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Prevalence of vision zero action plans or strategies: USA, 2021

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ABSTRACT

Background Vision Zero is a strategy to eliminate traffic fatalities and to promote equitable mobility options for all road users. Using a nationally representative survey, we aimed to estimate the prevalence of Vision Zero action plans or strategies in the USA.

Methods Municipal officials were surveyed in 2021. In this cross-sectional study, we calculated the prevalence of Vision Zero plans or strategies and compared municipalities with adjusted prevalence ratios (PR) to account for region and sociodemographic characteristics.

Results Among 1955 municipalities participating in the survey (question-specific response rate: 44.3%), the prevalence of a Vision Zero action plan or strategy was 7.7%; 70.5% responded *no* and 21.8% *don't know*. Prevalence was 4.8% in small municipalities (1000–2499 residents), 20.3% in medium-large municipalities (50 000–124 999 residents; PR=4.1), and 37.8% in large municipalities ($\geq 125 000$ residents; PR=7.6).

Conclusion The prevalence of Vision Zero plans and strategies across the USA is low. Additional adoption of Vision Zero plans and strategies could help address traffic fatalities.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Fifty-three US municipalities have been recognised by the Vision Zero Network for having a Vision Zero action plan or strategy or having committed to adoption in the near future, and 86 municipalities with $\geq 50 000$ residents had a Vision Zero initiative published online.

WHAT THIS STUDY ADDS

⇒ In 2021, a survey of a nationally representative sample of municipalities found that less than 10% of US municipalities had a Vision Zero plan or strategy to eliminate traffic fatalities. Larger population municipalities were more likely to have a Vision Zero plan.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Increasing the prevalence of Vision Zero plans and strategies may alleviate the high burden of pedestrian and bicyclist traffic fatalities in the USA.

INTRODUCTION

Pedestrian and bicyclist fatalities have increased in the USA over the past decade—both absolutely and relative to all traffic deaths. Over 6500 pedestrians and 900 bicyclists were killed in 2020, accounting for nearly 1 in 5 traffic fatalities.¹ In a recent nationwide survey, a quarter of US adults reported motor vehicle traffic as a barrier to walking; of these, 79% cited vehicle speed as a safety concern.² These real and perceived safety threats can discourage walking and bicycling,³ leading to significant health consequences.⁴ Only about half of US adults⁵ and a quarter of high school students⁶ meet the aerobic physical activity guideline in leisure time.⁴

Designed to eliminate traffic fatalities and serious injuries, regardless of travel mode, Vision Zero offers a paradigm for reducing pedestrian and bicyclist deaths through a Safe Systems approach, while promoting equitable mobility options for all. Since its adoption in 1997 by the Swedish parliament, Vision Zero has been implemented in many countries around the world.⁷ As of August 2022, 53 US cities were recognised for adopting Vision Zero, based on the multiple criteria established by the Vision Zero Network.⁸ Based on a web-based search

of published policy, Evenson *et al* found 86 Vision Zero initiatives among US municipalities with at least 50 000 residents.⁹ Nationwide Vision Zero prevalence, including among smaller municipalities, is unknown. Using a nationally representative survey of US municipalities, we aimed to determine the prevalence of Vision Zero action plans or strategies. We also sought to determine if this prevalence differed by municipality characteristics.

METHODS

Study sample

We conducted a cross-sectional analysis of data from the Community-Based Survey of Supports for Healthy Eating and Active Living (CBS HEAL), a web-based survey of US municipalities conducted from May to September 2021 by the Centers for Disease Control and Prevention. Of municipalities with at least 1000 residents on the 2017 Census of Governments file ($n=10 300$),¹⁰ the survey was distributed to a nationally representative sample ($n=4417$). Detailed methodology on the sampling strategy is available elsewhere.¹¹ The survey was sent to city or town managers or someone with an equivalent title, and the primary respondent could electronically nominate another municipal official to complete survey sections.

We defined population size as small (1000–2499 residents), medium-small (2500–49 999),



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medium-large (50 000–124 999), or large ($\geq 125\ 000$) using the 2017 Census of Governments files.¹⁰ Geographic categorisation was by Census region (Northeast, Midwest, South, or West).¹² Using 5-year estimates from the 2020 American Community Survey, we dichotomised municipalities by race/ethnicity (majority or minority non-Hispanic White), formal education level (majority with at least some college or majority with a high school education or less), and poverty prevalence ($\geq 20\%$ or $< 20\%$).¹³

Vision Zero assessment

Participants were asked the following: ‘Does your local government have a Vision Zero Action Plan or Strategy in place, as defined by the Vision Zero Network? A Vision Zero Action Plan or Strategy, as defined by the Vision Zero Network, is a plan or strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. Include a plan or strategy even if it was adopted by another level of government (such as a regional transportation planning authority).’ Participants could answer *yes*, *no*, or *don’t know*, or leave it blank.¹¹ We excluded those with a blank response.

Statistical analysis

We determined the count and weighted prevalence of municipalities by characteristic. We calculated the prevalence and 95% CIs of *yes*, *no*, and *don’t know* responses. We used predicted marginals from logistic regression models to calculate unadjusted and adjusted prevalence ratios (PR) and 95% CI comparing a *yes* response to a *no* or *don’t know* response. Adjusted models included the other municipality characteristics (ie, population size, Census region, race/ethnicity, education, and poverty prevalence). We assessed need for data suppression using National Center for Health Statistics standards.¹⁴ We also tested for linear and quadratic trends in the prevalence by population size category. As a sensitivity analysis, we calculated adjusted PRs after excluding *don’t know* responses. Significance was set at a two-sided alpha of 0.05. To account for the survey design and for weights for representativeness and nonresponse, we conducted all analyses in SAS V.9.4 (SAS Institute) and SAS-callable SUDAAN, release V.11.0.0 (RTI International, Research Triangle Park, North Carolina, USA).

RESULTS

A total of 1982 municipalities returned the survey (overall response rate: 44.9%). Twenty-seven left the Vision Zero question blank, yielding a sample size of 1955 (question-specific response rate: 44.3%). The response rate was similar across population size categories ($p=0.481$), but it statistically varied across other municipality characteristics, ranging from 35.7% in the Northeast to 49.1% in the Midwest (online supplemental table). The weighted sample was predominantly medium-small (table 1). The overall prevalence of a Vision Zero action plan or strategy was 7.7% (95% CI 6.6% to 9.0%); another 70.5% answered *no*, and 21.8% answered *don’t know* (table 2). Prevalence was higher with population size category, exhibiting a linear ($p<0.001$) but not quadratic ($p=0.068$) trend. Prevalence was 4.8% in small municipalities, 20.3% in medium-large municipalities (adjusted PR=4.1), and 37.8% in large municipalities (adjusted PR=7.6). Unadjusted prevalence was higher among municipalities in the West (compared with the Northeast) and among those with a more formally educated population (compared with less); however, these associations lost statistical significance after adjustment for other characteristics (table 2).

Table 1 Municipality characteristics, community-based policy and environmental supports for healthy eating and active living, USA, 2021

	Sample size	Weighted %
All municipalities	1955	100.0
Population size		
Small (1000–2499)	667	34.0
Medium-small (2500–49 999)	1127	58.7
Medium-large (50 000–124 999)	115	5.2
Large ($\geq 125\ 000$)	46	2.1
Census region		
Northeast	298	14.1
Midwest	655	35.2
South	558	36.2
West	444	14.5
Race/ethnicity		
$>50\%$ Non-Hispanic white	1637	83.4
$\leq 50\%$ Non-Hispanic white	318	16.6
Education		
\leq High school graduate	589	32.2
\geq Some college	1366	67.8
Poverty prevalence		
$\geq 20\%$	391	21.2
$< 20\%$	1564	78.8

No findings gained or lost statistical significance, and patterns remained consistent, when excluding *don’t know* responses (data not shown).

DISCUSSION

In this nationally representative survey, less than 10% of US municipalities reported having a Vision Zero plan or strategy to eliminate traffic fatalities. Prevalence was directly related to population size, with large cities at 37.8%. No other municipality characteristic was associated with Vision Zero prevalence after adjustment. Alongside data from passive surveillance⁸ and municipality websites,⁹ these findings establish a baseline for active surveillance of Vision Zero action plans or strategies across the USA, including among small municipalities. In light of the low overall prevalence, additional adoption of Vision Zero plans or strategies could help address traffic fatalities.

Over 20% of respondents were unsure if their municipality had a Vision Zero plan. Because mayors, city managers and city council members have been vital for generating political will and financial support,^{9,15} improving awareness of Vision Zero among policy-makers may help. Encouragingly, in a 2017 convenience sample of US road safety professionals from multiple disciplines (including planning, engineering, public health and law enforcement), over 90% were aware of Vision Zero as a safety strategy.¹⁶

Vision Zero views the road transport system through a public health lens, prioritising human life and health in all aspects of design and functioning.^{7,17} This framework includes two objectives relevant for population health. The first objective—to eliminate traffic fatalities and severe injuries⁹—directly addresses the growing rate of vehicle-related mortality across the USA. From 2010 to 2020, the number of pedestrian and bicyclist deaths increased by 51% and, as a share of all traffic fatalities, by 29%.¹ A similar increase has not been observed in other high-income countries.¹⁸ The second objective—to promote safe, healthy and equitable mobility for all road users⁹—may help increase physical activity by addressing real and perceived safety barriers to active transportation.

Table 2 Weighted prevalence and prevalence ratios of reporting a Vision Zero action plan or strategy by municipality characteristics, community-based policy and environmental supports for healthy eating and active living, USA, 2021 (n=1955)

	Prevalence (95% CI)			Prevalence ratio* (95% CI)	
	Yes	No	Don't know	Unadjusted	Adjusted†
All municipalities	7.7 (6.6 to 9.0)	70.5 (68.3 to 72.5)	21.8 (20.0 to 23.7)	N/A	N/A
Population size					
Small (1000–2499)	4.8 (3.4 to 6.8)	73.0 (69.3 to 76.4)	22.2 (19.1 to 25.7)	1.00 (ref)	1.00 (ref)
Medium-small (2500–49 999)	7.2 (5.8 to 8.9)	71.5 (68.7 to 74.1)	21.3 (18.9 to 23.8)	1.50 (0.99 to 2.26)	1.45 (0.96 to 2.19)
Medium-large (50 000–124 999)	20.3 (13.6 to 29.0)	52.5 (42.9 to 61.3)	27.5 (20.1 to 36.4)	4.20 (2.51 to 7.03)	4.08 (2.39 to 6.96)
Large (≥125 000)	37.8 (25.0 to 52.7)	47.2 (33.1 to 61.8)	---	7.84 (4.70 to 13.1)	7.59 (4.32 to 13.3)
Census region					
Northeast	5.2 (3.1 to 8.5)	66.1 (60.2 to 71.5)	28.7 (23.6 to 34.4)	1.00 (ref)	1.00 (ref)
Midwest	6.1 (4.6 to 8.2)	71.4 (67.8 to 74.7)	22.5 (19.4 to 25.9)	1.18 (0.66 to 2.21)	1.20 (0.68 to 2.11)
South	8.7 (6.6 to 11.3)	72.8 (69.0 to 76.3)	18.5 (15.5 to 22.0)	1.67 (0.95 to 2.95)	1.75 (1.00 to 3.08)‡
West	11.8 (9.0 to 15.3)	66.8 (62.2 to 71.1)	21.4 (17.8 to 25.6)	2.27 (1.29 to 4.00)	1.75 (1.00 to 3.06)‡
Race/ethnicity					
>50% NH white	7.5 (6.3 to 8.9)	71.0 (68.6 to 73.2)	21.5 (19.5 to 23.6)	1.00 (ref)	1.00 (ref)
≤50% NH white	8.8 (6.1 to 12.5)	68.0 (62.5 to 73.0)	23.2 (18.7 to 28.3)	1.17 (0.79 to 1.74)	0.70 (0.45 to 1.09)
Education					
≤HS graduate	5.6 (4.0 to 7.8)	73.2 (69.4 to 76.7)	21.2 (18.0 to 24.7)	1.00 (ref)	1.00 (ref)
≥Some college	8.8 (7.3 to 10.4)	69.2 (66.6 to 71.6)	22.1 (19.9 to 24.4)	1.56 (1.07 to 2.28)	1.22 (0.81 to 1.85)
Poverty prevalence					
≥20%	7.5 (5.3 to 10.6)	69.8 (65.0 to 74.3)	22.6 (18.7 to 27.2)	1.00 (ref)	1.00 (ref)
<20%	7.8 (6.6 to 9.3)	70.6 (68.3 to 72.9)	21.5 (19.5 to 23.7)	1.04 (0.70 to 1.54)	0.96 (0.64 to 1.46)

*Comparing yes to no and don't know.

†Adjusted models include all other municipality characteristics.

‡Although the lower confidence limit rounds to 1.00, these findings are not statistically significant.

---, data suppressed given unreliability (per National Center for Health Statistics guidelines); HS, high school; NH, non-Hispanic.

The Safe System approach is the recognised strategy for achieving a vision of zero fatalities.^{19 20} This approach is characterised by a redundant system design that protects all road users, acknowledging human mistakes and vulnerability.¹⁹ The Safe System approach has been adopted by the US Department of Transportation and incorporated into their National Roadway Safety Strategy,¹⁹ and it is described by the Vision Zero Network and Road to Zero as how we get to zero fatalities and safe mobility for all.²⁰ The Safe System approach covers safer people, roads, vehicles and speeds, along with improving post-crash care.¹⁹ Roads designed with Safe System principles in mind include features such as high-visibility crosswalks and reduced speed limits.²⁰ Applications of the Safe System approach have included implementation of evidence-based safety improvements to protect pedestrians and bicyclists at left turns in New York City and a plan for expanding bikeways and prioritising pedestrian and bicyclist safety in Jersey City, New Jersey.²¹

This study builds on the findings of Evenson *et al*⁹ by providing the first nationwide prevalence estimate of Vision Zero action plans or strategies among US municipalities with at least 1000 residents, based on the report of municipal officials. Nonetheless, its findings should be interpreted in light of some limitations. First, because it relies on self-report and does not clearly specify a timeframe, the survey may not accurately capture current municipality policy. The prevalence reported here may be an underestimate, especially given the percentage of *don't know* responses. Second, the response rate was less than 50%; although the survey was weighted for non-response, residual bias could still exist and diminish generalisability. Third, the survey question did not distinguish between plans

and strategies. Although these terms are sometimes used interchangeably,²² some municipalities may adopt broader strategies but not publish a public document outlining concrete plans.⁹ Finally, this study provides information on Vision Zero action plans or strategies, not specific Safe System design elements or health outcomes. Additional research may be beneficial on the relationship between plans and elements, and the impact of plan adoption on traffic fatality rates and active transportation in different types of communities. Ongoing deployment of CBS HEAL would allow researchers to monitor trends in Vision Zero implementation across the USA.

CONCLUSION

Based on a nationally representative 2021 survey, less than 10% of US municipalities had a Vision Zero plan or strategy to eliminate traffic fatalities. Large population cities were more likely to report a Vision Zero plan or strategy, although their prevalence was less than 40%. Additional adoption of Vision Zero plans and strategies may help address the increasing rate of traffic fatalities among pedestrians and bicyclists and promote physical activity.

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Competing interests None declared.

Patient consent for publication Not applicable.

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Supplementary Table. Municipalities Surveyed and Responded to Vision Zero Question, by Municipality Characteristic, Community-Based Policy and Environmental Supports for Healthy Eating and Active Living, United States, 2021

	No. Surveyed	No. (%) Responded	P value
All municipalities	4417	1955 (44.3)	
Population size			
Small (1000–2499)	1557	667 (42.8)	0.481
Medium-small (2500–49,999)	2516	1127 (44.8)	
Medium-large (50,000–124,999)	246	115 (46.7)	
Large (\geq 125,000)	98	46 (46.9)	
Census region			
Northeast	834	298 (35.7)	<0.001
Midwest	1333	655 (49.1)	
South	1333	558 (41.9)	
West	917	444 (48.4)	
Race/ethnicity			
>50% Non-Hispanic White	3612	1637 (45.3)	0.003
\leq 50% Non-Hispanic White	805	318 (39.5)	
Education			
\leq High school graduate	1435	589 (41.0)	0.003
\geq Some college	2979	1366 (45.9)	
Poverty prevalence			
\geq 20%	979	391 (39.9)	0.002
<20%	3435	1564 (45.5)	

*Not available for 3 municipalities (n=4414)