Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Final Report

Patient Handover and Timely Reporting of Radiology Results

A Report by the Health and Disability Commissioner

Introduction

In March 2007, Mr A[1] (aged 71 years) presented to Wellington Hospital's Emergency Department (ED) with severe pneumonia. Investigations revealed that he had advanced lung cancer that was later found to be inoperable.

At this time it came to light that Mr A had had a chest X-ray in 2004, when he had presented to the ED with pain in his abdomen and back. Although the X-ray had indicated a possible abnormality in Mr A's right lung, this finding was never followed up.

In May 2007, the Health and Disability Commissioner (HDC) received a complaint from Mr A's daughter about the lack of follow-up of her father's 2004 chest X-ray results, which delayed the diagnosis and treatment of his lung cancer.

As part of my assessment of this complaint, I reviewed information provided by Mr A's family, Capital and Coast District Health Board (CCDHB), and the consultant radiologist responsible for reporting on Mr A's chest X-ray in 2004. I met with Mr A and his family, and with CCDHB management. I obtained independent expert advice from Dr Jeff Garrett, Clinical Director of Medicine at Middlemore Hospital.

Summary of events

1. On Saturday 17 July 2004, Mr A presented at Wellington Hospital's Emergency Department (ED) with a possible bowel obstruction.

2. Mr A had a chest X-ray as part of routine investigations. The surgical registrar in the ED, Dr B, thought the X-ray showed an abnormality in Mr A's right lung and recommended that the X-ray be reviewed by a radiologist.

3. Mr A was admitted and seen on the ward by the on-call relieving surgical registrar, Dr C. Dr C documented that the chest X-ray had been reviewed by the radiology registrar who considered that the shadow on the right lung was vascular marking and not a cancerous tumour. On the recommendation of the radiology registrar and as the X-ray was done on a portable X-ray in the ED, Dr C requested a better quality X-ray to clarify the findings on the first X-ray. This second X-ray was never done.

4. On Monday 19 July 2004, Mr A underwent a procedure to investigate his bowel problems. The results were normal and he was discharged home four days later.

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[1] Names other than Capital and Coast District Health Board, Wellington Hospital, and the Commissioner's expert advisor have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

The discharge summary, completed by a house officer, did not mention the possibility of an abnormal chest X-ray finding.

5. On 18 August 2004 (one month after Mr A's chest X-ray was taken), consultant radiologist Dr D reported a "*superior right hilar mass around 3cm in diameter, suspicious for a central carcinoma*". The report was not typed until 15 September 2004 and not formally verified until 13 October 2004. Dr D did not telephone the clinical team to advise them of this significant and unexpected abnormality. Dr D also did not report his findings to Mr A's GP. Dr D wrongly assumed that the clinical team was already in the process of further investigating a presumed malignancy.

6. Mr A attended two outpatient appointments with surgical registrar Dr E. At Mr A's first appointment, on 2 August 2004, a barium enema was requested. It showed mild to moderate diverticular disease. Dr E reviewed all investigations on the computer but the chest X-ray report was not available at the time. Dr E did not review the electronic records again at Mr A's second appointment, on 20 September 2004, by which time the report was entered in the electronic record. Mr A was noted to be well by the time of his second appointment and he was discharged back into the care of his GP.

7. On 2 March 2007, Mr A presented to the ED with severe pneumonia. A chest X-ray taken the day before showed a collapsed right upper lobe. A CT scan performed on 6 March 2007 showed an ill-defined mass in Mr A's right lung.

8. On 8 March 2007, Mr A and his family were informed that he had lung cancer. They were also told about the 2004 chest X-ray report that had not been pursued and that it was likely that the tumour had been growing since that time. CCDHB offered an unreserved apology for what happened and for the grief it caused Mr A and his family.

9. Mr A had a bronchoscopy that confirmed squamous cell carcinoma of the lung. Mr A's cancer is inoperable and he is now being cared for by his family at home.

Actions taken by CCDHB

CCDHB undertook a review into Mr A's care. The review concluded that there were many points of failure in the system that together resulted in Mr A's 2004 chest X-ray report not being acted on. CCDHB has also worked closely with Mr A and his family to ensure that he obtained full ACC entitlement.

CCDHB Review findings

1. Dr C, who saw Mr A on the Ward after he was admitted in July 2004 and suggested a repeat X-ray, was a relieving registrar and would not have seen Mr A again. Because the suggested further X-rays were not urgent, Dr C documented his suggestion and expected that the regular surgical team would initiate those investigations on the following Monday.

2. On Monday, 19 July 2004, Mr A had surgery. Pelvic and lumbar X-rays taken after this were inconclusive, and it was considered that a bone scan should be done to exclude cancer.

   The review team assumed that the documented plan to repeat Mr A's chest X-ray was not fully acted on because the clinical team were focussed on the possibility of bone cancer. This created a fixation error. In other words, in pursuing the bone scan investigation, the plan for a further chest X-ray was overlooked. Mr A subsequently had a sigmoidoscopy, recovered well, and went home with outpatient follow-up care arranged.

Outpatient appointments

3. On 2 August 2004, Mr A had his first outpatient appointment with surgical registrar Dr E. Dr E reviewed Mr A's test results on the computer but Mr A's chest X-ray report was not available at this time. Dr E did not see any results of concern, and assumed that the chest X-ray had been reviewed and a diagnosis of malignancy discounted. In hindsight, Dr E regrets that he did not pursue his own evaluation of Mr A's chest X-ray more vigorously.

   Mr A's second outpatient appointment was on 20 September 2004. By this time, the X-ray report was available on the computer. Dr E did not re-check the computer for investigation results because it had been comprehensively checked during Mr A's first outpatient consultation. Dr E instead focused on following up the results of the investigations undertaken since the first outpatient appointment.

Radiology reporting

4. The review team noted that priority for X-ray reporting is given to patients most at risk, ie, those discharged from the ED or in intensive care areas. This is because of the volume of radiology investigations ordered and the reporting and typing resources available.

   With regards to inpatients, clinical staff have access to weekly radiology meetings. The ward staff can seek radiology assistance during the week, and an after-hours radiology registrar is also able to provide advice.

   The review findings indicate that X-ray reporting for inpatients appears to be a lower priority as the above safety-net mechanisms should ensure that anomalies are picked up. The review team was unable to confirm that Mr A's chest X-ray had been reviewed at a weekly radiology meeting.

   Delays in the availability of the X-ray report from consultant radiologist Dr D contributed to the error. Mr A's chest X-ray was taken on 17 July 2004. It was a month later (18 August 2004) before it was reported. There was another month's delay before the report was typed and became available (unverified) in the clinical record on 15 September 2004. There was a further delay before the unverified report was authorised by Dr D on 13 October 2004. In all, it took four months to present and confirm the findings. Dr D did not telephone the clinical team and advise them of his findings when he reported on the chest X-ray, nor when the report was verified on 13 October 2004.

5. The review team explained that when an X-ray report is verified in the clinical record, a report automatically prints at the referring destination. In Mr A's case, this would have been the ED where his chest X-ray was originally ordered at the time of his admission on 17 July 2004. The ED doctors would normally review reports that are printed and follow up any abnormal findings. The review team was unable to determine what happened to Mr A's chest X-ray report when it was sent to ED.

6. At the time of the review, the review team concluded that there were serious, current, and ongoing risks associated with the reporting of radiology results. The risks identified included the following:

   - while it is usual practice for radiologists to telephone significant unexpected abnormal results to the referring department or doctor, this process can fail if the patient's care is transferred to another doctor or department, and the information is not passed on;
   - the radiologists reported that they found it difficult to determine if an abnormal finding was expected or unexpected by the ordering clinician;
   - the doctor who had requested the radiology findings may not be available after hours;
   - there is no electronic mechanism for alerting physicians that results are ready and available in the clinical record and, conversely, there is no electronic mechanism to verify that a report has been received and read by the requesting doctor and/or team now responsible for the patient's care.

   As a result of these risks, the requesting doctor and/or team responsible for the patient's care may not necessarily be notified about a serious abnormality noted by the radiologist. This was especially concerning to the review team given the safety mechanisms relating to X-ray reporting processes that were newly implemented at that time. These included inpatient weekly meetings, access to radiologist review, and the ED yellow sticker system.

7. The review team also made the following recommendations:

   - once a radiology report has been read, a mandatory electronic sign-off verification to be generated and sent out electronically;
   - an automatic electronic health record alert to be sent to the ordering clinician when the radiology report is ready;
   - copies of X-ray reports to be automatically sent to GPs (when known);
   - consideration to be given to the feasibility of implementing an electronic alert for any investigations ordered (but not yet reported) on the patient's discharge summary, so that the clinical team responsible for the patient's care at outpatients and/or the patient's GP are advised.

Changes to improve radiology reporting
CCDHB advised that a number of changes have been made to its radiology reporting processes. In June 2007, the radiology team agreed to the following:

1. All significant abnormalities identified at report (and not referred to in the requesting information or that do not appear to have been detected by the patient's clinical team, ie, unexpected) will be discussed with the requesting physician and/or clinical team providing care to that patient and, where relevant, with the patient's GP. This follow-up duty may be delegated to a radiology team member trained specifically for this task.

2. A radiologist rings and discusses a finding with the clinical team member if the ED electronic sticky note label (part of the new electronic image system) diagnosis differs from the radiologist's findings.

3. Verbal communication of unexpected significant abnormal findings is now formally documented in the guideline "Communication of Radiology Results".

4. Radiology will continue with the planned contracting of reporting to other providers, when possible, to improve timeliness of reports.

A new Picture Archiving and Communications Systems (PACS) was implemented in March 2007, and a Radiology Information System (RIS) in September 2007. Initial feedback indicates that the radiologists have found that the system helps timely reporting. ED reports and high priority inpatient reports during regular working hours are usually up to date by the day's end. This includes the results from overnight and the current day's work.

Digital dictation has significantly reduced the turnaround times for reports. It has also allowed urgent reports to be prioritised for transcription and, if particular reports are needed urgently, they are much easier to access than with the old tape dictation system.

CCDHB advised that the radiology team remains committed to providing excellent service and will continue to advise findings of significant unexpected abnormalities by telephone, as now formally documented in the guideline "Communication of Radiology Results". The decision whether there is a need to ring through a result will continue to be made by the radiologist based on the clinical information provided by the requesting doctor, the information provided on the PACS sticky note (if relevant), and the radiologist's findings.

Radiologist's response
I asked Dr D for a detailed explanation about his role in Mr A's case.

As part of his response, Dr D outlined the problems facing radiologists at Wellington Hospital at the time, including systemic problems and a chronic understaffing of radiologists in the Radiology Department. This led to an unacceptable backlog of X-rays in the department resulting in films often not being reported until they were a month, two or even four to six months old. Dr D had long argued for system changes

to assist with this backlog, but the human resource and fiscal issues facing Wellington Hospital made such changes difficult.

In relation to Mr A's case, Dr D made the following comments:

1. He received Mr A's X-ray for reporting one month later than he should have. When he came to report the X-ray, he saw on the front of the film packet that there had been several subsequent investigations, including a bone scan performed on 22 July, the week following the chest X-ray. He wrongly assumed that the clinical team was in the process of further investigating a presumed malignancy. Had he realised that this assumption was wrong, he would have phoned Mr A's GP and the consultants involved to advise them of his findings.

2. Dr D accepts that there was adequate clinical information available to him when reporting Mr A's case, including the referral information commenting on the possible metastatic lesion in the right pulmonary hilum, and the bone scan study written on the X-ray packet the following week. However, these details led him to believe that the primary malignancy had been demonstrated and noted and was being "worked up" for potential treatment.

3. Dr D also accepts that discussion at a weekly radiology meeting does not obviate the duty of the radiologist who actually reviews and formally reports a significant abnormality on an X-ray. But in 2004 at Wellington Hospital, many inpatient films would sit unreported during the key management and decision-making processes of an inpatient's stay, leading to heavy reliance of the clinical teams on the weekly X-ray meetings to review cases that arguably should already have been reported. However, this does not reduce the importance of a timely and correct formal report.

4. Delays in typing on top of unacceptable delays in reporting of X-rays lessens the value of a radiologist's report and can make timely communication of reports very difficult, something that Dr D was very unhappy about at Wellington Hospital. The backlog was overwhelming. As a result of this, when Dr D felt it was clinically appropriate, he did phone through significantly abnormal results to referrers, particularly if the abnormality needed urgent treatment. Unfortunately, Dr D did not adopt this approach in Mr A's case, as he mistakenly believed that further investigations for the malignancy were already well advanced.

5. Dr D did attempt, without success, to find an explanation for the delay of 29 days between typing and verification of his report.

6. Dr D deeply regrets that he did not phone the surgical team or the GP to make sure that all Mr A's relevant radiological information had been passed on appropriately. Dr D states that this case has changed the way he practises.

Independent advice
Dr Jeff Garrett, Clinical Director of Medicine at Middlemore Hospital, was asked to advise whether the actions taken by CCDHB in response to this case are adequate, and whether anything further should be done to prevent the same thing happening again.

Dr Garrett regarded Mr A's initial evaluation by Dr B on admission as succinct and informative. Mr A's presenting condition was successfully treated. However, the incidental finding of an abnormality on his right lung went untreated because it was overlooked and not followed up.

Analysis of error
Dr Garrett explained that the error related to the management of an incidental finding discovered on a portable anterior-posterior (AP) chest X-ray performed in the ED. A subsequent note by Dr C requesting another better quality chest X-ray to clarify the findings of the first X-ray was not actioned. This may have been because the admitting team was focused on Mr A's presenting symptoms of right-sided abdominal and back pain. When the possibility of metastatic cancer was subsequently raised, it was pursued by way of a bone scan. Dr Garrett surmises that the most likely reason that the initial X-ray abnormality was overlooked was because when the bone scan was found to be normal and Mr A's primary problem was successfully managed, the clinical team would have become less concerned about cancer malignancy. Dr Garrett noted that in the context of Mr A's presenting condition and his subsequent management, the oversight was clinically understandable.

However, the error is less likely to have occurred if more robust systems had been in place. Dr Garrett concentrated his advice on the systems issues highlighted by Mr A's case.

Poor communication and handover processes
Dr Garrett noted that poor communication and handover processes were major issues that influenced the quality of continuity of care that Mr A received. These issues are not peculiar to Wellington Hospital but to all New Zealand hospitals and indeed worldwide.

Mr A was admitted at the weekend and his care was initially managed by the surgical registrar after confirmation with the consultant surgeon. Mr A's care over the weekend was managed by a house officer and a relieving surgical registrar who were not available from Monday onwards. Dr Garrett observed that over the last 20 years, the number of hours worked by junior doctors has halved. Given Mr A's length of stay in hospital, he would likely have required upwards of 15 separate handovers of care. Unless careful attention is paid to improving the handover process, the potential for mistakes arising out of poor communication is enhanced. In Mr A's situation, the decision to perform a better quality posterior-anterior chest X-ray was not passed on, and was simply overlooked. The need for effective handover cannot be overstated.

Dr Garrett noted that "group cause analysis" of sentinel events indicates that poor communication is a contributing factor in 65% of cases, and that lack of continuity of care is a contributing factor in 12% of cases. Both of these factors contributed to the omission in Mr A's case. The other crucial factor was the lack of effective handover. In general, the effects of ineffective handover are multiple and include a 3.5-fold

increase in preventable adverse events, delays in diagnosis, decreased patient satisfaction, increased length of hospital stay, increased investigations performed, and delays in ordering tests. Dr Garrett noted that there is a burgeoning literature outlining the importance of handover meetings in care, and that workshops addressing handover of care in hospital settings are available in Australia.

Admission to Discharge Planner
Dr Garrett commented on the value of a good Admission to Discharge Planner. This tool encourages medical staff to identify and define a problem list which can be handed over to other clinical teams responsible for a patient's care. Dr Garrett's view is that had such a planner existed at the time of Mr A's admission, his follow-up chest X-ray would have been less likely to be overlooked.

Timeliness of radiology reporting
Dr Garrett noted that acute hospitals are expected to provide care for 24 hours, seven days a week. Many of the difficulties currently relate to determining what is an adequate and safe level of clinical care after hours. X-rays, ultrasounds, and CT scans performed after hours are frequently accompanied by an informal verbal report, or written in the clinical records (frequently by a radiology registrar in training).

In Mr A's case, the chest X-ray was interpreted as showing an abnormality by the surgical registrar but not by the radiology registrar. This obviously reduced the concern the surgical registrar had in relation to the initial X-ray appearance, and likely impacted on subsequent events.

When the subsequent report is provided (often by a consultant radiologist or the radiology registrar with consultant supervision), the radiologist infrequently has access to any informal report by the radiology registrar, which is normally placed in the clinical record that accompanies the patient. Thus, the consultant radiologist has no way of auditing the quality of the initial report, or of knowing whether the registrar's report differs from the formal radiology report.

In Mr A's case, given that the initial informal report provided by the radiology registrar was that the X-ray was normal, it should have been Dr D's responsibility to contact the clinical team to outline his concerns given the findings of abnormality.

Dr Garrett acknowledged Dr D's view that it is probably unreasonable for radiologists to try to interpret whether the X-ray finding was expected or not, based on what is written on the radiology request form. However, in his view, it can be assumed that the radiology finding is unexpected if the report differs from that provided informally by the radiology registrar.

It goes without saying that X-rays performed on patients in hospital should be formally reported in a timely manner (ideally within three days). An X-ray report provided four months later (as in Mr A's case) is unlikely to be acted on by the team caring for him. It is unreasonable to expect doctors who are busy managing a heavy inpatient load to review all of the radiology results of a patient discharged four months earlier. Indeed, the junior team that had arranged the investigations would in all likelihood have left the hospital and the patient and/or his or her designated care team may be under a different consultant.

For these reasons, the electronic reporting of radiology results in a timely manner is critical. The results must be sighted and signed off by the team who ordered the investigation, with the consultant physician or surgeon as the default safety measure. In other words, if an X-ray result is delayed for any reason, it is the responsibility of the consultant physician or surgeon responsible for the patient's care to view the result, act on it, and sign off the result. Dr Garrett noted that this system has been in place for a number of years at Middlemore Hospital. However, it is not perfect and requires constant monitoring.

In commenting on the importance of weekly radiology meetings as a safety mechanism, Dr Garrett agreed that they are essential to good patient management. However, it is often the "difficult clinical cases" or "interesting radiology cases" that are discussed at such meetings and not every patient admitted to hospital is reviewed. The focus is also frequently on outpatient care. Therefore, unless the radiologists or clinicians highlight a case for discussion, it can easily be overlooked.

Dr Garrett noted a two-month delay in the furnishing of a discharge summary by the surgical registrar. Although not relevant to the outcome of Mr A's case, this delay is also unacceptable and compromises the care offered by others in the care continuum (namely general practitioners). Formally summarising the care offered to Mr A around the time he left hospital might have triggered the memory of the registrar in relation to the initial X-ray finding.

CCDHB confirmed that the discharge summary was completed on the day of Mr A's discharge. Dr Garrett responded that if the house officer's discharge summary was performed on the day of discharge yet the registrar's letter was posted two months later, this raises an issue of the adequacy of clerical support.

Summary of Dr Garrett's advice
In summary, Mr A had findings consistent with a lung cancer on a portable AP chest X-ray performed routinely at the time of his attendance at the ED. Once noted, the finding should have been more clearly documented within a problem list generated as part of an Admission to Discharge Planner. The informal evaluation of the X-ray findings by the radiology registrar undoubtedly reduced the importance of the finding in the minds of the clinical team. Nevertheless the responsibility of performing a better quality chest X-ray should have remained specifically with the house officer. However, neither the registrar nor the house officer who managed Mr A's care over the weekend was available on the Monday and this is another potential reason why the chest X-ray was not performed. If more formal handover meetings were in existence, or more timely reporting of radiology in place, or if informal reports issued by the radiology department were available to those providing the formal report, then Mr A would almost certainly have had his presumed lung cancer diagnosed in 2004.

Dr Garrett noted that Mr A's prognosis would not necessarily be better even if his lung cancer had been diagnosed in 2004. Dr Garrett noted that the shadow appears to have been close to the right hilum and therefore central. Mr A may have needed a pneumonectomy (a surgical procedure to remove all or part of a lung) to clear it, and his lung function may not have been sufficient to withstand the surgery.

Dr Garrett advised that the systems issues in this case are important for all hospitals in New Zealand, and likely to be found to a varying extent elsewhere.

CCDHB response
CCDHB responded that overall, Dr Garrett's review seemed fair and reasonable. A significant amount of work has been undertaken to improve both medical and nursing handover. CCDHB agreed with Dr Garrett's comments about the value of an Admission to Discharge Planner, and confirmed that it is standard practice to use problem lists in its medical services.

CCDHB noted that electronic sign-off of radiology reports is part of the next phase of its Electronic Health Record Project, occurring during 2008.

Update from CCDHB on improvements to radiology reporting

Improvements in timeliness of radiology reporting
CCDHB reported that since undertaking its review of Mr A's case, radiology has been able to deliver much more timely reports with the combination of measures such as contracting reporting, recruitment of radiologists and implementation of PACS and RIS electronic systems. With the implementation of the new RIS system in September 2007, new management reporting systems have been developed and are in the process of being completed and installed by the vendor. This has meant that regular reports on various performance indicators, such as report turnaround times, are yet to become routinely available. However, the RIS currently does allow much easier assessment of the number of examinations waiting to be reported, or waiting at other points in the reporting process (eg, typing, authorising). This has shown a significant reduction in the number of outstanding examinations awaiting review by a radiologist.

The new guideline "Communication of Radiology Results" was formally adopted on 29 November 2007. The radiologists stated that this practice has been discussed at numerous team meetings in recent years and actively encouraged, but not formally documented until now.

Although recruitment remains an ongoing challenge, the steps now taken to manage these risks have resulted in CCDHB being able to deliver much more timely reports in 2007 than was the case in 2004.

Radiology care and registrar supervision arrangements
Dr Garrett provided a detailed account of the systems in place at Middlemore Hospital regarding on-call radiology cover and registrar supervision mechanisms.

CCDHB advised that consultant review of registrar reporting had been an informal practice for some years and was first formally documented in the Radiology General Procedures Manual in June 2004. There are now robust, documented processes for registrar review of out-of-hours cases, which minimise the risk of an incorrect preliminary radiology report. The consultant radiologist is always available as back-up to the registrar out-of-hours.

The radiology registrar does not participate in the after-hours roster until after four months of orientation and training, at which time they participate in the evening

week-night roster only. They do not participate in the overnight roster until six months of training have been completed. All registrars are expected to contact their covering radiologist regarding any cases about which they are uncertain.

CCDHB advised that to date, volumes have not necessitated additional SMO radiologist cover on the weekends. Current cover consists of a general radiologist and an angiographer. The general radiologist reviews cases with the registrar usually each day on the weekend, depending on casemix, volume and complexity. Similarly, the volume of weekend ultrasound referrals has not been sufficient to warrant a sonographer weekend list. These are still performed by the radiology registrar and reviewed with the radiologist.

All examinations performed or interpreted by the radiology registrars are reviewed with a consultant radiologist before being reported. This is the case for all examinations both during regular working hours and for after-hours examinations until the registrar has successfully completed the Royal Australian New Zealand College of Radiologist fellowship exam Part II.

All on-call radiology studies are reviewed with a consultant either the same day or the next morning. The registrar issues a handwritten preliminary report at the time of all after-hours examinations. This is written on a duplicate Radiology Services Preliminary report form. The original form is faxed to the patient's location (eg, ward or ED), and the duplicate is retained for reference when reviewing the case with the consultant. The registrar is responsible for telephoning any significant discrepancies through to the referring team after checking the study.

Preliminary reports
Duplicate preliminary report forms were developed in 2002 when implementation of "hot reporting" of urgent films was attempted. The radiologist would handwrite a report for urgent films to enable timely turnaround. The original preliminary report would be placed in the film packet, which would then go with the patient to the ward or ED. The copy of the preliminary report would be kept on file in radiology. More complicated procedures (eg, CT scans) often had preliminary reports written in the patient's progress notes.

Since the preliminary report forms were developed, radiology registrars increasingly used the form to document both their after-hours cases and urgent working hours special examinations (ie, CT, ultrasound and sometimes MRI).

This practice was formally documented in the Radiology General Procedures Manual from 2004.

Plain film reviews and reports
CCDHB acknowledged that in 2004, the time taken to report plain films was a risk. Formal reports of plain films are rarely requested out-of-hours but, with the advent of PACS, it is possible for the referrer and the radiologist to view the films simultaneously at any time and discuss findings.

In the past there was no mechanism for formally documenting when ad hoc verbal reports had been obtained for plain films from the radiology registrars. However,

since PACS was implemented in mid-September 2006, the registrar team has developed an informal system of attaching a brief electronic sticky note to the image when it has given opinions on plain film cases. This allows the reviewing radiologist to know what the registrar interpretation was when he or she formally dictates the case or when the reviewing radiologist reviews the case with the registrar. The system also allows the registrar to assign the case to his or her individual work list for later review with a radiologist. This process of "Registrar Reporting" has recently been formalised in the Radiology General Procedures Manual.

Availability of electronic "sticky note" label
With the implementation of PACS, the electronic "sticky note" label is now available across CCDHB services. Resident Medical Officers and Senior Medical Officers have been advised of this facility and encouraged to use it. Its use will be advocated.

Further improvements planned for electronic health records
The Electronic Health Record Release 2 programme, which will be implemented in phases over 2008–2009, includes further improvements such as:

- mandatory fields including ordering clinician and address to send report
- alert that report ready
- electronic sign-off that report received
- automatic report to GP
- alert that report ready but not signed off as received.

Use of problem lists and Admission to Discharge Planners
Surgical services are discussing the implementation of problem lists through a phased approach. Audit of the use of the Admission to Discharge Planner is in progress at present and will be ongoing. The aim is to have a medical plan documented in the Admission to Discharge Planner, by revising it to include a dedicated section for a medical plan and instructions. The expected completion date for this work is June 2008.

Assurance from CCDHB
The Clinical Director of Radiology confirmed that the actions set out above have been implemented. In response to the specific question — Is the Clinical Director of Radiology "confident that the problems in radiology reporting evident in [Mr A's] case in 2004 have now been fixed and that CCDHB patients are no longer being placed at risk by radiology problems?" — the Clinical Director expressed confidence that the actions taken "have resulted in significant improvement to CCDHB's radiology reporting processes".

Commissioner's findings
Mr A fell through the cracks in CCDHB's system for patient handover and reporting of radiology results in 2004. His lung cancer should have been detected at that time, so that appropriate treatment could have been considered. The four-month delay in the formal radiology report may be explained by resource constraints, but cannot be excused. When Mr A's cancer diagnosis was eventually confirmed in 2007, only palliative treatment was possible. Naturally, the care failings in 2004 have been very distressing to Mr A and his family.

To its credit, CCDHB promptly acknowledged its mistake. It undertook a full review of what happened, shared the findings with Mr A and his family, and offered an unreserved apology. I commend CCDHB on its open and honest approach, which has been appreciated by Mr A and his family. I also commend CCDHB on its efforts to ensure that Mr A obtained full ACC cover (which has paid for necessary modifications to his home) and in recognising its ongoing duty of care towards Mr A.

Dr D, the consultant radiologist who reported Mr A's chest X-ray, acknowledges his part in what happened, and deeply regrets his failure to telephone the surgical team or the GP about his findings of a significant abnormality.

CCDHB, Dr D, and Dr Garrett have identified the many points of failure in the system that allowed Mr A to fall through the cracks. The error may not have occurred had more robust systems been in place at CCDHB at the time. Key recommendations made by Dr Garrett include better patient handover (including the use of problem lists and Admission to Discharge Planners) and electronic reporting of radiology results with electronic sign-off.

I have specifically taken into account the family's wishes and the commendable way CCDHB has responded to the family and to these events, in deciding not to undertake further investigation. I am satisfied that CCDHB has made extensive and necessary changes to improve the timeliness of radiology reporting, the handling of significant abnormal findings, and radiology cover and registrar supervision arrangements. Steps have also been taken to improve the handover of clinical information, although this is a complex problem in all hospitals.

The timely reporting of radiology results and effective handover of patient care are critical systems issues for all hospitals in New Zealand. It is essential that the issues highlighted by Mr A's case and the lessons learnt are shared nationally.

To this end, this report will be sent to the Minister of Health, the Director-General of Health, the Quality Improvement Committee, the Royal Australian and New Zealand College of Radiologists, and all district health boards, and will be placed on the HDC website (www.hdc.org.nz) for educational purposes.