

1 **Clinical Policy: Critical Issues Critical Issues in the Evaluation and Management of Adult Patients**
2 **Presenting to the Emergency Department Asymptomatic Elevated Blood Pressure**
3 **This DRAFT is EMBARGOED – Not for Distribution**
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7 Asymptomatic Hypertension:
8

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52

53 **ABSTRACT**

54 This clinical policy from the American College of Emergency Physicians addresses key issues in the
55 evaluation and management of adult emergency department patients presenting with asymptomatic hypertension.
56 A writing committee conducted a systematic review of the literature to derive evidence-based recommendations to
57 answer the following clinical-question: In adult emergency department patients being discharged with
58 asymptomatic elevated blood pressure, is initiation of outpatient antihypertensive medications from the
59 emergency department safe and effective? Evidence was graded and recommendations were made based on the
60 strength of the available data.

61

62 **INTRODUCTION**

63 Approximately half of adults in the United States (119.9 million) are affected by hypertension, but only
64 25% (27.0 million) of these individuals effectively control their blood pressure.^{1,2} Hypertension, defined as blood
65 pressure greater than 130/80 mm Hg, is the primary risk factor for cardiovascular disease and good blood pressure
66 control reduces the likelihood of subsequent stroke and heart attack.^{3,4} There are just over 6 million emergency
67 department (ED) visits annually in the United States for a primary chief complaint of hypertension and of those
68 patients, about 64% receive a primary diagnosis of hypertension.⁵

69 In general, ED physicians excel at identifying acute life-threatening emergencies like stroke or myocardial
70 infarction but have less experience with the long-term treatment for chronic illness such as asymptomatic
71 hypertension. Wide variation in practice patterns exist for the management of patients with asymptomatic elevated
72 blood pressure in the ED, despite the reliability of blood pressure measurements taken in the ED.^{6,7} The benefits of
73 starting or modifying blood pressure medications in asymptomatic high blood pressure may be countered by the
74 potential risks. For example, some ED physicians believe that blood pressure treatment should be left to the primary
75 care provider because of the need for long-term management and titration. Other ED physicians believe that treating
76 asymptomatic high blood pressure in the ED represents an opportunity to improve medication compliance. The
77 2013 ACEP Clinical Policy did not recommend for routine ED medical interventions for asymptomatic elevated
78 blood pressure, unless the patient had poor follow-up or the patient was part of a select high-risk patient population.⁸

79 This current ACEP clinical policy updates the 2013 clinical policy by incorporating new evidence with the aim of
80 providing guidance for ED physicians to determine if initiation of antihypertensive medications at and/or prior to
81 discharge from the emergency department is safe and effective.

82
83

84 **METHODOLOGY**

85
86 This ACEP clinical policy was developed by ED physicians with input from medical librarians and a patient
87 safety advocate and is based on a systematic review and critical, descriptive analysis of the medical literature and
88 is reported in accordance with Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)
89 guidelines.⁹

90

91 Search and Study Selection

92 This clinical policy is based on a systematic review with critical analysis of the medical literature meeting
93 the inclusion criteria. Searches of PubMed, SCOPUS, Embase, Web of Science, and the Cochrane Database of
94 Systematic Reviews were performed by a second librarian. Search terms and strategies were peer reviewed by a
95 second librarian. All searches were limited to human studies published in English. Specific key words/phrases,
96 years used in the searches, dates of searches, and study selection are identified under the critical question. In
97 addition, relevant articles from the bibliographies of included studies and more recent articles identified by
98 committee members and reviewers were included.

99 Using Covidence (Covidence, Melbourne, Australia), 2 subcommittee members independently reviewed
100 the identified abstracts to assess for possible inclusion. Of those identified for potential inclusion, each full-length
101 text was reviewed for eligibility. Those identified as eligible were subsequently abstracted and forwarded to the
102 committee's methodology group (emergency physicians with specific research methodological expertise) for
103 methodological grading using a Class of Evidence framework (Appendix E1).

104

105 Assessment of Risk of Bias and Determination of Classes of Evidence

106 Each study identified as eligible by the subcommittee was independently graded by two methodologists.
107 Design 1 represents the strongest possible study design to answer the critical question, which relates to whether the

108 focus was therapeutic, diagnostic, or prognostic, or a meta-analysis. Subsequent design types (i.e., Design 2 and
109 Design 3) represent respectively weaker study designs. Articles are then graded on dimensions related to the study’s
110 methodological features and execution, including but not limited to randomization processes, blinding, allocation
111 concealment, methods of data collection, outcome measures and their assessment, selection and misclassification
112 biases, sample size, generalizability, data management, analyses, congruence of results and conclusions, and
113 potential for conflicts of interest.

114 Using a predetermined process that combines the study’s design, methodological quality, and applicability
115 to the critical question, 2 methodologists independently assigned a preliminary Class of Evidence grade for each
116 article. Articles with concordant grades from both methodologists received that grade as their final grade. Any
117 discordance in the preliminary grades was adjudicated through discussion which involved at least 1 additional
118 methodologist, resulting in a final Class of Evidence assignment (i.e., Class I, Class II, Class III, or Class X)
119 (Appendix E2). Studies identified with significant methodologic limitations and/or ultimately determined to not be
120 applicable to the critical question received a Class of Evidence grade “X” and were not used in formulating
121 recommendations for this policy. However, content in these articles may have been used to formulate the
122 background and to inform expert consensus in the absence of evidence. Question-specific Classes of Evidence
123 grading may be found in the Evidentiary Table included at the end of this policy.

124

125 Translation of Classes of Evidence to Recommendation Levels

126 Based on the strength of evidence for each critical question, the subcommittee drafted the recommendations
127 and supporting text synthesizing the evidence using the following guidelines:

128 ***Level A recommendations.*** Generally accepted principles for patient care that reflect a high degree of
129 scientific certainty (e.g., based on evidence from one or more Class of Evidence I, or multiple Class of Evidence II
130 studies that demonstrate consistent effects or estimates).

131 ***Level B recommendations.*** Recommendations for patient care that may identify a particular strategy or
132 range of strategies that reflect moderate scientific certainty (e.g., based on evidence from one or more Class of
133 Evidence II studies, or multiple Class of Evidence III studies that demonstrate consistent effects or estimates).

134 **Level C recommendations.** Recommendations for patient care that are based on evidence from Class of
135 Evidence III studies or, in the absence of adequate published literature, based on expert consensus. In instances
136 where consensus recommendations are made, “consensus” is placed in parentheses at the end of the
137 recommendation.

138 There are certain circumstances in which the recommendations stemming from a body of evidence should
139 not be rated as highly as the individual studies on which they are based. Factors such as consistency of results,
140 uncertainty of effect magnitude, and publication bias, among others, might lead to a downgrading of
141 recommendations. When possible, clinically-oriented statistics (e.g., likelihood ratios [LRs], number needed to
142 treat) are presented to help the reader better understand how the results may be applied to the individual patient.
143 This can assist the clinician in applying the recommendations to most patients but allow adjustment when applying
144 to patients with extremes of risk (Appendix E3).

146 Evaluation and Review of Recommendations

147 Once drafted, the policy was distributed for internal review (by members of the entire committee) followed
148 by external expert review and an open comment period for all ACEP membership. Comments were received during
149 a 60-day open comment period with notices of the comment period sent electronically to ACEP members, published
150 in *EM Today*, posted on the ACEP Web website, and sent to other pertinent physician organizations. The responses
151 were used to further refine and enhance this clinical policy, although responses do not imply endorsement. Clinical
152 policies are scheduled for revision every 3 years; however, interim reviews are conducted when technology,
153 methodology, or the practice environment changes significantly.

155 Application of the Policy

156 This policy is not intended to be a complete manual on the evaluation and management of adult patients
157 with asymptomatic hypertension but rather a focused examination of critical questions that have particular relevance
158 to the current practice of emergency medicine. Potential benefits and harms of implementing recommendations are
159 briefly summarized within each critical question.

160 It is the goal of the Clinical Policies Committee to provide evidence-based recommendations when the
161 scientific literature provides sufficient quality information to inform recommendations for a critical question. In
162 accordance with ACEP Resolution 56(21), ACEP clinical policies do not use race-based calculators in the
163 formulation of recommendations. When the medical literature does not contain adequate empirical data to inform a
164 critical question, the members of the Clinical Policies Committee believe that it is equally important to alert
165 emergency physicians to this fact.

166 This clinical policy is not intended to represent a legal standard of care for emergency physicians.
167 Recommendations offered in this policy are not intended to represent the only diagnostic or management options
168 available to the emergency physician. ACEP recognizes the importance of the individual physician's judgment and
169 patient preferences. This guideline provides clinical strategies for which medical literature exists to inform the
170 critical questions addressed in this policy. ACEP funded this clinical policy.

171
172 ***Scope of Application.*** This guideline is intended for physicians working in the ED.

173 ***Inclusion Criteria.*** Adult patients aged 18 years or older who present to the ED with asymptomatic
174 elevated blood pressure without signs and symptoms of acute target organ injury.

175 ***Exclusion Criteria.*** Patients who present to the ED with signs or symptoms of acute hypertensive
176 emergencies (ie, patients with clinical findings that suggest acute target organ injury such as acute stroke, cardiac
177 ischemia, pulmonary edema, encephalopathy, and congestive heart failure), pregnant patients, patients with end-
178 stage renal insufficiency, emergent conditions that are likely to cause elevated blood pressure not directly related
179 to acute target organ injury (eg, trauma, other pain syndromes), and acute presentations of serious medical
180 conditions associated with hypertension such as stroke, myocardial infarction, and congestive heart failure.

181
182 **CRITICAL QUESTIONS**

183
184 **1. In adult emergency department patients being discharged with asymptomatic elevated blood pressure, is**
185 **initiation of outpatient antihypertensive medications from the emergency department safe and effective?**
186

187 **Patient Management Recommendations**

188 ***Level A recommendations.*** None.

189 ***Level B recommendations.*** None.

190 **Level C recommendations.** Consider the initiation of outpatient antihypertensive medications for patients
191 being discharged from the ED with asymptomatic elevated blood pressure.

192 Patients with asymptomatic elevated blood pressure should be referred for outpatient follow-up
193 (Consensus recommendation).

194
195 Potential Benefit of Implementing the Recommendations:

- 196 ● Improvement in cardiovascular and cerebrovascular risk.
- 197 ● Initiation of treatment sooner.
- 198 ● Potential reduction in healthcare disparities.

199
200 Potential Harm of Implementing the Recommendations:

- 201 ● Adverse effect of the medication.
- 202 ● Treating of a falsely elevated blood pressure and thus creating hypotension.

203
204
205 Key words/phrases for literature searches: Antihypertensive, Antihypertensive Agent, Antihypertensive
206 Agents, Antihypertensive Therapy, Asymptomatic, Blood Pressure, Clevidipine, Discharge, Discharge Planning,
207 Elevated Blood Pressure, Emergency Department, Emergency Medicine, Emergency Service, Enalaprilat,
208 Esmolol, Fenoldopam, Glyceryl Trinitrate, High Blood Pressure, Hospital Discharge, Hydralazine, Hypertension,
209 Labetalol, Nicardipine, Nitroglycerin, Nitroprusside, Nitroprusside Sodium, Patient Discharge, Phentolamine,
210 Pulmonary Hypertension, and variations and combinations of key words/phrases. Searches included January 2011
211 to the search dates of August 23 and 24, 2022 (Appendix E4).

212
213 Study Selection: One thousand seventeen articles were identified in the searches. Six hundred sixty-seven
214 articles were selected from the search results as candidates for further review. After grading for methodological
215 rigor, zero Class I studies, zero Class II studies, and 1 Class III study was included for this critical question
216 (Appendix E5).

217
218 Managing a chronic condition beyond discharge from the emergency department carries potential risks due
219 to the episodic nature of emergency medicine. Emergency physicians might hesitate to initiate chronic medications
220 due to both limited expertise in this area and concerns about the ongoing monitoring of the medication's safety and
221 effectiveness. Yet, considering the widespread challenges in accessing healthcare in the United States, the ED visit
222 might represent the sole opportunity for timely intervention. There is limited high-quality evidence directly
223 addressing the critical question.

224 In the only Class III study identified, Brody et al. found that prescribing antihypertensive medication upon
225 discharge from the ED was associated with short-term lowering of blood pressure without any increase in adverse
226 events (Table 1).¹⁰ In this retrospective analysis of 2 prospective, longitudinal randomized controlled trials,
227 uncontrolled blood pressure was defined as greater than 140/90 mm Hg or 160/90 mm Hg, depending on which of
228 the 2 RCTs (“PCCD” NCT00689819 and “adDReaCH” NCT01360476). Patients were included if they were

229 asymptomatic and excluded if they had a cardiovascular or neurovascular event or history of cardiovascular disease
 230 were excluded. Antihypertensive medications were initiated by the ED provider (Table 2). There was a total of 217
 231 patients of which 124 were female (57%). Importantly, 208 (96%) of the patients were African American, and 65
 232 (86%) had established hypertension at the time of the ED visit. The patients that received the antihypertensive
 233 prescription from the ED had a reduction of 11 mm Hg in blood pressure at follow up (95% CI 17 to 4 mm Hg).
 234 Both groups, with and without antihypertensive prescription, had similar rates of adverse events (1.59 versus 1.43;
 235 difference=0.16, 95% CI -0.34 to 0.67). No new neurological deficits, ischemic events, life threatening anaphylactic
 236 reactions or clinically significant hypotension (SBP <100 mm Hg) were reported in either group. These studies are
 237 consistent with Joint National Committee (JNC 8) guidelines that recommend treating hypertensive persons aged
 238 more than 60 years to a blood pressure goal of less than 150/90 mm Hg based on strong evidence and, treating a
 239 blood pressure of less than 140/90 mm Hg for other groups based on expert opinion.

240
 241

Table 1. Adverse Events Related to the Administration of Antihypertensive Therapy.¹¹

<p>Major adverse events:</p> <ul style="list-style-type: none"> (1) death from coronary heart disease (CHD); (2) death from other cardiovascular disease (CVD) including stroke; (3) death from other causes; (4) nonfatal myocardial infarction; (5) nonfatal stroke; (6) congestive heart failure; (7) surgery for aortic aneurysm; (8) coronary artery bypass surgery; (9) coronary angioplasty; (10) thrombolytic therapy; or (11) hospitalization for unstable angina <p>Other adverse events defined a priori as outcome variables:</p> <ul style="list-style-type: none"> (1) hospitalization for cerebral transient ischemic attacks (TIAs); (2) definite angina or intermittent claudication by Rose questionnaire; and (3) peripheral arterial occlusive disease defined as absent or diminished pedal pulses on one side with a bruit in the femoral artery on that side or absent or diminished pulse in any artery (femoral, posterior tibial, or dorsalis pedis) with ischemic ulcers, or history of surgery for peripheral arterial insufficiency.

242

243 **Table 2. Class of antihypertensive medications prescribed.¹⁰**

Drug Class	Prevalence in Study
Thiazide-like diuretics	54%

Angiotensin-converting enzyme inhibitors	26%
Calcium channel blockers	10%
Beta blockers	6%

244

245

246 Summary

247

248 The previous ACEP Clinical Policy discouraged routine intervention in the ED, except for specific
 249 populations, following a consensus recommendation. However, a recent review of current literature revealed a study
 250 demonstrating both efficacy and safety in treating patients with elevated blood pressure initiated from the ED.
 251 Considering this study's findings, there appears to be merit in contemplating the commencement of treatment for
 252 individuals arriving at the ED with asymptomatic elevated blood pressure.

253

254 Future Research

255

256 Given only 1 study was identified of quality, more research is needed to better answer the critical question.
 257 Also, future research should seek to address the following:

- 258 • Are there certain patient demographics that impact the initiation of anti-hypertensive medications
- 259 from the ED?
- 260 • What are the potential barriers and facilitators that impact the initiation of blood pressure
- 261 management from the ED?
- 262 • Does the availability of timely outpatient follow-up impact short- or long-term efficacy and safety
- 263 in prescribing from the ED?
- 264 • What is the appropriate outpatient follow-up time frame after discharging from the ED?
- 265 • For those without an established diagnosis of hypertension, is initiation of outpatient
- 266 antihypertensive medications from the ED safe and effective?

267

268 Quality Measures and Aims

269

270 ACEP uses an evidence-based approach to develop quality measures targeting variations in emergency
 271 care. ACEP's approach links measures to patient outcomes, reducing clinician burden and delivering meaningful
 272 information to clinicians and patients. Working with the ACEP Quality and Patient Safety Committee and
 273 Clinical Emergency Data Registry Committee (CEDR), the Clinical Policies Committee identified and elected to
 274 include Quality Payment Program (QPP) measure: *QPP317 Preventive Care and Screening: Screening for High*
 275 *Blood Pressure and Follow-Up Documented* (Appendix E6). The aims of this measure are:

276

- 277 1. Increase the percentage of patients 18 years and older screened for high blood pressure during the
278 measurement period.
279
- 280 2. Discharge the patient with a documented follow-up plan if the result of the blood pressure screening is
281 pre-hypertensive or hypertensive.
282

283

284 ***Relevant industry relationships: There were no relevant industry relationships disclosed by the***
285 ***subcommittee members for this topic.***

286 ***Relevant industry relationships are those relationships with companies associated with products or***
287 ***services that significantly influence the specific aspect of disease addressed in the critical question.***
288

DRAFT

289 **REFERENCES**

290
291 1. Estimated Hypertension Prevalence, Treatment, and Control Among US Adults: Tables. Data Source:
292 National Center for Health Statistics, Centers for Disease Control and Prevention. National Health and
293 Nutrition Examination Survey (NHANES), 2017–2020. Accessed March 22, 2024.
294 <https://millionhearts.hhs.gov/files/Estimated-Hypertension-Prevalence-tables-508.pdf>
295
296 2. Xu J, Murphy SL, Kockanek KD, Arias E. Mortality in the United States, 2021. NCHS Data Brief.
297 2022;456. Hyattsville, MD: National Center for Health Statistics.
298
299 3. World Health Organization. A global brief on hypertension: silent killer, global public health crisis.
300 World Health Day 2013. Accessed January 10, 2024. [https://www.who.int/publications/i/item/a-global-](https://www.who.int/publications/i/item/a-global-brief-on-hypertension-silent-killer-global-public-health-crisis-world-health-day-2013)
301 [brief-on-hypertension-silent-killer-global-public-health-crisis-world-health-day-2013](https://www.who.int/publications/i/item/a-global-brief-on-hypertension-silent-killer-global-public-health-crisis-world-health-day-2013)
302
303 4. Whelton PK, Carey RM, Aronow WS, et al. 2017
304 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention,
305 Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American
306 College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published
307 correction appears in *Hypertension*. 2018 Jun;71:e140-e144]. *Hypertension*. 2018;71:e13-e115.
308
309 5. Mullins PM, Levy PD, Mazer-Amirshahi M, Pines JM. National trends in U.S. emergency department
310 visits for chief complaint of hypertension (2006-15). *Am J Emerg Med*. 2020;38:1652-1657.
311
312 6. Kinsella K, Baraff LJ. Initiation of therapy for asymptomatic hypertension I the emergency department.
313 *Ann Emerg Med*. 2009; 54:792-793.
314
315 7. Brody A, Twiner M, Kumar A, et al. Survey of Emergency Physician Approaches to Management of
316 Asymptomatic Hypertension. *J Clin Hypertens*. 2017;19:265-269.
317
318 8. Wolf SJ, Lo B, Shih RD, Smith MD, Fesmire FM; American College of Emergency Physicians Clinical
319 Policies Committee. Clinical policy: critical issues in the evaluation and management of adult patients in
320 the emergency department with asymptomatic elevated blood pressure. *Ann Emerg Med*. 2013;62:59-68.
321
322 9. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for
323 reporting systematic reviews. *BMJ*. 2021;372:n71.
324
325 10. Brody A, Rahman T, Reed B, et al. Safety and efficacy of antihypertensive prescription at emergency
326 department discharge. *Acad Emerg Med*. 2015;22(5):632-635.
327
328 11. Neaton JD, Grimm RH, Prineas RJ, et al. Treatment of Mild Hypertension Study: Final Results. *JAMA*.
329 1993;270:713–724.
330

331 **Appendix E1.** Literature classification schema.*

Design/ Class	Therapy [†]	Diagnosis [‡]	Prognosis [§]
1	Randomized, controlled trial or meta-analysis of randomized trials	Prospective cohort using a criterion standard or meta-analysis of prospective studies	Population prospective cohort or meta-analysis of prospective studies
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series	Case series	Case series

332 *Some designs (eg, surveys) will not fit this schema and should be assessed individually.

333 [†]Objective is to measure therapeutic efficacy comparing interventions.

334 [‡]Objective is to determine the sensitivity and specificity of diagnostic tests.

335 [§]Objective is to predict outcome, including mortality and morbidity.

336

337 **Appendix E2.** Approach to downgrading strength of evidence.

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340

341

342

Downgrading	Design/Class		
	1	2	3
None	I	II	III
1 level	II	III	X
2 levels	III	X	X
Fatally flawed	X	X	X

343

344

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350 **Appendix E3.** Likelihood ratios and number needed to treat.*

351

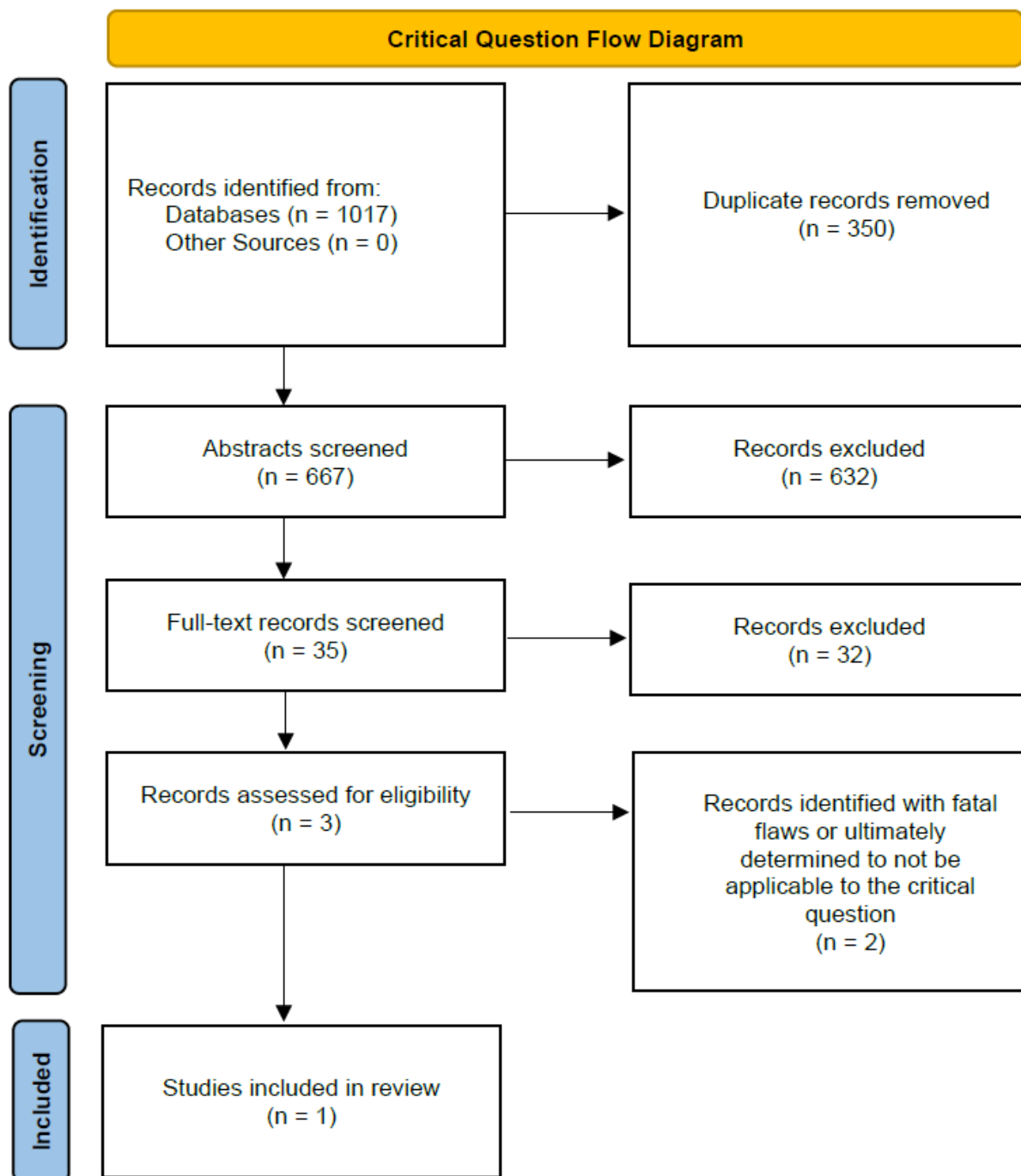
LR (+)	LR (-)	
1.0	1.0	Does not change pretest probability
1–5	0.5–1	Minimally changes pretest probability
10	0.1	May be diagnostic if the result is concordant with pretest probability
20	0.05	Usually diagnostic
100	0.01	Almost always diagnostic even in the setting of low or high pretest probability

352 *LR*, likelihood ratio.

353 *Number needed to treat (NNT): number of patients who need to be treated to achieve 1
354 additional good outcome; $NNT=1/\text{absolute risk reduction} \times 100$, where absolute risk reduction is the risk
355 difference between 2 event rates (ie, experimental and control groups).

356

357



Appendix E5. Literature Searches

Search Date	Database	Search Strings	Filters
8/23/2022	PubMed	((“Hypertension”[tiab]) OR (“Blood Pressure”[tiab]) OR (“Hypertension”[MH]) OR (“Blood Pressure”[MH])) AND ((“Antihypertensive”[tiab]) OR (“Clevidipine”[tiab]) OR (“Enalaprilat”[tiab]) OR (“Esmolol”[tiab]) OR (“Fenoldopam”[tiab]) OR (“Hydralazine”[tiab]) OR (“Labetalol”[tiab]) OR (“Nicardipine”[tiab]) OR (“Nitroglycerin”[tiab]) OR (“Nitroprusside”[tiab]) OR (“Phentolamine”[tiab]) OR (“Antihypertensive Agents”[MH]) OR (“Antihypertensive Agents”[Pharmacological Action]) OR (“Clevidipine”[Supplementary Concept]) OR (“Enalaprilat”[MH]) OR (“Esmolol”[Supplementary Concept]) OR (“Fenoldopam”[MH]) OR (“Hydralazine”[MH]) OR (“Labetalol”[MH]) OR (“Nicardipine”[MH]) OR (“Nitroglycerin”[MH]) OR (“Nitroprusside”[MH]) OR (“Phentolamine”[MH])) AND ((“Emergency Medicine”[tiab]) OR (“Emergency Treatment”[tiab]) OR (“Emergency Department”[tiab]) OR (“Emergency Medical Service*”[tiab]) OR (“EMS”[tiab]) OR (“Emergency Medicine”[MH]) OR (“Emergency Service, Hospital”[MH]) OR (“Emergency Treatment”[MH]) OR (“Emergency Medical Services”[MH])) NOT ((“Pregnant”[tiab]) OR (“Pregnancy”[tiab]) OR (“Pregnancies”[tiab]) OR (“Pregnancy”[MH]) OR (“Stroke”[tiab]) OR (“Stroke”[MH]) OR (“Myocardial Ischemia”[tiab]) OR (“Myocardial Ischemia”[MH]) OR (“Pulmonary Edema”[tiab]) OR (“Pulmonary Edema”[MH]) OR (“Heart Failure”[tiab]) OR (“Heart Failure”[MH]))	2011- Current
8/24/2022	Scopus	TITLE-ABS-KEY(“Hypertension” OR “Blood Pressure” OR “Hypertension”) AND TITLE-ABS-KEY(“Antihypertensive” OR “Antihypertensive Agent*” OR “Clevidipine” OR “Enalaprilat” OR “Esmolol” OR “Fenoldopam” OR “Hydralazine” OR “Labetalol” OR “Nicardipine” OR “Nitroglycerin” OR “Nitroprusside” OR “Phentolamine”) AND TITLE-ABS-KEY(“Emergency Medicine” OR “Emergency Treatment” OR “Emergency Department” OR “EMS” OR “Emergency Medical Service*”) AND NOT (“Pregnant” OR “Pregnancy” OR “Pregnancies”) AND NOT (“Stroke”) AND NOT (“Myocardial Ischemia”) AND NOT (“Pulmonary Edemia”) AND NOT (“Heart Failure”)	2011- Current
8/24/2022	Embase	('asymptomatic':ti,ab,kw AND 'hypertension':de,ti,ab,kw OR 'pulmonary hypertension':de,ti,ab,kw) AND ('antihypertensive agent':de,ti,ab,kw OR 'antihypertensive therapy':de,ti,ab,kw OR 'clevidipine':de,ti,ab,kw OR 'enalaprilat':de,ti,ab,kw OR 'esmolol':de,ti,ab,kw OR 'fenoldopam':de,ti,ab,kw OR 'hydralazine':de,ti,ab,kw OR 'labetalol':de,ti,ab,kw OR 'nicardipine':de,ti,ab,kw OR 'nitroglycerin':ti,ab,kw OR 'glyceryl trinitrate':de,ti,ab,kw OR 'nitroprusside':ti,ab,kw OR 'nitroprusside sodium':de,ti,ab,kw) AND ('emergency medicine':de,ti,ab,kw OR 'emergency treatment':de,ti,ab,kw OR 'emergency department':ti,ab,kw OR 'emergency ward':de,ti,ab,kw OR 'emergency medical service*':ti,ab,kw OR 'emergency health service':de,ti,ab,kw) NOT ('Pregnant':ti,ab,kw OR 'Pregnancy':de,ti,ab,kw OR 'Pregnancies':ti,ab,kw) NOT ('Stroke':ti,ab,kw) NOT ('Myocardial Ischemia':ti,ab,kw OR 'Heart Muscle Ischmeia':de,ti,ab,kw) NOT ('Pulmonary Edema':ti,ab,kw OR 'Lung Edema':de,ti,ab,kw) NOT ('Heart Failure':de,ti,ab,kw)	2011- Current

Appendix E5. Literature Searches (continued)

Search Date	Database	Search Strings	Filters
8/24/2022	Web of Science	TS=(“Hypertension” OR “Blood Pressure” OR “Hypertension”) AND TS=(“Antihypertensive” OR “Antihypertensive Agent*” OR “Clevidipine” OR “Enalaprilat” OR “Esmolol” OR “Fenoldopam” OR “Hydralazine” OR “Labetalol” OR “Nicardipine” OR “Nitroglycerin” OR “Nitroprusside” OR “Phentolamine”) AND TS=(“Emergency Medicine” OR “Emergency Treatment” OR “Emergency Department” OR “EMS” OR “Emergency Medical Service**”) NOT TS=(“Pregnant” OR “Pregnancy” OR “Pregnancy” OR “Stroke” OR “Myocardial Ischemia” OR “Pulmonary Edema” OR “Heart Failure”)	2011-Current
8/24/2022	Cochrane Library	('asymptomatic':ti,ab,kw AND 'hypertension':ti,ab,kw OR 'pulmonary hypertension':ti,ab,kw) AND ('antihypertensive agent':ti,ab,kw OR 'antihypertensive therapy':ti,ab,kw OR 'clevidipine':ti,ab,kw OR 'enalaprilat':ti,ab,kw OR 'esmolol':ti,ab,kw OR 'fenoldopam':ti,ab,kw OR 'hydralazine':ti,ab,kw OR 'labetalol':ti,ab,kw OR 'nicardipine':ti,ab,kw OR 'nitroglycerin':ti,ab,kw OR 'glyceryl trinitrate':ti,ab,kw OR 'nitroprusside':ti,ab,kw OR 'nitroprusside sodium':ti,ab,kw) AND ('discharge':ti,ab,kw OR 'patient discharge':ti,ab,kw OR 'hospital discharge':ti,ab,kw) AND ('emergency medicine':ti,ab,kw OR 'emergency treatment':ti,ab,kw OR 'emergency department':ti,ab,kw OR 'emergency ward':ti,ab,kw OR 'emergency medical service*':ti,ab,kw OR 'emergency health service':ti,ab,kw)	2011-Current

364 **Appendix E6. Quality Payment Program (QPP)**

365
366 **Measure ID**

367
368 QPP317 Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented.

369
370 **Measure Description**

371
372 Percentage of patients aged 18 years and older seen during the submitting period who were screened for elevated blood pressure AND a recommended follow-up
373 plan is documented based on the current blood pressure reading as indicated.

374
375 **Data of Interest**

376
377
378
$$\frac{\text{Patients who were screened for elevated blood perssure} \text{ AND } \text{have a recommended followup plan documented, as indicted if the blood pressure is pre-hypetensive or hypertensive}}{\text{All patients aged 18 years and older at the beginning of the measurement period with at least one eligible encounter during the measurement period}}$$

379
380 **Denominator Exclusions:**

381
382 Patient not eligible due to active diagnosis of hypertension.

383
384 **Denominator Exceptions:**

- 385
386
- 387 • Patient refuses to participate (either blood pressure measurement or follow-up).
 - 388 • Patient is in an urgent or emergent medical situation where time is of the essence and to delay treatment would jeopardize the patient's health status. This may include but is not limited to severely elevated blood pressure when immediate medical treatment is indicated.
 - 389 • Documented reason for not screening or recommending a follow-up for high blood pressure.
- 390

391 **Numerator Exclusions:**

392
393 Not Applicable

394

Evidentiary Table.

Author & Year Published	Class of Evidence	Setting & Study Design	Methods & Outcome Measures	Results	Limitations & Comments
Brody et al (2015)	III	Secondary analysis of data pooled from two randomized controlled trials; single, urban, academic medical center	Included emergency department patients with asymptomatic hypertension and subclinical hypertensive heart disease; patients with uncontrolled blood pressure (>140/90 mm Hg in one study and >160/90 mm Hg for the other study) and discharged from the emergency department; excluded potential hypertensive emergencies or cardiovascular or neurovascular events; outcomes: short-term blood pressure reduction; adverse events; multivariable regression to evaluate association with antihypertensive initiation from the emergency department and blood pressure reduction	N=217; baseline characteristics were similar between those who received an antihypertensive prescription and those who did not except for higher systolic blood pressure among those who received a prescription; systolic blood pressure reduction was independently associated with antihypertensive prescriptions from the emergency department ($P=.001$); the antihypertensive prescription accounted for a reduction of 11 mm Hg (95% CI 4 to 17 mm Hg; $P=.001$); adverse events were comparable and low in both groups	Retrospective; small number of observations from 1 health system; predominantly black population (96%)