October 2022

Academy of Medical Royal Colleges

Alerts and notification of imaging reports
Recommendations

Contents

Foreword

Timely communication and the actioning of urgent and unexpected findings is a crucial part of ensuring patient safety. There is an expectation that radiology departments will produce timely reports, flag up urgent and or critical findings and the clinical teams will acknowledge they have received and understood the reports and appropriate action has then taken place.

Over many years it has become apparent that for a variety of reasons, related to both organisational and human factors, this does not always occur, resulting in patient harm. This cannot continue as highlighted in the HSIB report referenced in this document, and failsafe systems need to be in place in all organisations undertaking diagnostics. It is clear that an IT failsafe solution would be optimal in ensuring that these reports are communicated efficiently as well ensuring the reports have been read and actioned.

These have been set up on an ad hoc basis by some trusts, but there is no robust nationwide system available or currently being planned which continues to put patients at risk. Until such time that these systems are widely available this document provides optimal and usable guidance to trusts which will help ensure patient safety.

I am grateful to Dr Teik Choon See for leading a multidisciplinary, intercollegiate team in developing the following guidance which sets the minimum standards that all organisations should achieve. Some organisations may already have these in place or be well in advance of these, but ultimately we need a robust national technology based IT failsafe system established throughout the NHS.

Dr Raman Uberoi
Medical Director Professional Practice, The Royal College of Radiologists

As the HSIB report recognised, this is a clear example of where a problem which arises in one area of medicine requires a solution developed and delivered across specialties and professions. That is precisely the role that the Academy can play to ensure college support and buy-in to enable a cross-profession response.

The recommendations produced here were considered and approved by the Academy Council which comprises the presidents of all the medical royal colleges and faculties in the UK. Colleges will therefore support and promote the recommendations among their members.

We hugely appreciate the work of the RCR in convening the multi-organisation team to look at this important issue and, more importantly, to come up with cross professional solutions which, if fully implemented and supported by the proper digital systems can ensure these dangerous errors do not continue. That will obviously be a significant improvement in patient safety — a goal we all support.

Professor Dame Helen Stokes-Lampard
Chair of Council, Academy of Medical Royal Colleges

Introduction

The Healthcare Safety Investigation Branch (HSIB) report, *Failures in communication or follow-up of unexpected significant radiological findings*[1] highlights the case of a patient with lung cancer on a chest radiograph that was not reported and acted upon promptly by several different clinical teams leading to delayed diagnosis and poor outcome. This case is by no means isolated. Similar incidents still occur despite a well-established electronic notification system and the referrer being notified in a timely fashion about the abnormal report. There is a clear need to address some of the areas of concern regarding the existing result notification system to ensure there are no opportunities for missed or delayed communication and action. To achieve this, the process and the responsibility to act on abnormal radiology findings needs to be clearly defined and standardised across multiple specialties. A fail-safe result notification system will require oversight and facilitation by healthcare organisations.

In addition to the standard result notification process, some imaging findings may require an alert system to prioritise actions. The time frame and the mode of communication will depend on the acuity of the findings. A system should also be in place to define responsibility for communicating results to patients.

The principles of a safe and effective imaging result notification process should encompass a fail-safe system from initiation of the report by the imaging department to appropriate action of the report by the referrers. Patients that are under the care of multiple clinical teams are most at risk of falling outside the completion of this system. Healthcare organisations should ensure a robust governance system to maintain patient safety by ensuring that all investigations are justified, completed and acted upon. Regular audits are essential to ensure compliance with the recommendations.

A robust digital infrastructure in combination with human interactions is essential to ensure the success of the fail-safe notification system.

Principles and recommendations of a Fail-Safe Result Notification System:

1. Prompt notification of all imaging reports by the Imaging department.

2. Prompt review, acknowledgement and action on all imaging reports by the referrers.

3. A system to facilitate identification and action of reports which have not been read, acknowledged and acted upon.

Current standards and considerations for imaging report notification

The recommendations for imaging report notification are highlighted by The Royal College of Radiologists (RCR) publications on the *Standards for interpretation and reporting of imaging investigations*[2] and the *Standards for the communication of radiological reports and fail-safe alert notification.*[3] The relevant recommendations include the following:

— It is the responsibility of employing organisations to ensure appropriate reporting and fail-safe systems are in place and to audit regularly.

— It is the responsibility of employing organisations to ensure that reports can be communicated to other information technology (IT) systems using HL7 standards. HL7 is a set of international standards for the transfer of clinical and administrative data between software applications used by various healthcare providers.

— It is the responsibility of the requesting doctor and/or their clinical team to read and act upon the report findings and fail-safe alerts as quickly and efficiently as possible. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— Fail-safe systems should be IT-based to reduce error and increase efficiency, but if facilities are not available, alternative manual processes should be in place.

— If manual processes (for example, telephone calls and emails) are required, administrative staff should be available to support radiologists and reporting radiographers at all times of the day or night.

The Quality Standard for Imaging,[4] published by the RCR and the College of Radiographers has a quality standard for managing unexpected diagnoses and potential medical emergencies (XR 510) which requires services to have processes in place for:

— Alerting referrers to unexpected findings.

— Ensuring acknowledgements of the alert are received by the service.

— Management of non-acknowledgement of receipt.

— Management of alerts when reporting out of hours.

An RCR audit to determine the compliance of UK healthcare organisations with published guidance on the communication of critical, urgent, and unexpected significant findings identified a wide variation in practice across the UK concerning the communication

and monitoring of reports with many organisations not fully compliant with published UK guidance. Despite the widespread use of electronic systems, only a minority of organisations have and use electronic tracking to ensure reports have been read and acted upon.[5]

The European Society of Radiology guidelines for the communication of urgent and unexpected findings highlighted that good communication helps to improve patient safety and that referrers should be aware of their responsibility to read and act on radiological reports.[6] It encouraged 'enhanced communication' for emergency and unexpected findings but raised concern that referrers will rely on alert mechanisms, and assume that the other reports are normal or have no significant findings. There is also a concern that the responsibility for ensuring that imaging reports are acted upon and even legal responsibility will transfer to radiologists, even though they have only limited information about the patient at the time of reporting. It should also be recognised that all alert mechanisms take additional time, effort and resources, so there are associated productivity costs.

The Parliamentary and Health Service Ombudsman highlighted learning related to failings in the imaging pathway in their report, *Unlocking Solutions in Imaging: working together to learn from failings in the NHS*.[7] One of the four recommendations specified that digital infrastructure must now be treated as a patient safety issue, and that The Department of Health and Social Care and NHS England and Improvement (NHSE/I), working with the NHS Transformation Directorate and NHS Digital, should prioritise improvements to digital reporting capabilities across the imaging system.

Healthcare Safety Investigation Branch report safety recommendations[1]

a. It is recommended that The Royal College of Radiologists (RCR), working with the Society and College of Radiographers (SCoR) and other relevant specialties through the Academy of Royal Medical Colleges, develops:

    —   principles upon which findings should be reported as 'unexpected significant', 'critical' and 'urgent'

    —   a simplified national framework for the coding of alerts on radiology reports

    —   a list of conditions for which an alert should always be triggered, where appropriate and feasible to do so.

b. It is recommended that the NHSE/I patient safety team takes steps to ensure providers are aware of the safety recommendations in this report and act to implement the key findings regarding risk controls such as a monitored acknowledgement system for critical, urgent and unexpected significant findings.

c. It is recommended that the NHS Transformation Directorate develops a method of digitally notifying patients of results. This should be used to inform patients of unexpected significant radiological findings after an agreed timeframe. It should be developed in conjunction with The Royal College of Radiologists. The notification system should be tested and evaluated.

d. It is recommended that the Care Quality Commission amends all appropriate core service frameworks to include risk controls identified in this report, to mitigate the risk of significant abnormal findings not being followed up.

A collaborative approach

This document is a collaborative effort from The Royal College of Radiologists, the Society of Radiographers, the Royal College of Emergency Medicine, the Royal College of General Practitioners, the Royal College of Physicians, the Royal College of Surgeons of England, the Royal College of Paediatrics and Child Health, the Academy of Medical Royal Colleges, and NHS Digital. It represents a collective consensus from clinical and published practices on the process of notification of expected or unexpected findings, which include cancer diagnoses or critical findings that may require immediate or urgent attention. Further collaborative work is being carried out by the NHS Transformation Directorate and NHSE/I and this document will be reviewed accordingly.

The main objective of this document is to ensure prompt and effective imaging result notification and its subsequent action to protect patient safety. It includes:

— Definitions of the different categories of imaging findings that require an alert notification

— A list of critical findings for which an alert should be triggered

— Simplified national alert text codes for imaging reports. These text codes refer to canned text codes used in proprietary radiology information systems.

The three main categories for imaging alerts are:

— New cancer diagnoses or newly detected cancer recurrences

— Critical findings that are time-critical

— Significant addenda in the report that may alter clinical management.

Individual healthcare organisations may incorporate additional imaging alerts, subject to their local governance processes.

The main objective of a robust notification process is to ensure that the imaging reports are reviewed and understood so that further clinical actions can be taken if required. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables the identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up on these reports. This may involve a digital system, a Results Coordination Team, or a combination. This should not solely become the responsibility of the imaging department. Funding and support should remain the responsibility of the healthcare organisations.

Every imaging referral must include a valid contact detail to which an urgent communication can be made if required, including an out of hours' contact. The system can also be pre-agreed between the referrers and the imaging department.

A **Results Coordination Team** is a team of staff employed by the healthcare organisation to optimise the alert notification system. The team is reportable to the local patient safety department, or other unit deemed appropriate by the healthcare organisation. They may also be responsible for other support services in escalating alerts and should at least be available from 9:00-17:00, 7 days a week.

The aim of the Result Coordination Team is to ensure that no patient suffers adversely because of delayed or miscommunicated radiology reports. The Results Coordination Team should be primarily focused on patient outcomes and not merely concerned with institutional compliance around alert and acknowledgement systems.

The function of a Results Coordination Team should include, as a minimum:

— Verbal communication to the referrers that an imaging report containing a critical finding which may require immediate intervention is now available. This includes inpatients, outpatients, and primary care. The role here is to escalate the review of the imaging report, and not communicate the actual report findings.

— Support the results notification system to ensure that reports are returned to the correct clinical team caring for the patient.

— Identify and escalate imaging alerts (for example a new cancer diagnosis or a significant addendum) that have not been reviewed and acted upon (or plan to act). A 48-hour interval before escalation is reasonable but this may vary depending on clinical urgency and should be agreed upon by the healthcare organisation.

It is important to acknowledge that this document should not be used to establish the legal standard of care in any particular clinical scenario.

A collaborative approach

1. A safe and effective result notification system requires a concerted effort from all involved, using an electronic system and supported by human interactions.

2. Alerts should be in place in three imaging categories: new cancer diagnoses or new recurrences, critical findings that are time-critical, and significant addenda that may alter clinical management.

3. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up these reports.

4. Every imaging referral (or through a pre-agreed system) must include a valid contact detail to which an urgent communication can be made if required, including an out of hours contact.

5. A Results Coordination Team should help ensure reports are returned to the correct clinical team, verbally inform the referrers that critical reports are available for immediate review and escalate imaging alerts that have not been reviewed and acted upon (or plan to act).

Categories of imaging findings and their notification processes

1. New cancer diagnosis or newly detected cancer recurrence suspected from imaging, expected or unexpected

This includes expected or unexpected imaging findings that suggest new or probable new cancer and new or probable new cancer recurrence.

Examples of new cancer diagnoses:

Examination:	*Chest radiograph*
Clinical indication:	*Breathlessness. Heart failure?*
Report:	*A spiculated right upper lobe lesion concerning for an underlying malignancy*

Examination:	*CT kidneys, ureters and bladder*
Clinical indication:	*Painless visible haematuria. Renal cancer?*
Report:	*A 2cm left upper pole renal lesion with imaging features of renal cell cancer*

Example of a newly detected cancer recurrence:

Examination:	*CT chest, abdomen and pelvis*
Clinical indication:	*Lymphoma in remission for 12 months. Now tiredness and abdominal fullness. Relapse?*
Report:	*Splenomegaly, enlarged mediastinal and para-aortic lymph nodes in keeping with recurrent disease.*

Cancer disease progression does not fall into this category e.g. growing tumour or new nodules in a known cancer.

— Cancer pathway imaging examinations and reporting should be prioritised.

— An alert should be triggered for all new cancer diagnoses or newly detected cancer recurrences. This includes expected diagnosis as the perception of what is expected or unexpected may not be clear. Reinforcing the result via the alert notification process will also help to ensure all the results are reviewed and acted upon promptly.

— The alert (alert text code: **CANCER**) should be immediately apparent on the report e.g. the red alert CANCER be stated at the top or bottom of the radiology report. The preferred format is at the discretion of the healthcare organisations. This notification should be triggered *immediately* upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions (or plan to act). The actions from the CANCER alert notification may include clinic review, further investigations, or treatment plan.

Recommendation on cancer imaging alerts

1. All imaging reports with expected or unexpected new cancer diagnosis or newly detected cancer recurrence should be notified to the referrers with a **CANCER** alert in the report via a digital platform immediately upon completion of the reports.

2. Referring teams must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

3. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system, a Results Coordination Team, or a combination.

2. Critical imaging findings where clinical management is time critical, expected or unexpected

— Imaging and reporting for patients with critical conditions should be prioritised.

— Critical imaging findings are those with diagnoses that may result in immediate or acute harm to the patient and therefore will require immediate or urgent clinical attention. The findings may be expected or unexpected.

— The list in Table 1 may be considered as critical imaging findings which may require an alert, if these are new findings, depending on severity. It is not intended to be definitive and may be subject to adaptation by local governance.

Table 1

System / Specialty / Region	New critical conditions
Central nervous system	— Cerebral or spinal haemorrhage — Intracranial mass with significant mass effect — Herniation syndrome — Acute stroke — Intracranial infection / empyema — Unstable spine fracture — Tension pneumocephalus — Spinal cord compression
Neck	— Airway compression or impending obstruction — Carotid artery dissection
Thorax	— Tension pneumothorax — Central pulmonary embolism — Mediastinal emphysema — Large pericardial effusion with suspected tamponade

System / Specialty / Region	New critical conditions
Abdomen	— Bowel perforation — Ischaemic bowel — High grade or closed loop bowel obstruction — Portal venous air — Acute volvulus — High grade traumatic visceral injury — Active intra-abdominal or retroperitoneal haemorrhage
Uro-genital	— Ectopic pregnancy — Placental abruption or placenta praevia — Uterine rupture — Foetal demise — Testicular or ovarian torsion
Musculoskeletal	— Necrotising fasciitis — Suspected physical abuse
Vascular	— Acute aortic dissection, injury or ruptured — Acute aortic aneurysm rupture — Suspected impending aortic aneurysm rupture — Deep vein thrombosis
General	— Significant misplacement of line, tube or other implanted devices of immediate clinical concern — Retained surgical foreign body — Foreign body with potential immediate clinical concern — Infection of immediate clinical concern e.g. open tuberculosis

System / Specialty / Region	New critical conditions
Paediatrics	— All conditions listed above where relevant — Significant congenital anomalies — Rib fracture — New fracture on follow up from skeletal survey — Metaphyseal fracture — Slipped upper femoral epiphysis — Significant dilatation of the upper urinary tract (requiring a paediatrician to prescribe antibiotic prophylaxis) — Preoperative radiography changes that may affect surgical planning (consolidation on a pre-op scoliosis CXR)

— The critical nature of the diagnoses means that imaging reports must be accessed or communicated as soon as they are made available.

— Due to the critical nature of some diagnoses, the radiologist or the diagnostic radiographer may have notified the referrers verbally before the examination being formally reported. Such communication including the name of the receiver and the time of notification needs to be documented in the patient record, the radiology information system, or the radiology report.

— An alert (alert text code: **CRITICAL**) should be triggered *immediately* upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions.

— A critical finding may be identified along with a new cancer diagnosis in a single examination e.g. acute spinal cord compression from a new metastatic lung cancer. A single CRITICAL alert can be triggered or in combination with a CANCER alert. The important aspect is to provide timely notification to the clinical teams.

— **If immediate intervention is required**, for example, tension pneumothorax or ruptured aortic aneurysm, the **alert should be supplemented by direct verbal communication**. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— The majority of critical imaging findings are identified from investigations performed for patients undergoing assessment or treatment in the hospital setting for example, Emergency Department or in-patients. However, some unexpected critical imaging findings may be identified in the out-patients setting or after the patient has been discharged from the hospital. This latter group of patients are at a higher risk of delayed diagnosis or treatment due to a potential delay in communicating, accessing or acting on the imaging reports. Therefore, for critical findings involving **out-patients, a verbal communication may be required in addition to the alert report notification.** The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— Verbal communication of the critical report to the referrers may be conducted by the reporter or the Results Coordination Team. In the event where the critical finding is life threatening, or during out of hours when the Results Coordination Team may not be available, it is recommended that the reporter communicates the result directly.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on critical imaging alerts

1. All imaging reports with expected or unexpected new critical findings that may result in immediate or acute harm to the patient should be notified to the referrers with a **CRITICAL** alert in the report via a digital platform immediately upon the completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by direct verbal communication.

3. For new critical findings involving out-patients, a direct verbal communication may be required in addition to the alert report notification.

4. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

5. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the report is now available for review. The reporter may need to make direct communication if life threatening or out of hours when the Results Coordination Team may not be available.

6. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

7. Referrers must ensure a valid contact detail is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

8. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

9. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system or a Results Coordination Team, or a combination.

3. Significant addenda in imaging reports where clinical management may be altered

A significant addendum includes findings that are interpreted differently compared with a preceding report of the same examination that may result in immediate or acute harm to the patient or may result in adverse outcomes if timely action is not taken. This is a separate entity compared to an addendum containing new findings or a revised report which does not affect clinical management.

Examples of a significant addendum:

Examination:	*CT head*
Clinical indication:	*Right sided weakness. Loss of balance. Stroke?*
First report:	*No CT features of acute stroke*
Addendum:	*Loss of grey-white interface and loss of insular ribbon in keeping with early features of ischaemia.*

Examination:	*CT liver*
Clinical indication:	*Post radiofrequency ablation assessment*
First report:	*High attenuation nodule in ablation site concerning for residual tumour*
Addendum:	*The high attenuation area is also seen in the unenhanced series in keeping with a haematoma. No features of residual tumour.*

— Significant addenda may include but are not exclusive to cancer diagnoses or the conditions listed in Table 1. They may also include reports that reduce the significance of an original report.

— The previous interpretation could be a preliminary report that is accessible to the clinical teams or a verified report. Addenda added to radiology reports, or as part of radiology quality and governance processes also fall into this category.

— Individual healthcare organisations should have an internal process on managing discrepancies, near misses and errors as well as sharing good practice according to RCR standards on radiology events and learning meetings (REALMs).[8] This includes compliance with the professional duty of candour.

— As the significant imaging findings are identified after the original report has been issued or reviewed by the referrers, a potential delay may occur for the referrers to review the addended report. This delay may significantly impact clinical management. An alert notification is therefore required.

— The alert (alert text code: **ADDITION**) should be triggered *immediately* via a digital platform and supplemented by direct verbal communication if immediate intervention is required. This applies to in-patients, out-patients and primary care. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— A Results Coordination Team is best placed to take over the role for verbal communication to highlight that the report containing a significant addendum that may require immediate intervention is now available for review.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on significant addenda alerts

1. All addended imaging reports that may alter clinical management should be notified to the referrers with an **ADDITION** alert in the report, via a digital platform immediately upon completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by verbal communication which should be documented in the imaging report or patient record.

3. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the addended report is now available for review.

4. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Roles and responsibilities of clinical teams and healthcare organisations

— The majority of imaging referrals will be requested by the junior medical teams or non-medical registered healthcare professionals, under the authorisation of the responsible consultant.

— The imaging reports and alerts will be directed to the original referrers for the examination.

— In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff or the registered healthcare professional that requested the examination.

— In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.

— It is the responsibility of the referrers to ensure that a valid contact detail is available on all imaging referrals, including out of hours. The system can also be pre-agreed between the referrers and the Imaging department. They must also ensure that all imaging reports are read, acknowledged and acted upon. This should be documented on the patient record. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— A patient journey may involve multiple clinical teams, whether it be in-patients, out-patients, or primary care. A clinical team may request an imaging examination but the team may no longer be involved in the patient's care when the imaging report is completed.

— It is the responsibility of the referrer receiving the radiology alert to act or redirect the alert accordingly. This should be documented on the patient record. The clinical team deciding to redirect a report should be clear that this action is safe and appropriate. A Results Coordination Team may help to ensure that the current responsible clinical team receives the report.

— It is the responsibility of healthcare organisations to adopt a fail-safe result notification system to protect patient safety. This includes the identification of imaging reports that have not been acted upon (or plan to act) and embedding a mechanism to ensure these reports are acted upon. This may involve a digital system, a Results Coordination Team, or a combination.

Recommendation on clinical teams and healthcare organisations

1. Referrers must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon.

2. When multiple clinical teams are involved in the care of a patient, the receiver of the alert should act or re-direct the alert accordingly if they are no longer part of the teams looking after the patient.

3. Healthcare organisations must ensure a fail-safe system that enables the identification of reports that have not been read, acknowledged, and acted upon.

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been acted upon. This may involve a digital system, a Results Coordination Team, or a combination.
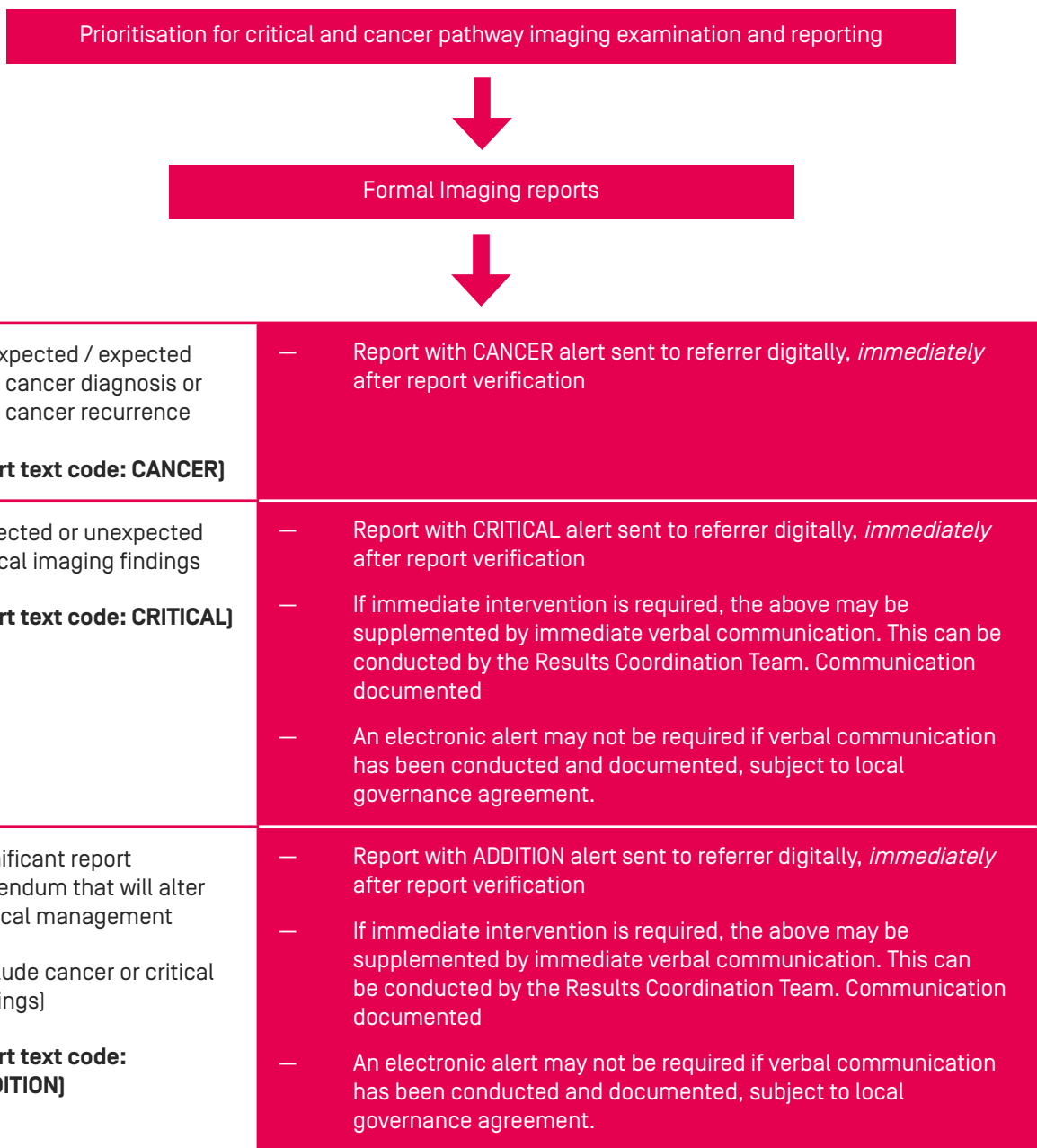
Patient communication

— The complexity surrounding the communication of imaging results directly to the patient by the Imaging Department is well recognised.[9]

— HSIB recommended that NHS Transformation Directorate in conjunction with RCR, develops a method of digitally notifying patients of results including unexpected significant radiological findings after an agreed timeframe. This development is at an early stage.

— Notifying the patients of imaging results containing alerts will require a high degree of sensitivity, empathy, and understanding. This is best done by the clinical team caring for the patient.

— Patients should be informed of when and how they will receive their imaging results. This is particularly relevant for outpatient examinations. Healthcare organisations should have a system in place to increase patient awareness of the process, for example, during a clinic consultation when the imaging request is made, via the imaging appointment letter, or the information could be displayed in the waiting area.

— All communication to the patient should be documented in the patient record.

— It is important to recognise that increasingly many patients can access their electronic medical records. It is recommended that the system embargoes the release of alert reports to the patient until the referrer reviews the report and authorises the release (or release at a pre-agreed timeline) where appropriate.

Recommendation on patient communication

1. The referrer or clinical team who cares for the patient is best placed to inform the patient of the imaging results.

2. Communication needs to be conducted sensitively via verbal, written, digital or a combination of approaches.

3. The IT system embargoes the release of alert reports to the patient until the referrer authorises the release.

Summary of result notification system

A robust system for reporting, notification, and action of cancer diagnoses, critical findings and significant addenda involves the following:

Prioritisation for critical and cancer pathway imaging examination and reporting

↓

Formal Imaging reports

↓

Unexpected / expected new cancer diagnosis or new cancer recurrence **[alert text code: CANCER]**	— Report with CANCER alert sent to referrer digitally, *immediately* after report verification
Expected or unexpected critical imaging findings **[alert text code: CRITICAL]**	— Report with CRITICAL alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.
Significant report addendum that will alter clinical management [include cancer or critical findings] **[alert text code: ADDITION]**	— Report with ADDITION alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Delivery of the alert report +/- verbal communication as above

Acknowledgement and documentation by the referrer upon receiving the report, and that action will be or has been taken including patient communication.

A fail-safe system to follow up on reports that have not been acknowledged. This may involve a digital system or a Results Coordinator Team, or a combination

Examples of innovative and progressive practices currently available in the UK

Scope	Mechanism
Alert codes	Different alert codes and patient tracking options are inserted at the end of reports dependent on findings. These enable identification and subsequent escalation.
Alert mechanism	An automated alert email is generated as soon as the report is authorised. The system continues to send reminder emails every 24 hours if no acknowledgement is received. If no acknowledgment is received after 96 hours, escalation emails are sent to the relevant clinical service lead. The system also allows for additional emails to be sent to multidisciplinary teams (MDT) if required.
Alerts escalation	The Trust's information team conducts weekly checks on reports which have not been reviewed and acted upon. The team emails the referrer and if there is still no action, call the referrer directly.
Clinical follow up	If a chest radiograph is suspicious of malignancy, an immediate Computerised Tomography (CT) is performed. The patient also sees the respiratory physician on the same day.
Full clinical integration	If a chest radiograph is suspicious of malignancy, the reporting radiographer contacts the patient directly to organise blood tests, book chest CT and schedule an appointment with the lung cancer nurse specialist.
Emergency Department (ED) alerts	If a fracture is identified on a radiograph, the reporting radiographer will check the ED electronic notes to see if the reviewing clinician has also detected this. If it has been missed a red alert electronic system is triggered to inform the ED team to recall the patient.

Multi-Disciplinary Team meeting (MDT) referral	Radiologists, reporting radiographers, and sonographers can refer the patient directly to an MDT for abnormal findings. These facilitate the care pathway and avoid delayed or missed results notification or action.
Patient communication	Patients are informed as soon as they check in at the reception for a chest radiograph that they may go on to have a CT that day [code 1], asked to make an appointment with their GP [code 2], or go home and no need to see a GP [code 3]. The code is inserted at the end of the imaging report.
Patient involvement	Healthcare organisation conducts focus group work with patients and carers to explore how best to communicate findings and minimise anxiety.
Primary care hotline	A hotline is available in primary care to receive any urgent communication including critical radiology reports.
Prompt radiology reporting	The radiology information team conducts daily checks on unreported examinations. Any unreported examinations of over 1 week are escalated for urgent reporting.
Significant Incidental findings	If a CT shows incidental pulmonary embolism, the result is immediately conveyed to specialist nurses who see the patient on the same day.

Conclusion

A prompt and effective imaging result notification system, in combination with robust audit and governance procedures, is essential to minimise patient harm and improve outcomes. The system should be practical, sustainable, and reliable. This requires a collaborative approach among healthcare organisations, the availability and functionality of information technology, funding support, and human oversight. Adopting the recommendations outlined in this document will protect patient safety, reduce variations and move towards a nationally recognised system achievable by all involved.

Glossary

Alert notification system	A system which highlights and sends out an alert to the recipient. The system could be electronic, manual, or a combination of both.
Alert text codes	These are canned text codes used in proprietary radiology information systems. The text code is inserted in the radiology report to highlight an alert.
Critical imaging findings	Findings which may result in immediate or acute harm to the patient that will require immediate or urgent clinical attention.
Healthcare organisations	Any organisation that provides healthcare services. These include public and independent organisations that provide primary, secondary, and tertiary care.
Imaging departments	Departments (including third-party providers) that provide any imaging services.
Radiology information systems	A networked software system for managing medical imaging and associated data. It is commonly used in conjunction with PACS (Picture Archiving and Communication Systems).
Referrers	Clinical professionals or teams from healthcare organisations that refer patients for imaging investigations. In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff that requested the examination. In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.
Results Coordination Team	A team of staff employed by the healthcare organisation to optimise the alert notification system. The team can provide verbal communication to the referrers to escalate an alert with critical findings, ensure reports are returned to the correct clinical team and escalate alerts that have not been reviewed or acted upon.

Working Group membership

Failures in communication or follow-up of unexpected significant radiological findings Working Group membership.

Dr Teik Choon See, Chair	Patient Safety Advisor, The Royal College of Radiologists
Professor Mark Callaway	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists [2018-2021]
Dr Raman Uberoi	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists
Dr William Ramsden	Vice President for Clinical Radiology, The Royal College of Radiologists
Dr Amanda Martin	Lead Radiographer, Bolton Hospital NHS FT, representing The Society of Radiographers
Mrs Alexandra Lipton	Professional Officer, The Society of Radiographers
Mrs Sue Johnson	Professional Officer, The Society of Radiographers
Mr Alastair Henderson	Chief Executive, Academy of Medical Royal Colleges
Dr Katherine Henderson	President, Royal College of Emergency Medicine
Dr James France	Chair Best Practice Committee, Royal College of Emergency Medicine
Dr Richard Roope	Clinical Advisor, Royal College of General Practitioners
Dr Simon Clark	Vice President for Health Policy, Royal College of Paediatrics and Child Health
Dr John Dean	Clinical Director for Quality Improvement and Patient Safety, Royal College of Physicians
Professor Neil Mortenson	President, Royal College of Surgeons of England
Mr Tim Goodacre	Vice President, Royal College of Surgeons of England

Alerts and notification of imaging reports

Dr Natasha Phillips	Chief Nursing Information Officer & Director Mission 4 –Digital Safety, NHSX
Dr Kelsey Flott	Deputy Director of Patient Safety NHSX
Ms Gill Foley	Data and Clinical Content Standards Lead, NHSX
Ms Moira Crotty	Programme Manager/ Clinical Imaging SME NHS Digital

Acknowledgements

This document is the collaborative effort of The Royal College of Radiologists, Society of Radiographers, Royal College of Emergency Medicine, Royal College of General Practitioners, Royal College of Physicians, Royal College of Surgeons of England, Royal College of Paediatrics and Child Health, the Academy of Medical Royal Colleges and NHS Digital.

We would like to express our gratitude to Fionnuala Morrissey, RCR Clinical Radiology Project and Development Officer, for administering and coordinating this project.

We appreciate the constructive feedback and suggestions from the RCR Clinical Radiology Professional Support and Standards Board and other radiology colleagues.

We are also grateful for the feedback received from the following lay and patient networks on the initial draft of the document:

Royal College of Physicians' Patient Carer Network

The Society of Radiographers' Patient Advisory Group

The Royal College of Radiologists' Lay Member Network

Royal College of Emergency Medicine's Lay Committee

The Academy of Medical Royal Colleges Patient and Lay Committee

References

1. Healthcare Safety Investigation Branch (2019) *Failures in communication or follow up of unexpected significant radiological findings*. Available at: https://www.hsib.org.uk/documents/135/hsib_report_failures_communication_follow_up_unexpected_significant_radiological_findi.pdf

2. RCR (2018) *Standards for interpretation and reporting of imaging investigations. Second edition*. Available at: https://www.rcr.ac.uk/publication/standards-interpretation-and-reporting-imaging-investigations-second-edition

3. RCR (2016) *Standards for the communication of radiological reports and fail-safe alert notification*. Available at: https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr164_failsafe.pdf

4. RCR (2021) *Quality Standard for Imaging*. Available at: https://www.rcr.ac.uk/sites/default/files/quality-standard-for-imaging-qsi.pdf

5. Duncan KA, Drinkwater KJ, Dugar N, Howlett DC; Royal College of Radiologists' Clinical Radiology Audit Committee (2016) Audit of radiology communication systems for critical, urgent, and unexpecte significant findings. *Clin Radiol.* 2016 Mar;71(3):265-70. Available at: https://www.ncbi.nlm.nih.gov/pubmed/26738965

6. European Society of Radiology (ESR) (2011) *ESR guidelines for the communication of urgent and unexpected findings*. Insights Imaging. 2012 Feb;3(1):1-3. doi: 10.1007/s13244-011-0135-y. Epub 2011 Nov 22. PMID: 22695992; PMCID: PMC3292650. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3292650/

7. Parliamentary and Health Service Ombudsman (2021) *Unlocking Solutions in Imaging: working together to learn from failings in the NHS*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005936/Unlocking_Solutions_in_Imaging_working_together_to_learn_from_failings_in_the_NHS_1_.pdf

8. RCR (2020) *Standards for radiology events and learning meetings*. Available at https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr201-standards-for-radiology-events-and-learning-meetings.pdf

9. Berlin, L. (2007) Communicating results of all radiologic examinations directly to patients: has the time come? Berlin L. *AJR Am J Roentgenol.* 2007 Dec;189(6):1275-82 Available at: https://www.ajronline.org/doi/10.2214/AJR.07.2740

Academy of Medical Royal Colleges