



Triage education in rural remote settings: A scoping review

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ABSTRACT

Background: Triage is a complex nursing task to prioritise patient care, based on acuity. Triage decisions can affect patient safety and must employ critical thinking. Graduate registered nurses are expected to triage in rural facilities, which is in contrast to current guidelines. The purpose of this review was; to discover how effective education support programs were in developing clinical decision-making skills for graduates at triage; and to determine what is known about triage education support programs for graduate or novice registered nurses undertaking triage in rural and remote settings.

Method: A scoping review was undertaken to identify and analyse primary research articles following PRISMA guidelines, sourced from four electronic databases.

Results: 6158 retrieved articles were found, after duplicate removal and screening against inclusion/exclusion criteria; fourteen articles were included. Themes included ‘variability of triage accuracy and assessment’; ‘education qualifications and experience’; and ‘training and supervision’.

Conclusion: This review demonstrates significant gaps in the literature reporting on this topic area, particularly in the rural context. Common recommendations include standardised triage education strategies, and strategies that account for differences in resourcing levels. Further research is required to attempt to link education strategies in rural contexts to acceptable triage outcomes like triage accuracy.

1. Background

Triage, meaning to “sort” is a complex technical skill performed to determine the significance of the patients’ injury or illness and prioritising those who need immediate treatment [1–4]. It is an autonomous nursing role that involves critical thinking and clinical decision making skills [4–6]. Triage accuracy or more importantly, inaccuracy, has been linked to patient safety outcomes; therefore nurses must be accountable for their decisions [4,7–9]. Since 1994, Australian emergency departments (EDs) have adopted the Australasian Triage Scale (ATS), a five-tiered triage scale to determine clinical priority [7,10–12]. Due to the complexities of the role, triage is typically performed by an experienced ED nurse [5,13]. Literature suggests the efficacy of triage decisions can be attributed to the level of experience the triage nurse possesses [6] and this view is common in practice. To this effect the College of Emergency Nursing Australia’s (CENA) position statement on the role of the triage nurse in Australia, states triage should be performed by an experienced registered nurse (RN) who demonstrates clinical expertise prior to being specifically trained in the role of triage [5], and while this is the norm in metropolitan areas in most emergency settings, this is not always common in rural and remote locations due to resources.

Graduate registered nurses (GRN’s) experience a considerable transition period during their first twelve months of practice [14]. GRN’s are expected to immediately be able to plan, assess, treat and re-assess any patients in their care, and this is true for emergency presentations as well. GRN’s consistently and comprehensively report feeling like they are not ready for autonomous clinical practice [15–19]. Kramer first noted in the 1970’s that GRN’s experience reality shock, as perceptions of the role differ to real life experience [20–22]. Furthermore, evidence suggests GRN’s are more task-oriented and have not yet had the opportunity or experience to refine their critical thinking skills [16,20,23] and therefore this seems to uphold the clinical ideal that only experienced nurses should undertake such an important role as triage.

Graduate RNs who feel overwhelmed in practice often consider leaving the profession [19]. Retention has been linked to the GRN’s experience of their first year, with between 20 and 50% leaving the workforce [17,18,20–22]. To combat this, support programs such as ‘Transition programs’ which encompass education and support are seen to be essential for the development of competent and safe novice RN’s [16,17,19,20,23]. However, transition programs appear to be variable in all aspects (education, content, length and support levels) and may or

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may not address triage.

Triage education in Australia was standardised in 2007, with the Emergency Triage Education Kit (ETEK) developed as the main education resource. Education and support programs for triage are often provided within the urban environment, which is different for many of their rural counterparts. Rural facilities often lack resources and acceptable skill mix [24,25], resulting in GRN's having to immediately work in an extended scope of practice [25] including in triage, often without education or support, within months of their commencement as an RN [25].

The purpose of this review was to 1) discover how effective rural education support programs were in developing clinical decision-making skills in graduate or novice RNs for triage and 2) to determine what is known about triage education support programs for graduate or novice RN's undertaking triage in rural and remote settings.

2. Method for literature review

A scoping review of current literature was executed, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) search guidelines [26]. The PICO terminology used was as follows:

(P)opulation – Graduate/new/novice nurses who triage in a rural setting.

(I)ntervention – Education support for triage.

(C)omparison – Current standards or current practice.

(O)utcome(s) – Effective clinical decision making for patient prioritisation.

Two searches were undertaken. A total of 185 articles were identified through the initial search strategy. Due to the limited number of appropriate articles found (four), a secondary search was conducted using the same database engines, excluding the key word 'rural' and expanding the date range to 2002–2017. Both searches used the following databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Proquest, Embase and Medline. Key words and MeSH terms used were 'triage*', 'nurs*', 'rural', and 'emergency'. The Boolean operators 'AND' was used to combine the terms and further search terms 'train*', 'education', 'program' and 'OR' 'support' were then added and combined. Limiters applied were English language (due to resources available to authors), peer reviewed and a date range of 2007–2017.

Due to the initial lack of appropriate articles for review, an expanded search was undertaken, widening the time frame and including non-rural ED's, therefore not all aspects of the initial PICO could be applied to the second search. Inclusion and exclusion criteria (Table 1) created from the above PICO, were used to filter the articles when applied to title, abstract and full text respectively (Fig. 1). Articles analysed were limited to published research papers and literature reviews. Purpose, method, findings, recommendations and limitations were tabulated for each article, following which, common themes and ideas were then developed.

The second search yielded 6158 articles, 1530 duplicates were identified and removed, leaving 4628 articles (Table 2). Inclusion criteria were the same as for search one, except that articles must have met at least two (rather than all) of the inclusion criteria (Table 1). The article titles were reviewed and 4511 were subsequently excluded as not relevant. The 117 remaining abstracts were then reviewed against the inclusion/exclusion criteria, resulting in 82 articles being excluded. The citation search technique of backward chaining was then undertaken. This involved the researcher reviewing the reference lists for suitable articles [27], which subsequently identified a further five suitable articles. The total 40 articles received a full text review and were paired against the inclusion/exclusion criteria. The result left 14 articles that met criteria (including the four original articles from the first search strategy). The search strategy in its entirety is displayed in Fig. 1. Study characteristics included a mix of quantitative (n = 3), qualitative (n = 6) and literature review (n = 5) papers, from Australia (n = 3),

Table 1

Inclusion/exclusion criteria.

Inclusion Criteria:
Search 1 must address all of the following
Search 2 must address at least two of the following:
o Must be related to emergency triage/emergency care
o Nurses who triage in a rural setting
o Education support systems/programs for triage
o Current standard or practice for triage training
o Effective clinical decision making for patient prioritisation
Exclusion Criteria:
Exclusion for any of the following:
o Any other clinical prioritisation models
o Non-peer reviewed articles
o Non-English articles

Asia (n = 3), Africa (1) and North America (n = 7). In line with the broadened scope of the review, not all of the articles related to rural practice, or GRN's directly but did contribute broadly to the review aims (for example one study excluded both rural and remote areas and GRNs but explored the link between experience and triage accuracy and education strategies) [12].

3. Method of data analysis

A scoping review process was chosen to examine broad ideas, categorize key concepts and identify gaps in the evidence, regardless of the quality of the study [28]. The content analysis was used for the scoping review. Recurring themes were identified and explored; data extrapolated and refined, and checked for validity [29].

4. Results

Three broad themes were identified and included 1) variability of triage accuracy/assessment, 2) lack of education, qualifications and experience required, 3) training and supervision requirement. Table 3 summarises the papers included in this review.

4.1. Variability of triage accuracy/assessment

Recommendations for triage education approaches currently focuses on improving accuracy of triage decision-making, as this is thought to support safe patient outcomes [9,30,31], however there are significant challenges to ensuring or assessing triage accuracy in rural contexts [9]. An Australian study [9] reported that rural triage accuracy increases with acuity. That is, the higher the triage score, the more accurate the triage decision is. The majority of patients triaged are of a lower triage acuity score, which has patient safety, waiting time and department flow implications. There is a tendency to under triage in rural facilities [30] and in non-triage educated control groups [31]. Conversely, the educated experimental group significantly over-triaged [31]. Post-graduate university qualifications had no bearing on rural triage accuracy [9,13], which leads to questioning the best type of education strategy needed for triage training.

While education level may not influence accuracy, whether experience of the nurse does impact triage accuracy is controversial. One qualitative small-scale study that relied on voluntary retrospective self-reflection [32], and a literature review [33], both found that experience improves triage accuracy. However, this was contradicted by a different US study [12], which involved a retrospective clinical audit of triage classification. This study, excluded RN's with less than two-years experience and therefore it is unclear whether this may have impacted on results of the study.

Another factor believed to influence triage accuracy is using a standardised tool. Standardisation is consistently identified as necessary

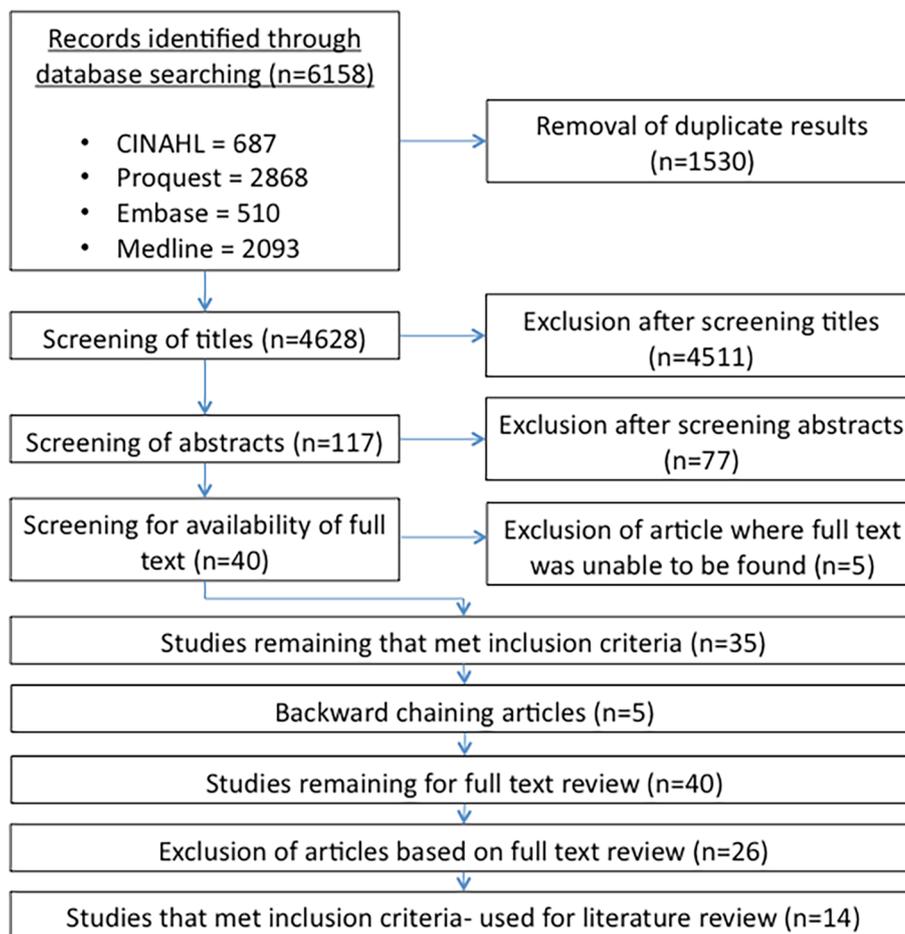


Fig. 1. Search 2 strategy.

Table 2
Search two strategy hits.

Records identified through database searching (n = 6158)	
CINAHL	687
Proquest	2868
Embase	510
Medline	2093

for rural triage accuracy and deemed imperative for quality patient care [11]. A national five-tier standardised triage scale is recommended in Australia [11] and many other countries now also use a five-tier triage scale, including Canada, the UK, Sweden and the USA [34]. Performance indicators are required to measure accuracy and consistency, which should enable accountability for triage nurses [9]. Performance indicators will also support benchmarking with similar sized hospitals [35], for accuracy in clinical prioritisation processes like triage.

4.2. Education qualifications and experience required

Triage inadequacies in rural contexts are often attributed to a lack of education, experience or empathy; all of which can affect patient safety [11]. Whilst not specifically related to triage, one study [25] about GRN’s in the rural setting, reported them to be underprepared for practice, overwhelmed and abandoned. Opinions in the literature propound that with more education and clinical support, GRN’s would feel more supported and prepared for practice [25,36], however this has not been specifically tested.

The effectiveness of triage education and triage tools have been

shown to be more valuable than years of experience [12,31], although this has not been studied in-depth, with only one study focused on GRN’s involvement in triage [25]. There also continues to be a lack of agreement of the amount of experience that is optimal before starting to triage. The majority of the literature suggests between six months and two years of experience is necessary prior to the commencement of rural triage [11,34,36]. For the type of experience that is most valuable, diversity of nursing experience is more highly regarded than ED experience [33]. Smith [33] affirms that rotating a novice nurse such as a GRN into other wards is beneficial for their learning and skill development; and likewise those nurses who have worked in other ward settings bring a breadth of experience and knowledge to the emergency setting and subsequently to triage [33].

4.3. Training and supervision requirement

There is an overwhelming agreement in the literature about a lack of uniformity in and provision of triage training in rural contexts, with repeated calls and recommendations for standardised training. A lack of triage training is related to triage decision inaccuracy [6,13], specifically under-triaging [31]. An example of the lack of triage training is that one Hong Kong study found no specific triage training had occurred for participants, prior to their commencement of triaging [37]; and while anecdotally confirmed as occurring in many rural and remote sites as well, little literature has been found about this issue. No studies professed satisfaction with the amount of triage training available, or said there was unnecessary training provided.

The literature indicates that the introduction of triage protocols is necessary and formal triage training is essential [6,37]. Standardisation

Table 3
Articles included in the review.

Citation	Methodology/Purpose	Methods	Findings	Recommendations	Limitations
Aloyce, Leshabari and Bysiewicz (Tanzania) [6]	Quantitative descriptive cross-sectional & observational study involving 1 national hospital and 3 municipal district hospitals – 66 participants Assess knowledge and skills of triage nurses	Questionnaire Observational checklist triage Equipment audit record	33% poor triage knowledge 58% no knowledge of triage waiting times Lack of triage training related to inaccurate triage decisions Lack of basic triage equipment Need formal training to prepare nurses for triage Need for triage policies and guideline development No formal triage education provided Five-level triage system more effective than three Post university degree qualifications are not necessary for triage effectiveness Staffing ratios, core competencies and level of triage training influence triage accuracy Rural facilities tend to under-triage High percentage of inaccurate triaging Current triage education inadequate Triage education method variable, including interaction teaching (case studies), traditional classroom, (handouts, published articles, self-learning materials), basic level triage assessment skills Only 64/279 participants had ≥ 8hrs triage education	Shows weaknesses in triage processes/ knowledge/training	Not focused solely on the novice nurse in the rural setting
Brown (USA) [13]	Literature Review Review the contribution of nursing research for rural emergency services	Systematic searching of two databases		Standardise triage training processes	Lack of samples for comparison groups Studies available not specifically related to triage or GRN's in rural setting Adult population triage only Simulated environment (no time limit/pressure)
Chen et al. (Taiwan) [30]	Observational study involving 14 hospital EDs in Taiwan – 279 valid questionnaire responses Assess triage accuracy between sites Nursing variables effect on triage accuracy	Cross-sectional survey		Improved triaged education program required	
Chung (Hong Kong) [37]	Qualitative, descriptive study involving 3 EDs – 7 participants Assess contextual influences on triage decision making	Unstructured interviews	Fear, uncertainty, indecision, work pressure influenced triage decisions No formal triage education, participants used guidelines to assist with triaging decisions Essential characteristics: flexibility, autonomy, communication, assertiveness, patience, compassion, listening and prioritization Cognitive characteristics: knowledge, critical thinking, rapid decision making ability No formal triage education provided Consistency of triaging present across sites Triage accuracy increases with acuity but accuracy not influenced between adult and paediatric populations Post bachelor qualifications have no bearing on triage accuracy	Triage protocols and training	Translated into English Limited data, small sample
Cone (USA) [36]	Qualitative, descriptive study involving 2 focus groups – 10 ED nurses Describe characteristics, insight and decision-making of expert emergency triage nurses	Questionnaire		Triage education needed in orientation and continued throughout practice RNs should not start triage training before one year experience	Self-reported Small sample size
Ekins and Morphet (Australia) [9]	Correlational Questionnaire involving 1 Western Australian Country Health Service Region – 46 participants Assess triage decision-making in rural health services	Questionnaire		Need to include diverse rural and remote sites in further studies Performance indicators required for accuracy and consistency	ATS only Questionnaire subjective, lengthy. Incomplete data – skewed No GRN's included in the study Not focused on education/support
Martin et al. (USA) [12]	Qualitative, descriptive study involving 3 EDs – 64 participants To evaluate: – The link between experience and triage accuracy – RN attitudes towards patients and triage	Clinical audit of triage classification	No statistical relationship between experience and triage accuracy No statistical relationship between attitudes and triage accuracy All participants had completed the Emergency Severity Index (triage) training course, however course was not defined	Understanding of triage algorithm only prerequisite for safe triage	Convenience sample Discrepancy in expert reviewers Excluded participants with < two years experience Not focused on education/support

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Table 3 (continued)

Citation	Methodology/Purpose	Methods	Findings	Recommendations	Limitations
McNair (USA) [11]	Discussion Paper To review the 5-level triage acuity scale and determine the cause(s) of triage inadequacies	Education article focusing on supporting opinion claims	Triage inadequacies related to lack of education, experience or empathy Standardised triage scale imperative for quality patient care Risk of cynicism of experienced nurses affecting triage accuracy	Triage education to include systematic assessment, critical thinking skills, documentation, local policies, knowledge of population groups Standardised triage scale to be used Nationally Hospital policies needed to assist ED nurses to avoid "empathy burnout" Transition programs to include leadership support, clinical supervision, development of interprofessional relationships Further study and regulations on graduate transition and implication for patient safety Review of literature post implementation of ATS is necessary	No information regarding scope of review
Mellor and Greenhill (Australia) [25]	Qualitative, grounded theory study involving 3 regions in South Australia – 21 participants Review of clinical support for GRN's in the rural setting	Open dialogue questionnaire	Under prepared for practice Feel overwhelmed and abandoned Need for clinical supervision Education programs for research were not defined	Did not explore in detail all aspects (example triage)	
Pardey (Australia) [35]	Extended literature review To identify themes in the clinical application of the ATS	Specific approaches not reported	National minimal standard of training required Benefits of having computerized comparable data between sites	Review of literature post implementation of ATS is necessary	Method not reported
Peng and Hamad (China) [34]	Literature Review To identify the current status of staff and patient satisfaction with ED triage in China	Integrative review	Triage nurses should undertake specific training and pass examination prior to triaging Education strategies included short courses/workshops, mentorship Staff and patients satisfied with new triage scale	Addition of four-tier triage scale Audit tools be created to evaluate triage	Translated into English
Rankin, Then and Atack (Canada) [31]	Quantitative experimental study – 132 participants Assess if web based learning impacts triage skills	Control and experimental group, with control group having tutorial recommended but not required and experimental group having tutorial mandatory and additional technology based training Questionnaire Chart audit	Improved knowledge and accuracy of triage in experimental group Experimental group had a slightly higher triage accuracy; not statistically significant Control group significantly under-triaging Experimental group significantly over-triaged Education strategy: online Canadian Triage and Acuity Scale (CTAS) course	Further research into the reliability of CTAS	Small scale study
Sanders and Minick (USA) [32]	Qualitative study – 7 participants Explore emergency nurses' perceptions of patient interaction at triage	Semi-structured interviews	ED nurses require experience and knowledge Patient rapport improves accuracy of triage More experienced nurses use subjective visual cues to improve triage accuracy	Education needed to: Improve patient interaction and visual assessment Include simulation and role playing	Small study scale Voluntary participants Retrospective recollections may have been inaccurate/ Not focused on education/support provided Only used one search engine in the literature review Method not reported
Smith (USA) [33]	Discussion Paper Use of revised cognitive continuum theory to understand triage decision-making	Specific approaches not reported	Experience, intuition, patient and peer aided judgment and triage tools improve triage accuracy	Four modes of judgment to be included in educational strategies Novice nurses to rotate through various clinical settings prior to triaging Education strategy to use human patient simulation Use of triage tools Further research to evaluate educational strategies	

of these triage training processes is recommended [13]. Furthermore, Pardey [35] believes there should be a national minimum standard of training required. Peng et al [34] concur, reiterating all nurses should undertake specific training and pass an exam prior to triage, along with the creation of audit tools to evaluate the effectiveness of triage [34].

5. Limitations

As there was no quality appraisal tool used to critically analyse the studies, all evidence was included regardless of the study quality [28]. There was significant variability in the methodology, measures and populations chosen for each study. Most research excluded RN's with minimal experience from their studies; therefore these findings are not conclusive and may be a weakness when interpreting the findings. Most studies were small scale or from a limited geographical area and therefore are not necessarily generalisable. These studies do however, provide evidence to add to the argument for national standardisation for assessment/benchmarking of triage.

6. Discussion

There is a paucity of literature about triage education/support for GRN's in the rural or remote environment. Articles discussing similar issues with an expanded scope were reviewed, in an effort to discover the multiple facets surrounding this issue. Notable themes were the variability of triage accuracy and assessment; education, qualifications and experience; and training and supervision requirements. Rural scope of practice and research requirements were contexts identified in limited articles.

Triage accuracy has historically and anecdotally been linked to the amount of experience an RN has. A conundrum therefore exists for those environments (such as rural EDs) that cannot limit people who triage to being experienced RNs due to resourcing. Variability in triage is seen as a risk to patient safety and much work has been done in developed countries to standardise tools and processes and place parameters around who can and cannot triage and the conditions by which this occurs (e.g. CENA professional standards and ETEK guidelines). It is interesting then that the study by Martin et al showed little relationship between experience and attitude [12], while the study by Cone and Murray showed characteristics expert triage nurses felt were needed for triage [36]. It bears consideration that significant clinical experience can have both positive and negative influences on triage decision-making. Experienced RN's use: intuition, flexibility, communication, assertiveness, patience, compassion and listening, to improve patient connection; and subjective visual cues to improve triage accuracy [32,33,36]. On the other end of the scale, more experienced nurses may become cynical and allow their own biases to influence their triage decisions [11] therefore experience, while valued for decision-making, can also make decisions fallible.

International studies overwhelmingly saw the need for a standardised approach to triage education. Australian triage education has been standardised with the implementation of the ETEK in 2007, however there is a lack of published literature proving its efficacy [9]. Furthermore there is a glaring lack of published research relating specifically to education in the rural ED setting and GRN's at triage. Benchmarking for triage accuracy should be created to assist educators in assessing competency, as well as clinical auditors to identify deficiencies in practice to improve patient safety.

Regardless of level of experience of the nurse all the literature agrees that there is a need for staff to undertake triage training before undertaking the role. However, there is a resounding lack of standardised triage education strategies and types reported in the literature [11,30,32,33,36]. The multiple recommendations identified for standardised triage education include: patient interaction, critical thinking skills, documentation skills, knowledge of population groups, systematic visual assessment [11,32], experience, intuition, patient and

peer aided judgment, triage tools [33], and human patient simulation [32,33].

With technological advancements, it is important to keep education resources applicable and readily available to the triage nurse. This may benefit rural GRN's, who have been found to lack resources and support. Furthermore, support programs could involve key personnel, such as clinical facilitators remoting in to rural areas, to offer assessment, support and feedback services.

7. Conclusion

Triage is a complex role that is being undertaken by GRN's in rural environments, prior to the development of their critical thinking skills and often without support. In attempting to address the purpose of identifying the effectiveness of rural education programs in developing GRN's triage skills, a significant gap in the literature has been identified. The second aim has been able to be partially addressed however shows significant lack of transparency about what education is provided, in what way and how this can be linked to outcomes. This is clearly linked to calls for standardisation of triage scales and education tools and strategies. Further research is required focusing on the education and support program requirements for the novice triage RN in the rural setting. The implementation of such programs that aim to improve GRN support, perceptions and safe triage practices will then require evaluation to measure effectiveness.

8. Conflict of interest

There are no conflicts of interest either financially, personally or organisationally that could inappropriately influence bias in relation to this article.

9. Ethical statement

This literature review does not contravene any ethical guidelines as outlined for authors by Elsevier. Any opinions are the authors own, based on the evidence provided.

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