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Research in Context

Evidence before this study

- Social determinants of health (SDH) have driven health disparities through multiple mechanisms during the COVID-19 pandemic in the US.
- Incorporating SDH factors into COVID-19 modeling can enhance the model's predictive accuracy, thus informing more effective and equitable response measures and policies.
- However, there have been no reviews on incorporating SDH factors into COVID-19 vaccine modeling in the US.

The added value of this study

- This study provided a review of studies that used mathematical modeling to assess COVID-19 vaccine or vaccine strategies in the US.
- The results show that few studies incorporate SDHs into their models and there is variation in the SDHs factors incorporated into the models.

Implications of all the available evidence

- Our findings highlight the current gap on inadequate incorporation of SDHs into transmission models.
- Future modeling studies should consider incorporating SDH factors and standardized approaches for incorporating SDH factors into future pandemic transmission models should be developed.

Introduction

- SDH accounts for approximately 50% of health outcomes and are the major drivers of health inequities
- Despite the apparent need and potential opportunities, progress toward incorporating these SDH factors in disease modeling has been limited
- To better understand the current progress on integrating SDH factors into mathematical transmission modeling of the COVID-19 vaccine, this scoping review investigated to what extent these transmission models have incorporated these factors, factors types, and the methods for incorporating SDH variables.

Methods

- We conducted a scoping review with guidance from the latest version of the JBI Manual for Evidence Synthesis. For transparency and reproducibility, we adhered to the PRISMA reporting guidelines for scoping reviews and searches.
- Medline and Embase were searched from the inception to October, 2022.
- We included studies that used transmission modeling to assess the effects of COVID-19 vaccine strategies in the US.
- Studies' characteristics, factors incorporated into models, and approaches to incorporate these factors were extracted.
- These factors were classified into demographic factors(age, gender, race, ethnicity, and comorbidities) and SDH factors (occupation, geographical location, and living conditions).

Incorporating Social Determinants of Health into Transmission Modeling of **COVID-19 Vaccine in the US: A Scoping Review**

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Table: Characteristics of factors incorporated into the models		Figure:		
Characteristic	Number of studies (%)		7514 records ident	
Total studies included	92 (100%)	tio	from database searc	
Factors incorporated in the model		ifica		
Demographic factors		ent		
Age	36 (39%)	<u>6</u>		
Comorbidities	5 (5%)		•	
Race/Ethnicity	3 (3%)		🔒 7441 records to revi	
Gender	1 (1%)		titles/abstracts	
SDH factors		ning		
Occupation	8 (9%)	Leel		
Geographical location	5 (5%)	S		
Living condition	2 (2%)			
Models incorporated				
Demographic factors alone	27 (29%)		2281 records to review	
SDH factors alone	2 (2%)		texts	
SDH factors alone or in combination with demographic factors	11 (12%)	iji -		
Both demographic and SDH factors	9 (10%)	lieit		
Neither demographic nor SDH factors	54 (59%)	ш		
Number of factors incorporated into the models				
0	54 (59%)			
1	24 (26%)	σ		
2	7 (8%)	nde	92 studies included in	
3	4 (4%)	Incl	review	
4	2 (2%)			
5	1 (1%)			
Type of models in models incorporating SDH factors (11 studies)			Conclusion	
Compartmental model	7 (64%)			
Agent-based model	4 (36%)	Few transmission modeling studi		
The approach used in models incorporating SDH factors (11 studies)		factors	5.	
Case distributed through equity dimensions integrated into the model	10 (91%)	There are variations in SDH facto		
Case distributed through paralleled unlinked models	1 (9%)	• INIS NI incorp	orating SDHs into modelin	

Results

- A total of 92 studies that met the eligibility criteria proceeded to data synthesis (Figure).
- Out of 92 studies, 27 studies incorporated demographic factors alone, 11 studies incorporated SDH factors (alone or combined with demographic factors), and 9 studies incorporated both demographic and SDH factors (Table).
- There were varying sets of SDH factors integrated into the model. The most common factors were occupation (8 studies), followed by geographical location (5 studies) (Table).

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PRISMA flowchart



ies of COVID-19 vaccine in the US incorporated SDH

ors incorporated in these models. arch on SDH impact and standardized approaches to Ŋg.

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