Acute Appendicitis Detection

# Core Attributes

|  |  |
| --- | --- |
| **Purpose** | Detect acute appendicitis |
| **Tag(s)** |  |
| **Panel** | Abdominal |
| **Define-AI ID** | 18020001 |
| **Originator** | Abdominal Panel |
| **Panel Chair** | Arun Krishnaraj |
| **Panel Reviewers** | Abdominal Panel |
| **License** | Creative Commons 4.0 |
| **Status** | Published |
| **RadElement Set** | [RDES26](https://radelement.org/home/sets/set/RDES26) |

# Clinical Implementation

**Value Proposition**

Acute appendicitis is the most common abdominal emergency and often requires surgical intervention. Most cases, if positive on CT, are heading to the OR, though some patients are treated with antibiotics for early appendicitis. The rapid identification of acute appendicitis can streamline these processes and ensure people get the treatment they need. An algorithm meeting this use case would also help prioritize the case on the worklist.

**Narrative(s)**

A 25-year-old male presents to the emergency room with fever and abdominal pain. The patient has been getting progressively worse over the past few days. Associated lab findings are leukocytosis (elevated white blood cell count) and anorexia.

**Workflow Description**

An image is obtained from the modality and sent to PACS and the AI engine. The image is analyzed by the engine. The system categorizes the status of the appendix as well as whether the appendix is ruptured. A message is sent to PACS from the engine with the classification information. Ancillary data is also sent to the PACS if collected by the engine.

# Data Elements

## Execution Conditions

The following elements describe acceptable procedure and patient demographic attributes that must be true for the proposed algorithm to execute.

### Procedure

|  |  |  |
| --- | --- | --- |
| Data Element | Inclusion Criteria | Exclusion Criteria |
| **Procedure** | CT, abdomen, pelvis, w/o contrast?? |  |
| **Modality** | CT |  |
| **Body Area** | abdomen |  |
| **Anatomy** | appendix |  |
|  |  |  |

### Demographic

|  |  |  |
| --- | --- | --- |
| Data Element | Description | Exclusion Criteria |
| **Age** | Patient’s age at the time of registration |  |
| **Ethnicity** | Ethnicity of patient, entered as Hispanic, not of Hispanic origin, or unknown. |  |
| **Race** | Race of patient, entered as American Indian or Alaskan Native, Asian or Pacific Islander, Black, White, or unknown. |  |
| **Sex** | A value representing the sex of a Living subject. |  |

## Considerations for Dataset Development

These are associative properties with the clinical scenario which radiologists suspect may be important features to improving model accuracy and reducing bias. The data elements may present in parallel with the target finding or may cause some variations to the target image features- which are critical to account for when developing for clinical environments.

Developers might use these data as a basis to scrap radiology reports for key features. These would also be valuable when deciding which transforms or other pre-processing steps to select for optimum training performance.

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Element** | Data Type | Description | Value Set |
| **Obstruction** | categorical | list of possible obstructions in the around the appendiceal. Can be one or more of the following: stone, fecalith, tumor, other mass. | stone, fecalith, tumor, other mass |
| **Peri-appendiceal** | categorical | Description of the conditions around the appendiceal. Can be one or more of the following: fat stranding, free fluid, abscess | fats standing, free fluid, abscess |

## Primary Outputs

**Appendix status**

|  |  |
| --- | --- |
| RadElement ID | RDE325 |
| Definition | the status of the appendix |
| Data Type | categorical |
| Value Set | normal  removed  appendicitis |
| Units | n/a |

**Appendix rupture**

|  |  |
| --- | --- |
| RadElement ID |  |
| Definition | presence of rupture in the appendix |
| Data Type | categorical |
| Value Set | removed appendix  non-ruptured appendix  ruptured appendix |
| Units | n/a |

## Secondary Outputs

**Appendiceal diameter**

|  |  |
| --- | --- |
| RadElement ID | RDE196 |
| Definition | diameter of the appendiceal |
| Data Type | numerical |
| Value Set |  |
| Units | mm |

**Peri-appendiceal fat stranding**

|  |  |
| --- | --- |
| RadElement ID | RDE197 |
| Definition | detection of fat stranding around appendiceal |
| Data Type | categorical |
| Value Set | absent  present |
| Units | n/a |

**Free fluid**

|  |  |
| --- | --- |
| RadElement ID | RDE198 |
| Definition | detection of free fluid around appendiceal |
| Data Type | categorical |
| Value Set | absent  present |
| Units | n/a |

**Obstructing focus**

|  |  |
| --- | --- |
| RadElement ID | RDE199 |
| Definition | presence of obstructing mass such as a stone or fecalith |
| Data Type | categorical |
| Value Set | absent  present |
| Units | n/a |

**Lumen contents**

|  |  |
| --- | --- |
| RadElement ID | RDE200 |
| Definition | content within the lumen |
| Data Type | categorical |
| Value Set | air-filled  contrast-filled  fluid-filled |
| Units | n/a |

**Peri-appendiceal abscess**

|  |  |
| --- | --- |
| RadElement ID | RDE201 |
| Definition | states the presence of the peri-appendiceal abscess |
| Data Type | categorical |
| Value Set | absent  present |
| Units | n/a |

**Opacification**

|  |  |
| --- | --- |
| RadElement ID | RDE202 |
| Definition | opacification of the appendix |
| Data Type | categorical |
| Value Set | absent  present |
| Units | n/a |