

1 **REVIEW ARTICLE**

2 **Pediatric urgent care Versus emergency**  
3 **departments: a systematic review of cost,**  
4 **wait times, and clinical outcomes**

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7 **ABSTRACT**

8 **Background:** The growing utilization of pediatric urgent care (UC) centers as alternatives to emergency depart-  
9 ments (EDs) for low-acuity conditions has significant implications for healthcare costs, wait times, and clinical  
10 outcomes. However, concerns persist regarding diagnostic accuracy, appropriateness of care, and disparities  
11 in access.

12 **Methods:** This systematic review, conducted following PRISMA guidelines, analyzed 13 studies comparing  
13 pediatric UC and ED settings. Databases (PubMed, Web of Science, Scopus, Embase, Cochrane) were searched  
14 with date restriction to the last 10 years (2015-2025), without language restrictions. Outcomes assessed  
15 included cost efficiency, wait times, and clinical outcomes (admission rates, diagnostic accuracy, and patient  
16 safety). Risk of bias was evaluated using the Newcastle-Ottawa Scale.

17 **Result:** In this systematic review, UC visits were significantly less expensive than ED visits (median cost: \$76.90  
18 vs. \$186.20), with comparable admission rates (<1%). Wait times were shorter in UC (median 1.2 vs. 3.5  
19 hours in EDs). However, 27% to 85% of UC-to-ED transfers were deemed unnecessary, often due to diagnostic  
20 uncertainty or limited pediatric readiness. Quality improvement interventions, such as antibiotic stewardship  
21 programs, improved guideline adherence (28%-64%). Malpractice claims revealed diagnostic errors as a major  
22 concern (41% of cases), particularly for appendicitis and respiratory conditions.

23 **Conclusion:** Based on the results of this study, Pediatric UC centers reduce costs and ED overcrowding while  
24 maintaining care quality for low-acuity conditions. However, high rates of avoidable transfers and diagnostic  
25 challenges highlight the need for enhanced pediatric training, standardized triage protocols, and telemedi-  
26 cine support. Policymakers should prioritize interventions to optimize UC utilization while ensuring equitable  
27 access and patient safety.

28 **Keywords:** Pediatric urgent care, Emergency departments, Healthcare costs, Wait times, Clinical outcomes,  
29 Diagnostic accuracy, Healthcare disparities

30 **Introduction**

31 Pediatric acute care delivery is increasingly divided  
32 between emergency departments (EDs) and urgent care  
33 (UC) centers, with significant implications for healthcare  
34 costs, patient wait times, and clinical outcomes. While  
35 EDs remain the primary setting for high-acuity pediatric  
36 emergencies, UC centers have expanded rapidly,  
37 managing up to 30% of low-acuity conditions that would  
38 otherwise be treated in EDs [1]. However, concerns  
39 persist regarding the appropriateness of care, diagnostic  
40 accuracy, and resource utilization in these settings,  
41 particularly for vulnerable pediatric populations [2].

Studies suggest that pediatric UC centers may reduce ED overcrowding and healthcare costs. For example, 42 43

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48 Poon et al. [3] found that non-emergent pediatric visits to  
49 urgent care were 60% less expensive than equivalent ED  
50 visits, with comparable clinical outcomes. Despite these  
51 benefits, disparities exist in access and quality, particularly  
52 for behavioral health emergencies and complex chronic  
53 conditions, which are frequently escalated to EDs due  
54 to limited urgent care capabilities [4]. Additionally,  
55 malpractice claims in pediatric emergency care indicate  
56 that diagnostic errors - most commonly involving  
57 appendicitis and respiratory distress - account for over  
58 40% of litigation cases, highlighting potential gaps in the  
59 accuracy of urgent care diagnoses [5].

60 Wait times also vary significantly between settings. Data  
61 from Macy et al. [6] indicate that pediatric patients in  
62 EDs experience prolonged stays (median 3.5 hours)  
63 compared to UC (1.2 hours), particularly for non-  
64 emergent conditions. These delays are exacerbated by  
65 systemic inefficiencies, such as incomplete specialty  
66 referrals and limited pediatric readiness in general  
67 UC centers [7]. Furthermore, physician confidence in  
68 managing pediatric cases varies widely, with only 46% of  
69 emergency providers in some regions reporting comfort  
70 with high-acuity pediatric presentations [8]. Given these  
71 challenges, this systematic review aims to compare  
72 pediatric UC centers and EDs across three critical  
73 domains: [9] cost efficiency, [10] wait times, and [1]  
74 clinical outcomes, including admission rates, diagnostic  
75 accuracy, and patient safety. By synthesizing existing  
76 evidence, we seek to inform policy recommendations for  
77 optimizing pediatric acute care delivery.

78 **Methods**

79 The systematic review was conducted in accordance with  
80 the Preferred Reporting Items for Systematic Reviews  
81 and Meta-Analyses (PRISMA) 2020 guidelines. The  
82 review evaluates pediatric urgent care versus emergency  
83 department (ED) utilization, focusing on costs, wait  
84 times, and clinical outcomes.

85 **Search strategy**

86 A comprehensive literature search was performed  
87 across PubMed, Web of Science, Scopus, Embase, and  
88 the Cochrane Library using Medical Subject Headings  
89 (MeSH) terms and keywords related to “pediatric urgent  
90 care,” “emergency department,” “cost,” “wait times,”  
91 and “clinical outcomes.” Boolean operators (AND/OR)  
92 were used to refine results, and the reference lists of  
93 included studies were manually screened for additional  
94 relevant publications. A date restriction to 2015 to 2025  
95 was applied, but no language restrictions were used to  
96 ensure better coverage.

97 **Study selection and eligibility criteria**

98 Two independent reviewers screened titles, abstracts,  
99 and full texts against predefined criteria. Disagreements  
100 were resolved via consensus or a third reviewer.  
101 Included studies compared pediatric urgent care and  
102 EDs and reported at least one outcome of interest (cost,  
103 wait times, or clinical outcomes such as admission  
104 rates, misdiagnoses, or mortality). Randomized/non-  
randomized trials, cohort studies, and cross-sectional  
analyses were eligible. Exclusions: case reports, reviews,  
non-English studies without translation, and studies  
lacking comparator groups.

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109 **Data extraction**

110 A standardized form captured study details (authors,  
111 year, location, design), patient demographics (age,  
112 gender, sample size), setting (UC vs. ED), and outcomes  
113 (cost data, wait times, clinical endpoints such as return  
114 visits or complications). Intervention specifics (e.g.,  
115 triage protocols) and confounders (e.g., acuity levels)  
116 were recorded. Data were extracted independently by  
117 two reviewers using Rayyan, a software tool to minimize  
118 bias.

119 **Risk of bias assessment**

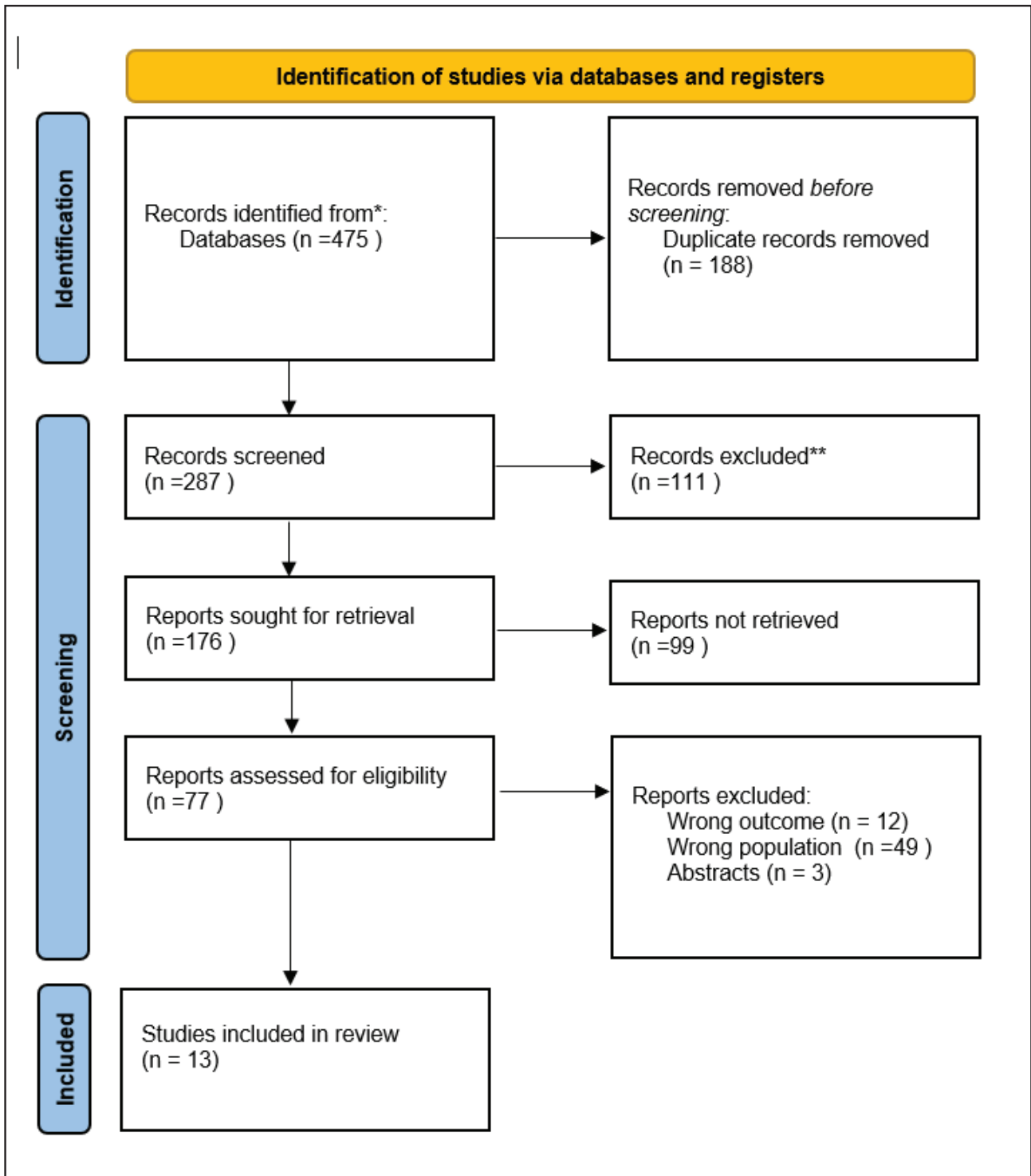
120 The Cochrane Risk of Bias Tool (RoB 2) [11] assessed  
121 randomized trials, while the Risk of Bias in Non-  
122 randomized Studies (ROBINS-I) [12] tool evaluated  
123 observational studies. Domains included selection bias,  
124 confounding, measurement of outcomes, and reporting  
125 bias. Studies were categorized as low, moderate, or high  
126 risk, with justification provided for each judgment.

127 **Results**

128 Figure 1 presents a PRISMA flow diagram outlining the  
129 systematic study selection process. Initially, 475 records  
130 were identified through database searches; 188 duplicate  
131 records were removed, leaving 287 studies for screening.  
132 Following title and abstract screening, 111 records  
133 were excluded, and 176 full-text articles were sought;  
134 however, 99 were unavailable, leaving 77 for full-text  
135 eligibility assessment. Of these, 64 were excluded due  
136 to incorrect outcomes ( $n = 12$ ), incorrect populations ( $n$   
137 = 49), or conference abstracts ( $n = 3$ ), leaving 13 studies  
138 that met the final inclusion criteria for the review.

139 Table 1 presents detailed demographic and study  
140 characteristics, showing considerable diversity in study  
141 designs, populations, and settings. The sample sizes  
142 ranged dramatically from 71 patients in a mental health  
143 intervention study [13] to over 5.9 million Medicaid  
144 claims in a cost analysis study [14]. Most studies were  
145 conducted in the United States (12 studies) [15-22], and  
146 a single study was conducted in Saudi Arabia [23] and in  
147 Chile [24]. The age distributions varied across studies,  
148 with some focusing specifically on young children  
149 (median age 3.5 years) [14] and others including broader  
150 pediatric populations up to 19 years [22]. Five studies  
151 specifically examined transfer patterns between UC and  
152 ED settings [18,20-22], providing critical data about  
153 healthcare system interactions.

154 Table 2 summarizes the key outcomes and findings from  
155 these studies, revealing several important patterns. Cost  
156 analyses showed significant differences between ED and  
157 UC visits, with median costs of \$186.20 versus \$76.90,  
158 respectively [22]. Appropriateness of care emerged  
159 as a major theme, with studies reporting up to 85%  
160 [20] of UC-to-ED transfers being discharged without  
161 intervention, suggesting potential overutilization. Quality



162 **Figure 1.** PRISMA flow diagram included searches of databases.

163 improvement interventions have demonstrated success  
 164 in areas such as antibiotic stewardship, with one study  
 165 showing an increase from 28% to 64% in adherence to  
 166 guidelines [25]. The tables collectively highlight both  
 167 system-level challenges (like unnecessary transfers) and  
 168 opportunities (like successful triage programs reducing  
 169 ED visits by 23.8%-80.5% [22]).

170 The included studies employed diverse methodologies  
 171 to examine pediatric acute care utilization. Retrospective  
 172 designs dominated (8 studies) [1,13-17,20,22], while

173 others used prospective observational [21], cross-  
 174 sectional [23], or quasi-experimental designs [22].  
 175 The largest studies utilized administrative databases,  
 176 including Medicaid claims [14] and national EMS  
 177 registries [17], while smaller studies focused on single-  
 178 center experiences [13,20]. Mental health integration  
 179 in EDs [13], malpractice patterns [16], and physician  
 180 preparedness [23] represented important specialized  
 181 focuses alongside the predominant themes of cost,  
 182 utilization, and quality metrics. The variation in sample

183 **Table 1.** Demographic and study characteristics.

Study (Author, Year) [Ref.]	Location	Study Design	Sample Size	Population	Age (Years)	Gender (% Female)	Setting
Casher et al. [13]	NM	Retrospective cohort	71 (intervention), 142 (controls)	Pediatric mental health	Matched controls	NM	Pediatric ED/Urgent Care
Fanny et al. [15]	USA	Retrospective cross-sectional	20,571 (2016), 18,943 (2017)	Pediatric ED visits	Median: 3.5	48.1% (2016), 47.3% (2017)	ED/Urgent Care
Glerum et al. [16]	USA	Retrospective review	728 claims	Pediatric malpractice	0-17	NM	ED/Urgent Care
Saper et al. [17]	USA	Retrospective cross-sectional	164,387	Pediatric EMS transfers	<18	NM	Outpatient/Urgent Care→ED
Eason et al. [18]	USA	Retrospective chart review	240	Pediatric transfers	NM	NM	Urgent Care→ED
Almadani et al. [23]	Saudi Arabia	Cross-sectional survey	197	ED physicians	NM	NM	ED
Ching et al. [19]	USA	Retrospective review	706	Ophthalmology referrals	Subgroup	NM	ED/Urgent Care
Olympia et al. [20]	Pennsylvania, USA	Retrospective cross-sectional	455	Pediatric transfers	Mean: 8.7	NM	UC→ED
Conners et al. [21]	USA	Prospective observational	4 centers	Enterovirus-D68	NM	NM	ED & UC
Montalbano et al. [14]	USA	Retrospective cohort	5,925,568	Medicaid patients	<19	48.1% (2016), 47.3% (2017)	ED & UC
Poole et al. [22]	USA	Quasi-experimental	2,134	Pediatric UTI	NM	NM	ED & UC
Wiltrakis et al. [25]	USA	QI study	9,306	SSTI patients	0-18	NM	ED & UC
Pacheco et al. [24]	Chile	Difference-in-differences	4,858,803	Public system	NM	NM	ED & UC

184 **Table 2.** Key study outcomes.

Study (Author, Year) [Ref.]	Primary Focus	Cost Analysis	Wait Times	Clinical Outcomes	Key Findings
Casher et al. [13]	Mental health integration	NM	NM	ED return visits	No difference in 90-day return rates
Fanny et al. [15]	Post-disaster burden	NM	NM	Admission rates	Increased trauma cases post-hurricane
Glerum et al. [16]	Malpractice claims	\$319,513 avg	NM	Diagnostic errors	41% claims are due to errors
Saper et al. [17]	EMS utilization	NM	NM	Transport rates	94% transported to the hospital
Eason et al. [18]	Transfer appropriateness	NM	NM	ED utilization	Fewer nonacute transfers
Almadani et al. [23]	Physician barriers	NM	NM	Confidence levels	Low confidence in dosing
Ching et al. [19]	Referral efficiency	NM	3.36 hrs.	Incomplete referrals	Insurance/race disparities
Olympia et al. [20]	UC→ED transfers	NM	NM	Discharge rate	85% discharged without intervention
Conners et al. [21]	Outbreak response	NM	NM	Volume changes	UC ↑20.3% vs ED ↑14.3%
Montalbano et al. [14]	ED vs UC costs	UC: \$76.90 ED: \$186.20	NM	Admission rates	<1% both settings
Poole et al. [22]	Triage impact	\$12.61 PMPM	NM	Visit reduction	23.8-80.5% decline
Wiltrakis et al. [25]	Antibiotic stewardship	NM	NM	Adherence rates	Improved from 28% to 64%
Pacheco et al. [24]	ED utilization	NM	NM	ED visits	2.69% reduction

185 types—from physician surveys [20] to malpractice  
 186 claims [16] to population-level insurance data [14]—  
 187 provides complementary perspectives on pediatric acute  
 188 care delivery.

189 Several studies yielded findings with direct practice  
 190 implications. The mental health integration study [13]  
 191 found no difference in 90-day return rates but lower  
 192 outpatient follow-up, suggesting a need for better care  
 193 coordination. The Enterovirus-D68 outbreak analysis

[21] revealed that UCs absorbed 20.3% more cases than 194  
 EDs (14.3%), demonstrating their role in pandemic 195  
 surge capacity. The Chilean study [24] provided unique 196  
 international data showing that UC implementation 197  
 reduced same-day ED visits by 2.69%, though this was 198  
 accompanied by potential fragmentation of primary care. 199  
 Perhaps most significantly, the cost comparison studies 200  
 [14,22] identified substantial potential savings—up to 201  
 \$50 million annually in Medicaid alone [14]—through 202  
 appropriate UC utilization, while maintaining quality as 203

Study (Author, Year) [Ref.]	Selection (max 4)	Comparability (max 2)	Outcome (max 3)	Total Score	Risk of Bias
Casher et al. [13]	3	1	2	6	Moderate
Fanny et al. [15]	4	2	3	9	Low
Glerum et al. [16]	3	1	2	6	Moderate
Saper et al. [17]	4	2	3	9	Low
Eason et al. [18]	3	1	2	6	Moderate
Almadani et al. [23]	3	0	2	5	High
Ching et al. [19]	3	1	2	6	Moderate
Olympia et al. [20]	4	2	3	9	Low
Conners et al. [21]	3	2	3	8	Low
Montalbano et al. [14]	4	2	3	9	Low
Poole et al. [22]	4	2	3	9	Low
Wiltrakis et al. [25]	3	2	3	8	Low
Pacheco et al. [24]	4	2	3	9	Low

\*NOS scoring [10]: Low risk = 8-9; Moderate = 6-7; High = ≤5\*.

shown by stable admission rates (<1% for both settings) [14] and no increase in treatment failures [22].

Table 3 presents the risk of bias assessment using the Newcastle - Ottawa Scale (NOS) [10] for cohort studies and a modified version for cross-sectional studies. The assessment shows that most large database studies [14-17,20,22] achieved low risk-of-bias scores [6,7], benefiting from comprehensive data capture and appropriate statistical adjustments. Studies relying on surveys [23] or small samples [13,20] had a higher risk of bias due to potential selection and response biases. Common limitations across studies included the lack of randomization (all studies were observational) and variable adjustment for confounders, such as socioeconomic status and comorbidities.

## Discussion

Our results corroborate earlier studies demonstrating that UC centers often manage lower-acuity conditions at lower cost than EDs. Montalbano et al. [14] found that UC visits were significantly cheaper (\$76.90 vs. \$186.20 per visit) while maintaining similarly low admission rates (<1%), consistent with prior analyses by Weinick et al. [1], who reported a 30%-50% cost reduction for non-emergent UC cases. Our observation that up to 85% of UC-to-ED transfers were discharged without intervention [20] reinforces findings from Yoffe et al. [26], who noted that 35% of pediatric transfers from UC were avoidable, often due to diagnostic uncertainty or lack of pediatric expertise.

The success of quality improvement interventions in our review, such as antibiotic stewardship programs improving adherence from 28% to 64% [25], parallels results from Gerber et al. [27], whose antimicrobial stewardship program in pediatric EDs reduced inappropriate antibiotic use by 48%. Similarly, our finding that phone triage reduced ED/UC visits by 23.8%-80.5% [25] aligns with studies by Bunn et al. [28], who demonstrated a 25% reduction in low-acuity ED visits following nurse-led telephone triage. The

Enterovirus-D68 outbreak analysis [21], showing UC absorbed 20.3% more cases than EDs (14.3%), supports the role of UC in pandemic surge capacity, as previously described [29] during the COVID-19 pandemic.

Our cost-saving estimates, particularly the potential \$50M annual Medicaid savings from shifting low-acuity cases to UC [14], are comparable to findings from Machta et al. [30], who projected \$4.4B in national savings with optimized UC use. However, our study also highlights persistent challenges, such as fragmented care post-UC implementation [24], echoing concerns raised by Uscher-Pines et al. [31] regarding care continuity in decentralized acute care systems.

Several novel insights emerge from our analysis. Unlike older studies that primarily focused on cost differences (e.g., Howard et al. [32]), our review incorporates recent data on diagnostic accuracy, malpractice risks, and system-level interventions. For instance, Glerum et al. [16] found that 41% of pediatric ED malpractice claims stemmed from diagnostic errors, a higher rate than the 28% reported by Selbst et al. [33] a decade ago, possibly reflecting increasing diagnostic complexity in pediatric acute care. Additionally, our mental health integration findings [13] contrast with earlier work by Santillanes et al. [34], which reported higher ED return rates for behavioral health patients, suggesting that newer care models may be improving outcomes.

Geographic disparities were also evident. While most U.S. studies showed consistent patterns of UC overutilization, the Chilean study [24] reported a modest 2.69% reduction in ED visits post-UC implementation - lower than the 8%-15% reductions observed in U.S. studies [35]. This may reflect differences in healthcare systems, as noted by Pines et al. [36], who found that UC penetration varies widely across countries.

## Limitations

Several limitations must be acknowledged. First, most studies were retrospective [7,8,11-17,20,22,25], which may introduce selection bias. Second, heterogeneity in



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