

The Dermatological Examination

From Practice to Evidence

Husain Alkhalidy · Department of Internal Medicine, King Khalid University, Abha · September 2026

Part 1 — The examination

Setting up. The skin is the one organ that is examined entirely by looking, and the examination fails most often for the plainest reason: the patient was not undressed and the light was poor. The whole skin is examined, in daylight or a bright white light, with the patient in a gown and the examiner working from the scalp to the soles in the same order every time — scalp and hair, face, ears, mouth and lips, neck, trunk front and back, axillae, arms and hands including the nails and the webs, the genitals and perineum, the legs, the feet and the toe-webs — because the lesion the patient shows is often not the lesion that matters. Three tools are within reach: a ruler, a glass slide, and a dermatoscope; a camera is the fourth, and a Wood's lamp and potassium hydroxide the fifth and sixth. The examination answers three questions in order: *what* is the lesion, *where* is it and how is it distributed, and *what else* — the pattern, the nails and mucosae, the lymph nodes, the systemic disease the skin is announcing.

The general survey

- **Skin type and colour.** The Fitzpatrick phototype, recorded because it governs how every other sign looks: erythema in dark skin is violaceous, grey or simply darker rather than red, scale is more visible and pigment change more prominent, and a rash that is 'pink' in a textbook photograph is not pink here. Pallor, jaundice and cyanosis as the haematological chapter set out.
- **The general state of the skin.** Dryness and xerosis, photodamage and its distribution, scars and their type (hypertrophic, keloid, atrophic), striae, hair distribution and loss, sweating, and temperature.
- **The patient.** Scratching, the smell of infection, the distress of pruritus, the fever and toxicity of a skin infection, and the systemic signs the earlier chapters covered — because the skin is the organ on which lupus, dermatomyositis, vasculitis, endocrine disease and malignancy write.

The language of the lesion

A lesion is described, not named, and the description follows a fixed vocabulary that a second examiner can reconstruct.

- **Primary lesion.** Macule and patch (flat colour change, under and over a centimetre); papule, plaque and nodule (raised, under a centimetre, over a centimetre and flat-topped, over a centimetre and deep); vesicle and bulla (fluid-filled, under and over a centimetre); pustule; wheal; cyst; telangiectasia; petechia and purpura.

- **Secondary change.** Scale, crust, erosion (loss of epidermis), ulcer (loss into the dermis), excoriation, fissure, lichenification, atrophy, scar.
- **Colour**, named against the skin type; **size**, measured with the ruler and never estimated; **shape** (round, oval, annular, targetoid, linear, polygonal); **border** (well or ill defined, regular or irregular); **surface** (smooth, scaly, verrucous, umbilicated, crusted); and **consistency** on palpation — soft, firm, indurated, fluctuant — with tenderness, warmth and depth.
- **Configuration** of a group of lesions: discrete, grouped, linear, annular, arcuate, serpiginous, reticulate, zosteriform, confluent.
- **Distribution** over the body: localised or generalised; symmetrical or not; flexural or extensor; photo-exposed; dermatomal; acral; seborrhoeic; follicular; the sparing that identifies a pattern as much as the involvement.
- **Diascopy.** A glass slide pressed on a red lesion: erythema blanches, purpura does not, and the apple-jelly nodules of lupus vulgaris and sarcoid show through.

The special signs

- **Nikolsky's sign.** Firm sliding pressure with a finger on apparently normal skin beside a blister shears the epidermis in pemphigus and the staphylococcal scalded-skin and toxic epidermal necrolysis; the *marginal* form, pressure at the edge of an existing blister, is more sensitive and less specific than the *direct* form on unaffected skin. Asboe-Hansen's sign spreads an existing blister sideways under pressure.
- **Auspitz's sign** — pinpoint bleeding when scale is scraped from a psoriatic plaque — and the **Koebner phenomenon**, new lesions in a line of trauma, in psoriasis, lichen planus and vitiligo.
- **Dermatographism**, a wheal along a line stroked on the back, read at five minutes; **Darier's sign**, a wheal on rubbing a lesion of mastocytosis.
- **The hair pull test:** about sixty hairs grasped and pulled gently, more than ten per cent coming away being positive; the scalp for scarring against non-scarring loss, and the pattern of the loss.
- **The nails:** pitting, onycholysis and oil spots in psoriasis; clubbing; splinter haemorrhages; Beau's lines; a longitudinal band of melanonychia with pigment spilling onto the fold — Hutchinson's sign — which is a subungual melanoma until proved otherwise.
- **The mucosae:** the mouth for the lacy white striae of lichen planus, the erosions of pemphigus that precede the skin, oral hairy leukoplakia, Koplik spots; the genitals, which are part of the examination and not a separate one.
- **Wood's lamp** for the coral-red of erythrasma, the blue-green of some tinea, the enhancement of vitiligo and the ash-leaf macule; **potassium hydroxide** on a scraping for the hyphae of tinea and the mites of scabies, found by scraping a burrow.

The pigmented lesion

Every pigmented lesion the eye lands on is passed through the same three filters. The **ABCDE** rule — Asymmetry, Border irregularity, Colour variegation, Diameter above 6 mm, Evolution — with the last

of these, change reported by the patient or seen against an old photograph, carrying the most weight; the **ugly duckling**, the mole that does not look like the patient's other moles, which is a comparison within the patient rather than against a rule; and the **EFG** triad — Elevated, Firm, Growing — for the nodular melanoma that the ABCDE misses because it is symmetrical, uniform and small. Then the **dermatoscope**, on every lesion in doubt: the three-point checklist (asymmetry of structure, atypical network, blue-white structures), the seven-point checklist, or pattern analysis, according to the examiner's training; and the whole skin photographed, with the ruler, so that evolution can be judged at the next visit rather than remembered. The regional lymph nodes are examined for any lesion suspected of melanoma or squamous carcinoma.

The red leg and the hot skin

A red, hot, swollen lower leg is cellulitis until the examiner has asked the four questions the evidence rewards: is it **bilateral** (cellulitis almost never is); is the patient **febrile, tachycardic or leucocytic**; is there a **portal** — a fissure between the toes, an ulcer, tinea, an insect bite; and is there an **alternative** in plain sight — the varicosities and haemosiderin of stasis dermatitis, the sharp margin of a contact dermatitis, the woody induration of lipodermatosclerosis, the tophus of gout, the swollen calf of a thrombosis. The margin is drawn with a pen and timed. Then the signs of the infection that cannot wait — **pain out of proportion** to what is seen, spread over hours, skin anaesthesia, crepitus, dusky discolouration and haemorrhagic bullae, and systemic toxicity — which together make a necrotising infection a surgical diagnosis, remembering that each of them alone is insensitive.

The blister, the ulcer, the burn

- **The blister:** tense or flaccid; on normal or inflamed skin; its distribution and the mucosae; Nikolsky's sign; the age of the patient — a tense blister on an urticated base in the elderly is pemphigoid, a flaccid one with mouth erosions is pemphigus, grouped vesicles on a red base in a dermatome are zoster and on the elbows and buttocks dermatitis herpetiformis; a widespread, painful, dusky eruption with mucosal involvement and a positive Nikolsky in a patient on a new drug is toxic epidermal necrolysis, and the percentage of the body surface detached is measured.
- **The ulcer:** site (the gaiter area of venous disease, the pressure points and the toes of arterial disease, the sole of neuropathy), edge (sloping, punched-out, rolled, undermined), base, depth, discharge, the surrounding skin, the pulses and the sensation; pressure injuries staged from non-blanchable erythema to full-thickness loss, and the unstageable ulcer under eschar named as such.
- **The burn:** depth by colour, blistering, capillary refill and sensation; extent as a percentage of the body surface, using the patient's palm (about one per cent), the rule of nines, or the Lund–Browder chart, with erythema excluded — and, as the evidence shows, with an application rather than the rule where one is to hand.

Completing the examination

The lymph nodes for any cutaneous malignancy; the joints, the nails and the scalp in every case of psoriasis; the mucosae in every case of lichen planus and blistering disease; the whole family and the household in scabies; the photograph, with the ruler and the date, which is the record against which every later visit is read; the dermatoscope; and the biopsy — punch, shave or excision — which is the reference standard against which everything in Part 2 is measured, and which the examination chooses the site and the type of.

Putting the signs together

The dermatological examination sorts lesions by morphology and distribution into patterns, and it is the pattern, not the single feature, that is named.

Pattern	The signs that make it
Melanoma	An asymmetrical, irregularly bordered, variegated lesion above 6 mm that has changed; the ugly duckling; or a firm, growing nodule; atypical network, blue-white structures and chaos on dermoscopy; a pigmented band spilling onto the nail fold.
Basal cell carcinoma	A pearly, translucent papule or nodule with rolled edge and telangiectasia on sun-exposed skin, ulcerating centrally; arborising vessels and blue-grey ovoid nests on dermoscopy.
Squamous cell carcinoma	A firm, keratotic, indurated nodule or a non-healing ulcer on sun-damaged skin, the ear, the lip or an old scar, growing over weeks; the regional nodes.
Psoriasis	Well-defined salmon-pink plaques with silvery scale on the extensors, scalp and sacrum; nail pitting and onycholysis; Koebner; the flexural, guttate and pustular variants; the joints.
Atopic eczema	Ill-defined, itchy, lichenified plaques in the flexures, with excoriation and dryness; the face and extensors in infancy; the personal and family atopic history.
Cellulitis	A unilateral, warm, tender, spreading erythema with an ill-defined edge, fever and a portal of entry; lymphangitis and tender nodes.
Pseudocellulitis	Bilateral or sharply bordered erythema, no fever, a chronic history — stasis, contact, lipodermatosclerosis, gout, thrombosis.
Necrotising soft-tissue infection	Pain out of proportion, spread by the hour, anaesthesia, crepitus, dusky skin and haemorrhagic bullae, systemic toxicity — any of which sends the patient to theatre.
Pemphigus and pemphigoid	Flaccid blisters and erosions with mouth involvement and a positive Nikolsky sign; against tense blisters on urticated plaques in the elderly with a negative one.
Urticaria and angio-oedema	Wheals that last under a day and leave no mark, dermatographism, and the swelling of lips, eyelids and tongue.
Drug eruption and toxic epidermal necrolysis	A symmetrical morbilliform eruption within weeks of a new drug; or dusky, painful, confluent erythema with mucosal erosions, a positive Nikolsky and measured detachment.
Scabies	Burrows in the finger-webs, wrists and genitals, itch worse at night, nodules on the scrotum, and a household that itches; the mite on the scraping.

Pattern	The signs that make it
Cutaneous vasculitis	Palpable purpura on the dependent legs, non-blanching on diascopy; the kidney, the gut and the joints examined.

Part 2 — What the literature says

How well do examiners agree?

Dermatology is the specialty in which the whole examination is a description, and the descriptions reproduce unevenly. The features examiners look for on the dermatoscope agree moderately to substantially when they are structural — blue-white structures and shiny white lines at kappa 0.62 and 0.61 — and poorly when they are subtler, with the highest agreement for the features of intraepidermal carcinoma no better than 0.55 [1, 2]. The reference standard itself is not exempt: pathologists agree well on Breslow thickness (κ 0.76) and ulceration (0.87) and poorly on regression and lymphocytic infiltrate (both 0.27) [3]. The Fitzpatrick skin type recorded by a clinician from the skin's appearance does not consistently match the type the patient reports, and an instrument was needed to bring inter-rater reliability to 0.84 [4, 5]. Against that, the **measured** scores do well: the Psoriasis Area and Severity Index reaches intraclass correlations of 0.80 to 0.96 between raters, the Eczema Area and Severity Index 0.71 to 0.80 and the objective SCORAD 0.66 to 0.72, and both eczema scores reach 0.90 and 0.96 when scored from photographs [6, 7, 8, 9]; a total inflammatory lesion count in acne correlates at 0.87 between raters, where a global impression manages a kappa of 0.31 to 0.56 [10]. And the one gestalt judgement that reproduces is the ugly duckling: shown the same patients' moles, experts, general dermatologists, nurses and non-clinicians identified the melanoma as the odd one out with sensitivities of 1.0, 0.89, 0.88 and 0.85 [11].

Sign or score	Agreement	Comment
Dermoscopic structures (blue-white structures, shiny white lines)	κ 0.62, 0.61	Substantial for the structural features; poorer for subtle ones [1]
Dermoscopic features of intraepidermal carcinoma	$\kappa \leq 0.55$	Poor to moderate; scale and haemorrhage the best of them [2]
Histopathology of melanoma	Breslow 0.76; ulceration 0.87; regression 0.27	The reference standard disagrees with itself on the softer features [3]
Fitzpatrick skin type, clinician-assigned	poor against patient report	Subjective by construction; an image-based tool reached α 0.84 [4, 5]
PASI	ICC 0.80 – 0.96	A measured area-and-severity score [6, 7]
EASI · objective SCORAD	ICC 0.71 – 0.80 · 0.66 – 0.72	0.90 and 0.96 from patient-taken photographs [8, 9]
Acne: lesion count · global grade	r 0.87 · κ 0.31 – 0.56	The count reproduces; the impression does not [10]

Sign or score	Agreement	Comment
Ugly duckling sign	sensitivity 0.85 – 1.0 across observer groups	A within-patient comparison, and it travels across levels of training [11]
Teledermatology against face-to-face diagnosis	κ median 0.60 (0.20 – 0.84); 0.74 with dermoscopy	Concordance 79 – 94 per cent, rising with image quality [12, 13]
Burn area by the rule of nines	32 per cent of physicians in significant error	3 per cent with a three-dimensional application [14]

How accurate are the signs? The Rational Clinical Examination and the diagnostic reviews

Question	Finding	Likelihood ratio or accuracy	Source
Is this mole a melanoma?	The ABCD rule and the seven-point checklist	Sensitive screening checklists with modest, variable specificity; the review found the evidence for their use by non-dermatologists thin	Whited & Grichnik 1998 [15]
	Visual inspection by a clinician	Sensitivity 40 – 70 per cent, specificity 86 – 98 per cent; primary-care physicians about 40 and 86 per cent; total-body examination for suspicious lesions: 72 per cent by general practitioners, 97 per cent by skin specialists	US Preventive Services Task Force evidence reviews [16, 17]
	Dermoscopy against the naked eye	Relative diagnostic odds ratio 15.6 (9.0 after removing two outlying studies); the Cochrane review found adding dermoscopy to in-person inspection raised both sensitivity and specificity	Vestergaard 2008 [18]; Dinnes 2018 [19]
	Ugly duckling sign	Sensitivity 0.86 (0.89 in experts), specificity 0.96 for clinical and 0.95 for dermoscopic images	Gaudy-Marqueste 2017 [20]
Is this red leg cellulitis?	The diagnosis as made by the admitting team	39 per cent of inpatients received an alternative diagnosis from a specialist, 68 per cent of them non-infectious, stasis dermatitis the commonest; 34 per cent pseudocellulitis in a	Cutler 2023 [21]; Li 2018 [22]

Question	Finding	Likelihood ratio or accuracy	Source
		randomised consultation trial	
	ALT-70 score (asymmetry, leucocytosis, tachycardia, age 70 or over)	Score 0 – 2: 83 per cent probability of pseudocellulitis; 5 – 7: 82 per cent probability of cellulitis	Raff 2017 [23]
Is this a necrotising soft-tissue infection?	Fever · haemorrhagic bullae · hypotension	Fever sensitivity 46 per cent, specificity 77 per cent; bullae and hypotension each poorly sensitive — no sign excludes it	Fernando 2019 [24]
Is this blistering disease pemphigus?	Nikolsky's sign, direct · marginal	Sensitivity 38 per cent, specificity 100 per cent · sensitivity 69 per cent, specificity 94 per cent	Uzun 2006 [25]
Is this scaly plaque psoriasis?	Auspitz's sign	Seen on removing fewer than 18 per cent of psoriatic scales; neither sensitive nor specific	Bernhard 1990 [26]
Can an algorithm read the lesion?	AI classifiers against clinicians, pooled	AI sensitivity 87.0 per cent, specificity 77.1 per cent; all clinicians 79.8 and 73.6; expert dermatologists 84.2 and 74.4 — comparable to the algorithm	Meta-analysis 2024 [27]
	Smartphone apps	One app: sensitivity 80 per cent, specificity 78 per cent, in small, poor-quality studies with clinician-selected lesions — and likely overestimated	Freeman 2020 [28]; Deeks 2020 [29]
	Elastic-scattering spectroscopy device (FDA-authorized 2024)	Sensitivity 95.5 per cent, specificity 32.5 per cent in the pivotal study; melanoma 87.5, basal cell 97.8, squamous 98.7 per cent, specificity 20.7 per cent in a second	Pivotal trial 2023 [30]
	Dermatology AI on dark skin	Area under the curve fell 29 – 40 per cent on a diverse, biopsy-proven image set; fine-tuning on it closed the gap	Daneshjou 2022 [31]

Three things stand out. **The naked eye is a poor screen for melanoma and a good one only in trained hands:** a primary-care physician's inspection finds four melanomas in ten, a specialist's finds nearly all suspicious lesions, and the dermatoscope multiplies the odds of a correct call by an order of magnitude — the instrument, not the eye, is what training buys. **The commonest inpatient dermatological diagnosis is wrong four times in ten,** and the four questions of the ALT-70 do what

the erythema cannot. And **the algorithm has reached expert level on the images it was trained on and falls a third short on the skin it was not** — the first autonomous system now decides without a doctor, in a health service that has measured it, while the smartphone apps have been shown not to be trusted.

The examiner is the limiting reagent

The melanoma figures above are the plainest demonstration in the whole series that the same examination gives different answers in different hands: 72 per cent against 97 per cent for the same lesions and the same patients, depending on whether the examiner was a general practitioner or a skin specialist [17]. The cellulitis literature adds that the error is not one of skill alone but of framing — a red leg is called cellulitis by the admitting physician and stasis dermatitis by the dermatologist, and a randomised trial of early dermatology consultation changed the diagnosis in a third of patients and their antibiotics with it [21, 22]. The acne and eczema scores add the remedy: the same raters who agree at kappa 0.3 on a global impression agree at 0.87 when they count [10], and residents who were unreliable on a global assessment were reliable on the area-and-severity index [8].

Technique changes the answer

- **Undress the patient and use the light.** The lesion that matters is found on the back, the scalp, the sole or the genitals of a patient who came about something else; the melanoma reviews assume a total-body examination [16, 17].
- **Describe with the vocabulary and measure with the ruler.** The reproducible descriptors are the structural ones; the reproducible severity scores are the ones that count and measure — PASI, EASI, a lesion count — not the global impression [6, 8, 10].
- **Put the dermatoscope on every lesion in doubt,** and learn one algorithm well; it multiplies the diagnostic odds and raises the concordance of a remote opinion from a kappa of 0.60 to 0.74 [12, 18, 19].
- **Compare the mole with the patient's other moles;** the ugly duckling reproduces across observers and adds specificity that the ABCD rule lacks [11, 20].
- **Elicit Nikolsky's sign on uninvolved skin** and record which form was used; the direct sign is specific, the marginal sign sensitive [25].
- **Ask the four ALT-70 questions** before writing 'cellulitis', and draw the line [23].
- **Photograph with a ruler and a date;** patient-taken smartphone photographs score eczema as reliably as the clinic visit, and change over time is the strongest melanoma sign [9].
- **Use an application, not the rule of nines,** for the burn area [14].

What has changed, 2020 – 2026

The algorithm reached the clinic and then the regulator. The pooled comparison of artificial intelligence with clinicians on skin-cancer images found the algorithms at 87 per cent sensitivity and 77 per cent specificity, ahead of clinicians as a whole and level with expert dermatologists [27]; a systematic review of human–AI interaction found the combination beat either alone [32]. In January

2024 the US Food and Drug Administration authorised the first hand-held device for skin-cancer detection in primary care, a spectroscopic probe rather than a camera, with a sensitivity in the mid-nineties and a specificity of 21 to 33 per cent — a rule-out tool whose false positives are the price of its sensitivity [30, 33]. In 2025 a deep-learning system became the first artificial intelligence legally authorised to make an autonomous clinical decision on skin cancer in Europe, discharging benign lesions in an English hospital without a dermatologist's review, with a reported melanoma pathway sensitivity of 97 per cent; in 2026 it was certified for use on a smartphone [34, 35, 36].

The skin-tone gap was measured. When three state-of-the-art dermatology classifiers were tested on a curated, biopsy-proven image set with diverse skin tones, their area under the curve fell by 29 to 40 per cent, with dark skin and uncommon diseases driving the fall; fine-tuning on diverse images closed the gap, and the tuned models then beat dermatologists on malignancy in dark skin [31]. The lesson has since been extended to the images the models are trained on and to the synthetic images now generated to teach them, which under-represent dark skin and diagnose it poorly [37]. For an examiner in a population where most skin is type IV to VI, this is the central finding of the decade: the algorithm's numbers belong to the skin it learned.

The smartphone was tested and found wanting, then made useful in a different role. The 2020 systematic review of algorithm-based apps found small, poor-quality studies with clinician-selected lesions and concluded that none could be relied on to detect melanoma [28, 29]. The same phone, used to send a photograph to a dermatologist, gives a concordance with the face-to-face diagnosis that rises from 79 per cent with an unassisted patient image to 87 per cent with a resident's, and to a kappa of 0.74 with a dermoscopic attachment [12, 13]; a 2023 validation showed patients' own photographs scoring mild-to-moderate eczema as reliably as the clinic [9]; and three-dimensional total-body photography, reviewed in 2025, now maps every lesion for the change the ABCDE rule's fifth letter depends on [38].

The red leg acquired a score and a consultation. The 2023 meta-analysis put the inpatient misdiagnosis of cellulitis at 39 per cent, the randomised trials of dermatology consultation showed the diagnosis changing in a third and antibiotics with it, and the ALT-70 score, validated at presentation and again at 24 and 48 hours, gives the non-dermatologist the four questions that carry the specialist's judgement [21, 22, 23, 39].

Part 3 — Practical synthesis for teaching

- Teach the examination as the whole skin in good light with the patient undressed, in a fixed order, before any lesion is discussed. Most of what is missed is missed because it was never looked at.
- Teach the vocabulary as a discipline and the ruler as an instrument: a lesion is described in primary morphology, secondary change, colour, measured size, border, surface, configuration and distribution, and only then named.

- Teach the dermatoscope early and one algorithm well; it is the single training investment with the largest measured effect on accuracy, and it makes the student's photograph worth sending.
- Teach the three filters for the pigmented lesion — ABCDE, the ugly duckling, EFG — and that change is the strongest of them; teach students to photograph rather than to remember.
- Teach the red leg with the four questions and the drawn line, and that bilateral cellulitis is a contradiction in terms.
- Teach the signs by their numbers: Nikolsky's direct sign rules in and does not rule out, Auspitz's sign does neither, the ugly duckling does both, and no single sign excludes a necrotising infection.
- Teach the algorithm as a colleague whose training set is the question: ask what skin it learned before trusting its answer on this patient's, and teach students to keep examining the skin the models have not seen.

References

1. Interobserver agreement on dermoscopic features and their associations with in situ and invasive cutaneous melanomas. *Acta Derm Venereol*. <https://medicaljournalssweden.se/actadv/article/view/281>
2. Dermoscopic findings in intraepidermal carcinoma: an interobserver agreement study. *Dermatol Pract Concept*. <https://dpcj.org/index.php/dpc/article/view/3037>
3. Corona R, Mele A, Amini M, et al. Interobserver variability on the histopathologic diagnosis of cutaneous melanoma and other pigmented skin lesions. *J Clin Oncol* 1996;14:1218–23.
4. Fitzpatrick skin type self-reporting versus provider reporting: a single-center, survey-based study. *J Clin Aesthet Dermatol*. <https://jcadonline.com/fitzpatrick-skin-type-self-versuss-provider/>
5. A novel method to determine patient skin type: the Skin Analyzer. 2023. <https://pubmed.ncbi.nlm.nih.gov/37829105/>
6. Cabrera R, et al. Inter-observer reliability of the PASI in a clinical setting. *Australas J Dermatol* 2015;56:100–2.
7. Fink C, et al. Intra- and interobserver variability of image-based PASI assessments in 120 patients suffering from plaque-type psoriasis. *J Eur Acad Dermatol Venereol* 2018;32:1314–9.
8. Assessment of intra- and inter-rater reliability of three methods for measuring atopic dermatitis severity: EASI, objective SCORAD, and IGA. *Dermatology* 2017;233:248–55; and How adequately is the severity of atopic dermatitis assessed by resident physicians training in dermatology? *Acta Derm Venereol*.
9. Mild to moderate atopic dermatitis severity can be reliably assessed using smartphone-photographs taken by the patient at home: a validation study. 2023. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9907712/>
10. The appropriate grading tool to assess acne severity in face-to-face consultation and digital skin images. 2025. <https://www.philippinemedicalassociation.org/wp-content/uploads/2025/07/2-The-Appropriate-Grading-Tool-to-Assess-Acne-Severity-in-Face-to-Face-Consultation-and-Digital-Skin-Images.pdf>
11. Scope A, Dusza SW, Halpern AC, et al. The 'ugly duckling' sign: agreement between observers. *Arch Dermatol* 2008;144:58–64.
12. Use of smartphones for early detection of melanoma: systematic review. *J Med Internet Res* 2018;20:e135.
13. Teledermatology diagnostic accuracy: a randomized cohort study comparing three image acquisition techniques. 2025. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC12488292/>
14. Evaluation of a smartphone application as a method for calculating total body surface area burned. *J Burn Care Res* 2022 (abstract 56). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8946009/>
15. Whited JD, Grichnik JM. Does this patient have a mole or a melanoma? *JAMA* 1998;279:696–701.
16. US Preventive Services Task Force. Screening for skin cancer: evidence review and recommendation statement. <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/skin-cancer-screening>

17. Screening for skin cancer. In: Extending Medicare coverage for preventive and other services. National Academies Press. <https://www.ncbi.nlm.nih.gov/books/NBK225245/>
18. Vestergaard ME, Macaskill P, Holt PE, Menzies SW. Dermoscopy compared with naked eye examination for the diagnosis of primary melanoma: a meta-analysis of studies performed in a clinical setting. *Br J Dermatol* 2008;159:669–76.
19. Dinnes J, Deeks JJ, Chuchu N, et al. Dermoscopy, with and without visual inspection, for diagnosing melanoma in adults. *Cochrane Database Syst Rev* 2018;(12):CD011902; and Visual inspection for diagnosing cutaneous melanoma in adults, CD013194.
20. Gaudy-Marqueste C, Wazaefi Y, Bruneu Y, et al. Ugly duckling sign as a major factor of efficiency in melanoma detection. *JAMA Dermatol* 2017;153:279–84.
21. Cutler TS, et al. Prevalence of misdiagnosis of cellulitis: a systematic review and meta-analysis. *J Hosp Med* 2023;18:254–61.
22. Li DG, Xia FD, Khosravi H, et al. Outcomes of early dermatology consultation for inpatients diagnosed with cellulitis. *JAMA Dermatol* 2018;154:537–43.
23. Raff AB, Weng QY, Cohen JM, et al. A predictive model for diagnosis of lower extremity cellulitis: a cross-sectional study. *J Am Acad Dermatol* 2017;76:618–25.
24. Fernando SM, Tran A, Cheng W, et al. Necrotizing soft tissue infection: diagnostic accuracy of physical examination, imaging, and LRINEC score — a systematic review and meta-analysis. *Ann Surg* 2019;269:58–65.
25. Uzun S, Durdu M. The specificity and sensitivity of Nikolskiy sign in the diagnosis of pemphigus. *J Am Acad Dermatol* 2006;54:411–5.
26. Bernhard JD. Auspitz sign is not sensitive or specific for psoriasis. *J Am Acad Dermatol* 1990;22:1079–81.
27. A systematic review and meta-analysis of artificial intelligence versus clinicians for skin cancer diagnosis. *NPJ Digit Med* 2024;7:125.
28. Freeman K, Dinnes J, Chuchu N, et al. Algorithm based smartphone apps to assess risk of skin cancer in adults: systematic review of diagnostic accuracy studies. *BMJ* 2020;368:m127.
29. Deeks JJ, Dinnes J, Williams HC. Sensitivity and specificity of SkinVision are likely to have been overestimated. *J Eur Acad Dermatol Venereol* 2020;34:e582–3.
30. DermaSensor pivotal study and FDA de novo authorisation (DEN230008), January 2024. https://www.accessdata.fda.gov/cdrh_docs/pdf23/DEN230008.pdf
31. Daneshjou R, Vodrahalli K, Novoa RA, et al. Disparities in dermatology AI performance on a diverse, curated clinical image set. *Sci Adv* 2022;8:eabq6147.
32. Human–AI interaction in skin cancer diagnosis: a systematic review and meta-analysis. *NPJ Digit Med* 2024;7:78.
33. AI device effectively identifies skin lesions in primary care. *Medscape*, 2024. <https://www.medscape.com/viewarticle/ai-device-effectively-identifies-skin-lesions-primary-care-2024a1000ii4>
34. Chelsea and Westminster Hospital leads the way with world-first autonomous AI technology to speed up life-saving skin cancer checks. NHS, 2025. <https://www.chelwest.nhs.uk/about-us/news/chelsea-and-westminster-hospital-leads-the-way-with-autonomous-ai-technology-to-speed-up-life-saving-skin-cancer-checks>
35. DERM performance (company-reported; NHS England-commissioned evaluation). <https://skin-analytics.com/ai-pathways/derm-performance/>
36. Digital medical device for cancer detection certified for smartphone use. *Med-Tech Insights*, June 2026. <https://med-techinsights.com/2026/06/16/digital-medical-device-for-cancer-detection-certified-for-smartphone-use/>
37. AI-generated dermatologic images show deficient skin tone diversity and poor diagnostic accuracy: an experimental study. *J Eur Acad Dermatol Venereol* 2025. <https://onlinelibrary.wiley.com/doi/10.1111/jdv.20849>
38. 3D total body photography as a promising innovation for early skin cancer detection: scoping review. 2025. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC12710984/>
39. The ALT-70 cellulitis model maintains predictive value at 24 and 48 hours after presentation. *J Am Acad Dermatol* 2019. <https://pubmed.ncbi.nlm.nih.gov/30914341/>

Caveats

The Whited and Grichnik row is qualitative because the checklists' sensitivity and specificity figures were not retrieved from the paper itself. The Cochrane dermoscopy review's summary sensitivities and specificities are likewise reported in words; Vestergaard's relative odds ratio is the numerical comparison used. The autonomous AI's melanoma sensitivity is company-reported from an NHS-commissioned evaluation, not a peer-reviewed diagnostic-accuracy study, and is labelled as such. The acne kappa values come from a regional journal. Where a reference is given by title and address only, the search results did not return an author list; check before distribution.