

Improving quality of chest radiographs in infants to optimise diagnostic accuracy -a quality development project

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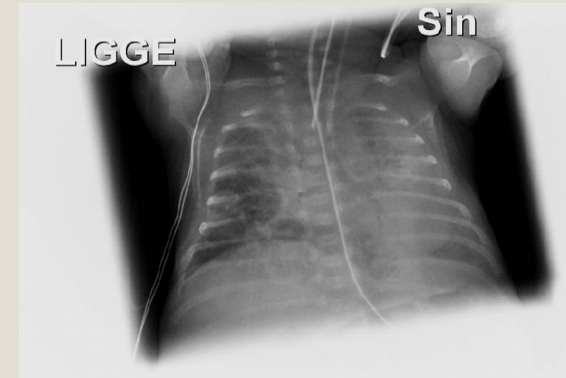
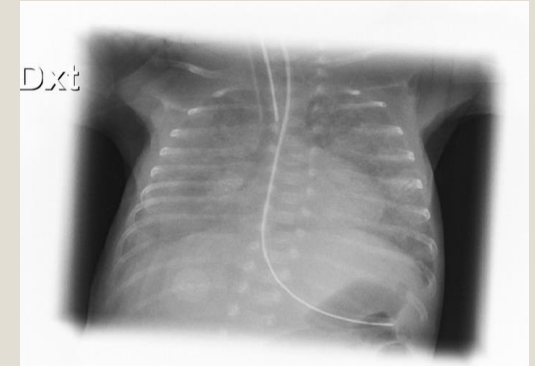
Background

The Radiology department annually performs 4448 chest radiographs of children

We experience an increasing number of chest radiographs of very young children with poor imaging quality. This gives rise to questionable diagnostic accuracy.

Observed problems

- X-ray performed at peak of inspiration difficulty
- Rotation and tilting of the chest
- Foreign objects in the image
- Inaccurate collimation



The purpose:

The purpose of this development project was to improve image quality of chest radiographs in hospitalised infants and thereby optimise diagnostic accuracy

Audit group

Secretary

-impartial. Seeks patient data for analysis

Pediatric radiologist

-performing audit

Specialized radiographer

-performing audit

Management representative

-decision competence for the department

Pediatric development- and implementation radiographer

-project manager. Gather and analysing results.

Audit group activities

The group met before the first audit and later after each audit.

The group's members each contributed their own competence to the ongoing discussion and analysis

The group made joint decision for process and result.

The projects took place over 40 weeks

Method:

Three audits were conducted:

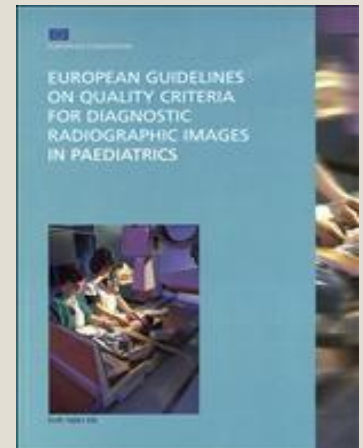
1. Baseline
2. After intervention
3. Six months after intervention

The audits were based on

Current *European guidelines on quality criteria for diagnostic radiographic images in paediatrics*

The department 's standards

Kohn, M.M. et al. *European guidelines on quality criteria for diagnostic radiographic images in paediatrics*. 1996 Luxembourg 1996. ISBN 92-827-7843-6.



Audit: fill-out form

		Fulfilled criteria			
		Yes	No	Pathology	Technical
1-7: European guidelines on quality criteria for diagnostic radiographic images in paediatrics 8-10: Department standards				Not possible to decide due to cause:	
1	Performed at peak of inspiration				
2	Reproduction of the thorax without rotation and tilting				
3	Reproduction of the chest must be extend from cervical trachea to T12/L1				
4	Reproduction of the vascular pattern in central half of the lungs				
5	Visually sharp reproduction of the trachea and the proximal bronchi				
6	Visually sharp reproduction of the diaphragm and costo-phrenic angles				
7	Reproduction of the spine and paraspinal structures and visualisation of the retrocardiac lung and the mediastinum				
8	Free of foreign objects				
9	Collimation cranial/caudal				
10	Collimation bilateral				

Inclusion and exclusion criteria

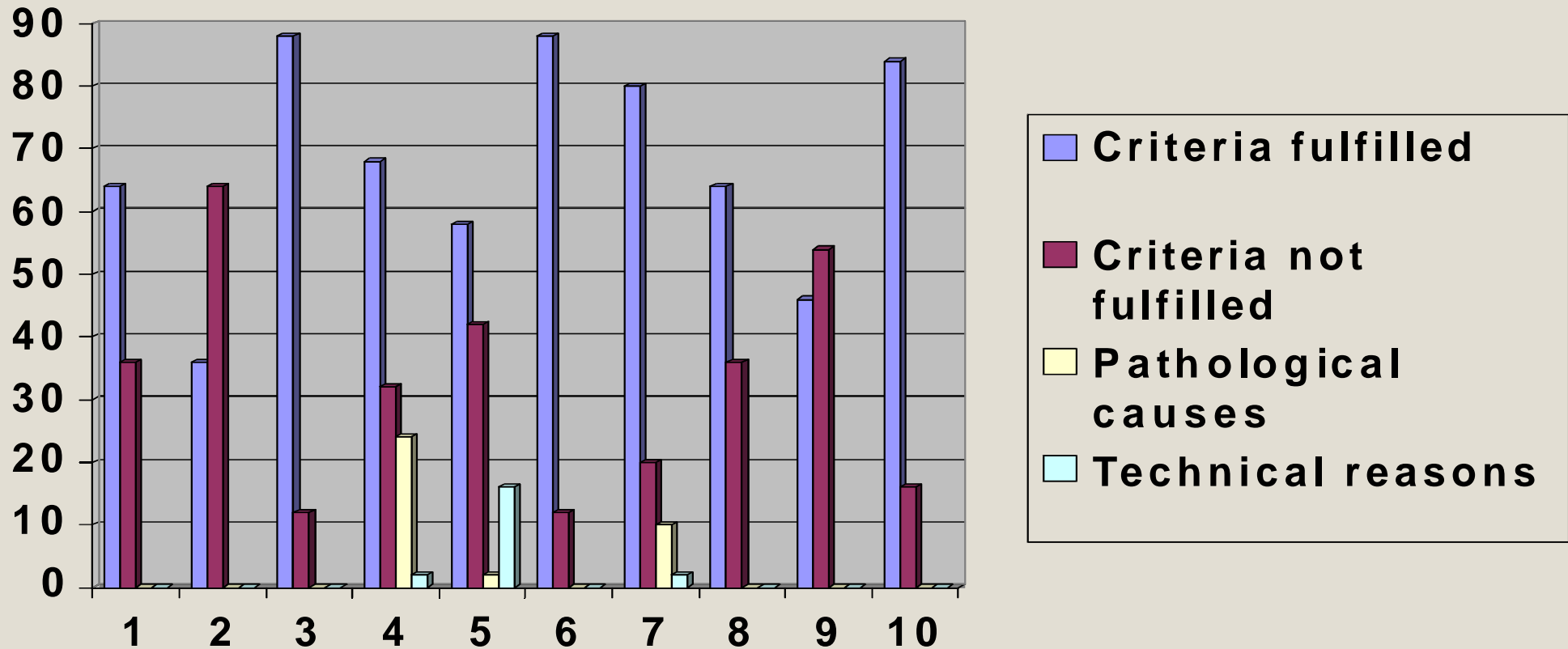
Inclusion:

- total of 50 chest radiographs in hospitalised infants
- Retrospective the last 50 portable chest radiography prior to project start
- supine position anterior-posterior (AP)
- use of same portable x-ray device and detector

Exclusion:

- children older than one year
- more than three radiographs of the same child

Baseline measurement



Audit group's decision

The audit group concluded that improving quality required more initiatives

Intervention

Five initiatives was conducted to improve image quality:

1. Nominations of the best pediatric portable chest radiographic images
2. "Hands on" session
3. Radiographers exchanging professional knowledge
4. Theoretical teaching by paediatric radiologist
5. Checklist for good radiographic technique

Nominations of best pediatric portable chest radiographic images



"Hands on" session



Radiographers exchanging professional knowledge



Request to radiographers

Increase your knowledge.....*and the chance to win!*

If you want to be called, when to take pediatric portable chest images, at the child ward.

Please sign up at the list below:

■ Mona _____

■ Kurt _____

■ _____

■ _____

■ _____

■ _____

.....*Remember to strike out your name when you no longer want to be called!*

■ _____

Theoretical teaching by paediatric radiologist

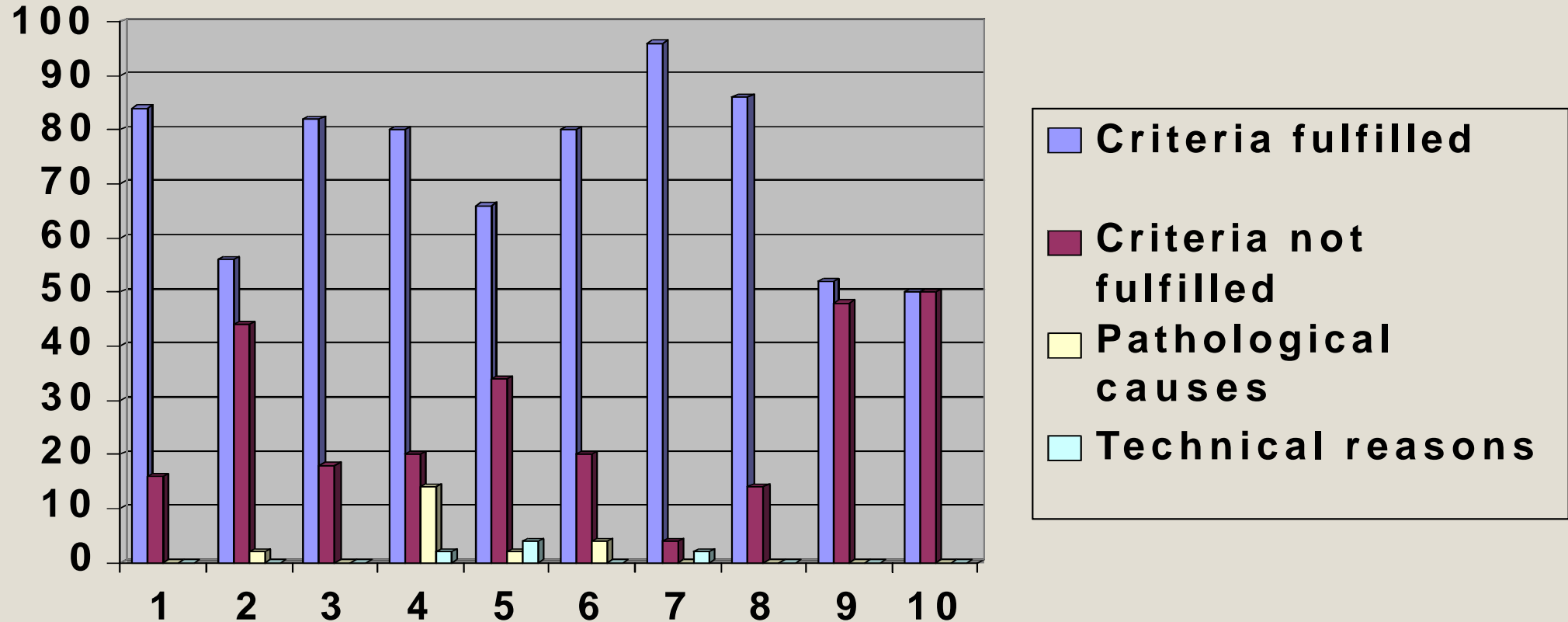


Checklist

good radiographic technique

- ✓ **Go two** if you can. Four eyes are better than two!
- ✓ **Make everything ready** before the detector is placed under the child
 - Check X-ray is ready to expose
 - The cattle and x-ray tube are horizontal
 - to avoid tilting
- ✓ **All wires etc. must be taken off.** All electrodes and wires are visual and disturb the image
- ✓ **Positioning, centering and collimation check.** The fare end of the incubator gives a good view
- ✓ **Respiration** of the child is observed -to be ready for exposure in maximum inspiration.

Survey after intervention including five initiatives



Results

The four measuring points in isolation...

The image quality improved in all four measurement points and all measurement points except *rotation and tilting of the chest* continued to improve six months after project completion.

Quality criteria from European guidelines for diagnostic radiographic images in paediatrics and department standard	Baseline measurement	Survey after intervention including five initiatives	Follow up after six months
Performed by deep inspiration	64%	84%	88%
Representation of the thorax without rotation and tilting	36%	56%	48%
Free of foreign objects in the radiographic image	64%	86%	92%
Correct collimation cranial-caudal	46%	52%	62%

Table: The performance measures of specified quality in four measurement points in the project process

Discussion

In *European guidelines* on quality criteria for diagnostic radiographic images in pediatrics, reproduction of the thorax without rotation and tilting is composed in one point.

- The child can be rotated and the incubator or x-ray tube tilted, at the same time so which one is it?
- Could it possibly be both?

Measuring point 10: Collimation bilateral

- The degree of quality fulfillment at baseline was measured to be 84%.
- At the end of the project, it had fallen to 50% and after another six months increased to 66%.

Through the project the staff had a lot of focus on these children and made great efforts to really do their best. In the attempt to make the collimation accurate some chest radiographs did no longer show all the anatomy.

Can we be too thorough?

Conclusion

The image quality of chest radiographs in hospitalised infants increased after the intervention.

Annual audits to monitor the image quality in pediatric chest radiographs are therefore recommended in order to maintain image quality and diagnostic accuracy.

Thank you!



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