

# Improving the Reporting of Nasogastric Tube Check Chest Radiographs

Liisa Chang, Hanna Chang, Shyamal Patel, Abhinav Jha, Nirav Patel

Department of Radiology, St George's Hospital, London

## BACKGROUND

The COVID-19 pandemic resulted in a higher number of critically unwell patients in hospital, which in turn led to a manifold increase in chest radiographs (CXRs) requested for nasogastric tube (NGT) position check. A rapid turnaround of these CXR reports is paramount to ensure safe and timely patient care. Feeding, flushing or administering medication through a misplaced NGT in the tracheobronchial tree is an NHS "Never Event". Analysis of national databases of Serious Untoward Incidents (SUIs) indicates that misinterpretation of NGT check CXR accounts for the majority of NGT-related SUIs.

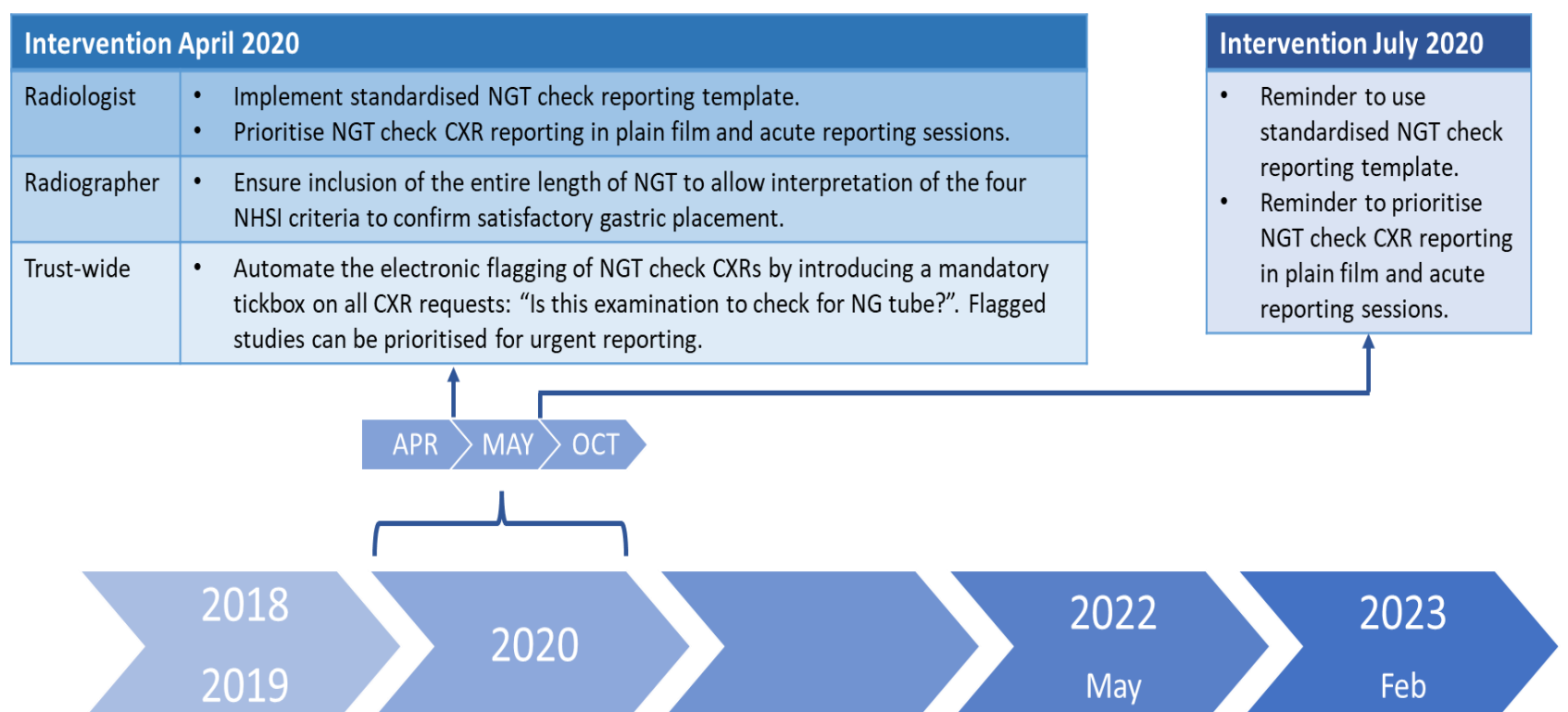
This quality improvement project (QIP) stems from a Trust SUI arising from instillation of feed through an NGT sited in the lung. Recommendations from the SUI included the standardisation of NGT check CXR reports to ensure a definitive radiologist view on the position of the NGT. A more recent NGT-related Trust SUI prompted further changes to the Radiologist reporting worklists to ensure timely reporting of NGT check CXRs.

## METHODS

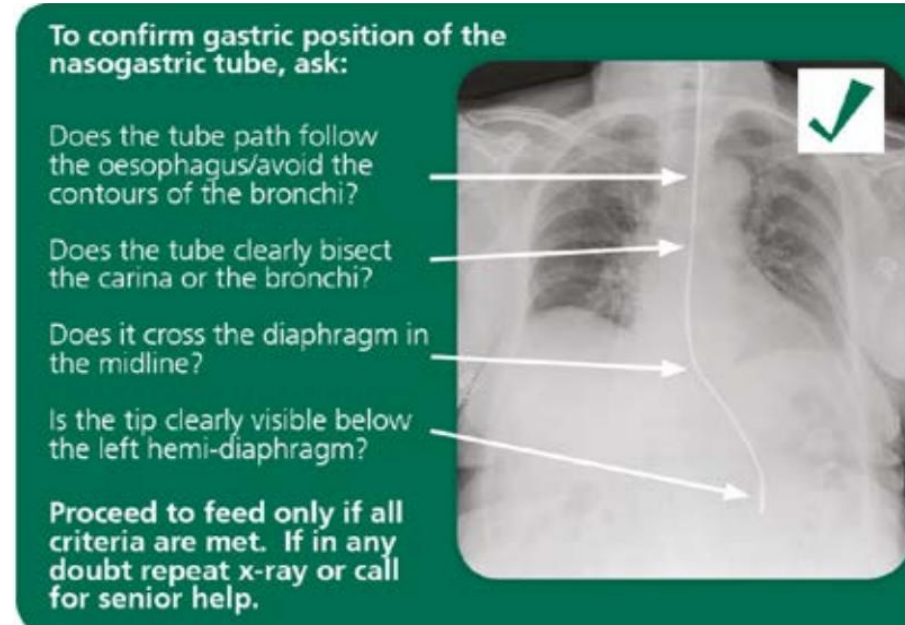
Retrospective data collection using Soliton (RIS). Data recorded over 8 day intervals during the following periods: April, May and October 2020; May 2022; and February 2023. Inclusion criteria: adult A&E and inpatients. Exclusion criteria: paediatric and neonatal patients.

## INTERVENTION

**Flowchart:** QIP timeline from 2018 to 2023 demonstrating audit cycles and implementation of changes to practice. The yellow box indicates most recent interventions of Feb 2023.



## INTERVENTION



**Top left:** Screenshot of electronic CXR request on iClip illustrating the mandatory "Is this examination to check for NG tube position?" tickbox.

**Top right:** Four criteria for NGT position check as per NHS Improvement (NHSI).

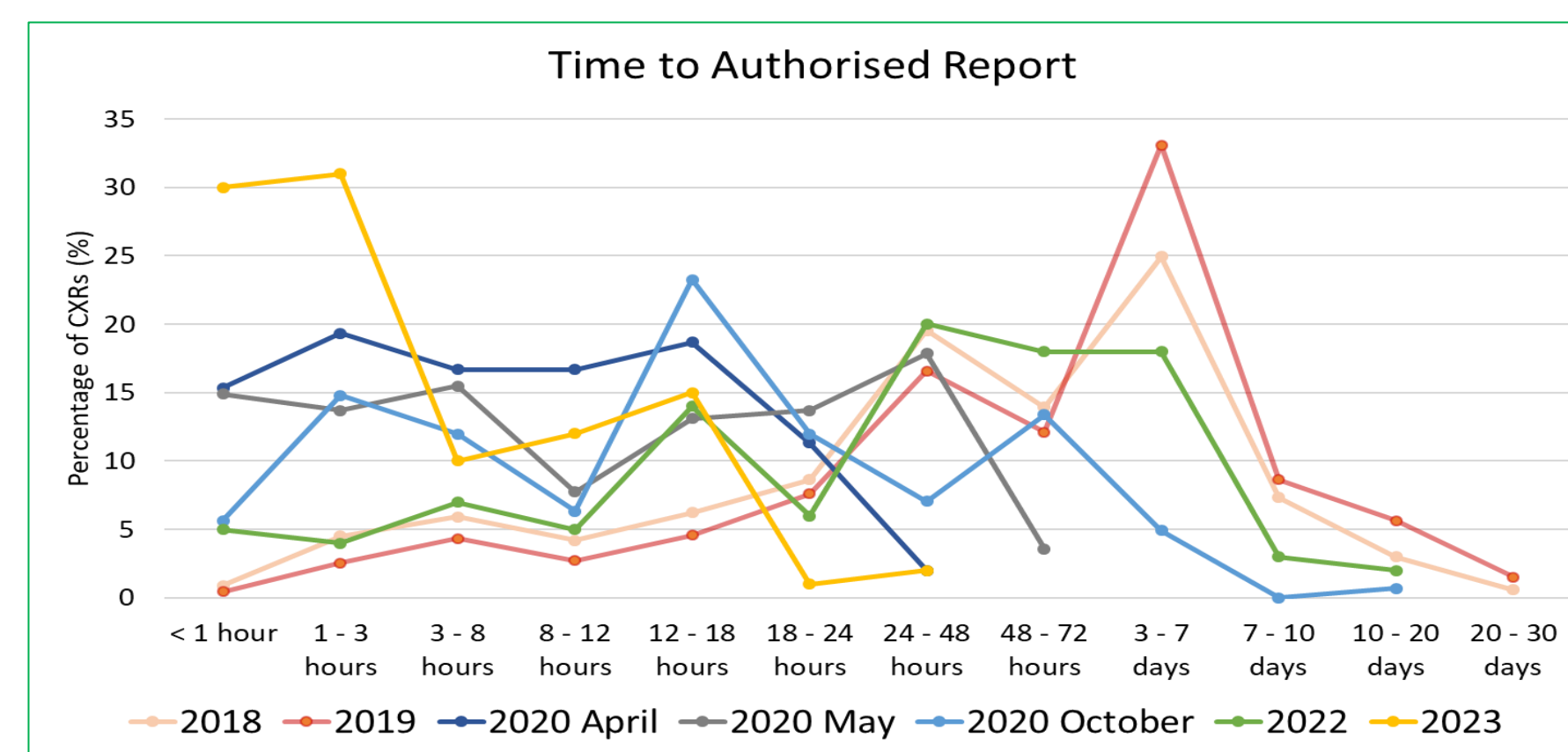
**Bottom left:** Standardised report template on Soliton (RIS) is based on the NHSI criteria.

This chest X-ray has been reviewed for the position of the nasogastric tube:  
There is a NG tube in situ which  
- Follows the path of the oesophagus  
- Bisepts the carina  
- Crosses the diaphragm in the midline  
- Has it's tip clearly visible below the left hemi-diaphragm  
The position of the NG tube is satisfactory and is safe to use for feeding.

## RESULTS

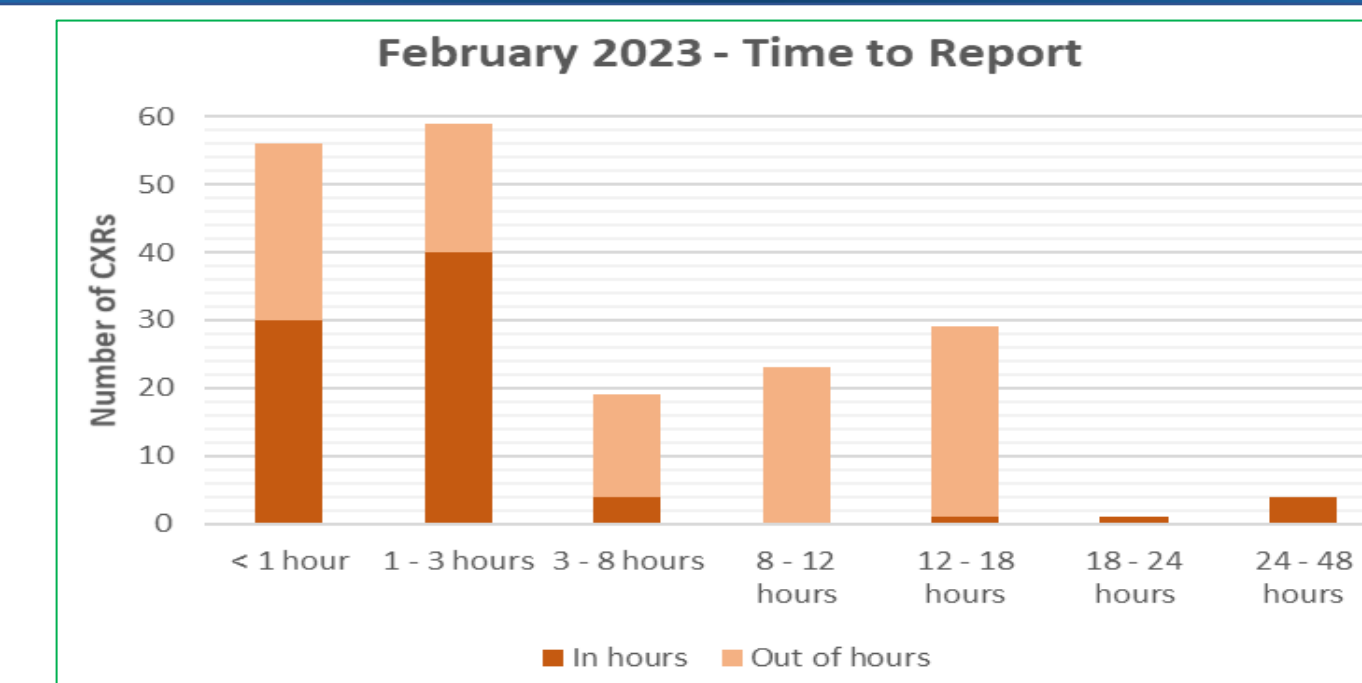
DATA FOR 8 DAY PERIOD	2020						
	2018	2019	April	May	October	2022	2023
Total no. CXR	28	42	158	168	230	169	190
Average no. CXR/day	4	5	20	21	29	21	24
Total reported within 3 hours	9%	4%	35%	29%	20%	9%	61%
Median reporting time	3-7 days	3-7 days	8-12 hours	8-12 hours	12-18 hours	24-48 hours	1-3 hours

**Table:** Collated data of audit cycles between 2018 and 2023. Total number of NGT check CXRs performed in an 8 day period have increased manifold (peak during COVID-19 pandemic). Comparison of percentage of NGT check CXRs reported within 3 hours and review of median reporting times confirm significant improvement in turnaround of NGT check CXR reports.



**Graph:** Line chart depicting time to authorised report by audit cycle, demonstrating definite improvement in NGT check CXR reporting times, particularly in the Feb 2023 cycle (yellow). Comparing the longest reporting times also confirms significant improvement since the implementation of automated flagging and new "Acute CT and NG" reporting worklist. In the latest audit cycle, all NGT check CXRs were reported within 48 hours (compared to up to 30 days on previous cycles).

## RESULTS



**Chart:** Evaluating the effect of whether study acquisition during "in-hours" or "out-of-hours" affects the reporting times for NGT check CXRs. In-hours defined as Mon-Fri 9am-5pm. Out-of-hours defined as Mon-Friday 5pm-9am, Sat and Sun.

Turnaround of NGT check CXR reports prior to the COVID-19 pandemic was variable, mostly due to assignation of these radiographs to the general X-ray reporting worklist. In addition, the flagging of NGT check CXRs for reporting was a manual process, completed by Radiographers at time of image acquisition so most NGT check CXRs were not flagged for urgent reporting.

In 2020, introduction of a mandatory tickbox on all electronic CXR requests (on Cerner iClip) resulted in automated flagging of NGT check CXRs for urgent reporting on Soliton (RIS). This resulted in a significant improvement in NGT check CXR reporting times (20-29% reported within 3 hours in 2020, compared to 4-9% in 2018 and 2019).

In 2023, implementation of new combined "Acute CT and NG" reporting worklist further expedited the reporting of NGT check CXRs when compared to prior audit cycles. All studies assigned to this worklist are treated with similar priority to emergency CT. As a result, the majority NGT check CXRs are reported within 3 hours (61%). Overall reporting times were marginally longer for CXRs acquired "out-of-hours" than those "in-hours" (median reporting time 3-8 hours and 1-3 hours, respectively).

All audit cycles demonstrated excellent uptake of the standardised reporting template. In February 2023, the template was used in 161/190 (85%) of NGT check CXRs. Reasons for non-utilisation of template included: no NGT in situ, CXR reported with CT, and most importantly, NGT not in satisfactory position. In February 2023, a total of 17/190 (9%) studies demonstrated NGT in unsafe position (most commonly sited in a bronchus or oesophagus).

## CONCLUSION

This QIP aimed to improve the turnaround of NGT check CXR reports, paramount during the COVID-19 pandemic. The results during COVID-19 were overwhelmingly positive. Re-audit in 2022 demonstrated a decline in reporting times. The recent introduction of combined "Acute CT and NG" reporting worklist has resulted in a significant improvement in reporting times when compared to all prior audit cycles. Implementation of a standardised template ensures clarity of reports for NGT position.

## REFERENCES

- The insertion, placement and checking of naso/oro-gastric tubes and Nasojejunal tubes; Adults/Children/Neonates St George's University Hospitals NHS Foundation Trust. Policy Reference Clin.4.6; Version 2.7 (issue date October 2019, review date October 2021)
- Resource set: Initial placement checks for nasogastric and orogastric tubes; NHS Improvement (issue date July 2016).