Can I report Chest X-rays? The GMC may want to know...

John Oakes
Royal Bournemouth Hospital

**Background**
Measuring outcomes is difficult in Diagnostic Radiology, but increasingly important in the current climate of appraisal, revalidation and patient safety.

**Aim**
To evaluate three separate strategies for assessing diagnostic accuracy in Chest X-ray reporting.

**Standard**
No accepted error rate for Diagnostic Radiology. Published data suggests a wide potential error incidence rate of 2-20%.

**Indicator**
Incidence of discrepancies in retrospective review of defined subsets of plain chest imaging.

**Target**
Incidence of discrepancies below 3%.

**Methodology**
1350 reported Chest X-rays identified from 2014. Three different strategies used to create defined subsets of imaging for analysis.

**Strategy 1**
40 consecutive GP referrals, 30 consecutive ED referrals and 30 consecutive in-patient referrals.

Peer review of these 100 images for identification of discrepancies, and likelihood of clinical importance.

**Results**
Majority (75%) normal or unremarkable.

1 potentially significant discrepancy – focal pleural thickening – 1% significant error rate.

6 non-significant discrepancies including longstanding apical opacity, incidental rib fractures, possible mediastinal widening.

**Advantages**
- Allows evaluation of ‘true’ error rate, with no case pre-selection

**Disadvantages**
- Low probability of significant pathology
- Requirement for colleague time
- Subjective assessment of discrepancy

**Strategy 2**
Patients identified that had CT imaging of the thorax within one month of their original Chest X-ray. Reports compared for potential discrepancies, with retrospective imaging comparison in these cases, to determine visibility on Chest X-ray and likely clinical importance.

**Results**
102 patients identified with CT imaging within one month. 41 report discrepancies identified – 37 not visible on original imaging or limited clinical significance – 4% error rate

Significant discrepancies included false positive hilar mass, and encysted pleural effusion reported as consolidation.

**Advantages**
- Higher likelihood of significant pathology
- More objective assessment of discrepancies
- Limited requirement for colleague involvement

**Disadvantages**
- Evaluation is time consuming
- Assessment of clinical importance remains subjective

**Strategy 3**
Correlation with lung MDT data, to identify patients with diagnosis of lung malignancy in 2014 and 2015.

Retrospective review of imaging to determine visibility.

**Results**
19 patients identified with a diagnosis of lung malignancy – in 8, the diagnosis was established after the original Chest X-ray.

No missed malignancy, but one potentially significant interpretation error (failure to recognize slow lesion growth) - 5% error rate.

**Advantages**
- All patients have significant pathology
- Discrepancies likely to be clinician important
- Lower time/resource requirement for assessment

**Disadvantages**
- Low absolute numbers make the resultant error rate difficult to interpret.

**Discussion**
There is a problem in Diagnostic Radiology – how do we show our outcomes are acceptable, with pressure for ‘hard’ outcome data, and requirement to improve patient safety.

Discrepancy meetings are well known to be subject to significant bias, which makes any formal measurement of error rates impossible. There are advocates of second reporting of 10% of all imaging, but resource requirements make this difficult for the foreseeable future.

I have tried to use complementary strategies for assessing a limited, but relevant subset of imaging to give an evaluation of my imaging competence, but significant issues remain.

**What is significant error?**
Many of the apparent discrepancies on chest X-ray reporting reflect the Radiologists assessment of the likely clinical importance, and their threshold for reporting minor or doubtful abnormalities.

This has the potential for introducing significant bias for the generation and subsequent evaluation of any error rate.

**Time and resource use**
There is a significant resource requirement in terms of Radiologist time – this needs to be weighed against the perceived value of any outcome data obtained.

**Error rates**
Assuming that the possibility of error is dependent on the presence of pathology, the error rate will be affected by the likelihood of pathology. Therefore the significant error rate in strategy 2 and 3 would be expected to be higher than strategy 1, where the majority of patients will not have significant pathology.

**Qualitative Value**
Although the aim of the study was to develop a qualitative measure of error rates, arguably the greatest benefit was qualitative, being able to compare reporting approaches, and reviewing my plain film assessment in the light of subsequent cross sectional imaging.

**Can I prove competence?**
Given the potential for bias, and relatively low numbers of examinations assessed, it would be difficult to prove competence. However, the similarity in error rate, allowing for expected potential differences between the different strategies, suggests that I am unlikely to be incompetent.

**Conclusions**
Combination of different strategies for assessing discrepancies in Chest X-ray reporting, with different and potentially complementary advantages and disadvantages, may allow a more robust quantitative evaluation.

Potential for significant bias, and wide range of expected discrepancy rates, makes quantitative evaluation potentially dangerous as an isolated performance measure.

The qualitative, self-learning elements of the exercise may be very constructive.

In conjunction with other techniques, a limited multi-strategy assessment of imaging discrepancies could be a useful tool as evidence for appraisal activity, but the time/resource cost needs to be considered.

**References**
