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Defining documentation burden (DocBurden) and excess DocBurden for all health professionals: A scoping review

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Abstract:
Objective: Efforts to reduce documentation burden (DocBurden) for all health professionals (HP) are aligned with national initiatives to improve clinician wellness and patient safety. Yet DocBurden has not been precisely defined, limiting national conversations and rigorous, reproducible, and meaningful measures. Increasing attention to DocBurden motivated this work to establish a standard definition of DocBurden, with the emergence of excessive DocBurden as a term.
Methods: We conducted a scoping review of DocBurden definitions and descriptions, searching six databases for scholarly, peer-reviewed, and gray literature sources, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extensions for Scoping Review (PRISMA-ScR) guidance. For the concept clarification phase of work, we used the American Nursing Informatics Association (ANIA)'s 6-Domains of Burden Framework.
Results: A total of 153 articles were included based on a priori criteria. Most articles described a focus on DocBurden, but only 18% (n=28) provided a definition. We define excessive DocBurden as the stress and unnecessarily heavy work a HP or healthcare team experiences when usability of documentation systems and documentation activities (i.e., generation, review, analysis and synthesis of patient data) are not aligned in support of care delivery. A negative connotation was attached to burden without a neutral state in included sources, which does not align with dictionary definitions of burden.
Conclusions: Existing literature does not distinguish between a baseline or required task load to conduct patient care resulting

from usability issues(DocBurden), and the unnecessarily heavy tasks and requirements that contribute to excessive DocBurden. Our definition of excessive DocBurden explicitly acknowledges this distinction, to support development of meaningful measures for understanding and intervening on excessive DocBurden locally, nationally and internationally.

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Appendix A1. Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4-6
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6-7
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	7-10
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	9-10; Table 1 and Table 2, Figure 1
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8-10, Table 1

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Table 1 (Search Strategy), Appendix A2 (Extracted Citations, n = 153)
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	9-11; Table 2, Figure 1
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7-12
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Table 2, Appendix A2 (Citations) and Appendix A3 (Characteristics); 9-12
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	11-12, Table 3, Figure 3, Figure 4
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Table 3, Appendix A3 (Characteristics); 11-12
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Figure 1, Table 3; 13
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	13-15; Table 3, Appendix A2 (Citations), Appendix A3 (Characteristics)
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Figure 3, Figure 4, Appendix A3 (Characteristics)
Results of	17	For each included source of evidence,	Table 3, Appendix

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
individual sources of evidence		present the relevant data that were charted that relate to the review questions and objectives.	A3(Characteristics), 13-16
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	16-21
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	21-26
Limitations	20	Discuss the limitations of the scoping review process.	27
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	28-30
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	33

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

Appendix Exhibit A2. Listing of all citations (n=153)

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Author Date	Description vs. Definition	**Type of resource**	**Stakeholder focus**	**Clinical Setting**	**Scribes**	**ANIA Documentation of Burden Domain(s)**
AHRQ 2022	DEF	PRP	MIX	NS	No	U, Q
Apathy 2023	DES	PRR	MD	AMB	No	SI, Q
Apathy 2023	DES	PRR	MD	AMB	No	U, SI
Arndt 2017	DES	PRR	MD	AMB	No	U, SI
Attipoe 2022	DES	PRR	MD	AMB	No	U
Avendano 2022	DES	PRLR	MIX	NS	Yes	U, Q, REG
Basch 2018	DEF	PRP	MD	NS	No	REG, REIM
Bates 2018	DES	PRP	MD	NS	Yes	U, Q
Baxter 2020	DES	PRR	MD	AMB	No	U
Benko 2022	DES	PRR	MD	AMB	Yes	Q, REIM
Bøgeskov 2019	DES	PRR	RN	INPT	No	SI, Q
Bosek 2022	DEF	PRR	RN	INPT	No	U, Q, REG
Brown 2020	DES	PRR	MIX	INPT	No	U, SI, Q, REG, IS
Cabilan 2015	DES	PRLR	MD	INPT	Yes	Q, REIM
Camilleri 2022	DEF	ABS	RN	INPT	No	Q, REIM
Chavis 2019	DES	NPRP	MIX	NS	No	SI, Q, REG, REIM
Chechel 2023	DES	PRP	RN	INPT	No	REG
Clarke 2022	DES	PRR	TRAIN	NS	No	U, REG
Cohen 2019	DEF	PRP	MD	NS	No	U, REG, Q
Cohen 2019	DES	NPRP	MD	AMB	Yes	Q
Colicchio 2019	DES	PRLR	MIX	NS	No	U, SI, IS
Collins 2018	DEF	ABS	RN	INPT	No	U, Q, IS
Congdon 1995	DES	PRR	RN	HC	No	Q, REIM
Cooper 2021	DES	PRR	RN	INPT	No	Q, IS

de Hoop 2021	DES	PRR	MD	NS	No	U, SI, IS
DiSanto 2017	DES	PRR	MD	AMB	Yes	SI
Duncan 2021	DES	OTH	RN	INPT	No	U, Q
Duncan 2020	DES	ABS	RN	INPT	No	U, IS
Dymek 2021	DES	PRP	MIX	NS	No	U, REG, IS
Ebbers 2022	DEF	PRR	MIX	AMB	No	U, Q, REG, REIM
Elkind 2022	DEF	NPRP	RN	NS	No	Q, IS
Englebright 2021	DES	PRR	RN	NS	No	U, IS
Erickson 2017	DES	PRP	MD	NS	No	REG, REIM, Q, IS
Everett 2022	DES	PRR	RN	INPT	No	U, Q, REG
Frey 2023	DES	PRP	MD	AMB	No	U, Q
Gaffney 2022	DES	PRR	MD	NS	No	U, REIM
Gesner 2022	DEF	PRR	RN	NS	No	U, SI, REG
Gesner 2019	DES	PRLR	RN	NS	Yes	U, Q, REG
Gesner 2021	DEF	OTH	RN	NS	No	SI, Q, REG
Gluckman 2019	DES	PRP	MD	NS	No	Q, REG, REIM
Golob 2016	DES	PRR	MD	NS	No	U, REIM
Golob 2018	DES	PRR	MD	INPT	Yes	Q, REIM
Gong 2021	DES	PRR	TRAIN	INPT	No	U, SI, REG
Gonzalez 2021	DEF	OTH	RN	INPT	No	U
Gutheil 1994	DES	NPRP	MIX	NS	No	SI, Q, REG, REIM
Hadland 2022	DES	ABS	OTH	INPT	No	U, Q, REG, REIM
Hallett 2023	DES	PRR	OTH	NS	No	Q, IS, REIM
Hardiker 2019	DES	PRLR	RN	NS	No	U, SI, Q, REG, IS, REIM
Harmon 2020	DEF	PRLR	RN	NS	No	U, Q, REG, IS
Heaton	DES	PRLR	MIX	INPT	Yes	U

2016						
Hebal 2017	DES	PRR	MIX	AMB	No	U, IS
Heisterkamp Iii 1977	DES	NPRP	MD	AMB	No	Q, REG, REIM
Henrich 2015	DES	PRR	NC	NS	No	U, Q
Hesselink 2023	DEF	PRR	MIX	INPT	No	Q
Hobensack 2022	DEF	PRR	MIX	NS	No	U, SI, Q, REG, IS, REIM
Hoelscher 2023	DES	PRR	RN	NS	No	U, Q
Horn 2021	DES	PRR	RN	INPT	No	Q, REIM
Iscoe 2022	DES	PRP	MD	NS	No	U, Q, IS
Johnson 2021	DES	PRLR	OTH	NS	No	U, SI, Q, REG, IS, REIM
Joukes 2018	DES	PRR	MD	AMB	No	U, Q
Kagawa 2022	DES	ABS	MIX	INPT	No	U
Kaizuka 2022	DES	PRR	MD	NS	No	U, Q, REG, REIM
Kang 2021	DEF	PRR	RN	NS	No	U, Q, REG
Keenan 2013	DES	PRR	RN	INPT	No	U, SI
Kesler 2022	DES	PRR	MD	INPT	No	SI, REG, REIM
Kroth 2018	DES	PRR	MD	AMB	No	U, SI
Kuhn 2015	DES	PRP	MD	NS	No	U, SI, Q
Kumar 2019	DES	PRP	TRAIN	NS	No	REIM
Leventhal 2015	DES	NPRP	MIX	NS	No	U, SI, Q, REG, IS, REIM
Leventhal 2017	DES	NPRP	MD	NS	No	U, SI, Q
Levy 2023	DEF	PRR	MIX	NS	No	U, Q, REG, IS, REIM
Li 2021	DES	ABS	MD	NS	Yes	U, Q
Lindsay 2023	DES	PRP	RN	NS	No	U
Lindsay 2022	DES	PRR	RN	INPT	No	U, REG, IS, REIM
Loszko 2021	DES	PRR	MD	INPT	No	U, SI, Q

Luchette 2016	DES	PRR	MD	INPT	No	U, SI, Q
Ludley 2023	DES	PRR	PTS	INPT	No	U, SI, Q, IS
Luh 2019	DES	PRP	MD	NS	No	U, Q, IS
McBride 2023	DES	PRLR	MIX	INPT; AMB	Yes	U
McClelland 2020	DES	PRLR	MD	NS	No	U, Q, REIM
McIlreevy 2021	DES	PRR	MIX	NS	No	U, Q, IS
McKenney 2019	DES	PRP	MD	NS	Yes	U, SI
Mishra 2022	DES	PRR	MIX	NS	No	U, IS
Mohan 2021	DES	PRR	MD	NS	No	U
Moore 2021	DES	PRP	MD	AMB	No	U, Q, REG
Moy 2021	DEF	PRR	MD	INPT	No	U
Moy 2022	DES	ABS	RN	INPT	No	U, Q
Moy 2023	DEF	PRR	MIX	INPT	No	U, SI, Q, REG, IS, REIM
Moy 2021	DES	PRLR	MIX	NS	No	U, Q
Moy 2021	DEF	ABS	MIX	INPT	No	U
Moy 2021	DES	PRR	MIX	INPT	No	U, SI, Q, REG, IS, REIM
Moy 2023	DEF	PRR	MIX	NS	No	U, Q, REG, REIM
Narayan 2023	DES	PRR	RN	HC	No	REG, REIM
Nguyen 2023	DEF	PRR	MD	AMB	No	REG
Nguyen 2021	DES	PRLR	MD	INPT; AMB	No	U, Q, REG
Nguyen 2021	DES	PRLR	RN	NS	No	U, SI, IS
Nguyen 2023	DES	PRR	MIX	AMB	Yes	Q
Nguyen 2023	DES	PRR	MD	AMB	No	REG, REIM
Noaimi 2020	DES	PRR	MD	AMB	Yes	SI
ONC 2020	DEF	PRP	MIX	INPT; AMB	NO	U, Q, REG, REIM, IS

Osinski 2021	DES	ABS	MD	INPT	No	U
Otokiti 2021	DES	PRR	MIX	NS	No	U
Padden 2019	DEF	PRP	RN	NS	No	U, IS, Q
Patel 2023	DES	PRR	MD	AMB	No	U
Payne 2015	DES	PRP	MIX	NS	No	SI, Q, REG, IS
Peddie 2017	DEF	PRR	MIX	NS	No	U
Perotte 2021	DES	ABS	MD	AMB	No	U
Peters 2020	DES	PRP	MD	AMB	No	REIM
Phillips 2021	DES	PRP	RN	INPT	No	U
Rajamani 2023	DES	PRR	MIX	INPT; AMB	No	U, SI
Ramsey 2023	DES	NPRP	MD	INPT; AMB	No	REIM
Rasche 2018	DES	PRR	PTS	HC	No	U, IS
Rodriguez-Fernandez 2022	DES	PRP	MD	NS	No	SI, Q, REIM
Rose 2022	DES	PRR	RN	INPT	No	Q
Ross 2020	DES	PRR	RN	INPT	No	U
Rossetti 2021	DEF	NPRP	MIX	NS	No	U, SI, Q, REG, IS, REIM
Rotenstein 2023	DES	PRR	MD	AMB	No	SI, Q
Rowlands 2022	DES	OTH	RN	INPT	No	Q
Rule 2021	DES	PRR	MIX	AMB	No	U, SI, REG, IS
Rule 2022	DES	PRLR	MIX	NS	No	U
Russell 2020	DES	OTH	RN	NS	No	SI, REG, IS, REIM
Samani 2023	DES	PRLR	RN	NS	No	SI, Q
Sawe 2020	DES	PRR	MIX	NS	No	U
Schloss 2020	DES	ABS	MD	NS	No	U
Schumacher 2019	DES	PRR	RN	HC	No	Q, IS
Schwartz	DEF	ABS	MIX	INPT	No	U

2019						
Schwarz 2021	DES	PRLR	OTH	NS	No	U
Sengstack 2019	DES	PPT	MIX	NS	No	U, SI, Q, REG, IS, REIM
Sengstack 2020	DES	PRP	RN	NS	No	U, SI, Q, REG, IS, REIM
Shah 2021	DES	PRLR	MD	NS	Yes	U, Q
Shah 2020	DES	PRP	MIX	INPT	No	U, SI, REIM
Sinsky 2020	DES	PRP	MIX	NS	No	Q, REG, REIM, IS
Starren 2021	DES	PRR	MIX	NS	No	U, REG
Strudwick 2022	DES	PRR	RN	INPT	No	U, SI, Q
Sutton 2020	DEF	PRR	RN	INPT	No	SI, Q
Swietlik 2020	DES	PRR	RN	INPT	No	SI, Q, REG, REIM
Tawfik 2019	DES	PRLR	MD	NS	No	U, REIM
Thomas Craig 2021	DES	PRLR	MD	INPT; AMB	No	U, SI, REG
Topaz 2016	DES	ABS	RN	NS	No	U
Tran 2020	DES	PRLR	MIX	INPT; AMB	Yes	SI, Q
van Buchem 2021	DES	PRLR	MD	INPT; AMB	Yes	Q, REIM
Voytovich 2022	DEF	OTH	NONE	NS	No	U
Waldren 2023	DES	NPRP	MD	AMB	No	U, REIM
Warner 2019	DES	PRP	MD	INPT	No	U, REG, IS, REIM
Westra 2018	DES	NPRP	RN	NS	No	Q, IS
Wilkie 2022	DES	PRR	MD	INPT	No	SI
Wilson 2019	DES	PPT	RN	NS	No	U, REG
Wu 2021	DES	PRLR	MD	INPT	No	U
Wurster 2022	DES	PRLR	MIX	INPT	No	U
Yin 2021	DES	PRR	RN	INPT	No	U
Yu 2013	DES	PRR	OTH	HC	No	U, SI, Q, IS
Zebehazy	DES	PRR	RN	INPT	No	U, SI, Q, REG,

2022						REIM
Ziemann 2021	DES	PRLR	MIX	AMB	Yes	Q
KEY	*DEF – definition of documentation burden* *DESC – description of documentation burden*	*PRR – peer reviewed research* *PRLR – peer reviewed literature review* *PRP – peer reviewed perspective/editorial/position paper* *NPRP-non-peer-reviewed perspective editorial/position paper* *ABS – abstract, conference/proceeding* *PPT- PowerPoint slides* *OTH - other*	*RN-nursing only* *MD- physician, MD, DO only* *MIX – mix of clinicians in the same study* *TRAIN – health professions trainees* *PTS – patients* *NC – non-RN, non-prescribing physician clinicians* *NONE – no population identified*	*AMB – ambulatory/outpatient* *INPT – inpatient* *SNF – post-acute, skilled nursing, rehabilitation* *HC – home care* *NS – not specified*		*Q = quality* *SI = self-imposed* *U = usability* *REG – regulatory* *REIM – reimbursement* *IS = interoperability, standards*

Appendix Exhibit A3 Table of Characteristics (based on citations in Appendix Exhibit A2)

Appendix 4: Glossary of terms related to documentation burden (DocBurden) and excessive DocBurden

Group of definitions	Term	Definition
Burden	Cognitive load[1-3]	"*[The] amount of information a person holds and processes within working memory; working memory can be thought of as 'the ability to remember and use relevant information while in the middle of an activity.'*" (note: Collins citation cites [2] inline)
	Cognitive load theory[4]	According to cognitive load theory, the *"learning process requires students to manipulate information in working memory, generating a cognitive load. Learning fails when the cognitive load generated by the task exceeds the student's available working memory.*"[4]
	Workload[5, 6]	"*The attributes of workload in nursing have been defined in terms of the amount of time to complete a task, expertise of the person completing a task, amount of physical exertion, and task complexity. [The] terms cognitive workload and mental workload are synonymous in the literature."[5]*
Documentation	Electronic health record[7]	"A repository of electronically maintained information about an individual's lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record."[7]
	Synthesis of patient data (into clinical impressions)[8]	The process by which a health professional reviews objective and subjective data regarding a patient case through application of clinical skills, in support of patient diagnosis and treatment.
	Communication through EHR[9]	Sharing and discussion of information between individuals (between different health professionals or between health professionals and patients) in support of patient care.
	Developing clinical impression(s)[10, 11]	This is a step in the medical decision-making process for a health professional (e.g., prescribing or ordering provider), and includes building on the synthesis of patient data, to support developing a list of potential diagnoses or conditions that might fit the current clinical scenario.
	Tasks[4, 12]	Health-related activities that are conducted by resource users in their personal or professional lives.[12] This can include primary or secondary tasks which are performed.[4]
	Medication administration[13]	The steps included, typically in an inpatient healthcare setting, where a patient receives a pharmacologic treatment from a healthcare provider (e.g., nurse).

ANIA Framework 6 Domains of Burden[14]	Interoperability/Standards[14]	*"Insufficient configuration standards resulting in duplication and re-entry of data even though it resides elsewhere, either internal to the organization or in an external system."*
	Quality[14]	*"Documentation required to demonstrate that quality patient care has been provided. This includes documentation requirements by the healthcare organization itself, as well as by governmental and regulatory agencies."*
	Regulatory[14]	*"Accreditation agency documentation requirements."*
	Reimbursement[14]	*"Documentation, coding and other administrative data entry tasks required for payment."*
	Self-imposed[14]	Organization culture's influence on what should be documented, when it exceeds what is needed for patient care, including due to fear of litigation; referring to "we've always done it this way", inadequate education, and/or misinterpretation of regulatory standards. (adapted from [14])
	Usability[14]	*"Limited and insufficient use of human factors engineering and human computer interface principles resulting in extra time spent entering data, scrolling, clicking and searching for pertinent information in the* [record or EHR]*."*

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Defining documentation burden (DocBurden) and excess DocBurden for all health professionals: A scoping review

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Keywords: electronic health records and systems; documentation burden; excessive documentation burden; clinician documentation; burden; usability; informatics; health informatics; healthcare.

After reading this work: Readers will understand the concept of documentation burden and excessive documentation burden, the origins of the current domains of documentation burden and be able to articulate a singular standardized definition of excessive documentation burden that can be applied to all health professionals.

Research Question: What is a standardized definition of excessive documentation burden to guide and align efforts to reduce burden across a variety of domains, settings, and from various stakeholder perspectives?

ABSTRACT

Objective: Efforts to reduce documentation burden (DocBurden) for all health professionals (HP) are aligned with national initiatives to improve clinician wellness and patient safety. Yet DocBurden has not been precisely defined, limiting national conversations and rigorous, reproducible, and meaningful measures. Increasing attention to DocBurden motivated this work

to establish a standard definition of DocBurden, with the emergence of excessive DocBurden as a term.

Methods: We conducted a scoping review of DocBurden definitions and descriptions, searching six databases for scholarly, peer-reviewed, and gray literature sources, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extensions for Scoping Review (PRISMA-ScR) guidance. For the concept clarification phase of work, we used the American Nursing Informatics Association (ANIA)'s 6-Domains of Burden Framework.

Results: A total of 153 articles were included based on a priori criteria. Most articles described a focus on DocBurden, but only 18% (n=28) provided a definition. We define *excessive* DocBurden as the stress and unnecessarily heavy work a HP or healthcare team experiences when usability of documentation systems and documentation activities (i.e., generation, review, analysis and synthesis of patient data) are not aligned in support of care delivery. A negative connotation was attached to burden without a neutral state in included sources, which does not align with dictionary definitions of burden.

Conclusions: Existing literature does not distinguish between a baseline or required task load to conduct patient care resulting from usability issues(*DocBurden*), and the unnecessarily heavy tasks and requirements that contribute to *excessive DocBurden*. Our definition of excessive DocBurden explicitly acknowledges this distinction, to support development of meaningful measures for understanding and intervening on excessive DocBurden locally, nationally and internationally.

1. BACKGROUND and SIGNIFICANCE

Good clinical practice requires that health professionals (HPs) record their observations, interpretations, actions, and decisions – tasks commonly referred to as documentation – in their patients' health records. However, depending on whether the effort is seen by the HP as directly related to, adding value to, or outside of patient care, the effort expended can have significant impacts on their professional experience. Electronic health record (EHR) documentation burden (*DocBurden*) is a key contributor to HP burnout, and is associated with decreased satisfaction in clinical practice,[1-3] loss of and negative impacts on health professional time,[4-6] information overload with risk of increased medical errors[7,8] and negative patient safety outcomes.[9-12] Burnout costs are estimated at $4.6 billion for United States (US) physicians annually,[13] and $16,00 per nurse annually.[14] The existing scope and definitions available of *DocBurden* lack *consistency* and *standardization*. The development of a standardized definition will allow for consensus building and alignment among research, policy, and operational groups focused on this issue; and in turn enable the development of rigorous, reproducible, and meaningful measures to understand, trend, and evaluate the impact of interventions on DocBurden. In this paper, we are deliberate in defining HPs broadly as including but not limited to physicians, registered nurses, advanced practice providers, therapists, medical assistants and any other interdisciplinary members of the clinical team that contribute to the delivery of patient care.

DocBurden and burnout have been associated together,[15-17] but impact and linkage between the two is not well quantified or measured.[18-22] Estimated rates and associated costs of DocBurden are also unknown, in part, due to a lack of explicit agreement within the scientific and healthcare communities on the *definition* of DocBurden and what would be considered unnecessarily heavy. DocBurden has been *described* and cited as having 6 contributory domains: reimbursement, regulatory, quality, usability, interoperability/standards, and self-imposed.[23]

Through the work of the NLM-funded 25x5 Symposium and now with the AMIA 25x5 Task Force, we confirmed the American Nursing Informatics Association (ANIA)'s Six Domains of Burden Framework[23] (henceforth referred to as the ANIA Framework) framework applies to all health professions.[22,24-27] The ANIA Framework highlighted areas in need of further research, evaluation, and solutions to address that domain's contribution to DocBurden, each established as a domain in the framework.[23]

The breadth of clinical care settings and variety of individual HP experiences have impacted how DocBurden has been defined to date. Several national efforts are addressing the problem of DocBurden, including priorities to improve health worker well-being.[17,28,29,30] American Medical Informatics Association (AMIA) 25x5 Task Force to Reduce Documentation Burden to 25% of current state,[22,26,27,31] and the National Burden Reduction Collaborative,[32] note a common emergent theme across these efforts is a call for a definition of DocBurden that supports unified future policy, research and regulatory efforts to support cross-organizational sharing and comparison of efforts.

2. OBJECTIVE

In this study we aimed to: 1) conduct a scoping review[33,34] to identify existing varying definitions and descriptions of DocBurden in the existing scholarly and gray literature, 2) perform a concept clarification[35] of DocBurden based on the scoping review results and in the context of the ANIA Six Domains of Burden Framework, and 3) develop and propose a standardized definition of DocBurden, and emergent related terms, for HPs across all care settings to guide and align policy, research, and operational efforts to reduce excessive DocBurden.

3. MATERIALS AND METHODS

A scoping review and concept clarification were the two primary methods used to systematically conduct this work. We followed three major steps: 1) Conduct a scoping literature review to identify sources that use and/or define the concept of DocBurden and the related terms of "documentation", "burden", and "excessive burden", "documentation burden", and "excessive documentation burden;" then, extract key study characteristics, and definitions and descriptions of DocBurden from included sources in scoping corpus. 2) Identify an organizing framework and apply the concept clarification methodology in contextualizing the ANIA Framework within the literature and mapping the included sources to the 6 domains of burden. 3) Synthesize the corpus definitions into standardized definitions of documentation, burden, DocBurden and excessive DocBurden. The approach created two opportunities in the analyses where novel concepts could be identified with reference to the ANIA Framework (i.e.; through the analysis and synthesis of the definitions and descriptions of DocBurden; during the concept clarification while reviewing the analysis with the subject-matter expert co-authors).

3.1 Scoping Review: Design and Search Strategy

We applied approaches from the Johanna Briggs Institute Manual for Evidence Synthesis of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extensions for Scoping Review (PRISMA-ScR) (Appendix A1).[33,34,37] Six databases, including PubMed, CINAHL, Scopus, Web of Science, Cochrane Database, and Google Scholar[36] were searched for scholarly, peer-reviewed journal articles and grey literature[36] (i.e., editorials, conference proceedings, power point slides, dissertations). (Table 1) Dates did not delimit the search (resultant dates ranged from 1977-2023). The authors (JBW, DRL) designed the search and

consulted with a health sciences librarian to review objectives and the corresponding search strategy. The search included a mix of key terms related to documentation, types of clinicians, and burden or alternative terms that might be applied. The two searches (narrow and broad strategies) were conducted in July 2023 and yielded a combined 940 citation results (Table 1).

3.2 Scoping Review: Study Selection, Eligibility Criteria, and Data Extraction

We used the Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia), to store, screen, and manage the review and results abstraction processes for articles retrieved from the six database searches (Figure 1). A priori inclusion and exclusion criteria were established (Table 2).

We identified *definitions* as sources that stated how they defined DocBurden, where *description* citations provided uses of or some characteristics of the term without offering a definition. All reviewers met as a team to do an initial walk through of the screening process, review of the inclusion and exclusion criteria and the method to approach using Covidence software. Any discrepancies during that process were iteratively discussed, and then individual screening commenced. At least two reviewers (BD, CJD, MG, DRL, RL, or JBW) independently evaluated the titles and abstracts for inclusion and exclusion criteria. Discrepancies were resolved by consensus. At least two reviewers then independently screened each full-text article. A final corpus of 153 full text articles were extracted for definitions, descriptions, and an a priori set of study characteristics (Appendix A2, A3).[37] Data were extracted by one reviewer (CJD, MG, RL or JBW) and verified by another (DRL or JBW). Once the extractions were complete, results were exported from Covidence for analysis.

3.3 Identify Framework and Concept Clarification

A concept clarification involves choosing, examining, and integrating existing definitions and descriptions of a concept and synthesizes them into one comprehensive definition through critical thinking. This method is appropriate when a framework offers key insights, but further adaptation is needed.[35] Specifically, we examined how the DocBurden literature fits within the ANIA Framework, or the "Six Domains of Burden: A Conceptual Framework to Address the Burden of Documentation in the Electronic Health Record."[23]

The same authors who performed the scoping review screening and extraction reconvened to examine each of the included sources and identify themes and domains of burden from within each source in the corpus as they applied to the ANIA Framework (Appendix A3).[37] We cross-walked each of the 153 included sources from our scoping review with the six-domains of DocBurden (Figure 2). Co-authors (PS, KC, KJ, JAM, DD, JJC, SC, AJM, JM, RGM, SCR, STR) with expertise in research(8), policy(3), and operational(3) and clinical informatics(5) domains related to DocBurden, provided expert review of the definitions (burden, excessive burden, documentation, DocBurden and excessive DocBurden) and concept clarification. The emergent specification of *necessary* DocBurden and *excessive DocBurden* was made during the concept clarification. The full team achieved consensus regarding the alignment of ANIA Framework domains to the literature citations.

4. RESULTS

Our initial search of the 6 databases yielded 940 citations, which we iteratively reviewed and screened to a final corpus of 153 articles (Figure 1, Appendix A2)[37] eligible for inclusion. Review of those 153 articles focused on extracting definitions or descriptions of DocBurden,

applicable domains of burden based on the ANIA Framework categories, and other characteristics to support the concept clarification (Appendix A3).[37]

Few (n=28) studies had an actual definition of DocBurden (Table 3). Of the 28 sources with distinct definitions, 11 of the sources offered an original definition of DocBurden, while the remaining 17 provided a reference in support of their definition. We identified 28 distinct definitions and 125 distinct descriptions of DocBurden from the 153 articles reviewed with varying amounts of conceptual and scope overlap (Appendix A3).[37]

Sixty-two percent of the 153 articles were peer-reviewed original research or literature reviews (n=95), while 24% (n=37) were peer-reviewed or non-peer reviewed perspective or editorial pieces. The remaining 14% of the sources were conference abstracts, power points slide decks, dissertations, or academic projects. Figure 4 shows the temporal trends in articles, with an inflection point around 2013.

4.1 Development of Standardized Definitions from Source Definitions

Using an iterative approach, we developed standard definitions based on the extracted definitions from the included scoping review sources. (Table 4) By summarizing the conceptual similarities and differences of DocBurden definitions and descriptions, we achieved a standardized definition of DocBurden. We found commonalities between the definitions, and also categorized the types of tasks that were mentioned in the included studies. We considered dictionary definitions of document,[38] documentation,[39] and burden.[40] As part of the concept clarification, we elicited feedback and refined the standardized definitions through 3-rounds of consensus discussion with expert co-authors (Table 5). One notable finding was that all descriptions of documentation burden had a negative connotation of burden, without separating

or differentiating what tasks were necessary or required to carry out patient care. Terms referenced in the definitions that required additional context are defined in Appendix A4.[41]

4.2 Presentation of Definitions (Burden, Excess Burden, Documentation, Documentation Burden, Excess Documentation Burden)

Burden

We determined the following standard definition from our synthesis of the literature: *Burden* is defined as the load[40,41] (e.g., cognitive load,[41,42] workload,[41] or task load[41]) experienced by a HP or healthcare team that is a *necessary* part of carrying out an activity or task required for care delivery (i.e.; medication administration, documenting a visit plan, writing a procedure or operative note). Contributors to burden may include the clinical environment, team makeup and dynamics, and individual factors (e.g., clinical expertise, training).

Excess Burden

We determined the following *emergent* standard definition from our synthesis of the literature: *Excess Burden* is defined as the excess or unnecessarily heavy load[40,41](i.e., excess cognitive load, excess or stressful workload, or excess task load) experienced by a HP or healthcare team including, but not limited to, tasks that are not aligned in support of care delivery.

Documentation

Documentation is an expected and required activity and product of patient care delivery. We observed that defining tasks included in *documentation* first is critical, and many sources did not offer a definition of documentation. Documentation included a range of activities from gathering information needed to care for the patient, gathering patient data itself (such as vital signs, point-of-care testing) and tasks of synthesizing[41] and entering information into the EHR. We found that the term *documentation* was used as both a noun (e.g., an EHR note created for a visit as a *document*) and a verb (e.g., *documented*, *documenting*, and *documents*) in the sources reviewed.[38,39,41]

We determined the following standard definition from our synthesis of the literature: *Documentation* is the patient-centered collection or generation of clinical data, review of clinical data, analysis of clinical data, and synthesis of clinical data,[41] all in support of direct patient care needs. These documentation tasks include but are not limited to the inputs and outputs necessary to support all aspects of the care and communication with the patient (e.g., the authoring of notes or flowsheets, synthesizing clinical data into diagnoses or clinical impressions, creation of care or treatment plans, and communication through the EHR with patients and other HPs).

Documentation Burden (DocBurden)

DocBurden is defined as the expected load (see *Documentation* above) on HP of completing necessary tasks included in documentation and EHR interaction. The included sources did not often differentiate between *DocBurden* and *excessive DocBurden* (defined below).

Excessive DocBurden

Based on multiple iterations with the co-authors immersed in the reviewed literature and measurement goals (Table 4), we arrived at the definition of *excessive DocBurden* that conveys the central roles of usability, a domain from the ANIA Framework, and the documentation activities themselves, in relation to the HP experience of burden when providing patient care. We determined the following *emergent* standard definition from our synthesis of the literature: *Excessive DocBurden* is defined as the stress and unnecessarily heavy load or work (i.e., *excessive burden*) a HP or healthcare team experiences when the usability[41] of documentation systems and documentation activities (i.e., generation, review, analysis and synthesis of patient data) are not aligned in support of patient care delivery.

The majority of articles were focused on physicians only (n=56, 37%), or nurses only (n=44, 29%), while fewer articles considered all types of health professionals (n=43, 28%). We found variability related to the stakeholder perspective and HP population. Three sources from the corpus mapped solely to the ANIA reimbursement domain, while forty-five of the 153 sources were categorized to reimbursement in combination with other domains of burden. Few studies examined interventions to mitigate burden. Some focused on the use of scribes for HP transcription (n=18, 12%) as a potential solution. However, several research citations that focused on scribes had study outcomes such as the amount of time HPs were able to spend engaging with patients rather than the EHR, without explicit linkage to DocBurden.[43,44] Additionally, patients were the focus of two included sources (1%).[45,46]

The concept clarification we performed confirmed the usefulness and relevance of the taxonomy of the ANIA Framework and their suggestion that *usability* is at the core of all 6 domains of DocBurden, not just the domain specifically labeled *usability*.[23] We found evidence of all domains in the 153 articles, however *usability*, *quality* and *self-imposed* had the greatest

number of representations. In 9 sources, all 6 domains were discussed in the same reference. Further, we observed that many citations had more than one domain covered, and the three domains that were also most common (*usability*, *quality* and *self-imposed*), often co-occurred (Figure 2).

5. DISCUSSION

The rapid evolution and increasing attention that DocBurden has recently received motivated this work to establish a standard definition of *DocBurden*.[24] Based on our initial search and review, we expanded our search and screening criteria to include articles that described or attempted to describe DocBurden and *excessive DocBurden*, in addition to those that provided an explicit definition.

5.1 "Burden" connotation: negative versus neutral

A definition of burden was not established in the majority of sources. There was a negative connotation attached to burden and there was no neutral state identified in these sources. We reflect that this representation does not align with the dictionary definition of burden,[40] and further the sources do not distinguish between the baseline or required task load that is integral to patient care and what is excessive.[47] We therefore highlight the need in future work to differentiate between the usual tasks (or *burden*) including *documentation* required for patient care delivery (i.e., medication administration,[41] procedure notes, and clinical impression[41] documentation), rounding, and transitions of care between members of the clinical team, and the excessive tasks that contribute to *excessive DocBurden*.[48] However, if we are imposing solutions that have poor usability[49] and excessive requirements for this necessary documentation,[50] then

that can create a different situation (i.e., too many clicks to complete an order or decision support process),[51,52] where the process of necessary documentation leads to *excessive DocBurden* (Figure 3). We consider the need to mitigate both DocBurden and excessive DocBurden, with further work needed to understand which tasks fall into which category.[53,54]

5.2 Emergent Terminology of Excessive DocBurden

We acknowledge that recognition of DocBurden is not new [55-56] and relies on HP perceived experiences.[57-58] However, the term *excessive DocBurden* is an emergent term from this work. We found that sources in the corpus often did not distinguish between the base challenge of usability in documentation that is integral to patient care (*DocBurden*) from unnecessary EHR tasks EHR tasks (*excessive DocBurden*). For example, the capture and planning of patient care and treatment activities within a patient's record are a necessary part of patient care delivery, and longitudinal understanding of patient conditions.[59] By distinguishing between *DocBurden* and *excessive DocBurden*, this terminology allows for a more nuanced understanding of DocBurden, intended to describe, and support the measurement of the HP experience.

There should be robust governance around which EHR documentation requirements are added to HPs' workloads. Too often, additional data collection effort is shifted to the HP, who is expected to capture the data needed for use outside of what is required for documentation of patient care delivery.[60] Our definition is inclusive of the concepts of: 1) systems which may lack appropriate usability design principles, 2) the need to define *necessity* in measuring documentation and differentiating between DocBurden and excessive DocBurden, and 3) activities that may inherently not be appropriate for HPs to complete.

5.3 Cross-walking to ANIA Framework Domains of Burden

Usability, *quality* and *self-imposed* domains were the top 3 domain topics found in the studies we analyzed. With our focus on sources exploring the HP experience of excessive DocBurden, it follows that sources in these domains presented work linked to end-users. Our finding demonstrating a focus on usability in the literature, which aligns with the ANIA Framework in suggesting that usability underlies all 6 domains.[23] Few sources focused solely on reimbursement, although healthcare is driven by financial considerations.[55,59,61] Future research is needed to understand the financial impacts of excessive EHR burden on quality of care, patient safety and the HP workforce.

5.4 Role and Impact of a Standard Excessive DocBurden Definition

Creating a standard definition of excessive DocBurden also requires clarifying assumptions, language, and scope. For example, the assumed definition and scope of the term 'documentation' varied across different types of HPs, care settings, and investigators. We observed that in some settings, particularly those focused on physicians, documentation referred only to clinical notes, while in other settings, particularly those focused on registered nurses, documentation referred to all forms of structured and unstructured data entry and review. In the corpus, there was also a lack of consensus on whether data retrieval/review was included or excluded as part of documentation. Likewise, when considering the primary and secondary purposes of documentation, it is useful to clarify that our definition of burden explicitly addresses HP's experience in the delivery of high value patient care. At its worst, excessive DocBurden can be a barrier to efficient HP work and teamwork, and communication between HPs and patients, which can impede providing the best care.

DocBurden has been noted to be a contributor to clinician burnout,[62] and there can be a presumption of a shared understanding, or instances of conflation or interchangeable usage with research focused on burnout, wellness, and resilience.[16,28,63,66] One of the barriers to the adoption of a standardized definition for excessive DocBurden has been the co-occurrence of terms and phrases used interchangeably when a different but adjacent concept is being considered, such as the concepts of HP burnout,[67] or clerical or purely administrative burden.[68] We observed an anticipated inflection point in included sources around 2013, aligned with expansion of EHR implementation after the HITECH Act.[69]

The work of Johnson, Neuss, and Detmer (2021)[56] offers a foundational perspective to understand the historic influences of our current state of burden, and conveys the importance of a clear definition as we consider the unintended consequences of developing the EHR (e.g., adding to documentation process instead of streamlining it, resulting in excess burden).[29,70] Returning the focus to the patient and their well-being, through the use of tools, such as clinical decision support, and those that support interoperability and usability, will inherently involve turning away from what the authors present as a focus on the "finances".[56] Our definition of DocBurden could enable moving from what they call the "Era of Entanglement" to an active phase of mitigation, but will require a rethinking of the HP experience and role in clinical care.[56]

5.5 Consideration of The Patient (and Caregiver)

We found two studies[45,46] that considered the patient as a member of the clinical team who might be experiencing DocBurden. As impacts of information blocking legislation take effect[31], it will be important to consider whether the patient will need to receive greater consideration when measuring and mitigating DocBurden, and attend to the potential risk of shifting burden to

the patient or their caregiver. Consistent with a clinical informatics vision for the EHR,[60] the primary purpose of documentation is to support the clinical care provided to patients, improve clinical decision making, and enable smooth transitions between levels of care by ensuring continuity through clear and concise communication to facilitate a shared situational awareness of the patient and conditions impacting the patient.

5.6 Limitations

Our robust and inclusive search of 6 available search databases occurred in July 2023; discourse regarding DocBurden is rapidly gaining attention, particularly in the grey literature. Due to our focus on identifying definitions and descriptions of DocBurden, we examined sources selected for that characteristic; sources were not examined for the rigor of the primary work other than by categorization of the type of publication. Factors that may have impacted our search include the lack of existing Medical Subject Headings (MeSH) terms for DocBurden, a significant amount of grey literature on this topic, and limited indexing of key words. Therefore, we conducted both a broad and narrow search (Table 1). Several definitions identified (Table 3) were linked to work produced from the clinical informatics community, including the 25x5 initiative,[25-27,31,59,62,71-73] and from the human computer interaction (HCI) community.[75] Further, several publications on the list had the same first author (Table 3), so the number of unique researchers or research teams examining DocBurden is lower than the 28 studies would suggest. Lastly, while a description was provided on how the authors approached interrater reliability for evidence screening and selection in the methods, Cohen's kappa was not calculated, which may be considered a limitation of this scoping review method and approach.[34]

5.7 Policy Implications

Agencies such as the Center for Medicare and Medicaid Services (CMS)'s Office of Burden Reduction and Health Informatics (OBRHI)[30] and the Office of the Surgeon General of the United States (OSG) have both announced initiatives in support of reducing DocBurden.[28] This definition of HP excessive DocBurden is in response to a call for action from policy stakeholders, including the AMIA 25x5 Task Force which is leading efforts to mitigate excessive DocBurden.[27,31,32,76] Additionally, while many agencies and HP societies report concern with the impact of HP excessive DocBurden on the healthcare workforce,[60] few generalizable measurement options or implementable solutions are offered. To address this, the AMIA 25x5 Task Force submitted a topic nomination to the Agency for Healthcare Research and Quality (AHRQ) Evidence-Based Practice Centers (EPC) program in June 2022.[77] The funded Technical Brief[76] is now available, which found that few generalizable measurement approaches capture the HP experience of DocBurden.[78]

5.8 Moving Forward

This scoping review confirmed that the state of the science is currently focused on describing and reporting the need for mitigating action.[56] Approximately 21% of the articles reviewed with DocBurden definitions or descriptions were editorials or white papers. It is telling that many research articles in the DocBurden domain did not offer a description or definition.

Further, research efforts may benefit from measuring the impact of interventions while considering those affected by the interventions, with particular attention to avoiding shifting excess DocBurden between care team members. In the case of scribes, for example, studies frequently implied that DocBurden would be reduced when using scribes.[80,81] In considering the

scribe as a member of the healthcare team, as we do, then adding a scribe is merely shifting the DocBurden and does not reduce the overall excessive DocBurden on the interprofessional team. This example of the inherent risk of making assumptions about what mitigates excessive DocBurden, and supports the assertion that a standardized definition will enable alignment and reproducibility of research to achieve measurable decrements in excessive DocBurden. Further, any standardized definition may need to be revisited over time to ensure that it remains aligned with DocBurden reduction practices and advances in the field.

6. CONCLUSION

The way in which excessive DocBurden is defined and described within the healthcare system and related literature has real world impacts and clinical implications, including the framing of how to measure DocBurden. A clear, standardized definition is essential for effective alignment of efforts to reduce DocBurden and excessive DocBurden, and measure progress toward this goal. Our scoping review presents an inclusive and interprofessional standardized definition of DocBurden as a basis for future studies, work, and policies, and serves to increase clarity on the concept, current discourse, and recent progression of excessive DocBurden within the U.S. health system.

Clinical Relevance Statement: What is a standardized definition of excessive documentation burden to guide and align efforts to reduce burden across a variety of domains, settings, and from various stakeholder perspectives for all health professionals? After reading this work, readers will understand the concept of documentation burden and excessive documentation burden based on the results of a scoping review and concept clarification. We cross-walked the scoping review corpus to the ANIA Framework 6 domains of burden. Readers will be able to articulate a singular standardized definition of excessive documentation burden, developed from the scoping review corpus, that can be applied to all health professionals.

Multiple Choice Questions:

1) Question: There was an increase in citations in the literature on the topic of documentation burden (DocBurden) after which year:
    a. 2009
    b. 1998
    c. 2013
    d. 2023

Answer: Choice c. 2013

Explanation: We found that citations in the documentation burden (DocBurden) body of literature increased significantly in our analyses after 2013. We show in Figure 4 that citations increased gradually after 2013, and there a continued steady increase in the years since. Federal legislation leading to the widespread implementation of electronic health records (EHR) in

hospitals occurred starting in 2011.[68] Some have hypothesized that these events contributed to the growing attention to and discussions of DocBurden.[59]

2) **Question:** Which of the following is a domain of documentation burden (DocBurden), where a domain references the aspect of work in the EHR affected by burden:
    a. Information technology
    b. Usability
    c. Cognitive load
    d. Public Health

Answer: Choice b. Usability

Explanation: Domains of burden have been explored in the ANIA Framework of 6 Domains of Burden. Domains identified include usability, which is more commonly cited, regulatory, reimbursement, quality, self-imposed and interoperability.[23] In the scoping review, we identified that 9 of the 153 sources cited all 6 domains of burden, and many sources explored more than one domain in their work (See Appendix A3).[37]

3) **Question:** Which members of the healthcare team are affected by excessive DocBurden:
    a. Nurses and nurse practitioners only
    b. Patients and physicians only
    c. Physicians, nurses, and patients only
    d. All members of the healthcare team

Answer: Choice d. All members of the healthcare team

Explanation: While 56% of scoping review sources focus on physicians, and 29% of sources focused on nurses, all members of the health care interdisciplinary team can be affected by

excessive DocBurden. Figure 3 gives an example of how excessive DocBurden can affect medication administration.

4) **Question:** Documentation burden (DocBurden) is the _____ load on the health professional of completing necessary tasks included in documentation and EHR interaction.
    a. Excessive
    b. Expected
    c. Unanticipated
    d. Fluid

Answer: Choice b. Expected

Explanation: The analyses of our scoping review resulted in a standardized definition of documentation burden (DocBurden), as "[the] *expected* load on health professionals of completing necessary tasks included in documentation and EHR interaction." We identified that while burden carries a negative connotation in most sources, this differs from the dictionary definition of burden which is a neutral state. We therefore define excessive DocBurden as "[the] stress and unnecessarily heavy load or work (i.e. excessive Docburden) a health professional or healthcare team experiences when the usability[41] of documentation systems and documentation activities are not aligned in support of patient care delivery. See Table 5.

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Competing interests:

AJM reports employment by JP Morgan Chase, with a role at the financial institution unrelated to her capacities associated with this research, and this work was performed on her own time. KC reports grant funding from NINR and American Nursing Foundation, and a leadership role for AMIA (Board Member). JC reports professional duties at the University of Alabama at Birmingham. DD reports leadership roles on the Corporation for Corporation for National Research Initiatives (Board Member) and the International Academy for Health Sciences Informatics (Board Member). CJD reports receiving training funding from National Library of Medicine T15 Training grant. KJ reports grants from FDA Sentinel Program, NIH Pioneer Award, support for attending NIH and Robert Wood Johnson Foundation meetings, and leadership roles for American College of Medical Informatics (President), ex officio member of AMIA Board of Directors, and Robert Wood Johnson Foundation (Chair of National Advisory Committee for Amos Medical Faculty Development Program). JAM reports serving on scientific advisory board for and holding shares in Augmedix. RGM reports funding from the American Medical Association. SCR reports grant funding from Agency for Healthcare Research and Quality, NINR, and a leadership role for AMIA (Chair of AMIA's 25x5 Task Force). VT reports a leadership role for AMIA (Board Member).

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Contributorship Statement:

DRL, JBW, SCR, and KC conceptualized the project. The authors (DRL, JBW) designed the search strategies. BD, CJD, MG, DRL, RL, or JBW independently evaluated the titles and abstracts for inclusion and exclusion criteria. Data were extracted by one reviewer (CJD, MG, RL or JBW) and verified by another (DRL or JBW). All authors contributed to the concept clarification phase. The manuscript was drafted by DRL and JBW, with detailed feedback from SCR, BD, and KC. The manuscript and standardized definitions were reviewed in detail by expert co-authors (PS, KJ, JAM, DD, JC, SC, JM, AJM, STR). The complete manuscript (drafts and final version) was reviewed in detail by all co-authors.

Data Availability Statement:

The data underlying this article are available in the article and in its online supplementary appendix materials.

Disclaimer:

The contents of this manuscript represent the view of the authors and do not necessarily reflect the position or policy of the U.S. Department of Veterans Affairs or the United States Government. AJM reports employment by JP Morgan Chase, that her views are hers alone and do not represent those of JP Morgan Chase, and this work was performed on her own time.

List of Appendix Supplemental files:

Appendix A1: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist
Appendix A2: Listing of all citations (n=153)
Appendix A3: Table of characteristics of 153 citations, included in Scoping review extraction
Appendix A4: Glossary of terms related to documentation burden(DocBurden) and excessive DocBurden

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Table 1: Search Strategies* for Scoping Review (*Conducted July 2023)	
PubMed	
Narrow	documentation burden AND "electronic health records" Filters: Meta-Analysis, Review, Systematic Review
Broad	“documentation burden” OR “burden of documentation,” no filters
Cochrane Database of Systematic Reviews	
Narrow	documentation AND burden AND "electronic health record" in Title Abstract Keyword - (Word variations have been searched)
Broad	“documentation burden” OR “burden of documentation,” no filters
Web of Science	
Narrow	documentation AND burden AND "electronic health record" (Topic) and Review Article or Meta Analysis or Systematic Review (Publication Type)
Broad	“documentation burden” (All Fields) OR “burden of documentation” (All Fields)
CINAHL Complete	

Narrow	documentation AND burden AND “electronic health records”
Broad	“documentation burden” OR “burden of documentation,” no filters
Google Scholar	
Narrow	“documentation burden” AND definition AND "electronic health records," excludes citations and patents, sorted by relevance, sorted by Review Articles only
Broad	“documentation burden” OR “burden of documentation,” dates: 2013-2023
Scopus	
Narrow	TITLE-ABS-KEY (documentation AND burden AND electronic AND health AND records) AND (LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "le") OR LIMIT-TO (DOCTYPE , "no") OR LIMIT-TO (DOCTYPE , "ch") OR LIMIT-TO (DOCTYPE , "ed") OR LIMIT-TO (DOCTYPE , "sh"))
Broad	TITLE-ABS-KEY ("documentation burden" OR "burden of documentation")

Table 2: Title and Abstract Review Criteria, screening inclusion and exclusion criteria

Title and Abstract Review Criteria	
Inclusion	Exclusion
~Articles impacting documentation for the clinician ~Medical literature or articles related to healthcare ~Articles that examine methods or interventions that impact documentation length or burden (ex: scribes, speech recognition, AI) ~Documentation burden includes consumption and generation (ex: synthesis, authoring, review, analysis of clinical data) ~Articles that discuss usability and its factors ~Articles specific to COVID-19 and documentation practices at that time (policy and standards changed to streamline documentation at that time)	~Articles that are focused exclusively on clinical outcomes (ex: smoking cessation) ~Training articles about the task/workflow of documenting (ex: student nurses, med students on completion metrics, adhering to regulatory guidelines) ~Articles on patient safety outcomes that do not connect through documentation burden role or mechanism ~Articles not available in English.
Full Text Review Criteria	
Inclusion	Exclusion
~Context is related to healthcare AND one of	~Documentation burden is not related to

the below: ~There is an actual definition of documentation burden ~There is a description of documentation burden ~Reference to seminal documentation burden citation	healthcare ~No description and/or definition of DocBurden ~Single mention in abstract only to DocBurden ~There is no reference or citation to other work about DocBurden. ~Describing or defining an adjacent concept such as burnout, compassion fatigue, etc. ~Full text is unavailable, or not available in English.

Table 3 Definitions of Documentation Burden from Scoping Review Sources

Author^^ (year)	**Original Reference (vs Cited)****	**Definition (page number), [ANIA Framework Domain(s)]**
AHRQ[A1] (2022)	Yes	"Documentation burden (both documenting and reviewing documents) contributes to clinician workloads, increased cognitive load, and has been found to negatively impact the quality of patient care delivered." [Q, U]
Basch[B1] (2018)	Yes	"Two new areas of burden further exacerbate health care inefficiency, including regulatory burden associated with specific documentation for incentive and/or quality programs, and what can be called "EHR burden"—burden resulting from poor design and usability, suboptimal implementation, and inadequate training." (p. 914), [REG, REIM]
Bosek[B2] (2022)	Yes	"Documentation burden occurs when organizations use the EHR for more than documentation of care, such as billing and fulfilment of regulatory oversight." (p. 6), [Q, REG, U]
Camilleri[C1] (2022)	No	"The nurse documentation burden is nurse discontentment with documentation methods in in the EMR system due to long work hours, time constraints, and patient workload linked increased possible human errors, decreased patient safety, poor documentation quality, and ultimately, nurse burnout." (p. 172), [REIM, Q]
Cohen[C2] (2019)	Yes	"We defined burden for respondents as "work that does not add value." (p. 15) , [Q, REG, U]
Collins[C3] (2018)	Yes	"…our team sought to utilize log-file analyses to understand, quantify, and visualize the problem of documentation burden for a specific use case: nurses' flowsheet data entries in acute and critical care units." (p. 349), [IS, Q, U]
Ebbers[E1] (2022)	No	"The findings of these studies suggest that not only the amount of time spent on the EHR is relevant for the experienced documentation burden, but also the actual effort put in by the healthcare professional is an important factor, which is also stated in a recent scoping review by Moy et al…" (p. 858), [Q, REG, REIM, U]
Elkind[E2] (2022)	No	"Frontline nurses describe documentation burden as barriers to the patient and family experience, efficacy, and nurse well-being." (p. 5), [IS, Q]
Gesner[G1] (2021)	No	"Documentation burden is defined as the demand to document specific aspects of patient care as stipulated by policies implemented at the local, federal and state levels." (p. 2), Q, REG, SI]
Gesner[G2] (2022)	No	"Documentation burden is defined as the increased effort and time demand to document patient care in the EHR. For the purpose of this paper, the constructs for effort include EHR workload

		and usage, clinical documentation/review, and cognitively cumbersome work." (p. 984), [REG, SI, U]
Gonzalez[G3] (2021)	Yes	"Documentation burden for the purpose of this project is defined as the documentation complexity leading to increased time spent on charting." (p. 2), [U]
Harmon[H1] (2020)	No	"An ever-increasing documentation requirement is known as documentation burden." (p. 16), [IS, Q, REG, U]
Hesselink[H2] (2023)	No	"The survey included reported time spent on documenting quality indicator data and validated measures for documentation burden (i.e., such documentation being unreasonable and unnecessary, [and time]) and elements of joy in work (i.e., intrinsic and extrinsic motivation, autonomy, relatedness and competence)." (p. 1), [Q]
Hobensack[H3] (2022)	No	"Documentation burden is the stress imposed by the excessive work required to generate clinical records of healthcare-related interactions and results from an imbalance between the usability and satisfaction of documentation systems alongside the clinical and regulatory demands of entering and consuming health record data." (p. 440), [IS, Q, REG, REIM, SI, U]
Kang[K1] (2021)	No	"[However], low fitness and poor alignment with user workflow are continued sources of documentation burden. In addition, increased mandatory documentation related to quality and reporting requirements by hospitals, which can cause data redundancy and documentation of content unrelated to patientcare or outcomes, were additional sources of burden." (p. 845), [Q, REG, U]
Levy[L1] (2023)	Yes	"Documentation burden, defined as the excessive effort expended on healthcare documentation, is associated with a number of adverse outcomes, including clinician burnout, reduced quality of medical care, and disruption of clinical data contained in the electronic health record." (p. 11), [IS, Q, REG, REIM, U]
Moy[M1] (2021)	Yes	"…[one] type of documentation burden—workflow fragmentation…" (p. 894),[U]
Moy[M2] (2021)	No	"…[they] have also contributed to EHR documentation burden among physicians— defined as added work (e.g., documentation) or actions (e.g., clicks) performed in the EHR beyond that which is required for good clinical care." (p. 1003), [U]
Moy[M3] (2023)	No	"Documentation burden is defined as "work that does not add value" (i.e., work beyond that which is required for good clinical care)." (p. 2), [IS, Q, REG, REIM, SI, U]
Moy[M4] (2023)	No	Consistent with Cohen et al, we define EHR documentation burden as additional work (i.e., documentation or actions) performed in the EHR beyond that which is essential for "good" clinical care." (p. 2), [Q, REG, REIM, U]
Nguyen[N1] (2023)	No	"Researchers have reported on the documentation burden (ie, time and effort clinicians spend on documentation) …" (p.255), [REG]
ONC[O1] (2020)	Yes	"This report outlines three primary goals informed by extensive stakeholder outreach and engagement for reducing health care provider burden: 1) Reduce the effort and time required to record information in EHRs for health care providers during care delivery. 2) Reduce the effort and time required to meet regulatory reporting requirements for clinicians, hospitals, and health care organizations. 3) Improve the functionality and intuitiveness (ease of use) of EHRs." (p. 9), [IS, Q, REG, REIM, U]
Padden[P1] (2019)	No	"The increasing requests and requirements of nursing documentation have been branded burdensome, which can be thought of as a load heavier than average." (p. 60), [IS, Q, U]
Peddie[P2] (2017)	No	"We view documentation burden as the consequence of a configuration or arrangement of actors, resources, knowledge, and place." (p. 264), [U]
Rossetti[R1] (2021)	Yes	"We define documentation burden as the stress imposed by the excessive work required to generate clinical records of healthcare-related interactions, occurring as a result of the imbalance between the usability and satisfaction of electronic health record (EHR) systems and clinical and regulatory demands of entering and consuming EHR data." (p. 3), [IS, Q, REG, REIM, SI, U]
Rossetti[S1]	No	"Documentation burden can be understood as a combination of many factors, including time, low

(2019)		usability, low satisfaction, and high cognitive spending." (p. 1187) , [U]
Sutton[S2] (2020)	No	"Redundant documentation and regulatory requirements contribute to documentation burden, defined as the completion of unnecessary documentation elements in the electronic health record (EHR)." (p. 465), [Q, SI]
Voytovich[V1] (2022)	Yes	"Clinicians spend a significant amount of their time charting information in electronic health records, leading to a notable documentation burden." (p. 208), [U]

Table 4: Process Steps of Developing Standardized Definitions From Scoping Review Corpus

Methods	Actions	Results/Findings
1) Scoping Review	*Develop search strategies *Conduct search *Extract doc burden definitions and descriptions	Scoping review synthesis yields a collection of descriptions and definitions of DocBurden
2) Concept Clarification	*Cross-walk scoping review corpus with ANIA Six Domains of Burden Framework *Core writing group drafts definitions distilling corpus definitions and descriptions *Conduct three rounds of asynchronous review to refine standard definitions and scoping review findings	Draft standard definitions, including definitions for supporting relevant terms such as documentation Define emergent terms (i.e., burden, excessive Docburden)
3) Present a Standardized Definition	*Conduct final expert co-author round *Develop exemplar figure of DocBurden vs Excessive DocBurden	**Finalize DocBurden and Excessive DocBurden definitions**

Table 5: Standardized Definitions Developed From Source Definitions[41]
Burden
Burden is defined as the load[41] (e.g., cognitive load, [41] workload, [41] or task load) experienced by a HP or healthcare team that is a necessary part of carrying out an activity or task[41] required for care delivery (i.e.; medication administration, documenting a visit plan, writing a procedure or operative note).
Excess Burden

Excess Burden is defined as the excess or heavy load[41](i.e., excess cognitive load, excess or stressful workload, or excess task load) experienced by a HP or healthcare team including, but not limited to, tasks that are not aligned in support of care delivery.
Documentation
Documentation is the patient-centered collection or generation of clinical data, review of clinical data, analysis of clinical data, and synthesis of clinical data, all in support of direct patient care needs. These documentation tasks include but are not limited to the inputs and outputs necessary to support all aspects of the care and communication with the patient (e.g., the authoring of notes or flowsheets, synthesizing clinical data into diagnoses or clinical impressions, creation of care or treatment plans, and communication through the EHR[41] with patients and other HPs).
Documentation Burden (DocBurden)
Expected load (see *Documentation* above) on HP of completing necessary tasks included in the documentation and EHR interaction.
Excessive DocBurden
Excessive DocBurden is defined as the stress and unnecessarily heavy load or work (i.e., excessive burden) a HP or healthcare team experiences when the usability[41] of documentation systems and documentation activities (i.e., generation, review, analysis and synthesis of patient data[41]) are not aligned in support of patient care delivery.
[41] Refers to terms defined in glossary file (Appendix A4)

Legends for Tables and Figures:

Table 1:
Title: Search Strategies* for Scoping Review
Source: The authors developed and conducted this search and screening strategy by examining the literature to identify sources that either define or describe DocBurden.
Notes: *Search conducted July 2023. These narrow and broad searches were combined, and duplicates were removed, prior to title and abstract screening. The rationale for the dual narrow and broad search approach was intended to be more comprehensive and inclusive.
Alt text: Table format of the Scoping Review search strategies for each of the databases included in the study.

Table 2:
Title: Title and Abstract Review Criteria, screening inclusion and exclusion criteria
Source: The authors developed and conducted this screening strategy by examining the literature identified in the 6-database search, to identify sources that either define or describe DocBurden.
Alt text: A table format of the inclusion and exclusion criteria, divided in two parts to reflect the title and abstract criteria and then the full text review criteria.

Table 3:
Title: Definitions of Documentation Burden from Scoping Review Sources

Source: The authors analysis of the sources from the scoping review that contained definitions of DocBurden and their characteristics are presented in this table.
Notes: The citation superscription (Letter + number) refers to Appendix A2 with a full list of all 153 extracted sources. [37] "Yes" = Original definition offered in the source; "No" = Definition referenced prior work in the source. ANIA Documentation Burden Key: (IS) interoperability and standards;(Q) quality; (REG) regulatory; (REIM) reimbursement; (SI) self-imposed; (U) usability
Alt text: A table format of the definitions that were extracted from sources from the scoping review that had a definition (i.e., definitions were found in 28 sources of the full corpus of 153).

Table 4:
Title: Process Steps of Developing Standardized Definitions From Scoping Review Corpus
Source: The steps presented align with the 3 objectives to use the scoping review corpus (1) of included studies' definitions and descriptions as the basis for the concept clarification (2) and cross-walking to the 6 ANIA Domains of Burden, and then to develop the standardized definitions (3). The steps during which emergent definitions arise for burden and excessive burden are also noted.
Alt text: A table format of the process and steps taken to achieve the definitions presented in the results section of the paper.

Table 5:
Title: Standardized Definitions Developed From Source Definitions
Source: The authors developed these standardized definitions of burden, excessive burden, documentation, documentation burden (or DocBurden), and excessive DocBurden through analysis of the scoping review corpus.
Alt text: A table format of the definitions presented in the results section of the paper, including the definitions that the study team developed based on the analyses in this work.

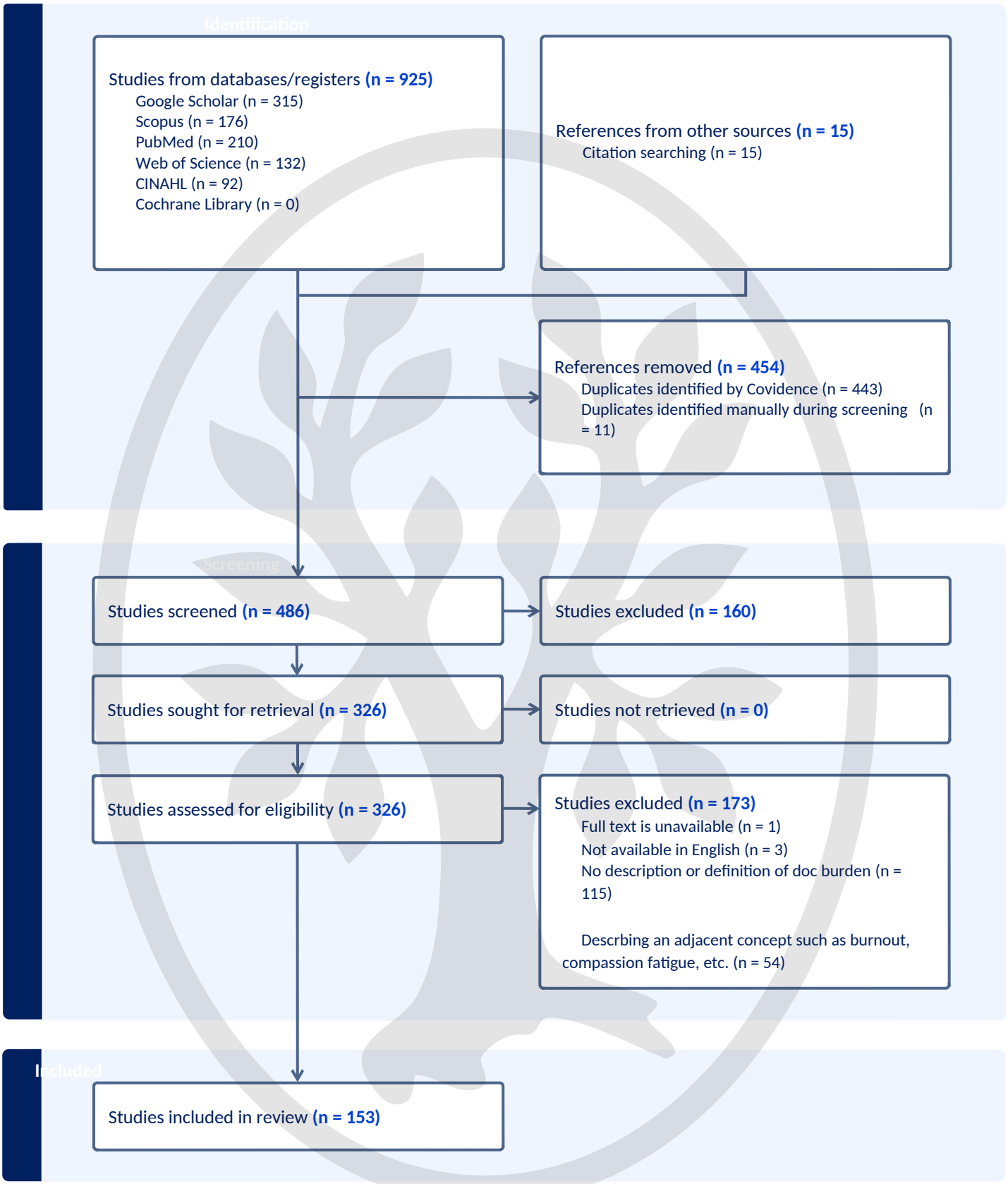
Figure 1:
Title: PRISMA Diagram
Source: The authors analysis of the literature extracted during the Scoping Review sequential identification, screening and inclusion of Database search results.
Alt text: A flow diagram showing the numbers of sources from each database identified by the initial search, and then the steps taken shown in separate boxes at each stage of exclusion during the Scoping Review process, to reach the final 153 studies included in the extraction corpus.

Figure 2:
Title: Cross Walking Scoping Review Sources by ANIA Framework 6 Domains of DocBurden and Evidence Type
Source: The authors analysis of the literature extracted as in the scoping review and concept clarification (Appendix Supplement A2 and A3), [37] cross-walking the sources to the 6-domains of burden in the ANIA Framework.
Notes: The 6 Domains of Burden categories are: Interoperability/standards, Quality, Regulatory, Reimbursement, Self-imposed, and Usability. The evidence (article) types are: Peer-reviewed research (navy blue); Peer-reviewed literature review (royal blue); Peer-reviewed perspective sources (light blue); Non-Peer-reviewed research perspective sources (dark maroon); Abstract, Conference proceedings (rust); Other (peach).
Alt text: An image (bar graph) with the x-axis of the 6-Domains of DocBurden, where there is one bar per Domain; the y-axis is the number of articles which referenced this Domain. Each bar is composed of

color blocks representing the 6 types of evidence or article type, with colors as described in the Notes for this figure. Articles may have referenced more than one domain, so the y-axis total across all 6 Domains is greater than 153. The usability bar (one of the 6 Domains) is tallest, with over 100 sources including this concept. In decreasing frequency of source listing of Domains: Usability, followed by Quality, then Regulatory, then Self-Imposed, then Reimbursement, and finally Interoperability.

Figure 3:
Title: Medication Ordering and Administration Exemplar: Burden and Excessive Burden
Source: The authors designed this graphic to illustrate the iterative nature of medication administration, including burden (i.e., dark blue gear) and instances of excessive burden (i.e., light blue gears).
Notes: The healthcare professional roles noted in the dark blue gear are: PP= health professional – prescribing provider (MD, NP, PA); RN = health professional – registered nurse. The excess burden domain examples in light blue are the 6 Domains of Burden categories: IS = interoperability/standards, Q = quality, RG = regulatory, RI = reimbursement, SI = self-imposed, U = usability.
Alt text: A figure which is shows a central gear with 8 spokes numbered in clockwise fashion, and 8 smaller gears at each of the spokes. The figure illustrates the difference between DocBurden (i.e., the necessary documentation tasks that are included in medication ordering and administration), from excessive DocBurden. The medication ordering and administration process is broken down into 8 steps or tasks: 1. Review existing EHR data, 2. Write order, 3. Sign order, 4. Document plan, 5. Acknowledge order, 6. Review order and plan, 7. Administer medication, and 8. Education patient and document. The inner central gear has 8 spokes, and each of the prior tasks is in one of the 8 spokes, where the necessary burden or DocBurden has the health professional abbreviation listed who would be doing the task.). There is one smaller gear at each of the 8 spokes that represents a linked example of excessive DocBurden task or event that can be experienced by health professionals. Each of the excessive DocBurden gears has in parentheses to denote the domains of excessive DocBurden that would be associated with that task. For example, for DocBurden task number 8 (Educate patient and document by the RN), the excessive burden associated is “First dose” documented in flowsheet, care plan and MAR or medication administration record. Usability (U) and Quality (Q) are the Domains associated with this excessive DocBurden task.

Figure 4:
Title: References by Year (n = 153)
Source: The authors present the number of included sources in the Scoping Review by year of publication.
Alt text: A bar chart showing the numbers of sources from the scoping review corpus published in each year. The years range from 1977 through 2023. Starting in 2013, there is a steady increase in articles published through 2021, at when the increase leveled off to the present.



	Peer-Reviewed Research	Peer-Reviewed Literature Review	Peer-Reviewed Perspective	Non-Peer-Reviewed Perspective	Abstract, Conference Proceeding	Other
Usability	49	19	16	5	12	5
Quality	36	14	15	10	5	4
Regulatory	23	7	11	6	1	4
Self-Imposed	28	7	6	5	0	3
Reimbursement	20	6	11	7	2	2
Standards	18	5	10	4	2	2

Figure 2: Cross Walking Scoping Review Sources by ANIA Framework 6 Domains of DocBurden and Evidence Type