



PMB definition guideline: Appendicitis

Disclaimer

The appendicitis management benefit definition has been developed for the majority of standard patients. These benefits may not be sufficient for outlier patients. Therefore Regulation 15(h) and 15(l) may be applied for patients who are inadequately managed by the stated benefits. The benefit definition does not describe specific in-hospital management such as theatre, anaesthetists, anaesthetist drugs and nursing care. However, these interventions form part of care and are prescribed minimum benefits.

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Abbreviations

CMS	Council for Medical Schemes
PMB	Prescribed Minimum Benefit
CT	Computed Tomographic
U&E	Urea and Electrolytes
AIR	Appendicitis Inflammatory Score
FBC	Full Blood Count
CRP	C-reactive protein
BHCG	Beta-Human Chorionic Gonadotropin
UTI	Urinary Tract Infection
PCT	Procalcitonin
MRI	Magnetic resonance imaging

1. INTRODUCTION

- 1.1. The legislation governing the provision of the Prescribed Minimum Benefits (PMBs) is contained in the Regulations enacted under the Medical Schemes Act, 131 of 1998 (the Act). In respect of some of the Diagnosis Treatment Pairs (DTPs), medical scheme beneficiaries find it difficult to know their entitlements in advance. In addition, medical schemes interpret these benefits differently, resulting in a lack of uniformity of benefit entitlements.
- 1.2. The benefit definition project is coordinated by the Council for Medical Schemes (CMS) and aims to define the PMB package, as well as to guide the interpretation of the PMB provisions by relevant stakeholders.

2. SCOPE AND PURPOSE

- 2.1 This is a recommendation for the diagnosis, treatment and care of individuals with appendicitis in any clinically appropriate setting as outlined in the Act.
- 2.2 The purpose is to provide detailed clarification in respect of benefit and entitlements to members and beneficiaries of medical schemes.

Table 1: Possible ICD10 codes for identifying appendicitis

ICD 10 code	WHO description
K35.2	Acute appendicitis with generalized peritonitis
K35.3	Acute appendicitis with localised peritonitis
K35.8	Acute appendicitis, other and unspecified
K36	Other appendicitis
K37	Unspecified appendicitis
K38.2	Diverticulum of appendix
K38.3	Fistula of appendix
K38.8	Other specified diseases of appendix

3. EPIDEMIOLOGY AND BURDEN OF DISEASE

- 3.1. Acute appendicitis is one of the most common general surgical emergencies worldwide, with an estimated lifetime risk of 7 – 8% (Stewart, Khanduri, McCord, Ohene-Yeboah, Uranues, Vega Rivera & Mock, 2014).

- 3.2. Acute appendicitis affects about 90 – 100 patients per 100 000 inhabitants per year in developed countries. The peak incidence usually occurs in the second or third decade of life, and the disease is less common in the very young and very old population. Most studies show a slight male predominance. Geographical differences are reported, with lifetime risks for appendicitis of 16% in South Korea, 9. 0% in the USA, and 1. 8% in Africa (Lee, Park, Choi, 2010; Ohene-Yeboah, Abantanga, 2009).
- 3.3. Despite being so common, a poor understanding of the causes of appendicitis and an absence of reliable discriminators for disease severity still persist. Direct luminal obstruction can cause appendicitis (often by a faecolith, lymphoid hyperplasia, or impacted stool; rarely by an appendiceal or caecal tumour) but these tend to be exceptions rather than regular occurrences. Although several infectious agents are known to trigger or be associated with appendicitis (Lamps, 2010; Dzabic, Bostrom & Rahbar, 2008), the full range of specific causes remains unknown (Carr, 2000).
- 3.4. Recent theories focus on genetic factors, environmental influences, and infections. Pregnant women seem to have a reduced risk for appendicitis, with the lowest risk in the third trimester. Appendicitis becomes a diagnostic challenge when it occurs in this subgroup (Zingone, Sultan, Humes, & West, 2015).
- 3.5. Appendicitis in pregnancy becomes a challenge to diagnose due to the displacement of the caecum, as a result of the growing uterus.

4. DIAGNOSIS, INVESTIGATIONS AND STAGING

- 4.1. Modern diagnosis aims to first confirm or exclude appendicitis, secondly to stratify simple and complex disease when appendicitis is suspected. Acute appendicitis is predominantly a clinical diagnosis, and various scoring systems are used to predict probability of diagnosis.
- 4.2. Andersson (2015), conducted a study on 182 patients with suspicion of acute appendicitis. The patients were stratified to low, intermediate, and high probability of appendicitis using two different clinical scores (AIR / Alvarado) and by an experienced surgeon. From the study, the AIR score was especially good at identifying patients with high probability of appendicitis. The AIR score had a specificity of 0.97 for all appendicitis and 0.92 for advanced appendicitis, compared with 0.91 and 0.77, respectively for the surgeon and Alvarado score. Therefore, in this series, the AIR score had both higher sensitivity and specificity than the Alvarado score, and the experienced surgeon in the clinical diagnosis of the appendicitis (Andersson, 2015).

- 4.3. An ideal scoring system with high sensitivity and specificity, that is clinically applicable, is required. This remains an area for future research. There is still no consensus regarding the most appropriate strategy to minimize potential harm to patients (such as radiation from imaging), while maintaining a high degree of accuracy in the treatment of the disease. This is a source of concern for patients and surgeons alike.

Table 1: Clinical assessment - diagnostic

Discipline	Number of consults
GP / primary care practitioner (including emergency physician and family physicians)	2
Gastroenterologist/ Surgeon	1

Table 2: Investigations considered PMB level of care only if clinically appropriate

	Description	Comments
Laboratory investigations / Point of care tests	U&E and Creatinine	Required
	Complete Full Blood Count(FBC)	Required
	CRP/ PCT	See the role of biomarkers below
	Urine dipsticks	To exclude UTI and Pregnancy
	BHCG	Pregnancy test – can be either a blood or urine sample. Urine samples are now quite sensitive in early days of pregnancy and cheaper than the blood tests.
Imaging radiology	Ultrasound of the abdomen	Indicated in low risk patient. Its first-line investigative role is most beneficial in children, who typically have thinner musculature, less abdominal fat, and a greater need for radiation avoidance than adult patients.
	Interventions which are not routine and are subject to specialist motivation	
	X-Ray of the abdomen	Can be used to rule out faecal loading if clinically suspected.
	CT scan of the abdomen	Indicated in intermediate and high risk adolescent, adult and older patients at increased risk of malignancy.

	MRI	Recommended in pregnant patients with suspected appendicitis, if this resource is available must be with a Specialist motivation
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4.4. Biomarkers are used to supplement patient history and clinical examination, especially in children, women of fertile age, and elderly patients when diagnosis is difficult. No inflammatory marker alone, such as white blood cell count, C-reactive protein, or other novel tests, including procalcitonin (PCT), can identify appendicitis with high specificity and sensitivity (Yu, Juan, Wu, Shen, Wu & Lee, 2013).

4.5. White blood cell count is obtained in virtually all patients who are assessed for appendicitis, when available.

5. MEDICAL TREATMENT

5.1. Recently, antibiotics have been proposed as a single treatment for uncomplicated appendicitis in selected patients who wish to avoid surgery and are willing to accept the risk. Such patients need to be made aware of a failure rate at 1 year of around 25–30%, and the need for readmission or surgery of up to 38% appendectomy during follow-up.

5.2. Antibiotics have been given intravenously for 1–3 days in all the referred trials. Therefore, a reasonable recommendation is at least 1 day of intravenous treatment as well as hospital surveillance, in view of the fact that rescue appendectomy has been judged necessary for 5–23% of patients. The choice of antibiotics should be determined by local resistance patterns and the potential for heterogeneous causes. (Bhangu, Søreide, Di Saverio, Assarsson & Drake, 2015).

5.3. Oral antibiotics have subsequently been given for 7–10 days as part of this regimen, with a slower recovery in some patients, albeit while avoiding early surgery. The length and nature of oral antibiotics should be investigated in future research.

5.4. Antibiotics are recommended as PMB level of care where clinically indicated as part of post-operative care.

6. SURGICAL TREATMENT

- 6.1. Surgical management (open or laparoscopic) remains the treatment of choice for appendicitis. Use of laparoscopic appendectomy depends on the availability of resources and surgeon expertise.
- 6.2. Laparoscopy can be done safely in children and obese individuals with a low risk profile and favourable outcomes (Ciarrocchim & Amicucci, 2014; Cheong & Emil, 2014).
- 6.3. The concept of low-cost laparoscopy, with the use of straightforward, inexpensive, reusable devices can lead to equivalent costs and outcomes, even in complex appendicitis (Di Saverio, Mandrioli, Sibilio, Smerieri, Lombardi, Catena, Ansaloni, Tugnoli, Masetti & Jovine, 2014).
- 6.4. The cost of disposables remains the single biggest outlier with laparoscopic versus open appendicectomies.
- 6.5. Laparoscopic appendectomy is considered PMB level of care subject to the use of the following surgical equipment. This is to ensure that the costs of disposables used for the procedure make this procedure cost effective and affordable.

Table 4: Surgical equipment recommended as PMB level for care for laparoscopic appendectomy

	ROUTINE	COMPLICATED
NECESSARY ITEMS	<i>Ports: (3 in total)</i> 2 x 10mm + 1 x 5mm OR 2 x 5mm + 1 x 10mm	<i>Division of bowel:</i> Stapler device Reloads x 3
	<i>Re-usable instruments:</i> Maryland grasper Atraumatic grasper Scissors Diathermy hook Suction device	<i>Specimen retrieval:</i> Wound protector
	<i>Division of appendix +/- haemostasis (choose 1):</i> Liga clip Haemolock Endoloop	
OPTIONAL EXTRAS (requires motivation)	<i>Specimen retrieval:</i> Endopouch	<i>Energy device (any 1):</i> Ultrasonic dissector Bipolar energy

6.6. The availability and use of laparoscopy depends on expertise and access to specialist equipment and therefore does not need to be mandated.

6.7. Robotic surgery is not recommended as PMB level of care.

This guideline will be due for update on 31 March 2020.

7. References

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