

Building A High Reliability Safety Net For Incidental Finding Follow Up: Fully Automated, Electronic Information Transfer Bridge From The Radiology Report To A Community Practice Office Level Report

Pamela Johnson, MD, FACR, Vice Chair of Quality and Safety in Radiology

Sheree Coleman, Senior Epic Cupid/Radiant Analyst

William Geiger, Senior Program Engineer, Medical Imaging Information Technology

Christopher Lawrence, MD, Resident, Johns Hopkins Radiology

Ryan Ortez MD, Resident, Johns Hopkins Radiology

Steven Kravet, MD, MBA, President, Johns Hopkins Community Physicians



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M E D I C I N E

Incidental Findings on CT & MRI: Standardized Recommendations

- Incidental findings are commonly discovered on CT and MRI and may require additional characterization with an alternative radiology test or surveillance imaging to confirm benignity.
- To facilitate management by ordering providers, many radiology practices use standardized management recommendations in report impressions, derived from American College of Radiology white papers¹, Fleischner society and other society guidelines².
- We integrated reporting templates into our enterprise imaging voice dictation system (PowerScribe), which radiologists insert into their report impression using the PickList function.
- This process allows for uniform management recommendations, flagging in the electronic medical record (Epic) and tracking for radiologist's adherence.

¹<https://publish.smartsheet.com/42d18e874a164318a0f702481f2fbb70>

²[https://www.jvascsurg.org/article/S0741-5214\(17\)32369-8/fulltext](https://www.jvascsurg.org/article/S0741-5214(17)32369-8/fulltext)

SOCIETY FOR VASCULAR SURGERY® DOCUMENT

The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm

Elliot L. Chaikof, MD, PhD,¹ Ronald L. Dalman, MD,² Mark K. Eskandari, MD,³ Benjamin M. Jackson, MD,⁴ W. Anthony Lee, MD,⁵ M. Ashraf Mansour, MD,⁶ Tara M. Mastracci, MD,⁷ Matthew Mell, MD,⁸ M. Hassan Murad, MD, MPH,⁹ Louis L. Nguyen, MD, MBA, MPH,¹⁰ Gustavo S. Oderich, MD,¹¹ Madhukar S. Patel, MD, MBA, ScM,¹² Marc L. Schermerhorn, MD, MPH,¹³ and Benjamin W. Starnes, MD,¹⁴
Boston, Mass; Palo Alto, Calif; Chicago, Ill; Philadelphia, Pa; Boca Raton, Fla; Grand Rapids, Mich; London, United Kingdom; Rochester, Minn; and Seattle, Wash

SVS AAA Surveillance Guidelines

- 2.5-2.9 cm: US or CT in 10 years
- 3.0-3.9 cm: US or CT in 3 years
- 4.0-4.9 cm: CTA in 1 year
- 5.0 cm in women: elective repair
- 5.0-5.4 cm in men: CTA in 6 months
- ≥ 5.5 cm in men: elective repair

PowerScribe 360 | Reporting

File Edit View Insert Format Tools Speech Help

Close Draft Prelim Sign AutoText New Content Wizard 00:00 - 00:00

Fields (1)

Aortic Recommendations

Abdominal aortic aneurysm measuring 3.0-3.4 cm as ab CTA in 3 years per ACR and SVS recommendations.

Pick List Choices

- normal
- 2.6-2.9 cm
- 3.0-3.4 cm
- 3.5-4.4 cm
- 4.5-5.4 cm
- >5.5 cm
- enlarging

Enter Findings Mode

Abdominal aortic aneurysm meas

CT CHEST, ABDOMEI

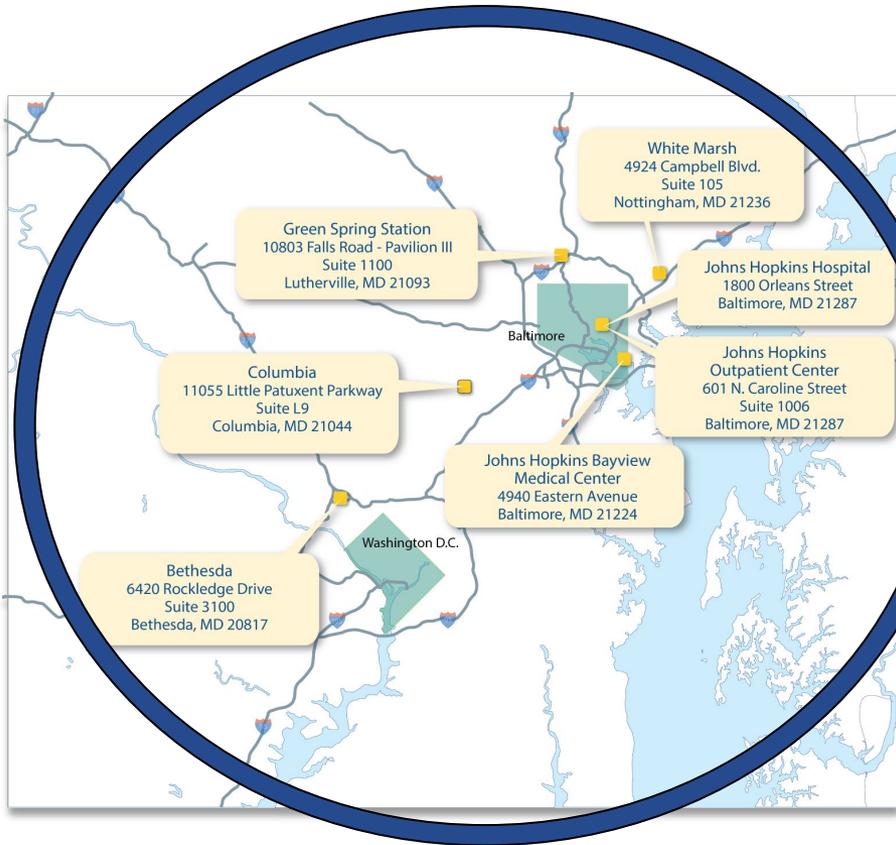
History: 60-year-old man with aortic aneurysm

AAA surveillance pick list: follow up interval dictated by AAA size as per SVS guidelines

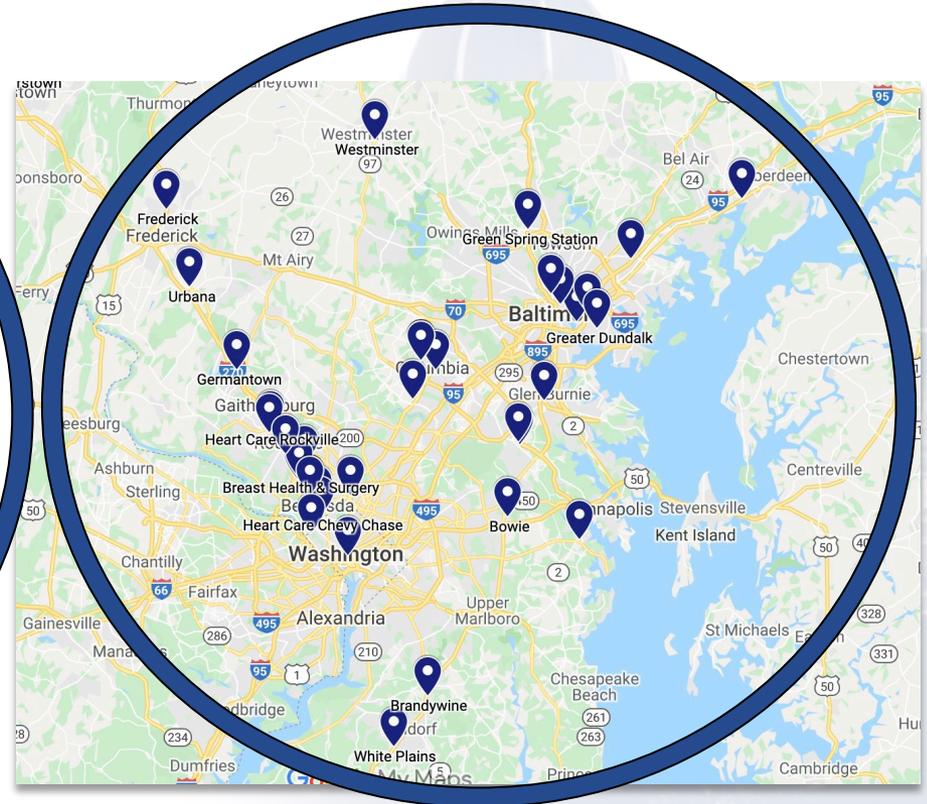
Incidental Findings on CT & MRI: Management Challenges

- The challenge rests in ensuring that patients undergo recommended follow-up imaging months to years later.
- We developed a semi-automated solution for emergency department (ED) patients with incidental findings. If reported while the patient is in the ED, the recommended follow up test is listed in the ED After Visit Summary (AVS). If the recommendation is added to the report after the patient is discharged from the ED, it is transferred to a report in Epic managed by an ED nurse who communicates the information to the patient.
- Many practices assign a radiology staff to oversee the list of patients with incidental findings that require follow up and intervene if the recommended imaging test is not performed in the advised time interval.
- For our ambulatory practice, where >600 primary care providers manage thousands of patients, we decided to create a more innovative solution, with the aim of facilitating ordering provider management and improving adherence to surveillance guidelines.

Goal: Harness Epic to Reliably and Unintrusively Bridge this Network



Johns Hopkins Radiology



Johns Hopkins Ambulatory Practice

Electronic High Reliability Bridge: Objectives

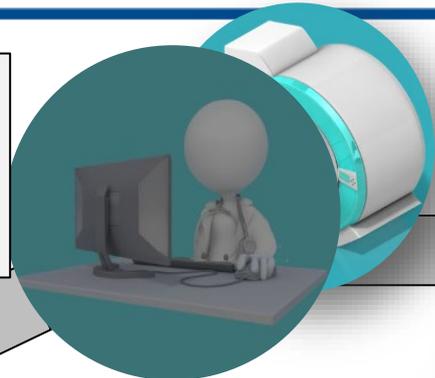
Project Goal: build an information transfer platform from radiology report to office-level reports in Epic, to ensure radiology follow-up recommendations for imaging studies are completed at the appropriate time intervals and avoid potential delays in diagnosis.

Project Plan: enhance the existing incidental finding report process in PowerScribe and Epic by creating a report in Epic that compiles a list of patients who need surveillance imaging, mapping the report the office from which the order was placed and facilitate tracking of exam completion.

Project Scope: Four primary care offices (20 to 30 providers) participated in pilot, with the goal of subsequently advancing across a 40 office practice with >600 providers.

Electronic High Reliability Bridge: Information Flow

Imaging reveals incidental finding. Radiologist uses structured pick list in PowerScribe for impression and management recommendation.



Follow up imaging exam code and due date populate office level report managed by administrator.



Ordering provider receives report via InBasket. Unintrusive Best Practice Alert (BPA) serves as reminder & facilitates ordering.

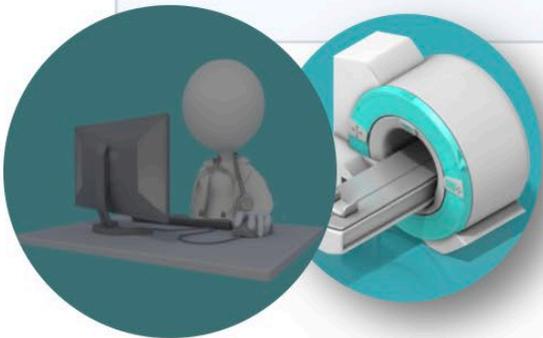
Epic Report Mock-Up

Patient info	Incidental Finding	Follow Up Exam	Due Date	Exam Ordered	Exam Completed
Name & MR	Lung nodule	Chest CT IMG 123	6/30/21	Yes	No
Name & MR	Thyroid nodule	US thyroid IMG 456	12/30/20	Yes	No
Name & MR	AAA	CTA AP IMG 789	2/30/31	No	No

Electronic High Reliability Bridge: Process

Radiology

Existing standardized macros enhanced so discrete data elements transfer to Epic from PowerScribe through an HL7 interface. Custom fields added to the PowerScribe template as pick lists tied to the selections built out in Epic. PowerScribe adds fields to the bottom of the reports at HL7 coded element (CE) segments.



Epic

HL7 Engine processing rule updated for ORU messages received from the dictation system to add the ST segments for incidental findings and convert the newly created CE segments to ST segments before sending into the EMR/HIS by the HL7 engine.

Ambulatory Practice

Information organized into reports that can be accessed by office staff. Filter in Epic creates sub-reports based on the office from where the test was ordered. Email reminder sent to office manager. Additionally, results flagged in provider InBasket and unintrusive BPA serves as reminder and facilitates ordering.



Translation of PowerScribe Macros into Epic Report Fields

The screenshot shows a software interface with a menu bar (File, Edit, View, Insert, Format, Tools, Speech, Help) and a toolbar. The main window displays a report titled "Report - UNKNOWN, - MCIC Test2". The left sidebar has a "Fields (12)" section with "Enter Findings Mode" selected. The main text area contains the following text: "Incidental Finding: [Abdominal aortic aneurysm measuring 3.0-3.4 cm as above. Recommend follow-up ultrasound or CTA in 3 years per ACR and SVS guidelines]", "Recommended Followup: [follow-up Ultrasound or CTA in 3 years (US/CTA 3yrs)]", "ALERT: (I) Incidental Findings", and "This report contains significant findings which may require clinical or imaging follow up." A blue arrow points from the right-side callout box to the "Recommended Followup" text.

Surveillance interval listed as years in radiology report translates to "due date" in the Epic office level report

The screenshot shows a software interface with a menu bar (File, Edit, View, Insert, Format, Tools, Speech, Help) and a toolbar. The main window displays a report titled "Report - UNKNOWN, - MCIC_test2". The left sidebar has a "Fields (12)" section with "MCIC FU Recommendations" selected. The main text area contains the following text: "Incidental Finding: [Incidental thyroid nodule measuring less than 1 cm with no suspicious features in a patient with age >=35. Further imaging with thyroid ultrasound on a nonemergent basis is only warranted in high risk patients]", "Recommended Followup: [Thyroid Ultrasound Nonemergent - High Risk Patients Only]", "ALERT: (I) Incidental Findings", and "This report contains significant findings which may require clinical or imaging follow up." A blue arrow points from the right-side callout box to the "Recommended Followup" text.

Recommended follow up exam translates to an IMG code in the Epic office level report

Ambulatory Practice User Manual

Radiant/Ambulatory

Track Recommendations for Follow-up

Use a Report to Track Recommendations for Follow-up

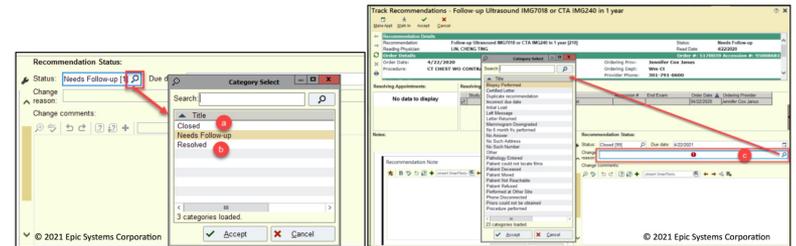
If a Radiologist reports an Incidental Finding with a recommendation, and the Authorizing Provider will now receive a flagged In Basket notification, the recommendation, and place orders directly from their In Basket. Ambulatory managers or care-coordinators can track and resolve or close them as appropriate. **Note: this function**

Try It Out – Track Recommendations

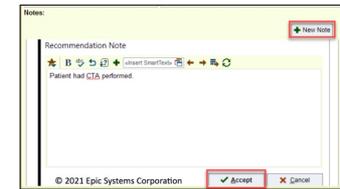
- The **Login Department Recommendation** report will include all open recommendations for the current department.
 - Columns will indicate the recommendation, status, due date, recommendation notes, and if an appointment or order is linked.
 - Click on a patient row to display a **Follow-Up details** report in the bottom, identifying the recommended imaging and the time frame for completion.
- Click **Track Recs** in the report toolbar to complete follow-up documentation.



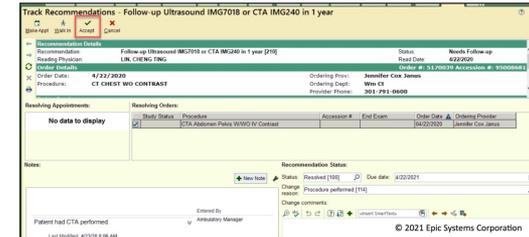
- Recommendation Status can be updated as appropriate by clicking the magnifying glass in the Status section. Recommendations will default into **Needs Follow-up** status.
 - A status of **Closed** can be used to indicate the recommendation no longer requires follow-up.
 - A status of **Resolved** can be used to indicate follow-up imaging has been scheduled or performed and it no longer needs to be tracked.
 - Once the Status is updated, enter an applicable **Change reason** and comments. Click the magnifying glass in the Change reason section to display a list of possible answers.



- Use the Notes section to enter pertinent information about the follow-up or status changes. Click **+New Note** to start the recommendation note and click **Accept** to save.



- After updating the recommendation status and entering any necessary notes, click **Accept** to save your work. If the recommendation has been changed to Resolved or Closed, it will fall off of the Login Department Recommendation report.



You Can Also...

This workflow is available at the following ambulatory facilities:

- WM JHCP INTERNAL MEDICINE
- WM JHCP FAMILY PRACT
- GSS JHCP INTERNAL MED
- GSS SOM INTERNAL MED
- CPHO JHCP FAMILY PRACT



Results, Lessons Learned and Future Directions

- The platform was piloted for thyroid nodules and abdominal aortic aneurysm surveillance in 4 practices and successfully communicated the information from the radiology dictation to the office level report.
- Office administrators access the report to ensure the exam is conducted by the due date. Once the follow up imaging test is performed, the patient is automatically removed from the list. If provider disagrees with the recommendation, patient can be manually removed.
- InBasket result enhanced by Best Practice Alert that stays in the BPA library until the follow up exam is ordered or the recommendation is dismissed.
- Following roll out, we identified necessary enhancements:
 - Ability for the ordering provider to dismiss the order from the InBasket if it is not clinically warranted to remove the patient from the list
 - Automation to avoid re-adding a patient to the report if another radiologist makes the same recommendation after the ordering physician declines
- Future directions:
 - Adding more incidental findings to the platform (lung nodules, ovarian cysts, renal cysts & masses, adrenal nodules, etc) and lung cancer screening reports
 - Monitor the number of studies that accumulate on the office level report to fully gauge the time expenditure by an office administrator, particularly as additional incidental finding recommendations (e.g. lung nodule follow up) are added
 - Evaluating downstream outcomes (completed follow up, final diagnosis)