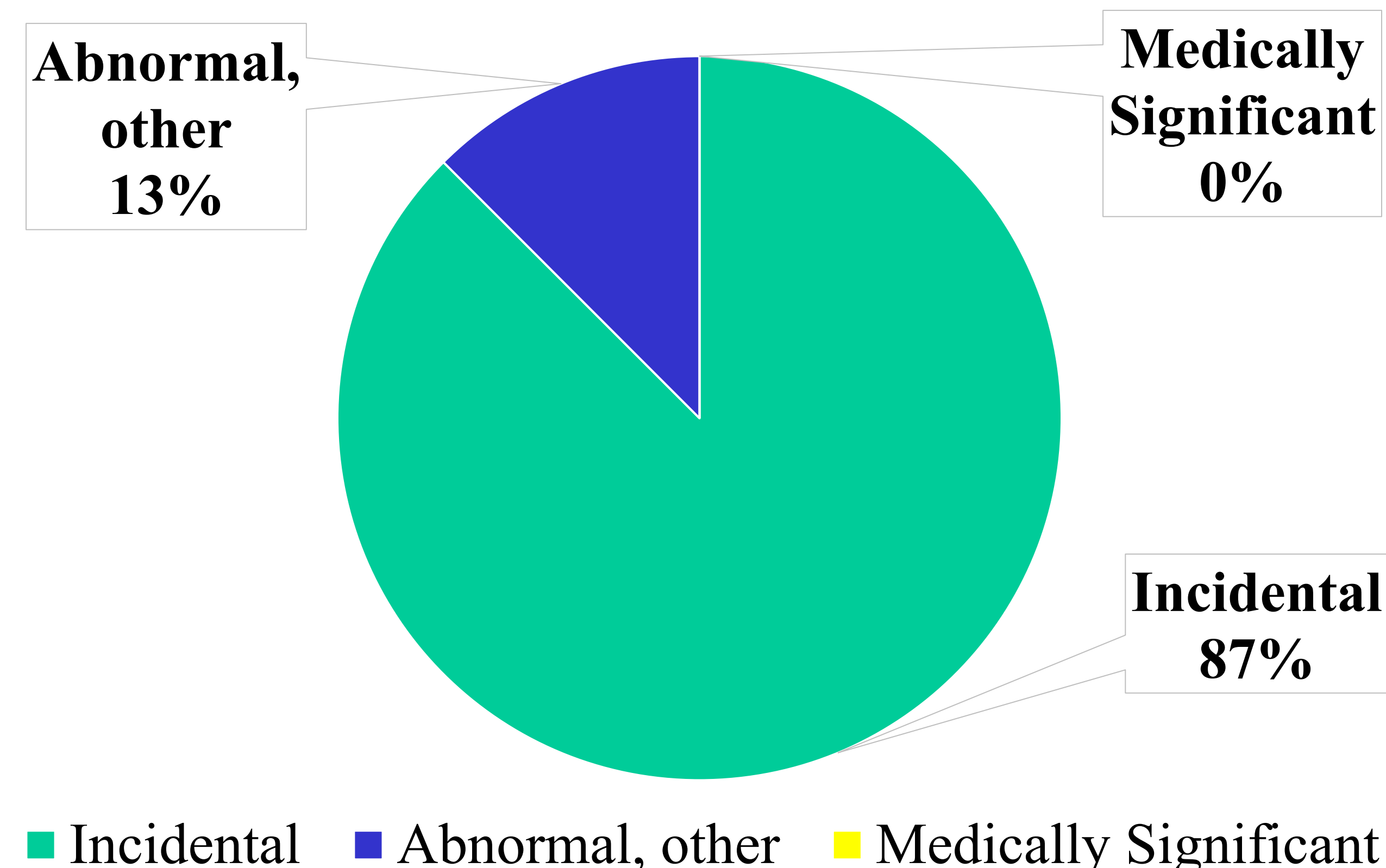
<b>Gender</b>	Male	48
	Female	42
<b>Head CT Results</b>	Normal	66
	Abnormal	24
<b>Average Age at 1st Head CT</b>	Age (years)	10.9
<b>Length of Seizure</b>	<30 seconds	4
	30-60 seconds	3
	1-2 minutes	9
	2-5 minutes	20
	>5 minutes	12
	N/A	42
<b>New vs Breakthrough Seizure</b>	New	59
	Breakthrough	29
<b>Isolated vs Incited Seizure</b>	Isolated	76
	Incited	10
<b>Other Imaging Obtained (Brain MRI, EEG, etc.)</b>	Yes	44
	No	43
<b>Characteristic of Abnormal Head CT Result</b>	Incidental	21
	Abnormal, other	3
	Medically Significant	0

## Normal vs. Abnormal Head CTs



**Figure 1.** Normal (n=66) and abnormal (n=24) head CT scan data elicited from findings in radiology reports of pediatric patients presenting to OLOL Children's Hospital with seizures.

## Categories of Abnormal Head CTs



**Figure 2.** Abnormal head CT scans subdivided into three categories:

- **Incidental** (n=21): indicated medical diagnosis unrelated to seizure.
- **Abnormal, other** (n=3): other medical conditions present but did not impact immediate seizure treatment.
- **Medically Significant** (n=0): altered treatment plan.

## Results

- Of the 90 cases reviewed, only 27% (n=24) had abnormal CT findings. Importantly, none of these findings were deemed medically or surgically significant in the context of seizure management.
- Among the abnormal results, 87% (n=21) were incidental to a seizure diagnosis, often revealing ear, nose, and throat (ENT) issues requiring otolaryngologist follow-up.
- The remaining cases (n=3) were categorized as "abnormal, other," involving conditions such as anoxic brain injury or cerebral atrophy but still did not impact immediate seizure treatment.

## Conclusion

- The study results demonstrate that head CT scans in this population rarely yielded findings that significantly impacted the management of pediatric patients with seizure or seizure-like activity.
- Given the low diagnostic value and the risks associated with ionizing radiation, routine use of head CT in these cases should be reconsidered.
- This further highlights the need for educational and communication strategies to inform concerned parents about the risks of unnecessary radiation exposure and support healthcare providers in making evidence-based decisions.
- By reconsidering the routine use of CT scans in this patient population, we can enhance patient care and reduce unnecessary procedures. Our findings strongly advocate for reevaluating the use of head CT in pediatric seizure evaluation.

## References

- [1] National cancer institute. (2018, September 4). *Radiation Risks and Pediatric Computed Tomography*. National Cancer Institute; Cancer.gov. <https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/pediatric-ct-scans>.