Supplementary Material

Clinical scenarios and prompt text used to query the large language models

This document lists the 30 clinical scenarios used in the study and the exact prompt wording given to each language model, following the format of the ACR Appropriateness Criteria (panel, variant, clinical scenario, imaging study, and appropriateness category). Each scenario was presented twice: once as a zero-shot prompt and once as a one-shot prompt. The fixed instruction and the one-shot worked example are shown once below; for every scenario, only the clinical details and the imaging study changed.

1. Fixed Prompt Components

The following instruction was placed at the start of every prompt, in both the zero-shot and one-shot conditions.

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You are a radiologist. For the clinical scenario below, state the appropriateness category
of the requested imaging study according to the ACR Appropriateness Criteria.

Choose only one of the following three categories and answer in exactly this format:
Answer: [Usually Appropriate / May Be Appropriate / Usually Not Appropriate]
Brief rationale: [1-2 sentences]
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In the one-shot condition only, the instruction above was followed by this single worked example before the scenario being tested. The same example was used for all 30 scenarios and was not part of the study set.

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EXAMPLE CASE:
Clinical scenario: A 25-year-old man presents with 6 hours of worsening right lower
quadrant pain, a temperature of 38.1°C, and leukocytosis (13,200/mm3). Examination shows
marked tenderness at McBurney's point. Acute appendicitis is suspected clinically.
Imaging study in question: CT abdomen and pelvis with IV contrast
Answer: Usually Appropriate
Brief rationale: According to the ACR Appropriateness Criteria for Right Lower Quadrant
Pain (Suspected Appendicitis), Variant 2, CT abdomen and pelvis with IV contrast is the
first-line imaging study and is rated Usually Appropriate for patients with fever and
leukocytosis suggestive of appendicitis.
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Zero-shot prompt structure: [Instruction] + "Clinical scenario: …" + "Imaging study in question: …"

One-shot prompt structure: [Instruction] + [Worked example] + "Now evaluate the following case:" + "Clinical scenario: …" + "Imaging study in question: …"

2. Summary of All 30 Scenarios

ID	ACR panel / variant	Imaging study evaluated	ACR category
S01	Nonlocalized Abdominal Pain, Variant 1	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)

ID	ACR panel / variant	Imaging study evaluated	ACR category
S02	Nonlocalized Abdominal Pain, Variant 1	Abdominal radiograph without contrast	Usually Not Appropriate (Red)
S03	Nonlocalized Abdominal Pain, Variant 2	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S04	Nonlocalized Abdominal Pain, Variant 3	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S05	Nonlocalized Abdominal Pain, Variant 4	CT abdomen without contrast	May Be Appropriate (Yellow)
S06	Right Lower Quadrant Pain (Suspected Appendicitis), Variant 1	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S07	Right Lower Quadrant Pain (Suspected Appendicitis), Variant 2	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S08	Right Lower Quadrant Pain (Suspected Appendicitis), Variant 3	MRI abdomen and pelvis without contrast	Usually Appropriate (Green)
S09	Right Lower Quadrant Pain (Suspected Appendicitis), Variant 3	CT abdomen and pelvis with IV contrast	Usually Not Appropriate (Red)
S10	Right Lower Quadrant Pain (Suspected Appendicitis), Variant 2	Ultrasound abdomen (grayscale, without Doppler)	May Be Appropriate (Yellow)
S11	Right Upper Quadrant Pain, Variant 1	Ultrasound abdomen	Usually Appropriate (Green)
S12	Right Upper Quadrant Pain, Variant 2	Ultrasound abdomen	Usually Appropriate (Green)
S13	Right Upper Quadrant Pain, Variant 4	CT abdomen with IV contrast	Usually Appropriate (Green)
S14	Right Upper Quadrant Pain, Variant 5	Hepatobiliary (HIDA) scintigraphy	Usually Appropriate (Green)
S15	Right Upper Quadrant Pain, Variant 3	Abdominal radiograph without contrast	Usually Not Appropriate (Red)
S16	Left Lower Quadrant Pain (Suspected Diverticulitis), Variant 1	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S17	Left Lower Quadrant Pain (Suspected Diverticulitis), Variant 1	Double-contrast barium enema	Usually Not Appropriate (Red)
S18	Left Lower Quadrant Pain (Suspected Diverticulitis), Variant 2	Ultrasound abdomen (grayscale)	May Be Appropriate (Yellow)
S19	Left Upper Quadrant Pain, Variant 1	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S20	Left Upper Quadrant Pain, Variant 3	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S21	Epigastric Pain, Variant 1	CT abdomen with IV contrast	May Be Appropriate (Yellow)
S22	Epigastric Pain, Variant 2	CT abdomen with IV contrast	Usually Not Appropriate (Red)
S23	Epigastric Pain, Variant 3	CT abdomen with IV contrast	Usually Appropriate (Green)

ID	ACR panel / variant	Imaging study evaluated	ACR category
S24	Suspected Small-Bowel Obstruction, Variant 1	CT abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S25	Suspected Small-Bowel Obstruction, Variant 1	Upright abdominal radiograph	May Be Appropriate (Yellow)
S26	Suspected Small-Bowel Obstruction, Variant 1	MRI abdomen and pelvis without contrast	Usually Not Appropriate (Red)
S27	Suspected Acute Mesenteric Ischemia, Variant 1	CT angiography (arterial and portal venous phase) abdomen and pelvis with IV contrast	Usually Appropriate (Green)
S28	Suspected Acute Mesenteric Ischemia, Variant 1	Color Doppler ultrasound of the mesenteric vessels	May Be Appropriate (Yellow)
S29	Acute Pyelonephritis, Variant 2	CT abdomen and pelvis with IV contrast (renal protocol)	Usually Appropriate (Green)
S30	Acute Pyelonephritis, Variant 1	CT abdomen and pelvis with IV contrast (renal protocol)	Usually Not Appropriate (Red)

3. Clinical Scenario and Imaging Study Text, by Case

The table below gives the exact clinical scenario and imaging study text inserted into the "Clinical scenario" and "Imaging study in question" lines of both prompt types for each of the 30 cases.

ID	Clinical scenario (used in both zero-shot and one-shot prompts)	Imaging study in question	ACR category
S01	A 35-year-old man presents to the emergency department with 12 hours of diffuse, nonlocalized abdominal pain and a temperature of 38.6°C. He has no recent surgical history. On examination there is diffuse tenderness without rebound.	CT abdomen and pelvis with IV contrast	Green
S02	A 35-year-old man presents to the emergency department with 12 hours of diffuse, nonlocalized abdominal pain and a temperature of 38.6°C. He has no recent surgical history.	Abdominal radiograph without contrast	Red
S03	A 58-year-old woman underwent open colon resection 5 days ago. On postoperative day 5 she develops diffuse abdominal pain, fever (38.9°C), and leukocytosis (18,000/mm3).	CT abdomen and pelvis with IV contrast	Green
S04	A 47-year-old patient with acute myeloid leukemia, recently treated with chemotherapy, is neutropenic (ANC 300/mm3). He presents with diffuse abdominal pain, fever, and diarrhea; neutropenic enterocolitis (typhlitis) is suspected.	CT abdomen and pelvis with IV contrast	Green
S05	A 29-year-old woman presents with 8 hours of poorly localized, nonspecific abdominal pain. There is no fever, no leukocytosis, and no surgical history; pregnancy test is negative.	CT abdomen without contrast	Yellow
S06	A 22-year-old man reports 18 hours of right lower quadrant pain. He has no fever and a normal white blood cell count. On examination there is mild tenderness without rebound.	CT abdomen and pelvis with IV contrast	Green
S07	A 16-year-old boy presents with pain that began periumbilically and migrated to the right lower quadrant, a temperature of 38.4°C, and leukocytosis (14,500/mm3). Examination shows marked tenderness at McBurney's point with rebound; acute appendicitis is suspected clinically.	CT abdomen and pelvis with IV contrast	Green
S08	A 24-year-old pregnant woman (14 weeks' gestation) presents with right lower quadrant pain, fever, and leukocytosis; acute appendicitis is suspected.	MRI abdomen and pelvis without contrast	Green
S09	A 24-year-old pregnant woman (14 weeks' gestation) presents with right lower quadrant pain, fever, and leukocytosis; acute appendicitis is suspected.	CT abdomen and pelvis with IV contrast	Red
S10	A 16-year-old boy presents with pain that began periumbilically and migrated to the right lower quadrant, a temperature of 38.4°C, and leukocytosis (14,500/mm3); acute appendicitis is suspected clinically.	Ultrasound abdomen (grayscale, without Doppler)	Yellow
S11	A 41-year-old woman presents with right upper quadrant pain of unclear cause. There is no fever or leukocytosis, and gallbladder disease is not specifically suspected.	Ultrasound abdomen	Green
S12	A 52-year-old woman develops right upper quadrant pain, nausea, and vomiting after a fatty meal; biliary disease is suspected. Murphy's sign is positive.	Ultrasound abdomen	Green
S13	A 60-year-old man presents with right upper quadrant pain, a temperature of 39.1°C, and leukocytosis (17,200/mm3). Acute	CT abdomen with IV contrast	Green

ID	Clinical scenario (used in both zero-shot and one-shot prompts)	Imaging study in question	ACR category
	cholecystitis is suspected, with concern for a complication such as perforation or emphysematous cholecystitis.		
S14	A 68-year-old critically ill patient in the intensive care unit develops right upper quadrant pain and sepsis; acalculous cholecystitis is suspected. Initial ultrasound findings were negative or equivocal.	Hepatobiliary (HIDA) scintigraphy	Green
S15	A 45-year-old woman presents with right upper quadrant pain without fever or leukocytosis; biliary disease is suspected, and initial ultrasound findings were negative or equivocal.	Abdominal radiograph without contrast	Red
S16	A 63-year-old man presents with left lower quadrant pain, fever (38.2°C), and mild leukocytosis; acute diverticulitis is suspected.	CT abdomen and pelvis with IV contrast	Green
S17	A 63-year-old man presents with left lower quadrant pain, fever (38.2°C), and mild leukocytosis; acute diverticulitis is suspected.	Double-contrast barium enema	Red
S18	A 70-year-old man presents with recurrent left lower quadrant pain and low-grade fever, consistent with mild-to-moderate acute diverticulitis; there are no clinical features suggesting a complication.	Ultrasound abdomen (grayscale)	Yellow
S19	A 30-year-old man presents with left upper quadrant pain and suspected splenomegaly (the spleen tip is palpable on examination).	CT abdomen and pelvis with IV contrast	Green
S20	A 55-year-old woman presents with left upper quadrant pain not otherwise specified; there is no fever, no splenomegaly, and no other localizing clinical findings.	CT abdomen and pelvis with IV contrast	Green
S21	A 46-year-old man with a history of alcohol use presents with severe epigastric pain, nausea, vomiting, and a markedly elevated serum lipase; acute pancreatitis is diagnosed clinically, and this is the initial imaging study.	CT abdomen with IV contrast	Yellow
S22	A 46-year-old man has a clinically and biochemically confirmed diagnosis of mild acute pancreatitis. He is responding well to treatment, with no clinical deterioration suggesting a complication.	CT abdomen with IV contrast	Red
S23	A 50-year-old man with known acute pancreatitis develops fever, rising white blood cell count, and clinical deterioration on day 5 of admission; a complication such as necrosis, abscess, or pseudocyst is suspected.	CT abdomen with IV contrast	Green
S24	A 72-year-old woman with a history of prior abdominal surgery presents with colicky abdominal pain, distension, vomiting, and inability to pass flatus or stool; small-bowel obstruction is suspected.	CT abdomen and pelvis with IV contrast	Green
S25	A 72-year-old woman with a history of prior abdominal surgery presents with colicky abdominal pain, distension, vomiting, and inability to pass flatus or stool; small-bowel obstruction is suspected.	Upright abdominal radiograph	Yellow
S26	A 72-year-old woman with a history of prior abdominal surgery presents with colicky abdominal pain, distension, vomiting, and inability to pass flatus or stool; small-bowel obstruction is suspected.	MRI abdomen and pelvis without contrast	Red
S27	A 76-year-old man with a history of atrial fibrillation develops sudden-onset, diffuse abdominal pain that is disproportionate to the physical examination findings; acute mesenteric ischemia is strongly suspected.	CT angiography (arterial and portal venous phase) abdomen and pelvis with IV contrast	Green

ID	Clinical scenario (used in both zero-shot and one-shot prompts)	Imaging study in question	ACR category
S28	A 76-year-old man with a history of atrial fibrillation develops sudden-onset, diffuse abdominal pain that is disproportionate to the physical examination findings; acute mesenteric ischemia is strongly suspected.	Color Doppler ultrasound of the mesenteric vessels	Yellow
S29	A 34-year-old woman presents with fever, flank pain, and pyuria. Despite 72 hours of appropriate antibiotic therapy, she shows no clinical improvement; complicated pyelonephritis (abscess, obstruction) is suspected.	CT abdomen and pelvis with IV contrast (renal protocol)	Green
S30	A 29-year-old woman presents with a typical clinical picture of uncomplicated acute pyelonephritis. This is her first episode, with no risk factors for complication and no treatment-resistant course.	CT abdomen and pelvis with IV contrast (renal protocol)	Red