

Table 1: Study Characteristics

Study	Country	Study length (days)	N (men%)	Population	Test
<b>Under-use</b>					
Ahmad 2012	Indonesia	181	554 (41%)	Patients registered at health clinics where TB was suspected	Sputum smear microscopy
Belletti 2013	USA	N/S	1517 (46%)	Patients with COPD	Pulmonary function tests (PFT)
Bertella 2013	Italy	1765	437 (286)	Patients with COPD	PFTs
Caplan 2000	USA	365	81	Patients with a thyroid nodule	FNA of thyroid
Chavez 2009	USA	2920	200 (48%)	Patients with COPD	PFT
Droogendijk 2011	Netherlands	730	287 (45%)	Women >50yrs and men >18 years with Iron Deficiency Anaemia	Upper endoscopy and colonoscopy
Gerrits 2008	Netherlands	2556	65 (0%)	Women aged 18 – 65 yrs with newly diagnosed urinary incontinence	Urine dipstick
Gibbons 2010	New Zealand	364	265	Patients with subclinical hypothyroidism	Free T4
Gnani 2004	UK	365	90 (53%)	Patients with heart failure	CXR, ECG and Echocardiogram
Girard 2010	France	28	19 (37%)	Patients with acute hepatitis	Hepatitis serology (HBs antigens, anti-HBc antibodies)
Kinuoani 2017	France	150	61 (18%)	Patients with urinary tract infections	Urine Dipstick
Lange 2007	Denmark	91	2549 (44%)	Patients with COPD	PFTs
Lipczynska 2012	Poland	61	93	Aged ≥ 55 with Heart Failure (HF) or HF risk factors	Echocardiogram, BNP, CXR
Loo 2009	UK	364	131 (50%)	Patients with Atrial Fibrillation	Echocardiogram
Majumdar 2003a	USA	2371	531 (47%)	Patients >50 years, on Proton Pump Inhibitors with persistent dyspepsia	Upper endoscopy
Majumdar 2003b	USA	2371	132 (47%)	Patients with peptic ulcer disease (PUD)	H.pylori
Moscavitch 2009	Brazil	61	167 (43%)	Patients with Heart Failure	ECG, CXR, Echocardiogram
Musicco 2004	Italy	NR	1549 (38%)	Patients being assessed for Dementia	Collection of laboratory tests to rule out conditions with similar presenting symptoms to dementia

Nicholson 2010	UK	1827	6943 (100%)	Men with epididymo-orchitis	C. trachomatis, N. gonorrhoeae, urethral swabs and midstream urinalysis.
Nicopoulos 2003	UK	242	32	Patients with subfertility	Mid-luteal progesterone and semen analysis
Pimlott 2006	Canada	1611	160 (34%)	Patients with Dementia	FBC, TSH, serum electrolytes, serum calcium, glucose
Smith 2008	UK	731	29870 (52%)	Patients with COPD	PFT
Sokol 2015	USA	3652	75902 (23%)	Patients with Asthma	PFT
Ulrik 2010	Denmark	121	1716 (44%)	Patients with COPD	PFT
Ulrik 2013	Denmark	731	4058	Patients with COPD	PFT
van der Pluijm-Schouten 2017	Netherlands	840	100%*	Patients (couples) referred to IVF clinics	Chlamydia Antibody Titre and Semen Analysis
<b><u>Over-use</u></b>					
Aljebreen 2013	Saudi Arabia	365	147 (51%)	Patients who had upper endoscopy	Upper endoscopy
Azzam 2015	Saudi Arabia	121	161 (30%)	Dyspeptic patients who had upper endoscopy	Upper endoscopy
Bhatt 2001	UK	504	437 (65%)	Patients referred for pelvis x-rays	Pelvis x-ray
Birk-Urovitz 2017	Canada	1538	77 (38%)	Patients that had a Thyroid Stimulating Hormone (TSH) test	TSH
Bishop 2003	Canada	28	139	Patients with non-red flag LBP	Advanced imaging (CT, MRI or bone scan)
Cai 2015	USA	121	550 (46%)	Patients who under went upper endoscopy	Upper endoscopy
Chan 2004	Malaysia	153	250 (45%)	Patients who under went upper endoscopy	Upper endoscopy
Chan 2006	Malaysia	184	27 (63%)	Patients who underwent 'diagnostic colonoscopies'	Colonoscopy
Cardin 2005	Italy	151	1678	Patients who had upper endoscopy	Upper endoscopy
Cardin 2007	Italy	182	NR	Dyspeptic patients who had upper endoscopy	Upper endoscopy
Eccles 2001	UK	182	275	Patients who had knee or lumbar x-ray	Lumbar or knee x-ray
Elwyn 2007	UK	184	215	Patients who under went upper endoscopy	Upper endoscopy
Fiorenza 2017	USA	456	45 (34%)	Patients who under went upper endoscopy	Upper Endoscopy

Grover 2007	USA	364	68 (0%)	Patients with uncomplicated UTI	Urine culture and sensitivity analysis
Gurzun 2014	UK	7	1070 (54%)	Patients who underwent an echocardiogram	Echocardiogram
Hassan 2007	Italy	30	3769 (46%)	Patients who underwent upper endoscopy	Upper endoscopy
Hughes-Anderson 2002a	Australia	1613	154 (55%)	Patients who had colonoscopy	Colonoscopy
Hughes-Anderson 2002b	Australia	1613	162 (55%)	Patients who had upper endoscopy,	Upper endoscopy
Ip 2014	USA	1096	100 (43%)	Patients with non-red flag LBP	MRI lumbar spine
Johnson 2011	USA	510	779 (0%)	Patients with uncomplicated UTI	Urine culture
Kovacs 2013	Spain	183	602 (48%)	Patients with non-red flag LBP	MRI lumbar spine
Lalude 2014	USA	121	102	Patients who had SPECT Myocardial perfusion imaging (MPI) studies	Single Photon Emission CT (SPECT) MPI
Landry 2011	USA	272	124	Patients who had U/S of thyroid, pelvis, abdo, carotid or soft tissue	Thyroid, pelvis, abdomen, carotid or soft tissue ultrasound
Lin 2016	Australia	NR	NR	Patients with non-red flag LBP	Lumbar Spine X-ray
Lindbäck 2017	Sweden	59	0	Patients that had urinary cultures	Urinary Culture
Linder 2006	USA	608	1076 (19%)	Patients with pharyngitis	Strep testing (rapid antigen detection test, throat culture)
Llor 2011	Spain	122	658 (0%)	Women with UTI	Urine cultures
Mafi 2013	USA	4377	8066	Patients with non-red flag LBP	X-ray, CT or MRI
Mafi 2015	USA	4018	9362 (25%)	Patients with uncomplicated headache (non-red flag	CT and MRI
Michaleff 2012	Australia	3621	3070 (70%)	Patients reporting first time neck pain or LBP (non-specific, non red flag)	Any radiological test
Noya 2008	Israel	N/S	209 (35%)	Patients who had H.pylori testing	H. pylori test
Piccoliori 2013	Italy	63	475 (43%)	Acute or chronic non-red flag LBP	Any radiological test
Piterman 2008	Australia	550	19219	Patients with GORD	Endoscopy. Barium Swallow
Remedios 2014	UK	NR	2026	Patients who had CTs and/or MRIs	CT and/or MRI
Sharp 2015	USA	730	37,464	Patient with Acute Sinusitis	CT Sinuses

Schers 2000	Netherlands	214	1096 (50%)	Patients with non-red flag LBP	X-ray
Tahvonen 2017	Finland	180	18 (35%)	Patients with non-red flag LBP	Lumbar Spine X-ray
Van Gurp 2013	Netherlands	366	155 (38%)	Patients who had Echocardiogram	Echocardiogram
Williams 2010	Australia	1005	1706 (43%)	Patients with non-red flag LBP	All imaging

\*Both men and women