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## REVIEW



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# Global Guidelines in Dermatology Mapping Project (GUIDEMAP)—A systematic review of the methodological quality of contact dermatitis clinical practice guidelines

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## Abstract

The Global Guidelines in Dermatology Mapping Project (GUIDEMAP) assesses the methodological quality of clinical practice guidelines (CPGs) for high-burden skin diseases. This review focuses on contact dermatitis. We searched MEDLINE, Embase, PubMed, Web of Science, Cochrane Library, Emcare, Epistemonikos, PsycINFO and Academic Search Premier for CPGs published between 1 November 2018 and 1 November 2023. Prespecified guideline resources were hand searched. Two authors independently undertook screening, data extraction and quality assessments. Instruments used were the Appraisal of Guidelines for Research and Evaluation (AGREE) II Reporting Checklist, the U.S. Institute of Medicine's (IOM) criteria of trustworthiness, The Agency for Healthcare Research and Quality's National Guideline Clearinghouse Extent Adherence to Trustworthy Standards (NEATS) Instrument and Lenzer's Red Flags. Twenty five CPGs were included, exhibiting heterogeneity in both the topics they addressed and their methodological quality. Whereas the CPGs on management of hand eczema from Denmark, Europe and the Netherlands scored best, most CPGs fell short of being clear, unbiased, trustworthy and evidence-based. Disclosure of conflicts of interest scored well, and areas needing improvement include 'strength and wording of recommendations', 'applicability', 'updating' and 'external review'. Adhering to AGREE II and Grading of Recommendations, Assessment, Development and Evaluations (GRADE) enhances methodological quality.

## KEYWORDS

allergic contact dermatitis, contact dermatitis, clinical practice guidelines, hand dermatitis, irritant contact dermatitis, orthoergic dermatitis

## 1 | INTRODUCTION

In 2021 we published a scoping review on clinical practice guidelines (CPGs) of the 12 most burdensome dermatological conditions

measured with disability adjusted life years (DALYs), which included contact dermatitis.<sup>1</sup> Previously there was a notable concern recognised on the accessibility of CPGs.<sup>1</sup> A desire was expressed for the establishment of an online repository specifically for comprehensive dermatology guidelines, aiming to enable swift access in clinical settings. To address this, there was an acknowledged need to compile

Esther J. van Zuuren and Bernd W. M. Arents contributed equally to this work.

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internationally available CPGs for common dermatological diseases. An online repository may minimise research redundancy, identify high-quality CPGs and offer a summarised resource of methodological appraised CPGs for patients and clinicians. Additionally, it draws attention to areas that can be improved, such as accurate and comprehensive reporting and adherence to standards for guideline development. Furthermore, by providing a freely accessible global platform, this resource would significantly contribute to dermatological education and reference, particularly benefiting clinicians in resource-poor countries.<sup>1</sup> The scoping review marked the commencement of the Global Guidelines in Dermatology Mapping project (GUIDEMAP).<sup>2</sup> The objective of GUIDEMAP is to collate the available CPGs, critically appraise their quality, and to create a global dermatology guidelines repository.<sup>1</sup> Teams were formed to identify and appraise the methodological quality of CPGs per condition. We have previously published the first systematic review in this series for atopic dermatitis,<sup>3</sup> followed by successive systematic reviews of CPGs on psoriasis, alopecia areata and urticaria.<sup>4-6</sup> In this review we focussed on contact dermatitis, which is a prevalent inflammatory skin condition. The lifetime prevalence of contact dermatitis in the general population is estimated at 15%.<sup>7</sup> Contact dermatitis develops as a result of either repeated exposure to substances that cause an allergic reaction or by exposure to irritants that damage the skin barrier, both leading to inflammation of the skin.<sup>8,9</sup> Contact dermatitis encompasses many different types, including allergic contact dermatitis, irritant contact dermatitis, photoallergic contact dermatitis, phototoxic contact dermatitis and protein contact dermatitis.<sup>8,10-12</sup> Irritant contact dermatitis appears to be more common than allergic contact dermatitis, but the epidemiology of contact dermatitis is influenced by trends in domestic and occupational exposure, technological advancements and regulatory measures.<sup>8,10,13-15</sup> It was estimated that in 2017 there were approximately 221 million new cases of contact dermatitis and 79 million people living with the condition in 195 countries and territories globally.<sup>10,16</sup> The clinical symptoms of contact dermatitis can present in a variety of ways, and it is possible for patients to experience multiple subtypes of the condition simultaneously.<sup>12,13,17</sup> The hands are most commonly affected, with irritant contact dermatitis (70%) being the leading cause followed by allergic contact dermatitis (25%) and to a lesser extent protein contact dermatitis (5%).<sup>15,18</sup> The COVID-19 pandemic, due to mandatory use of antiseptics and personal protective equipment such as gloves, highlighted the importance of preventing and managing occupational skin disease, and its consequences.<sup>19,20</sup> Importantly, contact dermatitis is responsible for 95% of all cases of occupational skin diseases and can lead to significant health and socioeconomic burden, especially among healthcare workers, hairdressers, beauticians and metal and construction workers.<sup>12,13,17-22</sup> Contact dermatitis can have a long-term negative impact on the quality of life of patients by adversely affecting their emotional well-being, social interactions, work productivity and daily activities.<sup>8,12,15,17,18</sup> Considering all the aforementioned factors, CPGs have a pivotal role in managing contact dermatitis and improving the well-being of affected patients. The methodology for developing a CPG is laid down in the Appraisal of Guidelines for Research & Evaluation

(AGREE)<sup>23</sup> and the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Evidence to Decision Framework.<sup>24</sup>

The objective of this review is to critically appraise the methodological quality of available CPGs on contact dermatitis.<sup>1</sup>

## 2 | METHODS

This systematic review adheres to the guidelines set out in the 2020 PRISMA statement.<sup>25</sup> It follows the pre-established protocol available on the Open Science Framework.<sup>26</sup>

### 2.1 | Eligible studies

All CPGs related to contact dermatitis, which had been created by various organisations at local, regional, national or international level, including those affiliated with governmental organisations were eligible for inclusion. We excluded consensus statements that were based solely on expert opinions, single-author documents, CPGs that did not provide recommendations, standalone treatment algorithms, summaries, reviews and duplicate publications.<sup>26</sup>

### 2.2 | Literature search

We conducted a comprehensive search covering the period from 1 November 2018 until 1 November 2023 for relevant literature using multiple bibliographical databases, including MEDLINE (OVID version), Embase (OVID version), PubMed, Web of Science, Cochrane Library, Emcare (OVID version), Epistemikos, PsycINFO (EbscoHOST version) and Academic Search Premier. Whenever possible, the Canadian Agency for Drugs and Technologies in Health (CADTH) filter was applied, which is specifically designed for identifying guidelines.<sup>27</sup> The concept contact dermatitis was combined with the guidelines-terms from the CADTH-filter. We used not only controlled subject terms for contact dermatitis, but also several free text terms and synonyms. The search strategy was optimised for all of the databases, taking into account the differences of the various controlled vocabularies as well as the differences of database-specific technical variations (e.g., the use of quotation marks). Animal-only studies and conference abstracts were excluded. The search was performed on 7 November 2023 by an information specialist (JWS) and results were deduplicated before being presented to the reviewers. Appendix 1 in the Supplement provides a detailed description of the search strategy. Two reviewers (EJvZ/ZF) independently screened the search results based on title, abstract and keywords via the Rayyan platform.<sup>28</sup> Any discrepancies were resolved by a third independent reviewer (BWMA). Additionally, two reviewers (EJvZ/BWMA) performed a manual search of guideline repositories, such as Guidelines International Network (G-I-N), National Institute for Health and Care Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), Turning Research into Practice (TRIP), DynaMed, and Emergency Care Research Institute

(ECRI). These two reviewers also independently searched over 200 websites of Dermatological societies that are members of the International League of Dermatological Societies (ILDS), and contacted 110 societies per email to inquire about the availability of eligible guidelines. No language restrictions were applied. Reports deemed eligible were retrieved in full text (EJvZ). Two reviewers (EJvZ/ZF) assessed their eligibility, and any differences were resolved with a third reviewer (BWMA) to consolidate a joint decision. In addition, we checked all the references of included CPGs (EJvZ) for additional eligible reports.

## 2.3 | Methodologies for appraisal

In the protocol,<sup>26</sup> which was published in 2019 at the beginning of the scoping review,<sup>1</sup> it was outlined that three instruments would be used to assess the methodological quality of identified guidelines, modelled on a review by Eady et al.<sup>29</sup>: the AGREE II Reporting Checklist,<sup>23</sup> the US Institute of Medicine (IOM, since 2015 the National Academy of Medicine) criteria of trustworthiness<sup>30</sup> and Lenzer's Red Flags.<sup>31</sup>

In November 2022, GUIDEMAP decided to make an amendment to the protocol, replacing the IOM-criteria with the Agency for Healthcare Research and Quality's National Guideline Clearinghouse Extent Adherence to Trustworthy Standards (NEATS) Instrument, given its validation.<sup>32</sup> The NEATS instrument builds upon the IOM-criteria and the AGREE II framework. See Table 1 for details on the four instruments that were used.

To maintain consistency with our earlier published work we chose to retain the IOM-criteria that we had previously included, making it also possible to calculate correlations between IOM and NEATS. Blinded assessments were conducted independently by four authors (EJvZ, BWMA, SV and ZF), working in pairs.

## 2.4 | Data extraction and management

To describe the characteristics of the included CPGs, we used the datasheet of our previous systematic review of CPGs on atopic dermatitis.<sup>3</sup> We extracted the following items: country; organisation producing the CPG; type of contact dermatitis; year of publication; geographical region; language; topics covered in CPG; publication source; sociodemographic index; funding source; accessibility of CPG; patient involvement; use of AGREE II; use of GRADE. The assessment of CPGs with the AGREE II tool was conducted through the online AGREE PLUS platform.<sup>33</sup> Once the appraisals were completed, the scoring (ranging 1 to 7) was unblinded. In situations where there was a difference of more than two points in scoring of any of the 23 items, the reviewers discussed and resolved the discrepancy. The consolidated data obtained from AGREE PLUS were exported into a datasheet, with scores per item and domain scores expressed as a percentage (ranging from 0% to 100%, as per AGREE II methodology), and graded accordingly. The grading followed our protocol as: excellent ( $\geq 70\%$ ), average ( $\geq 50\%$

and  $< 70\%$ ) and poor ( $< 50\%$ ). We deliberately did not assign an overall grade to the CPGs, as it would not adequately reflect the diverse strengths and weaknesses inherent in each guideline as we had justified previously.<sup>3,29</sup> As for the IOM-criteria and Lenzer's Red Flags assessments, we reused earlier created evaluation forms for each reviewer, ensuring their assessments were blinded.<sup>3</sup> A new Excel form was developed (BWMA) to evaluate each item of NEATS. Prior to its implementation, the form underwent piloting. After unblinding, any differences in scoring between the reviewers for IOM, Red Flags and NEATS were resolved by discussion.

The NEATS overall scoring followed Burns et al., summing-up the 12 Likert scores and for three items add 5 points when scoring 'yes' and 0 points when scoring 'no' or 'unknown' (score range 12–75).<sup>34</sup> The percentages for NEATS were calculated in exactly the same way as AGREE II does per domain (actual score minus minimum score, divided by maximum score minus minimum score; 0%–100%).

Guidelines in languages other than English, French, German, Spanish, Dutch, Polish and Arabic, were translated using Google translate.

## 2.5 | Statistical analyses

The descriptive statistics based on the datasheets were calculated with Microsoft's Office 365 Excel. Correlations between the four assessment instruments were calculated with the Pearson correlation coefficient, based on the AGREE II sum of domain percentages, the number of IOM items 'fully met', the NEATS total percentage scores, and the number of Red Flags, for which SPSS version 28.0 (IBM, Armonk, NY, USA) for Windows was used.

## 3 | RESULTS

The database search retrieved 1129 records as shown in Figure 1 and Appendix 1 in the Supplement. After removal of duplicate references ( $n = 465$ ), we screened the titles, abstracts and keywords of 664 records, of which 639 were excluded. Full-text copies of the remaining 25 records were obtained for further evaluation. Of these 25 reports, 11 were identified as duplicate publications, and one publication focused on implementation rather than being a CPG, and were therefore excluded.<sup>35–46</sup> The manual search yielded 13 additional reports, one<sup>47</sup> of which did not meet the explicit criteria of a guideline. In total we identified 25 CPGs that met the inclusion criteria (see Figure 1).<sup>48–72</sup>

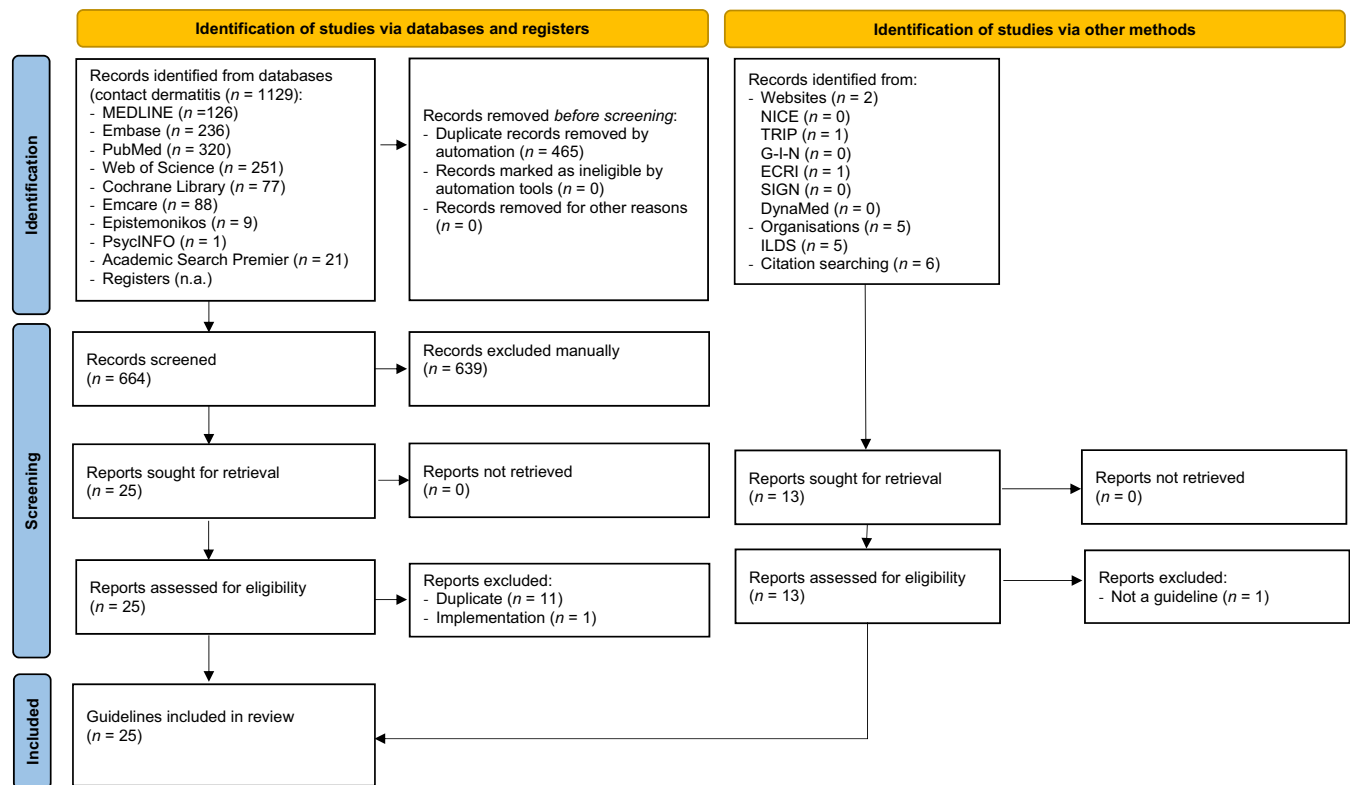
### 3.1 | Characteristics of the included clinical practice guidelines

Details on the guideline characteristics are presented in Table 2. Eight CPGs considered prevention, diagnosis and management,<sup>50,52–55,63,67,70</sup> four covered diagnosis and management,<sup>59,64,68,69</sup> while four focused solely on prevention,<sup>49,51,66,72</sup>

TABLE 1 Assessment instruments and their domains or criteria.

AGREE II <sup>23</sup>	IOM-criteria <sup>30</sup>	NEATS-criteria <sup>32</sup>	Lenzer's Red Flags <sup>31</sup>
23 items within 6 domains	9 criteria	15 criteria within 12 domains	8 items
Domain 1 Item 1-3	Scope and Purpose Criterion 1	Establishing transparency Domain 1 1 criterion	Sponsor(s) is a professional society that receives substantial industry funding
Domain 2 Item 4-6	Stakeholder Involvement Criterion 2	Management of conflicts of interest Domain 2 1 criterion	Sponsor is a proprietary company, or is undeclared or hidden
Domain 3 Item 7-14	Rigour of Development Criterion 3	GDG composition Domain 3 2 criteria	Committee chair(s) have any financial conflict*
Domain 4 Item 15-17	Clarity of Presentation Criterion 4	Systematic review intersection Domain 4 1 criterion	Multiple panel members have any financial conflict*
Domain 5 Item 18-21	Applicability Criterion 5	Establishing evidence foundations Domain 5 3 criteria	Any suggestion of committee stacking that would pre-ordain a recommendation regarding a controversial topic
Domain 6 Item 22-23	Editorial Independence Criterion 6	Rating strength of recommendations Domain 6 1 criterion	No or limited involvement of an expert in methodology in the evaluation of evidence
Overall quality of the guideline (1 to 7)	Overall quality of the guideline (1 to 7) Criterion 7	Articulation of recommendations Domain 7 1 criterion	No external review
Recommended for use (yes, yes with modification, no)	Recommended for use (yes, yes with modification, no) Criterion 8	External review Domain 8 1 criterion	No inclusion of non-physician experts/patient representative/community stakeholders
		Updating procedures Criterion 9	*Includes a panellist with either or both a financial relationship with a proprietary healthcare company and/or whose clinical practice/specialty depends on tests or interventions covered by the guideline.
		Rating strength of recommendations Domain 9 1 criterion	
		Articulation of recommendations Domain 10 1 criterion	
		External review Domain 11 1 criterion	
		Updating procedures Domain 12 1 criterion	

Abbreviation: GDG, Guideline development group.



**FIGURE 1** PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources. ECRI, Emergency Care Research Institute; G-I-N, Guidelines International Network; ILDS, International League of Dermatological Societies; NICE, National Institute for Health and Care Excellence; SIGN, Scottish Intercollegiate Guidelines Network; TRIP, Turning Research into Practice.

six solely on diagnosis,<sup>48,57,58,60–62</sup> two only on management<sup>65,71</sup> and a single one covered both prevention and management.<sup>56</sup> The CPGs varied in the topics addressed. Hand eczema was most frequently covered with 11 CPGs.<sup>50–54,61,64–68</sup> Some were very specific, such as diaper dermatitis,<sup>49</sup> Toxicodendron dermatitis<sup>71</sup> and perianal eczema.<sup>59</sup> Three CPGs focused on the impact of COVID-19, highlighting the adverse effects of increased hygiene measures and protective gear, such as gloves.<sup>51,66,72</sup>

The majority of the CPGs (19/25) originated from countries categorised as having a high socio-demographic index (SDI).<sup>73</sup> Three CPGs were from countries with a high-middle SDI,<sup>48–50</sup> one from middle SDI,<sup>51</sup> while the remaining two CPGs were from countries with a low-middle<sup>66</sup> and low SDI.<sup>69</sup> Fourteen CPGs<sup>48–52,54,55,58–60,63,65,68,69</sup> were in a language other than English, of which six required translation prior to assessment.<sup>48–50,52,63,68</sup>

Europe accounted for 14<sup>52–60,62,65,67,68,70</sup> of the 25 CPGs with Germany having the highest number of contributions (seven CPGs).<sup>54–60</sup> Asia provided six CPGs,<sup>48–50,63,64,66</sup> the USA two,<sup>71,72</sup> Africa and South America both one<sup>51,69</sup> and one included authors from various continents.<sup>61</sup>

Financial support for the CPGs varied. Societies provided funding for nine CPGs,<sup>53–55,58–60,63,65,68</sup> while one CPG obtained financial backing from a governmental entity,<sup>52</sup> and one from an university grant.<sup>50</sup> The guideline makers of four CPGs explicitly stated that they did not receive any funding,<sup>49,51,56,64</sup> while for nine CPGs the funding

sources remained unclear or undisclosed.<sup>48,57,61,62,66,69–72</sup> One CPG received funding from a pharmaceutical company.<sup>67</sup>

Only five CPG groups involved a patient representative.<sup>52–54,58,65</sup> For the development of their guideline, three GPG groups applied AGREE II as well as Grading of Recommendations Assessment, Development and Evaluation (GRADE),<sup>52,53,65</sup> and one guideline used GRADE for only a part of their recommendations.<sup>54</sup>

### 3.2 | AGREE II scoring

Two CPGs on hand eczema (Denmark<sup>52</sup> and The Netherlands<sup>65</sup>) and one on epicutaneous patch testing (Germany<sup>58</sup>) scored 'excellent' for all six domains of the AGREE II reporting checklist. One CPG scored 'poor' on all domains.<sup>69</sup> The remainder showed a large variety in scoring and grading per domain (Table 3). In-depth details per AGREE II-item are presented in Table S1 in the Supplement.

The results per AGREE II domain, reported in median percentages (0%–100%, higher is better) and interquartile range in percentage points, were 'Editorial Independence' (median 71%, Q1–Q3 46%–88%), 'Scope and purpose' (median 67%, Q1–Q3 50%–78%), 'Clarity of presentation' (median 56%, Q1–Q3 44%–69%), 'Stakeholder Involvement' (median 50%, Q1–Q3 33%–61%), 'Rigour of development' (median 36%, Q1–Q3 20%–52%), and 'Applicability' (median 35%, Q1–Q3 21%–46%). See Table S1.

TABLE 2 Characteristics of included CPGs.

Country	Organisation/author(s)	Type of contact dermatitis	Prevention/ diagnosis/ management	Journal/ website	Socio-demographic index	Language	Funding	Open access	In scoping review	Patient involvement	AGREE used <sup>a</sup>	GRADE used <sup>b</sup>
China 2020 <sup>48</sup>	Committee on Allergic Diseases, China Dermatologist Association	Allergic contact dermatitis	Diagnosis	Journal	High-Middle	Chinese	Undisclosed	Yes	No	No	No	No
China 2022 <sup>49</sup>	Yan et al.	Diaper dermatitis	Prevention	Journal	High-Middle	Chinese	None	Yes	No	No	No	No
China 2021 <sup>50</sup>	Scientific Committee of Chinese Dermatologist Association; Committee on Allergic Disease, Chinese Dermatologist Association; China "Hand Eczema Scientific Research Collaboration Group"	Handeczema	Prevention, diagnosis and management	Journal	High-Middle	Chinese	University	No	No	No	No	No
Colombia 2020 <sup>51</sup>	Arenas Soto et al.	Hand eczema	Prevention	Journal	Middle	Spanish	None	Yes	No	No	No	No
Denmark 2020 <sup>52</sup>	Sundhedsstyrelsen (National Board of Health)	Hand eczema	Prevention, diagnosis and management	Journal	High	Danish	Government	Yes	No	Yes	Yes	Yes
Europe 2022 <sup>53</sup>	Thyssen et al.	Hand eczema	Prevention, diagnosis and management	Journal	High	English	Society	Yes	No	Yes	Yes	Yes
Germany 2023 <sup>54</sup>	Deutsche Dermatologische Gesellschaft e.V. (DDG)	Hand eczema	Prevention, diagnosis and management	Website	High	German	Society	Yes	No	Yes	No	Partial
Germany 2021 <sup>55</sup>	Deutsche Dermatologische Gesellschaft e.V. (DDG)	Irritant and allergic contact dermatitis	Prevention, diagnosis and management	Website	High	German	Society	Yes	No	No	No	No
Germany 2021 <sup>56</sup>	Dissemond et al.	Irritant contact dermatitis	Prevention and management	Journal	High	English	None	No	No	No	No	No
Germany 2018 <sup>57</sup>	Geier et al.	Allergic contact dermatitis	Diagnosis	Journal	High	English	Undisclosed	No	No	No	No	No
Germany 2019 <sup>58</sup>	Deutsche Dermatologische Gesellschaft e.V. (DDG)	Allergic contact dermatitis	Diagnosis	Website	High	German	Society	Yes	Yes	Yes	No	No
Germany 2019 <sup>59</sup>	Deutsche Dermatologische Gesellschaft e.V. (DDG)	Perianal dermatitis	Diagnosis and management	Website	High	German	Society	Yes	No	No	No	No
Germany 2021 <sup>60</sup>	Deutsche Dermatologische Gesellschaft e.V. (DDG)	Irritant and allergic contact dermatitis	Diagnosis	Website	High	German	Society	Yes	No	No	No	No
International 2021 <sup>61</sup>	Silverberg et al.	Hand eczema	Diagnosis	Journal	High	English	Undisclosed	Yes	No	No	No	No
Italy 2019 <sup>62</sup>	Stingeni et al.	Allergic contact dermatitis	Diagnosis	Journal	High	English	Undisclosed	Yes	No	No	No	No
Japan 2020 <sup>63</sup>	The Japanese Dermatological Association	Irritant and allergic contact dermatitis	Prevention, diagnosis and management	Journal	High	Japanese	Society	Yes	No	No	No	No

TABLE 2 (Continued)

Country	Organisation/author(s)	Type of contact dermatitis	Prevention/ diagnosis/ management	Journal/ website	Socio-demographic index	Language	Funding	Open access	In scoping review	Patient involvement	AGREE used <sup>a</sup>	GRADE used <sup>b</sup>
Korea 2021 <sup>64</sup>	Kim et al.	Hand eczema	Diagnosis and management	Journal	High	English	None	Yes	No	No	No	No
Netherlands 2019 <sup>65</sup>	Nederlandse Vereniging voor Dermatologie en Veneerologie (NVDV)	Hand eczema	Management	Website	High	Dutch	Society	Yes	No	Yes	Yes	Yes
Pakistan 2020 <sup>66</sup>	Masood et al.	Hand eczema	Prevention	Journal	Low-middle	English	Undisclosed	Yes	No	No	No	No
Spain 2020 <sup>67</sup>	Silvestre Salvador et al.	Hand eczema	Prevention, diagnosis and management	Journal	High	English	Pharma	Yes	Yes	No	No	No
Sweden 2022 <sup>68</sup>	Svenska Sällskapet för Dermatologi och Venerologi (SSDV)	Hand eczema	Diagnosis and management	Website	High	Swedish	Society	Yes	No	No	No	No
Togo 2019 <sup>69</sup>	Koussake	Irritant and allergic contact dermatitis	Diagnosis and management	Website	Low	French	Undisclosed	Yes	No	No	No	No
UK 2023 <sup>70</sup>	Yu	Irritant and allergic contact dermatitis	Prevention, diagnosis and management	Website	High	English	Undisclosed	No	No	No	No	No
USA 2022 <sup>71</sup>	Butt et al.	Toxicodendron dermatitis	Management	Journal	High	English	Undisclosed	No	No	No	No	No
USA 2021 <sup>72</sup>	Emergency Care Research Institute (ECRI)	Irritant contact dermatitis	Prevention	Website	High	English	Undisclosed	No	No	No	No	No

<sup>a</sup>Appraisal of guidelines for research and evaluation.<sup>b</sup>Grading of recommendations assessment, development and evaluation.

TABLE 3 Scoring results for AGREE II, Institute of Medicine (IOM) criteria, NEATS and Red Flags.

Guideline <sup>e</sup>	AGREE II domain scores <sup>a</sup>							IOM scoring <sup>b</sup>		NEATS scoring <sup>c</sup>		Red Flags <sup>d</sup>	
	Scope and purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence	Fully met	NEATS %	Red flags	NEATS %	Red flags		
Denmark 2020 <sup>52</sup>	92%	89%	83%	86%	83%	100%	8	87%	0	87%	0		
Netherlands 2019 <sup>65</sup>	89%	89%	80%	89%	77%	92%	8	94%	0	94%	0		
Germany 2019 <sup>58</sup>	86%	75%	75%	75%	79%	83%	9	89%	0	89%	0		
Europe 2022 <sup>53</sup>	94%	86%	97%	94%	65%	100%	9	100%	0	100%	0		
Germany 2023 <sup>54</sup>	61%	75%	57%	78%	58%	88%	6	83%	2	83%	2		
Korea 2021 <sup>64</sup>	83%	56%	52%	56%	35%	83%	1	30%	2	30%	2		
Spain 2020 <sup>67</sup>	78%	56%	36%	64%	6%	75%	2	44%	3	44%	3		
Colombia 2020 <sup>51</sup>	50%	72%	10%	53%	29%	83%	1	38%	1	38%	1		
Germany 2021 <sup>60</sup>	78%	58%	21%	53%	0%	88%	2	35%	2	35%	2		
USA 2022 <sup>71</sup>	67%	47%	48%	72%	40%	71%	2	48%	3	48%	3		
Germany 2021 <sup>55</sup>	67%	61%	57%	69%	33%	88%	3	44%	1	44%	1		
Germany 2019 <sup>59</sup>	69%	53%	36%	64%	29%	88%	4	48%	3	48%	3		
USA 2021 <sup>72</sup>	69%	33%	11%	58%	73%	8%	0	14%	4	14%	4		
Germany 2021 <sup>56</sup>	47%	44%	24%	50%	21%	71%	1	27%	5	27%	5		
China 2022 <sup>49</sup>	75%	14%	45%	67%	25%	21%	1	33%	3	33%	3		
Italy 2019 <sup>62</sup>	69%	56%	38%	39%	38%	63%	1	16%	2	16%	2		
Japan 2020 <sup>63</sup>	64%	50%	45%	67%	46%	21%	0	32%	4	32%	4		
Pakistan 2020 <sup>66</sup>	53%	28%	6%	31%	2%	58%	1	8%	4	8%	4		
Sweden 2022 <sup>68</sup>	50%	39%	43%	47%	25%	46%	1	16%	3	16%	3		
Germany 2018 <sup>57</sup>	42%	42%	16%	44%	21%	54%	1	8%	4	8%	4		
International 2021 <sup>61</sup>	50%	36%	30%	36%	40%	25%	0	8%	6	8%	6		
UK 2023 <sup>70</sup>	33%	17%	24%	50%	35%	46%	1	22%	3	22%	3		
China 2020 <sup>48</sup>	50%	25%	20%	44%	35%	29%	0	8%	3	8%	3		
China 2021 <sup>50</sup>	31%	17%	8%	25%	4%	58%	0	11%	2	11%	2		
Togo 2019 <sup>69</sup>	47%	6%	5%	31%	10%	38%	0	3%	3	3%	3		

Note: See Supplementary data for details per instrument used, and their correlations.

<sup>a</sup>AGREE II scores in percentages per domain; excellent ( $\geq 70\%$ ; green), average ( $\geq 50\%$  and  $< 70\%$ ; yellow) and poor ( $< 50\%$ ; red).

<sup>b</sup>IOM-scoring 'fully met' from 0 to 9 (higher is better).

<sup>c</sup>NEATS-scoring 0%–100% (higher is better).

<sup>d</sup>Red Flags scoring from 0 to 8 (higher is worse).

<sup>e</sup>Sorting based on number of AGREE II domains scoring excellent, average and poor. This is not an absolute ranking from highest to lowest quality.

### 3.3 | IOM scoring

Two CPGs scored 'fully met' on all nine IOM criteria (Europe<sup>53</sup> and Germany<sup>58</sup>) and two on eight criteria (Denmark<sup>52</sup> and The Netherlands<sup>65</sup>). Six guidelines did not score 'Fully met' on any of the criteria: two from China,<sup>48,50</sup> Japan,<sup>63</sup> International,<sup>61</sup> ECRI<sup>72</sup> and Togo.<sup>69</sup> See Table 3.

Ranking the IOM-criteria, 'Management of conflicts of interest' was the best scoring criterion (16/25 'fully met'), followed by 'Transparency' (9/25). The lowest three were 'Establishing evidence foundations', 'Rating strength of recommendations' and 'External review' with only four out of the 25 CPGs meeting these criteria fully. Sixteen did not meet the criteria 'Rating strength of recommendations' and 'External review', and 18 did not on 'Updating procedures'. More details are provided in Table S2 in the Supplement.

### 3.4 | NEATS scoring

Five CPGs scored over 70%: Europe (100%),<sup>53</sup> The Netherlands (94%),<sup>65</sup> Germany (89%),<sup>58</sup> Denmark (87%)<sup>52</sup> and Germany (83%).<sup>54</sup> The five lowest and below 10% were China (8%),<sup>48</sup> Germany (8%),<sup>57</sup> International (8%),<sup>61</sup> Pakistan (8%)<sup>66</sup> and Togo (3%).<sup>69</sup> See also Table 3 and Table S3 in the Supplement.

Based on overall domain scores, the domains 'Disclosure and management of COI' (64%) and 'Disclosure of funding' (52%) were the best scoring and the only ones over 50%. The three lowest scoring domains, and below 30%, were 'Updating' (26%), 'External review' (25%) and 'Patient and public perspectives' (22%) (see Table 3; Table S3).

### 3.5 | Red Flags

Applying Lenzer's Red Flags methodology, two CPGs received no red flags of the possible eight, and scored no 'caution' or 'uncertain': The Netherlands<sup>65</sup> and Europe.<sup>53</sup> The two lowest scoring CPGs were Germany<sup>56</sup> with five red flags and the international CPG<sup>61</sup> with six.

The three best scoring Red Flag domains were 'Any suggestion of committee stacking that would pre-ordain a recommendation' (0 red flags), 'Sponsor(s) is a professional society that receives substantial industry funding' (1 red flag), and 'Committee chair(s) have any financial conflict' (3 red flags). Most of the red flags were for 'No external review' (17/25) and 'No inclusion of non-physician experts/patient representative/community stakeholders' (19/23). More information is found in Table 3 and Table S4 in the Supplement.

### 3.6 | Correlations between AGREE II, IOM, NEATS and Red Flags

From the outset,<sup>26,29</sup> it was decided that multiple instruments would be used, reflecting multiple angles, to assess the methodological

quality of CPGs. Similar to our previous publication on CPGs for atopic dermatitis,<sup>3</sup> we were interested in exploring correlations between the four instruments, especially with the addition of NEATS and its possible correlation with IOM. We found very high correlations between AGREE II and NEATS ( $r = 0.95$ ;  $p < 0.001$ ) and between NEATS and the number of IOM items 'fully met' ( $r = 0.95$ ;  $p < 0.001$ ). AGREE II and NEATS correlated highly with fewer red flags ( $r = -0.74$  and  $-0.75$ , respectively;  $p < 0.001$ ). See Table S5 in the Supplement.

## 4 | DISCUSSION

### 4.1 | Main findings and interpretation

Twenty five CPGs were included encompassing an array of topics such as hand dermatitis, Toxicodendron dermatitis, and contact dermatitis in its broader context. In addition we found CPGs focusing on diagnostics, management and/or prevention, as well as combinations of all three. As a result, the included CPGs are quite heterogeneous, both in topics, as in the aspects of care. Furthermore, the COVID-19 pandemic has had considerable impact on hand hygiene and use of personal protective equipment (PPE), with contact dermatitis emerging as a consequence of these measures, both for the general population and health care providers.<sup>19,20,51,66,72</sup> Therefore, besides general public health information, specific recommendations regarding COVID-19 and its association with contact dermatitis have been developed. The profound influence of the pandemic was clearly evident in the latest developed guidelines.<sup>51,66,72</sup> We also found that of the 25 guidelines, seven were developed by healthcare professionals from Germany, highlighting their valuable contribution to the body of knowledge in this field.<sup>54-60</sup> The assessed methodological quality of these guidelines is directly related to their staging (indicated as S1-S3),<sup>74</sup> from consensus based (S1) to completely evidence based (S3). It is therefore not surprising that an S3 guideline<sup>58</sup> scored better than S1.<sup>55,59,60</sup>

The guidelines that scored the highest, as assessed with our four instruments, are the CPGs on management of hand eczema from Denmark, Europe and the Netherlands.<sup>52,53,65</sup> This could be attributed in part to the fact that hand eczema is a relatively well-defined topic. However, these guidelines also incorporated patient involvement, and adhered to the AGREE II and GRADE methodology, all contributing to their high scores.

In contrast to our appraisal of atopic dermatitis guidelines,<sup>3</sup> the AGREE II domain of 'Editorial independence' scored excellent in more than half of the CPGs on contact dermatitis (14/25). This was consistent with the IOM criteria 'Transparency' and 'Management of conflicts of interest', the second item of NEATS ('Disclosure and Management of conflicts of interest'), and the low number of red flags for conflicts of interest. This may be due to the fact that most of the diagnostics and therapeutics for contact dermatitis do not pose a conflict of interest, unlike atopic dermatitis with new and emerging therapies. Similar to the atopic dermatitis CPGs review, the AGREE II

domains 'Rigor of development' and 'Applicability' received the lowest scores.

The IOM criteria 'Rating strength of recommendations', 'Updating procedures' and 'External review' were least met. The last two criteria were also found to be the least met in the review of the atopic dermatitis CPGs.<sup>3</sup> Still, those could be easily met by including an expiry date or updating statement, as well as seeking external review.<sup>3</sup> The IOM criterion 'Guideline development composition group' (GDG), refers to a multidisciplinary group including methodological experts, as well as patient and public involvement.<sup>30</sup> It scored 7/25 'fully met' and 12/25 'partially met'. However, in the NEATS instrument these components are split into separate items: 'Multidisciplinary group', 'Involvement of a methodological expert' and 'Patients, carers, and public involvement'.<sup>32</sup> Notably, it becomes clear that the items 'involvement of a methodological expert' and 'patients, carers, and public involvement' especially scored poorly, as confirmed by the number of red flags raised for the similar items. On the other hand, the IOM standards for the criterion 'guideline development composition group' yielded relatively better scores, with 'partially met' being the most common rating for 12 out of 25 CPGs, masking these deficiencies. This refinement of the NEATS instrument in comparison to the IOM standards represents a significant improvement, particularly in assessing these aspects.

## 4.2 | Applicability and future perspectives

CPGs on contact dermatitis are essential for healthcare providers in helping patients to make informed decisions about their care.<sup>1,29</sup> Developing CPGs for contact dermatitis poses significant challenges. First, the definition of contact dermatitis covers various types, each having distinct aetiologies, including causative factors like allergens and irritants, for instance.<sup>11,12</sup> Second, accurately diagnosing, effectively managing and preventing contact dermatitis can be quite challenging.<sup>11,75</sup> The applicability of these CPGs may vary across different regions and healthcare settings, considering factors such as the local healthcare system, diagnostic and treatment accessibility, locally prevalent contact allergens, and available resources. Ultimately these CPGs are intended to enhance the overall quality of care delivered to individuals and thus enhancing quality of life, including the ability to work.

With our systematic review we address the recognised need highlighted in the introduction. By synthesising the international CPGs which will be made available in the online repository (including the CPGs themselves), our review offers a high quality appraised resource for patients and clinicians reducing research waste particularly benefiting CPG development in resource-poor countries.

When using high-quality guidelines for another local situation, the GRADE-ADOLPMENT,<sup>76</sup> ADAPTE<sup>77</sup> or RAPADAPTE<sup>78</sup> methodologies can also be used. These approaches are particularly applicable to contact dermatitis when the primary strategies involve allergen and irritant avoidance, and the use of topical treatments, all of which can be implemented in various settings, depending on feasibility,

accessibility and affordability. However, local prevalent contact allergies may differ, as reflected in various standardised patch test series.

## 4.3 | Strengths and limitations

A comprehensive search was performed by an experienced information specialist (JWS), utilising multiple databases without any language restriction. In addition, six guideline repositories and over 200 websites of the members of the ILDS were hand searched, and 110 dermatological societies were contacted by email to enquire about their contact dermatitis guidelines. A further strength was that the assessors followed a directed approach for each guideline assessment: AGREE II first (23 items), then NEATS (15 items), then IOM-criteria (9 items), followed by Red Flags (8 items). By doing so, recall issues were reduced as much as possible. To further ensure a comprehensive approach, both in language and appraisal, we engaged in thorough discussions in pairs after unblinding to address any potential arising issues.

As not all societies' websites were online or freely accessible, and only a few have responded to our email, it is possible that some guidelines may have been missed. Although bibliographic databases typically index keywords, abstracts, and titles in the English language, irrespective of the article's original language, guidelines might not have been found as it was not feasible to incorporate terms from all languages spoken worldwide into our literature search. Additionally, guidelines that were not indexed in the predefined databases and online guideline repositories may not have been captured. Furthermore, as per protocol, we hand searched the websites of dermatological societies (ILDS) and not of others, such as occupational healthcare societies. Six guidelines<sup>48-50,52,63,68</sup> required translation, all others were within the language capabilities of the authors. For these six we used Google Translate. This automated translation may have led to missing nuances which could have been important for the appraisal process. Regarding the correlations between the four instruments, there is also a limitation. All four instruments are intended to assess the methodological quality of a CPG. To calculate correlations between those instruments, we added the domain percentages of AGREE II as a total score. This is not advised by AGREE II, as the domains are not relatively weighed. Therefore the sorting in Table 3 is based on the domain scores according to our grading system. For NEATS, of which only two peer-reviewed publications are available, we used the Burns et al. method to calculate the scores.<sup>34</sup> The correlations we found, however, were high to very high, confirming that all four instruments assess the methodological quality of these instruments and are quite in concordance.

In conclusion, we identified 25 CPGs on contact dermatitis that are less than 5 years old. These CPGs are highly heterogeneous in terms of their topics (aetiology of contact dermatitis) and aspects of care (diagnosis, prevention and treatment). Likewise, and not unexpectedly, the methodological quality of these guidelines is equally diverse. We also found that the four instruments used were quite

concordant. We used NEATS for the first time, and it correlated very highly with AGREE II. Whereas the CPGs on management of hand eczema from Denmark,<sup>52</sup> Europe<sup>53</sup> and the Netherlands scored best,<sup>65</sup> most CPGs fell short of being clear, unbiased, trustworthy, and evidence-based to the extent they could and should be. There is ample room for improvement to enhance the methodological quality of CPGs by adhering to the AGREE II and GRADE directives. This includes incorporating quite simple elements such as specifying the date for guideline updates and seeking external review. Domains such as synthesis of evidence, strength and wording of recommendations, and applicability, need more resources to be addressed properly. It is important to note that while the methodological quality of certain CPGs may appear suboptimal for some, this does not necessarily imply that the content is not valuable or useful. Including methodologists and patient representatives during guideline development, would be very welcome, and could benefit patients with contact dermatitis and their quality of life.

This systematic review contributes to the establishment of a freely accessible global platform, aligning with the identified need and benefitting dermatological education by summarising these insights, particularly in resource-poor countries.

#### AUTHOR CONTRIBUTIONS

**Esther J. van Zuuren:** Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; software; formal analysis; project administration; data curation; supervision. **Bernd W. M. Arents:** Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; software; formal analysis; data curation; supervision. **Sofieke Vermeulen:** Writing – review and editing; investigation; methodology. **Jan W. Schoones:** Conceptualization; writing – review and editing; methodology. **Zbys Fedorowicz:** Investigation; methodology; writing – review and editing.

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#### CONFLICT OF INTEREST STATEMENT

B.W.M.A. was a member of the guideline working groups on hand eczema for The Netherlands and the EU. He was not involved in appraising those guidelines. No other authors were involved in any of the included guidelines. Furthermore, none of the authors have any interests to declare.

#### DATA AVAILABILITY STATEMENT

All data are available in the article and Supplementary data.

#### ETHICS STATEMENT

Ethics approval was not required for this systematic review.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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