

Evidence Base of Caries Management by Risk Assessment (CAMBRA)

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Introduction

The concept of Caries Management by Risk Assessment (CAMBRA) is based on the understanding that tooth caries is a bacterially based transmissible infection¹⁻⁴ caused by imbalance between pathological and protective factors⁵. The pathological factors are bacteria, frequency of fermentable carbohydrate intake, salivary dysfunction. The protective factors are saliva flow, topical fluoride, antibacterial agents, salivary proteins, calcium and phosphate⁵. CAMBRA focuses on the assessment of the pathological factors and the subsequent enhancement of the protective factors.

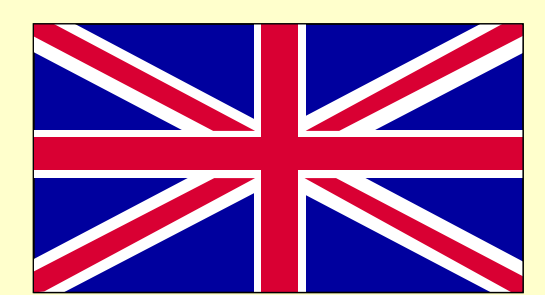
Methods

The methodology followed the format of a systematic literature review⁶⁻⁸. Literature search extended to 9 English (BioMed Central, Cochrane Library, Directory of Open Access Journal, mRCT/ISRCTN Register, PubMed, ReFeR, Cochrane Oral Health Review Register) and 2 Portuguese (BBO, LILACS) databases.

Inclusion criteria

Two reviewers assessed the inclusion of articles independently, according to the criteria:

- (1) Listing in above databases;
- (2) Relevant to review objectives of the particular topic;
- (3) Language of publication comprehensible by reviewers:



English



German



Spanish



Portuguese

Exclusion criteria

Included articles were reviewed in-depth by 2 reviewers independently and excluded if they did not comply with one or more of the criteria:

Reviews

Focus on population or intervention not clearly stated in title and abstract

No clear inclusion and exclusion criteria for reviewed publications stated

Lack of clear search strategy; key words used; searched databases; study-by-study critique table; discussion of study qualities

Trials

Etiology	Prognosis	Therapy
No control group included	Not a COHORT-study	Not truly randomised
Study and control group are not comparable	No clear diagnostic criteria for patient inclusion stated	No control group included
Exposure and outcomes not measured the same way in the compared groups	Patients were included at different stages of the disease	Drop out rate >33%
Exposure does not precede outcome	Follow-up period <1 year	Patients and clinicians not 'blinded' where possible and appropriate
No clear dosage-response relationship	Drop out rate >33%	No baseline data provided for both the control and study group
	No clearly defined outcome is evident	Baseline differences not statistically adjusted
	Possible confounders not stated or statistically corrected	Clinically important outcomes for patients not assessed

In-vitro laboratory studies, studies with animal tissues were excluded. In-situ studies were included if they followed a randomised- controlled design⁹⁻¹².

Articles, which passed exclusion criteria, were rated as being of Strong, Good and Reasonable evidence according to a scoring system¹³.

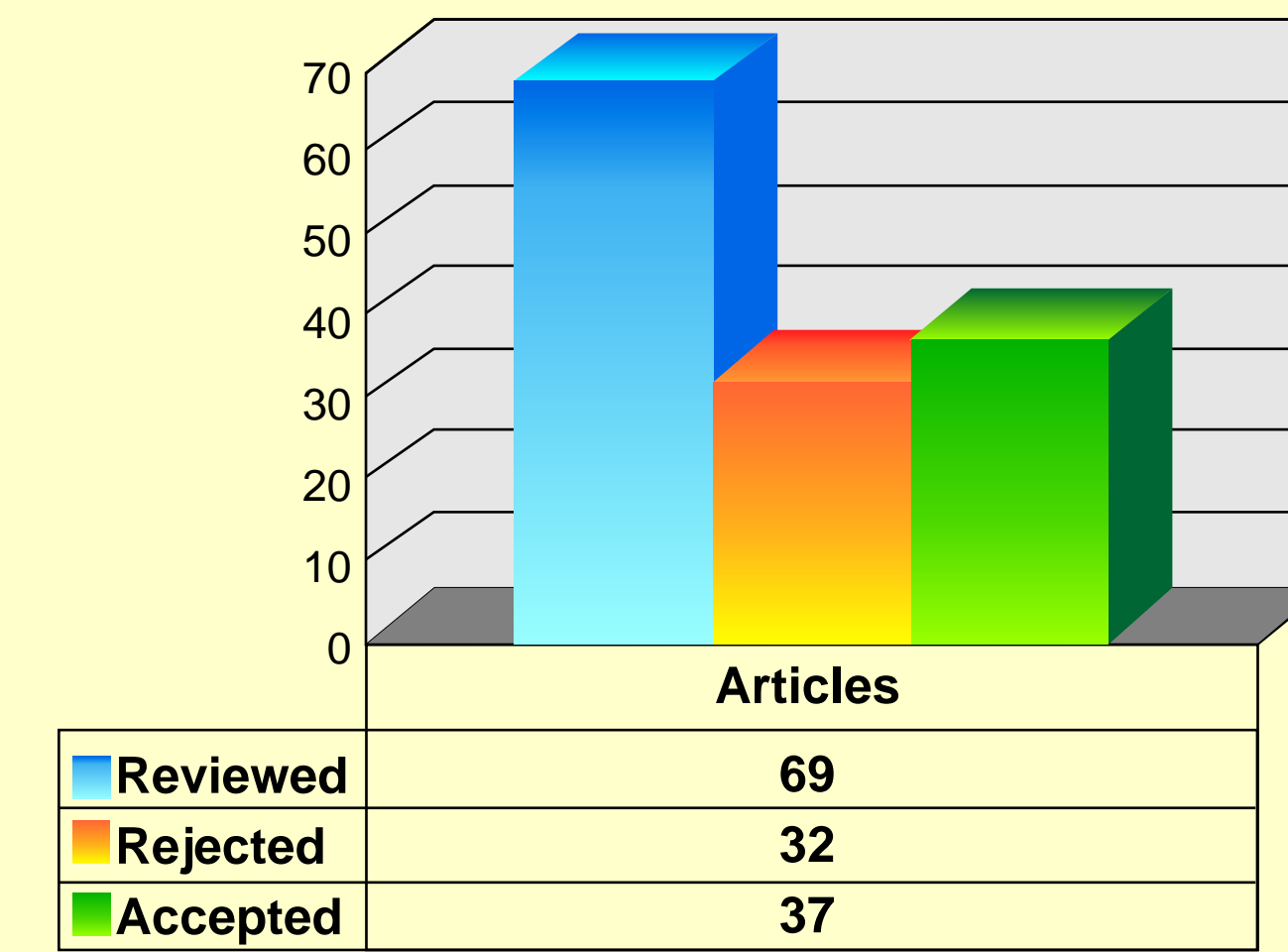
Results

Caries risk assessment

Saliva flow and caries

Review question: Is caries associated with saliva flow?

Exclusion criteria: Etiology



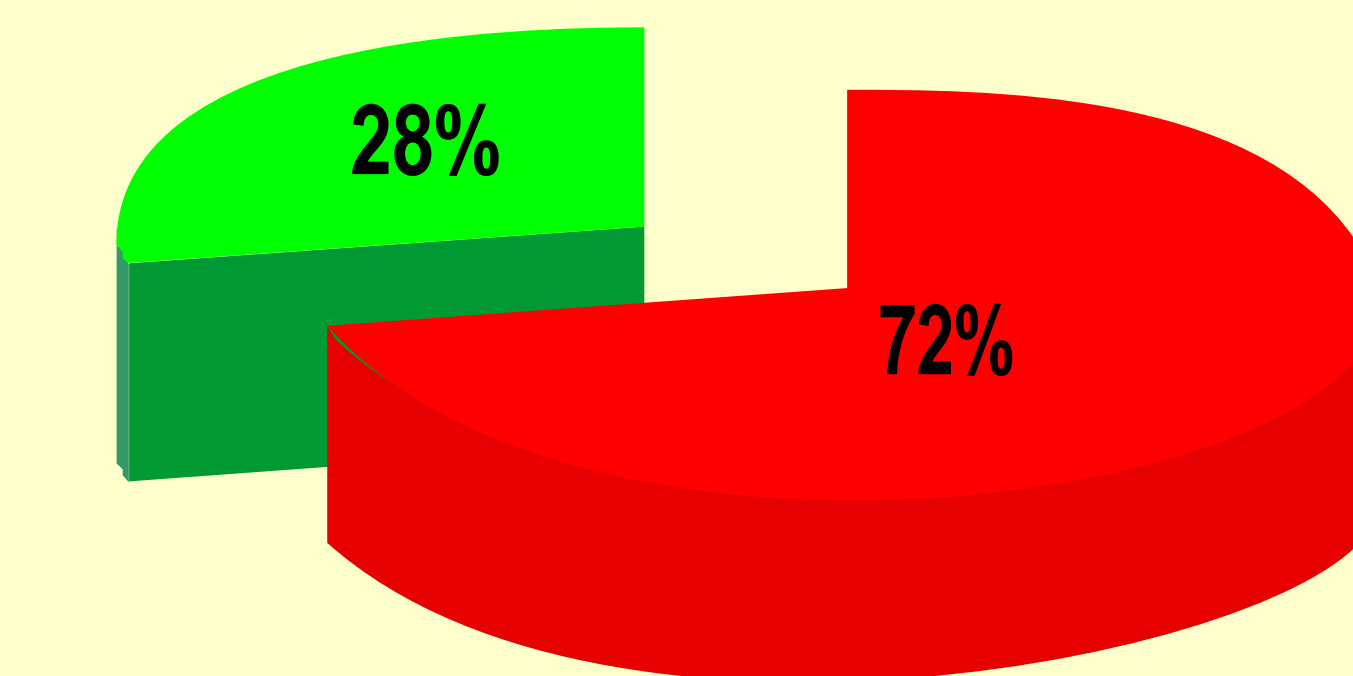
Results: Yes = 14 articles* - No = 23 articles**

* Saliva flow changes measured outside healthy limits

** Saliva flow changes measured within healthy limits

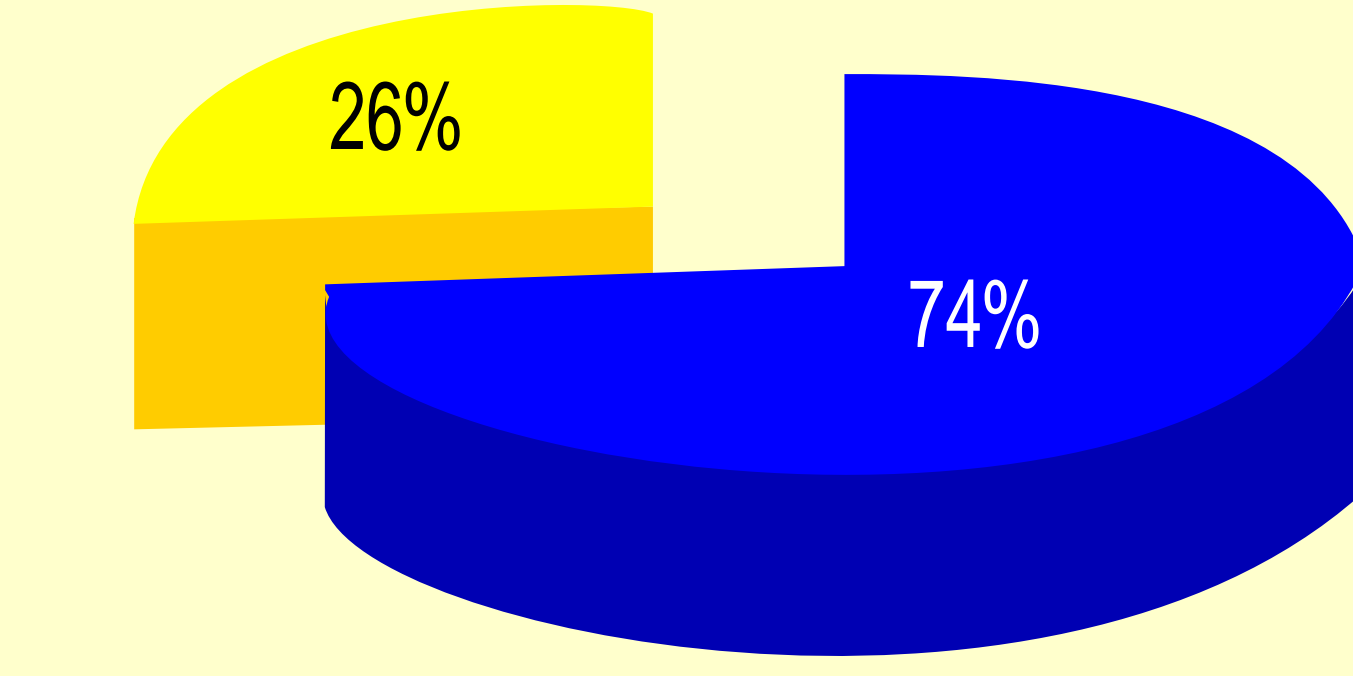
Caries risk assessment

Articles in support for CAMBRA: 72%
Articles not supporting CAMBRA: 28%



Caries management

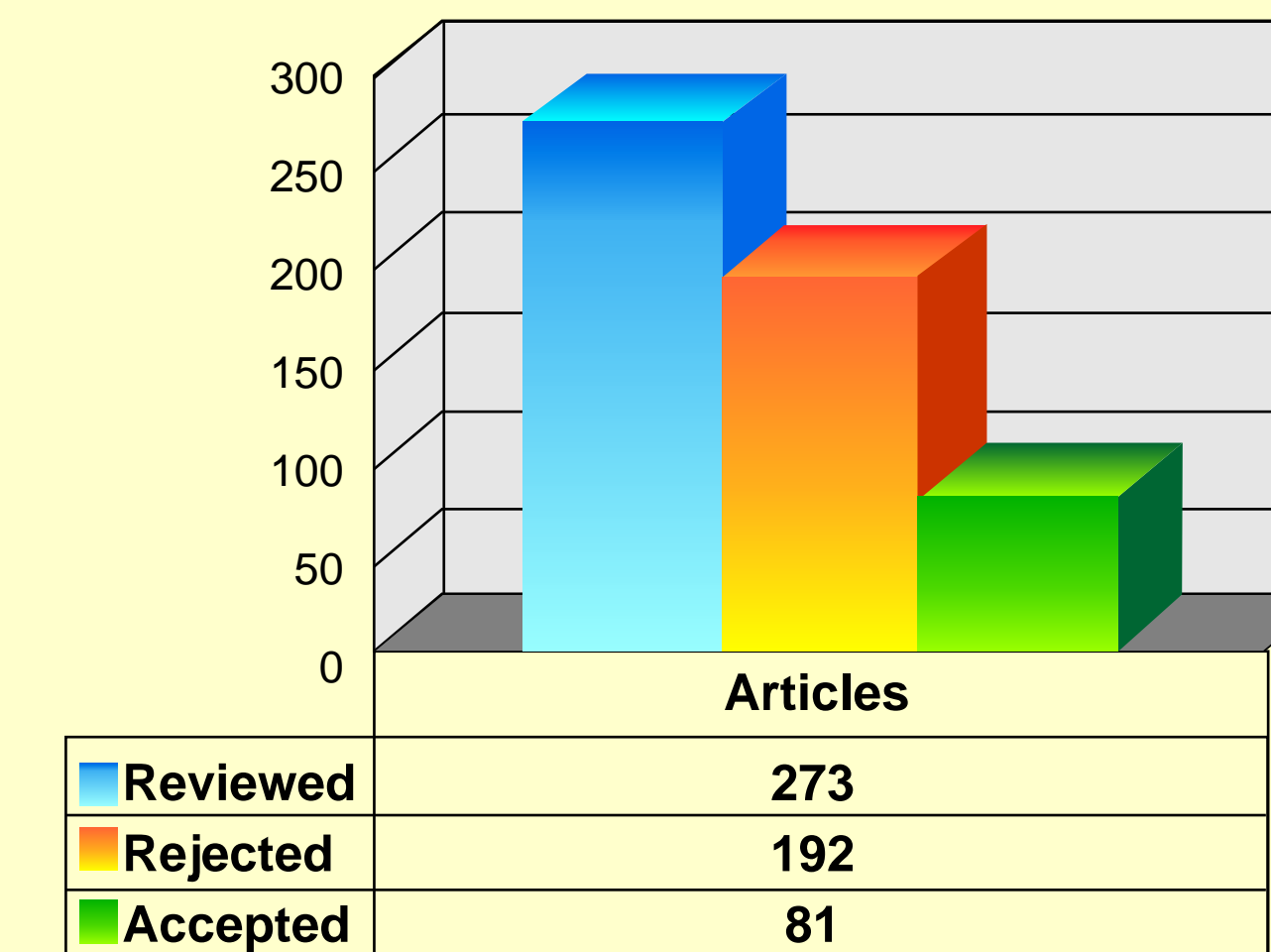
Articles in support for CAMBRA: 74%
Articles not supporting CAMBRA: 26%



Pathological factors* for caries risk assessment

Review question: Can factors* predict caries?

Exclusion criteria: Prognosis



* Other predictors (n = 15) not listed = 20 articles together

Results:

Salivary Lactobacillus count*

Yes = 9 articles* - No = 2 articles**

* In conditions of joint action with S.mutans
** In conditions without S.mutans action

Results:

Salivary S.mutans count*

Yes = 12 articles* - No = 1 article

* Useful without use of past caries experience as predictor

Results:

Frequency of fermentable carbohydrate intake*

Yes = 12 articles* - No = 3 articles

* Useful caries predictor under condition of low or no fluoride exposure

Results:

Past caries experience*

Yes = 22 articles* - No = 0 articles

* Particularly useful for patients < 16 years of age

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Results

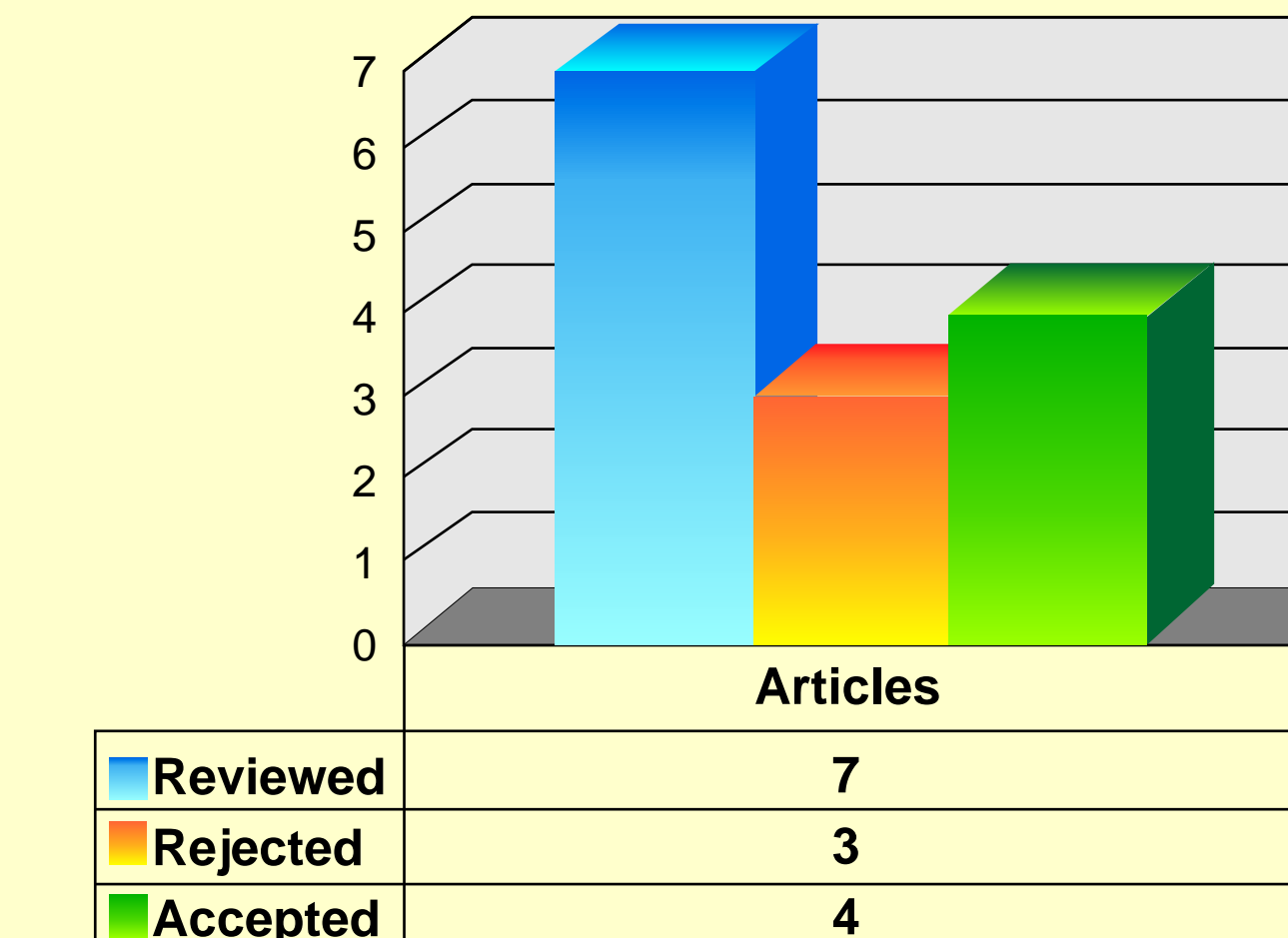
Caries management

Tooth tissue remineralisation

Casein phosphopeptides / Amorphous calcium phosphate (CPP/ACP)

Review question: Does CPP/ACP remineralise enamel lesions?

Exclusion criteria: Therapy

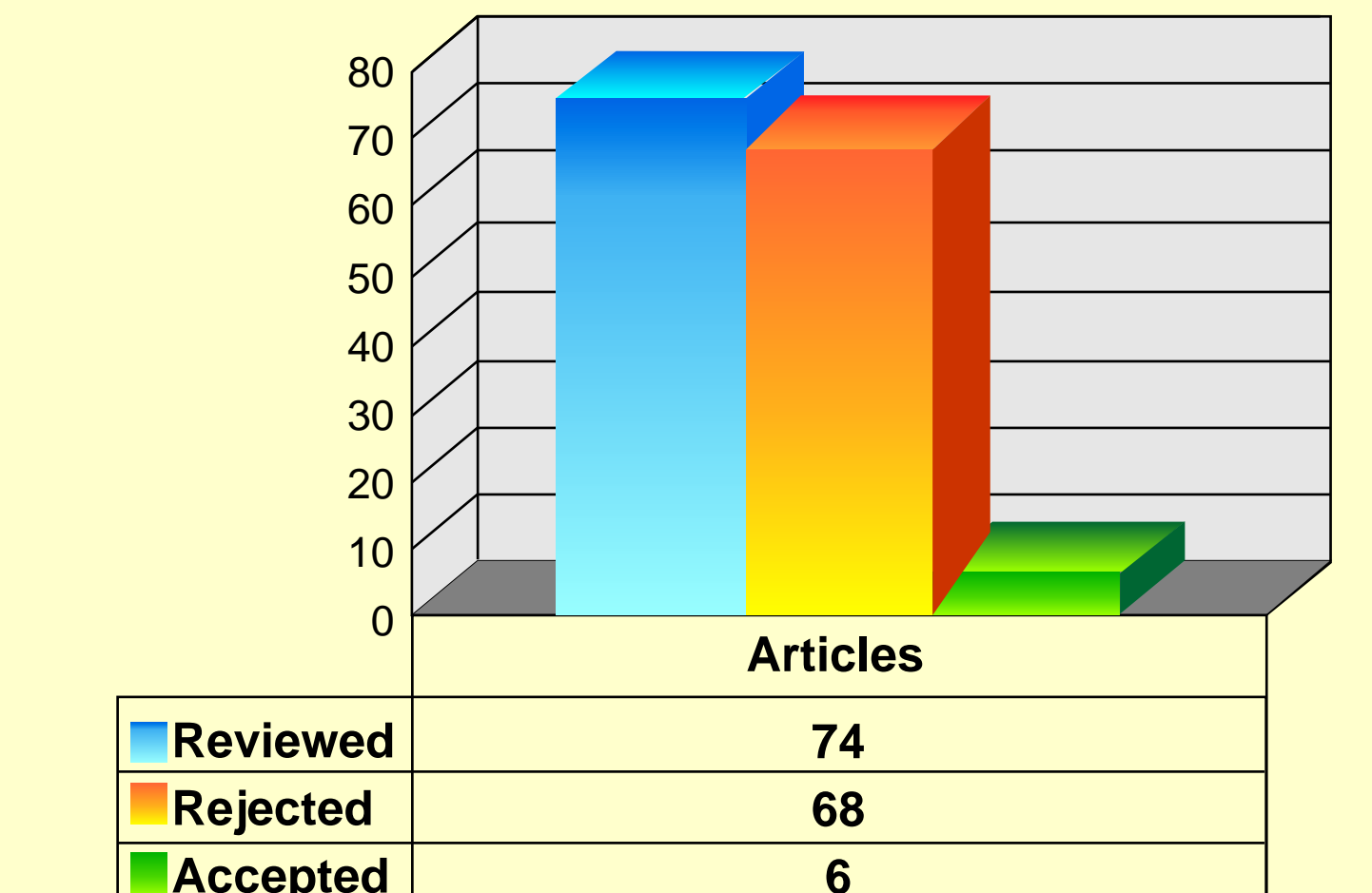


Results: Yes = 4 articles - No = 0 articles

Topical Fluoride application

Review question: Does topical fluoride remineralise enamel lesions?

Exclusion criteria: Therapy



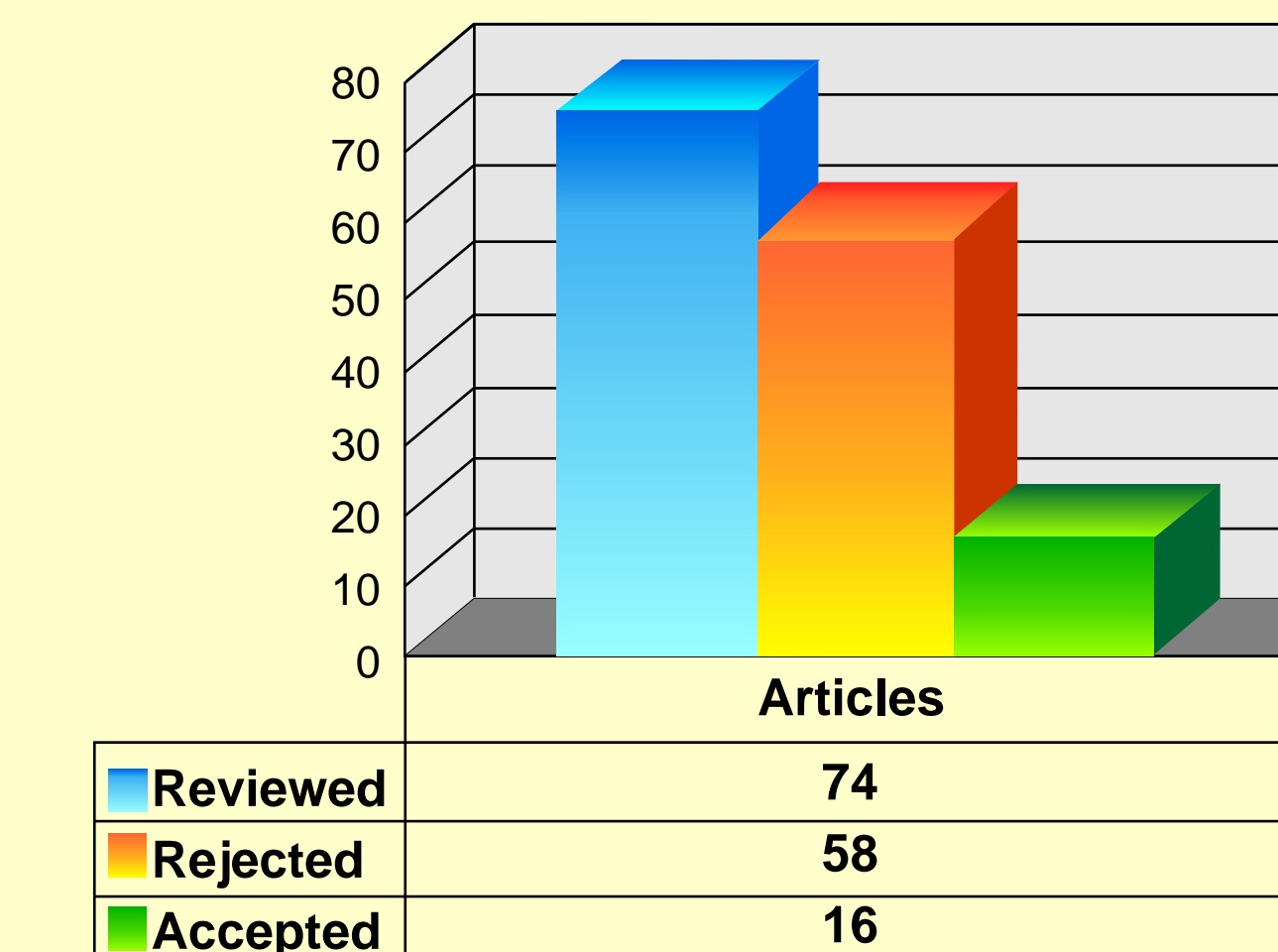
Results: Yes = 4 articles - No = 2 articles

Antibacterial therapeutics

Chlorhexidine

Review question: Does Chlorhexidine reduce caries?

Exclusion criteria: Therapy

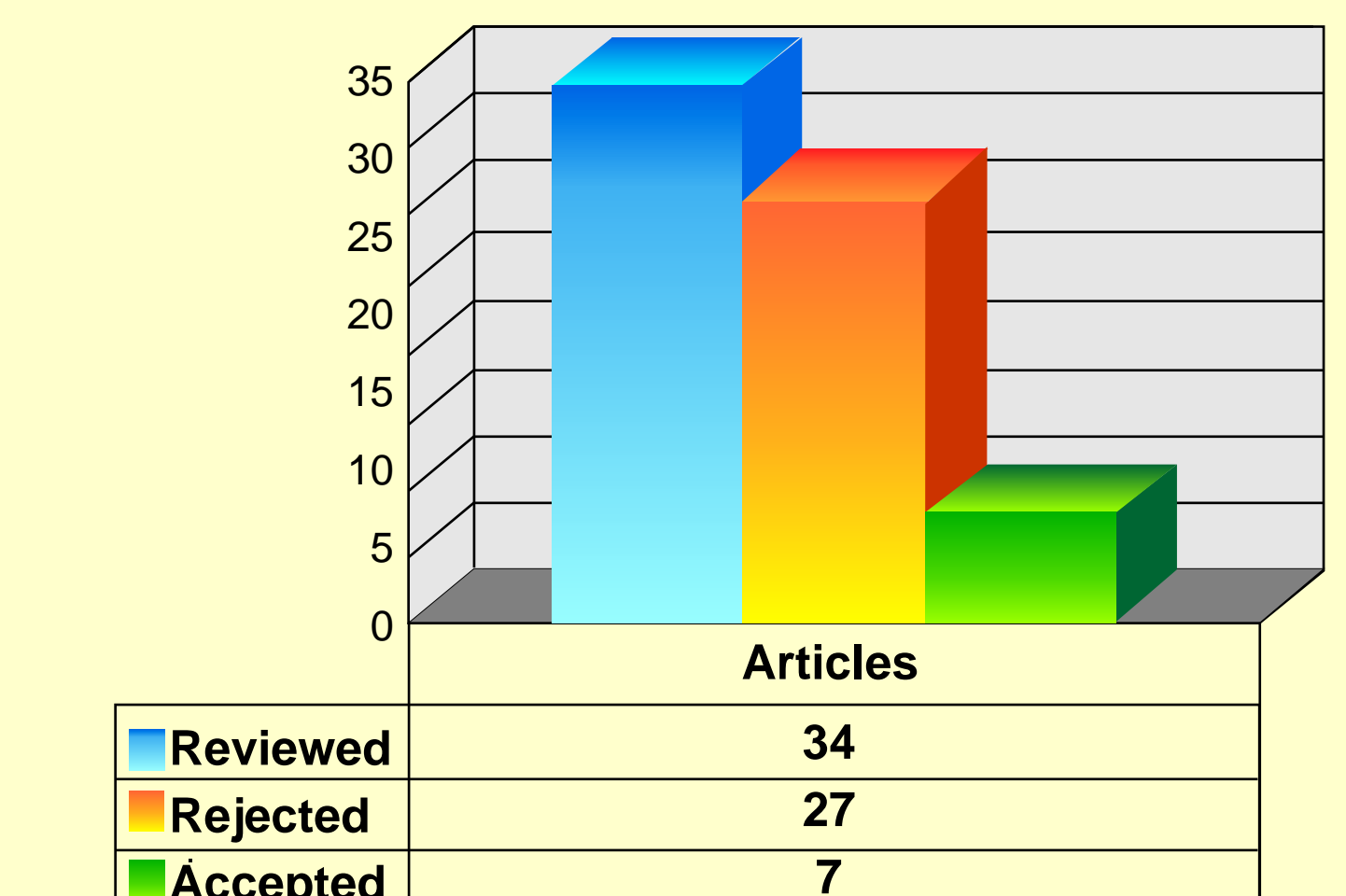


Results: Yes = 9 articles - No = 7 articles

Antibacterial effect of Glass Ionomer

Review question: Does GIC inhibit bacteria?

Exclusion criteria: Therapy

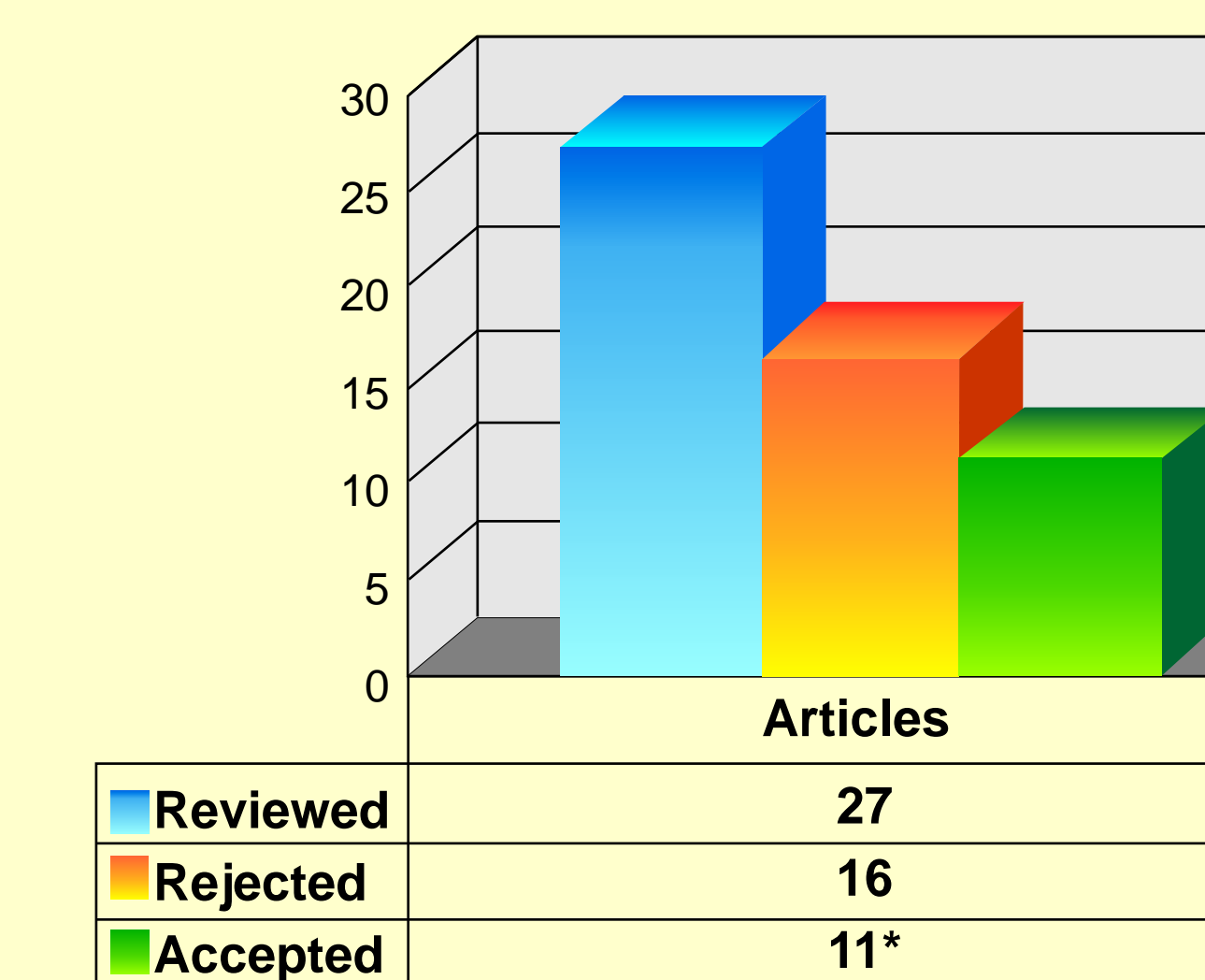


Results: Yes = 5 articles - No = 2 articles

Other interventions

GIC based fissure sealant

Review question: Do GIC based fissure sealants protect against caries?



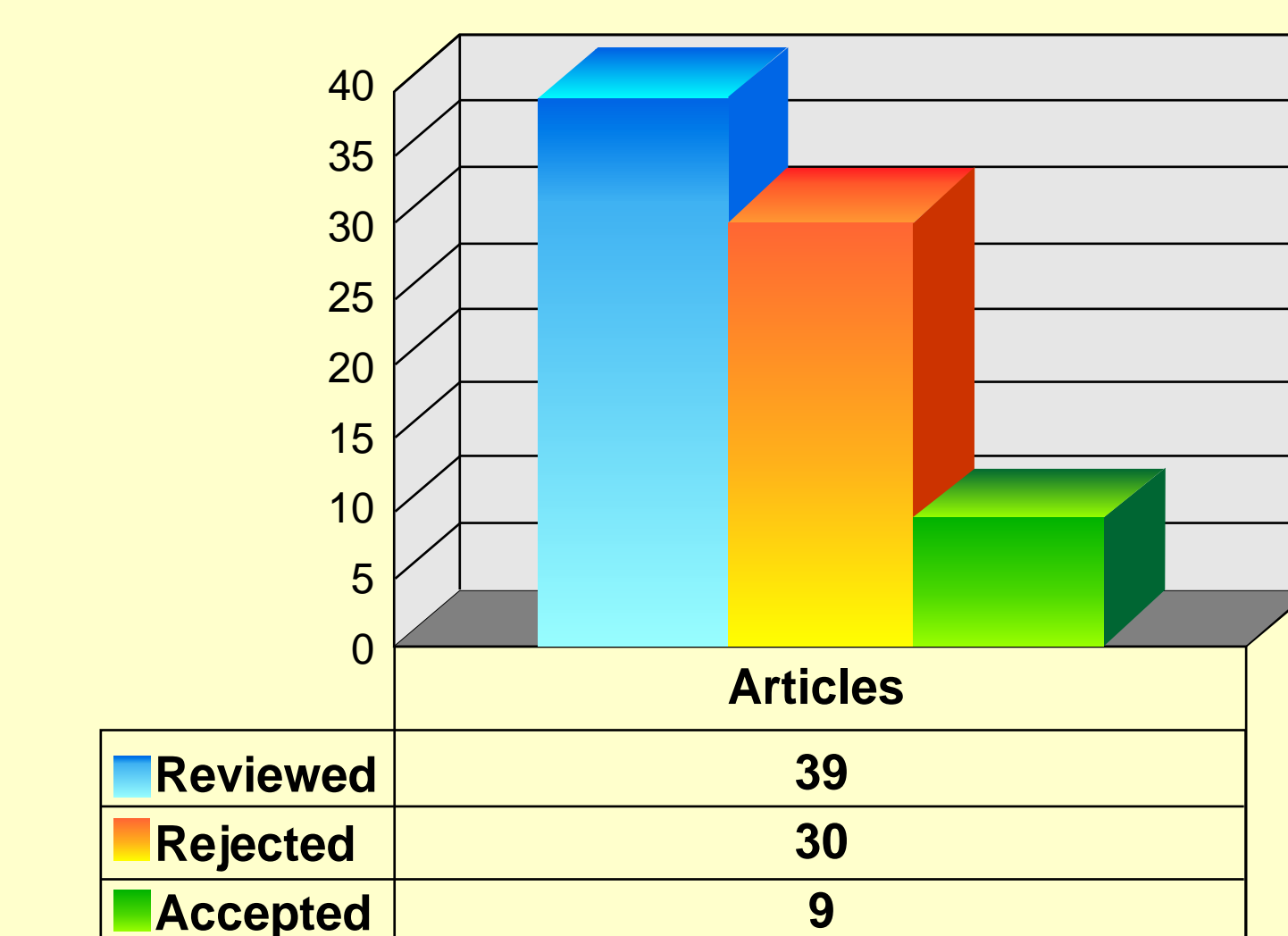
Results: Yes = 10 articles - No = 2 articles

* One article showing both results from 2 different studies

Dental Chewing Gum

Review question: Does sugar-free chewing gum reduce caries?

Exclusion criteria: Therapy



Results: Yes = 7 articles - No = 2 articles

Discussion and Conclusion

597 articles were reviewed, 426 did not comply with the exclusion criteria and were rejected. 171 articles were accepted as evidence.

The results show an emerging evidence base for CAMBRA in support of the viability of assessing the risk factors: Saliva flow; Salivary counts of S. mutans and Lactobacilli; Frequency of fermentable carbohydrate intake; past caries experience and for the use of Dental chewing gum; Chlorhexidine; Topical fluoride; Glass ionomers; CPP/ACP for caries management.