

# ***THREE YEARS EXPERIENCE OF PROCESS IMPROVEMENT IN DIAGNOSTIC IMAGING BROUGHT BY THE “INCIDENTAL FINDINGS” PROGRAM***

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**CATEGORY: QUALITY IMPROVEMENT REPORT AWARDS**

**TYPE OF STUDY: ORIGINAL**

**DISPLAY FORMAT: ELETRONIC PRESENTATION**

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In 2016, our institution started a follow-up program called “Incidental Findings” (IF) in which incidental findings identified by our radiologists in imaging exams ordered via emergency room (ER) were tracked until their outcomes. With this program, we aimed to deliver a more personalized service that would not only be limited by a single patient interaction with the radiology department, but would be maintained until diagnostic closure or treatment.



- The “Incidental Findings” program was developed in 2016, using a Plan-do-check-act method (PDCA) by our Quality Department.
- Two years later in 2018, due to the low number of notifications in 2016 (0,01%) and 2017 (0,11%), we included the rate of notification as a quality indicator in the imaging department balanced scorecard (BSC), and we established a target of 0,24%.
- Including a target in BSC on one hand resulted in an increase in the number of notifications in 2018, but on the other, we started to have problems with incidental finding communication to the patients or referring physicians as expressed in Table 1.
- The solution came with more comprehension of the process, brought by a flowchart algorithm that allowed a visual understanding, and a more efficient training and replication of the information for the staff.
- The new process is summarized in flowcharts (Figures 1, 2 and 3). In those flowcharts we detailed all the steps of identification and registering of an incidental finding (Fig.1), process of communication with the family physician and/or the patient (Fig.2) and follow-up and outcomes (Fig.3).
- The outcomes were then classified as benign, malignant, or ongoing/undetermined, and this information was made visible as a positive feedback for the radiologists.



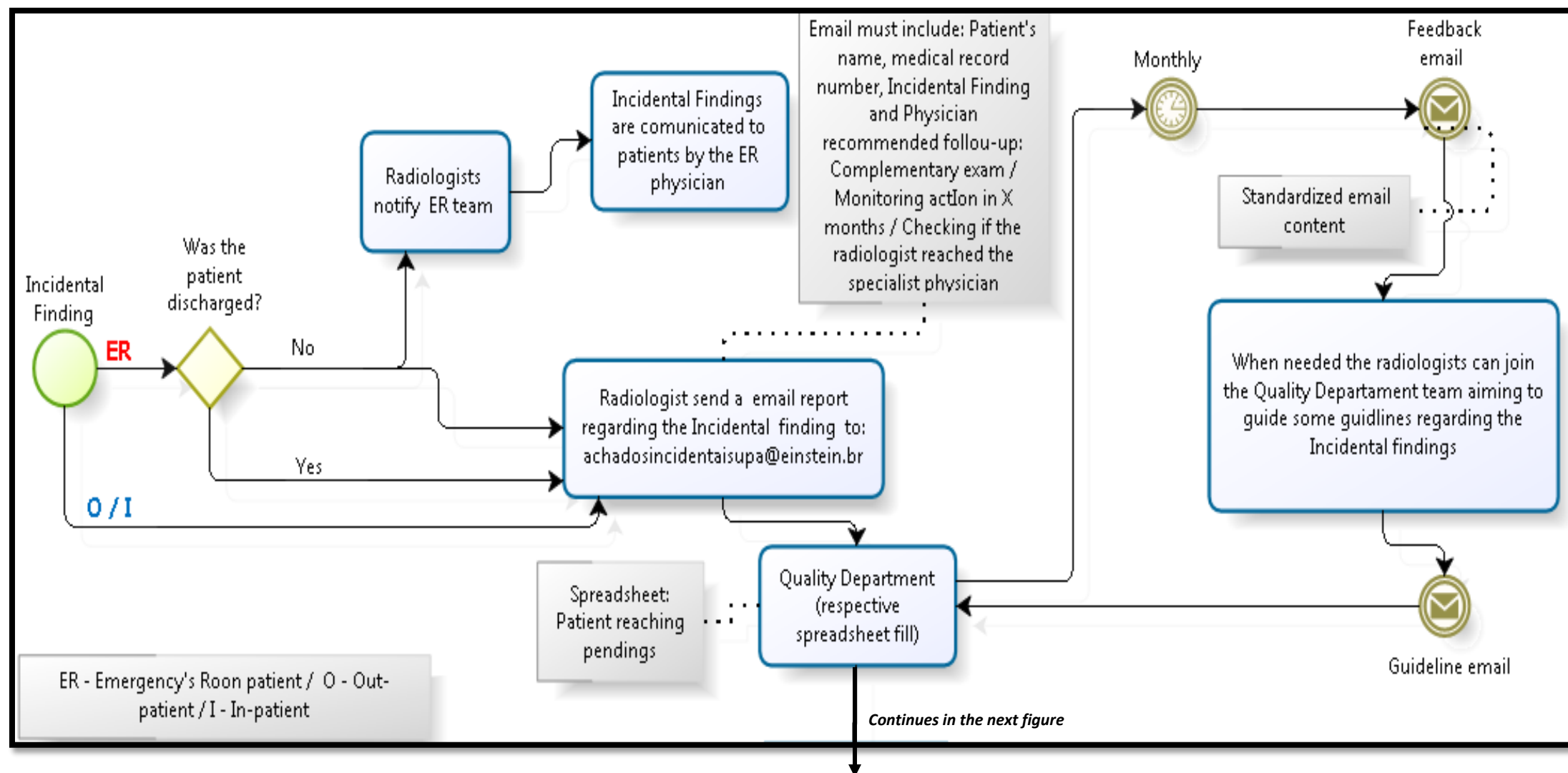


Figure 1 - Physician flowchart – Incidental findings communication steps from Radiologists team to Quality Department.



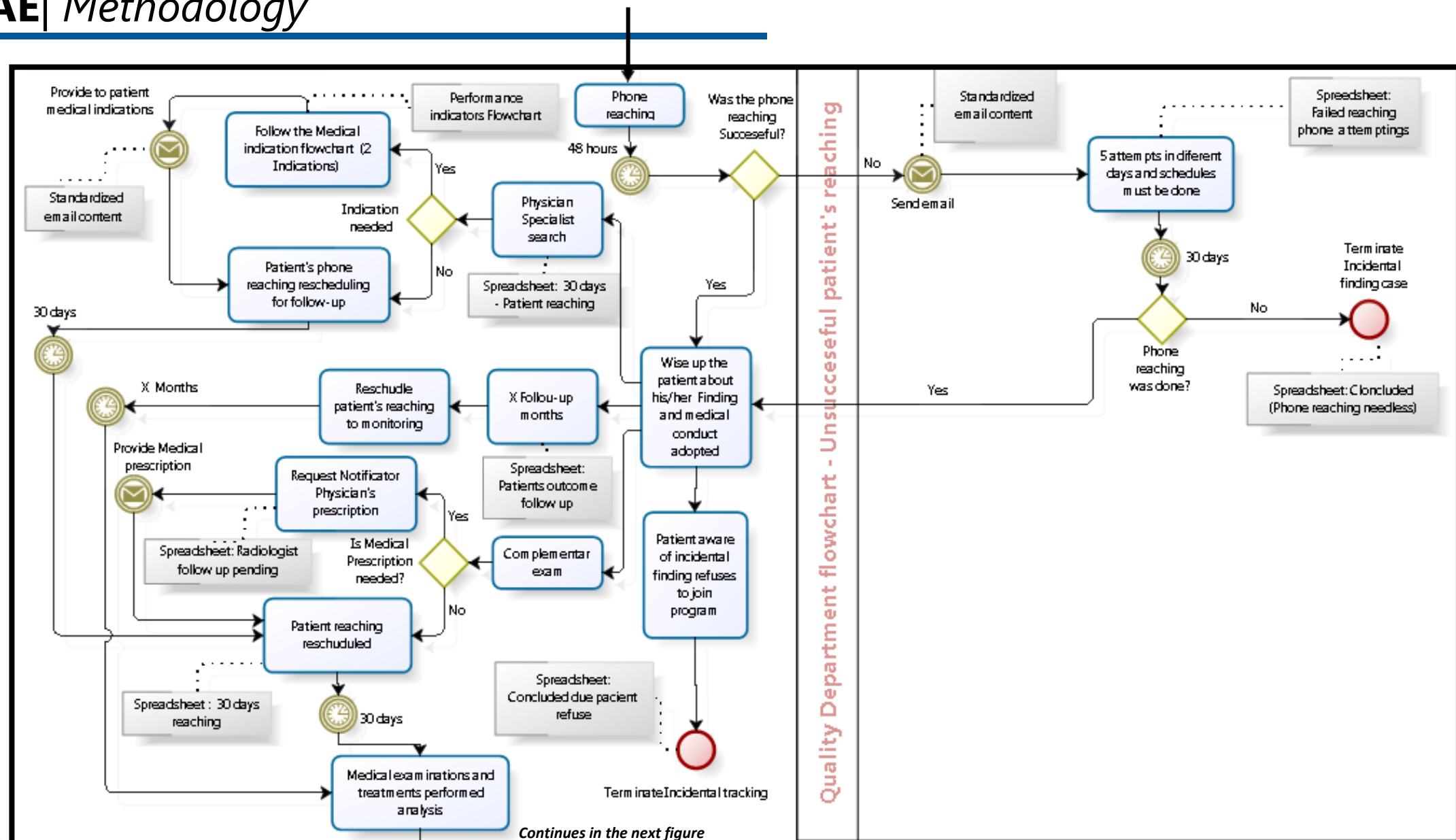


Figure 2 - Quality Department flowchart - Successful and unsuccessful patient's reaching attempts flows.





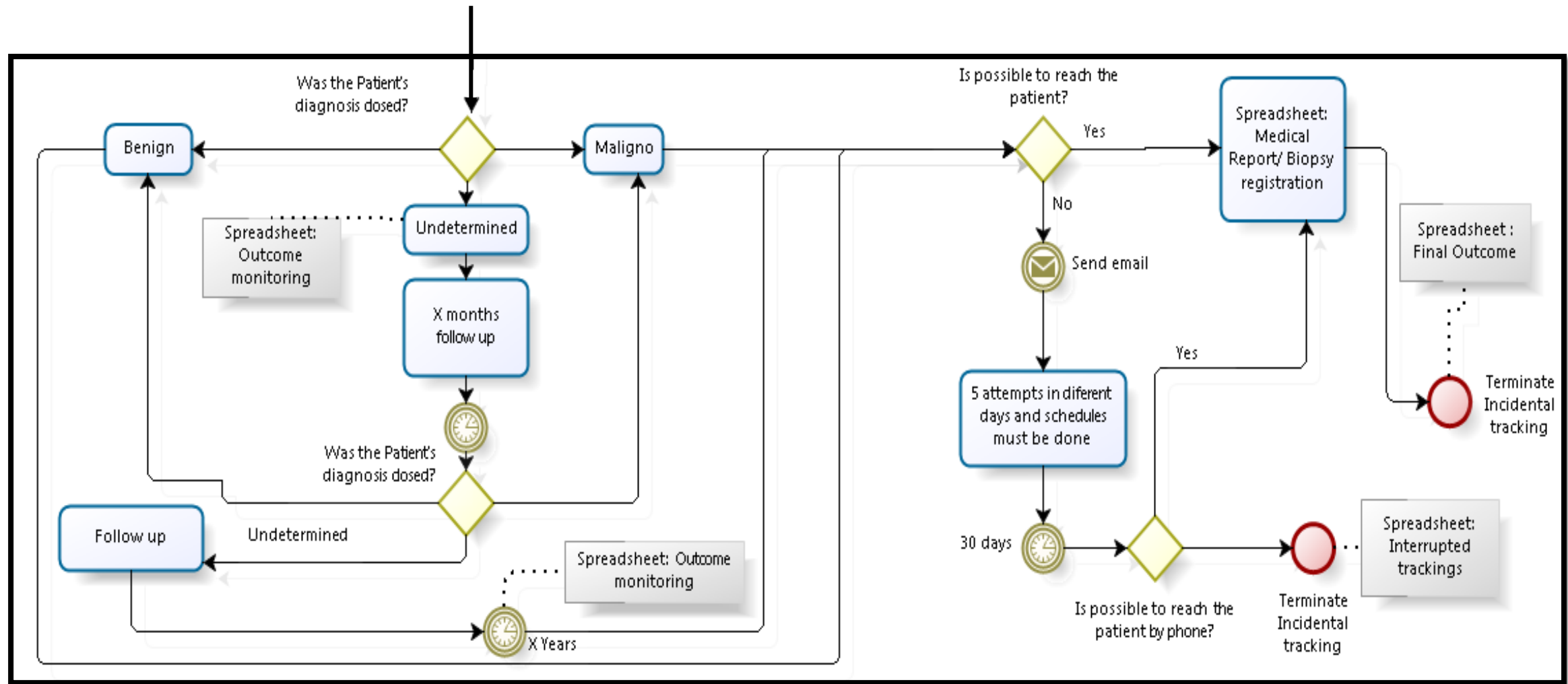


Figure 3 - Quality Department Flowchart of patient's Outcome / Follow-up - Incidentals findings and their possible denouements.

- Table 1 shows the evolution of the number of incidental findings reported from 2016 to 2019 that increased in 2018 once it was included as a BSC target.
- The 2018 numbers also highlighted an increase in uncommunicated incidental findings for referring physician or patient (32% of patients/referring physicians were not communicated).
- Following the new approach, it was noticed a relevant decrease in this discrepancy in 2019 due to the greater effectiveness in the communication of findings directly to patients or to their physicians, guiding prompt and proper treatment (Table 1). The number of identified malignancies also showed an increase over time from two cases in 2016 to 10 in 2019. An example of a case of a lung adenocarcinoma identified and successfully included in the program until its treatment is shown in Fig.4.

| YEAR | Exams on Emery Room CT | Total Incidental Findings Notified by Radiologists | Percentage (%) of Incidental Findings | Benign | Lost Follow-up | Malignant | Ongoing | Incidental Findings Communicated to Patients or Ref. Physician | Percentage (%) Of Non-Communicated Incidental Findings |
|------|------------------------|--|---------------------------------------|--------|----------------|-----------|---------|--|--|
| 2016 | 24280                  | 18   | 0,01%                                 | 5      | 11             | 2         | 0       | 18   | 0,0%   |
| 2017 | 27327                  | 31   | 0,11%                                 | 11     | 15             | 5         | 0       | 28   | 9,7% (n=3)   |
| 2018 | 27.424                 | 121  | 0,44%                                 | 18     | 97             | 7         | 0       | 82   | 32,2% (n=39)   |
| 2019 | 30.863                 | 114  | 0,37%                                 | 37     | 34             | 10        | 25      | 108  | 5,2% (n=6)   |

Table 1. Number and types of notified incidental findings and respective patient’s reporting from 2016 until 2019 (Computer Tomography (CT))

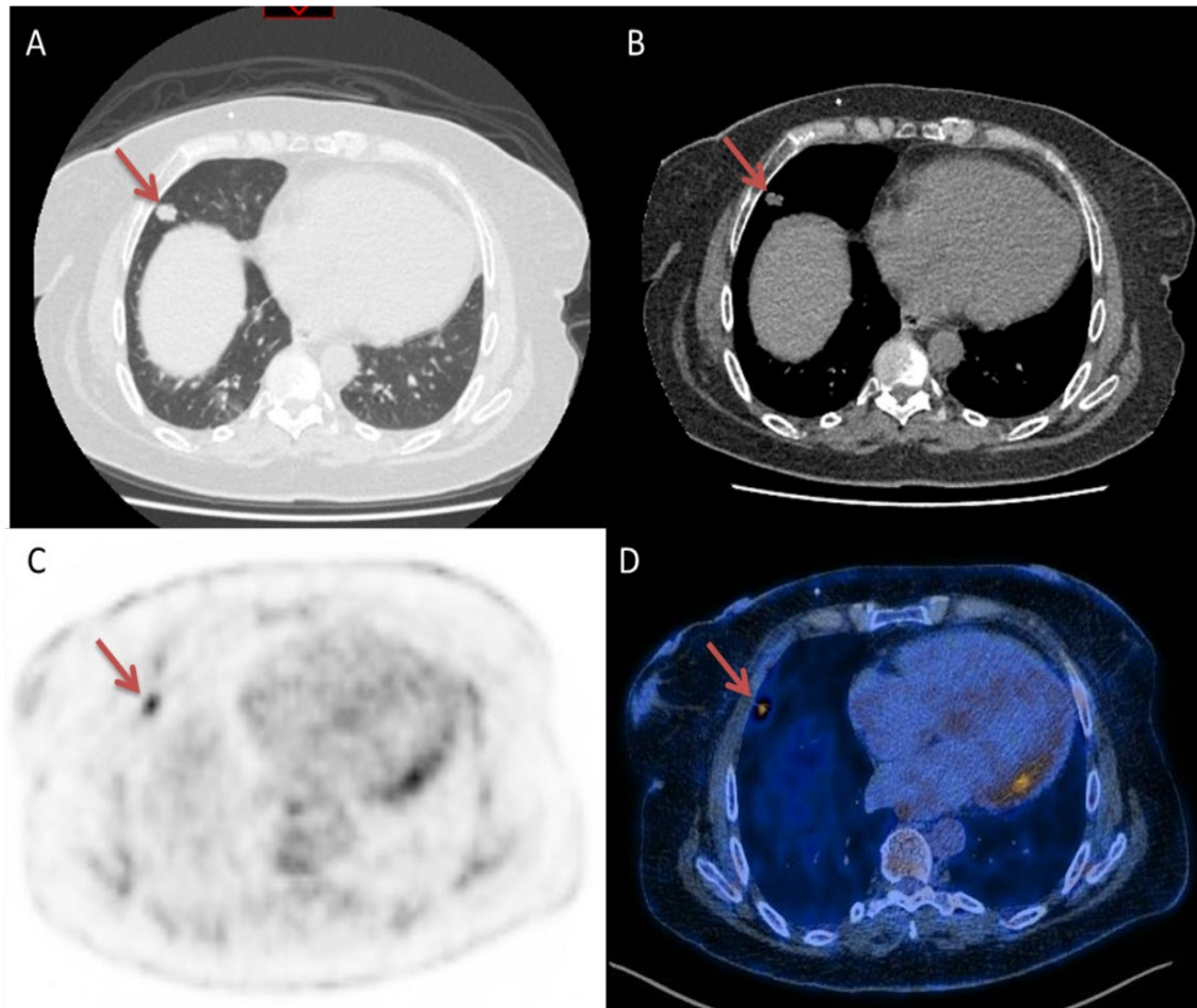


Figure 4 – A chest CT of a 61-year-old woman with chest pain after minor trauma. CT identified fractures in several ribs and also, **a suspicious lung nodule in the middle lobe**. This patient was included for follow-up of the “Incidental Finding” program, and her family doctor was contacted. In a time-frame of two months, she performed a Positron Emission Computed Tomography / Computed Tomography (PET/CT), a CT-guided lung biopsy, and underwent curative surgical resection of **a papillary adenocarcinoma**.

(A) Nodule (arrow) on a axial view of CT with lung window; (B) Axial view with mediastinal window of a CT; (C) Axial view of PET showing high uptake of fluorodeoxyglucose by the nodule; (D) Axial fusion view of PET/CT.





- IF in emergency exams are very frequent. Hanna et. al (in 2016) found 16.4% of these finding in exams of patients that underwent CT or Ultrasound in ER.
- Lumbreras et al. in 2014 found 1.9% of exams with IF that needed additional intervention, showing its relevance.
- In our practice, we measured 0.37% CTs (114 out of 30,863 exams) with notifications of IF in 2019 with 10 cases of proven malignancies (8,8%). Therefore, we know that we still have room to increase the number of notifications.
- Our major improvement with the intervention described in this study is the process efficiency of the first contact and follow-up of IF. We improved from 32.2% of non-communicated IF in 2018 to 5.2% in 2019.
- The main intervention was the detailed description of the process in a flowchart algorithm that made possible to bring efficiency to the team.

- Lumbreras, Blanca, et al. "Management of patients with incidental findings in imaging tests: a large prospective single-center study." *Clinical imaging* 38.3 (2014): 249-254.
- Hanna, Tarek N., et al. "Incidental findings in emergency imaging: frequency, recommendations, and compliance with consensus guidelines." *Emergency radiology* 23.2 (2016): 169-174.
- Lumbreras, Blanca, et al. "Unexpected findings at imaging: predicting frequency in various types of studies." *European journal of radiology* 74.1 (2010): 269-274.

We described the process of creation and the first three years of experience with the “Incidental Findings” program, describing the errors and the successes of the process. For a successful program, proper and detailed process design documentation, and a full engagement of the team are crucial. A well-functioning program provides more visibility for the radiologists and can improve patient experience, ensure a personalized care, and can have an important impact on better and timely treatment.

*Thank you – Muito Obrigada!*

