Insights Series #138

Resources and Local Service Provision Shape Travel Time to Critical Healthcare

Troy Anderson, Pranav Kodali, Eden Singh, and Sam Speer
Vanderbilt University

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Key Findings:

- In the average LAC country, less than one quarter of adults report they can reach an emergency medical care provider in under ten minutes.
- Income level, education, and urban residency are significant, negative predictors of estimated travel times to a hospital or clinic.
- Better local roads and health care (measured by satisfaction with these services) correlate strongly with lower perceived travel time to a hospital or clinic.
- Ownership of a phone and/or a car significantly decreases estimated travel time to a hospital or clinic.

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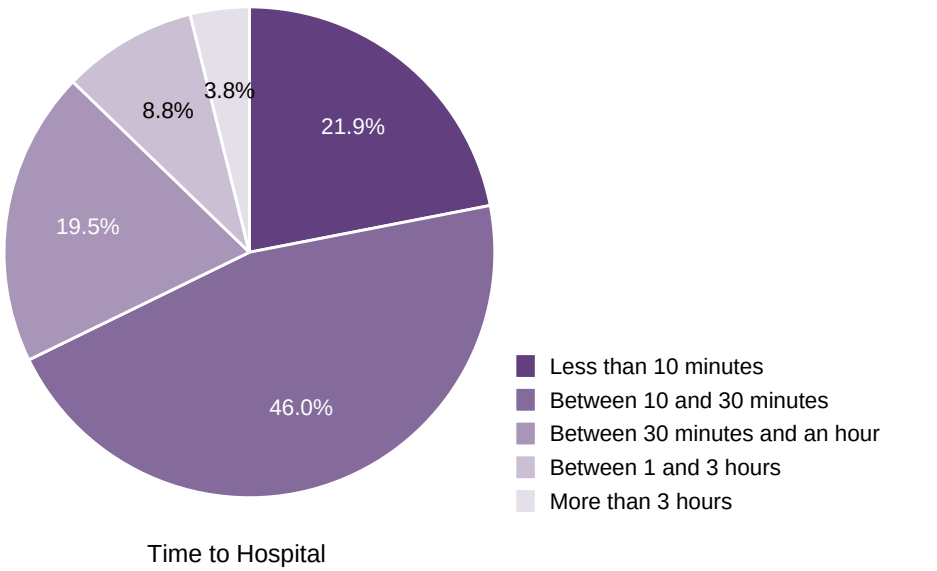
The quality of a country's healthcare is often critical to its development. When scholars evaluate healthcare systems, they often look at factors such as medical services offered, density of hospitals, and the economic accessibility of facilities.[1] However, factors outside of the hospital are often overlooked when the quality of medical services is assessed. Emergency medical transportation service is one such external factor that has been found to be inadequate or nonexistent in many places in the Americas.[2] When emergencies arise, individuals in developed countries often rely on ambulance services. In less developed contexts, though, people are often forced to rely on alternative forms of transportation because of deficits in such services.[3] This can increase the amount of time it takes to get critical treatment, and those delays can have potentially fatal consequences.

In this *Insights* report, we analyze the public's estimated travel times to urgent medical care facilities using data from the 2016/17 round of the LAPOP AmericasBarometer survey. To assess general perceptions of the amount of time it takes to reach a hospital or clinic in the Latin America and Caribbean (LAC) region, we use responses from the following question:

INFRA3. "Suppose you are in your house and experience a very serious injury and need immediate medical attention. How long do you think it would take you, by the fastest means, to get to the nearest medical center or hospital?"

Figure 1 shows the LAC region-average distribution of responses to the survey question. The pie chart displays the average amount of time the population of 20 nations in the LAC region estimates it takes to get to the nearest medical center or hospital in an emergency.[4] This travel time is split into 5 intervals: less than 10 minutes, between 10 and 30 minutes, between 30 minutes and 1 hour, between 1 and 3 hours, and more than three hours. As the figure shows, nearly half (46%) of the population across the 20 LAC countries estimates that it would take between 10 and 30 minutes to get to the nearest medical center or hospital. Interestingly, the percentage falling into this 10 to 30 minute time interval



Source: © AmericasBarometer, LAPOP, 2016/17; v.07172017

Figure 1: Estimate Travel Time for Urgent Care

for the average LAC country is not too different from that found in the AmericasBarometer surveys of the United States (50% reporting a travel time between 10 and 30 minutes) and Canada (53%). For the LAC region, the next two largest time intervals are less than 10 minutes and between 30 minutes and an hour, at 21.9% and 19.5%, respectively. In other words, in the average LAC country, the vast majority of the population expects to reach a hospital or medical center in under half an hour.

This is a promising finding for the LAC region because those who live closer to and have better access to hospitals and clinics have better health outcomes than those who must endure longer travel times.[5] At the same time, analyzing the factors that underlie variation in travel time is critical in determining the degree of uniformity of treatment for residents of the LAC region. Determining the subgroups who perceive the longest urgent care travel times is important, as this information could inform future healthcare efforts and policy. Therefore, the next sections of this report analyze individual-level predictors of response to the travel time to the hospital or clinic question.

Socioeconomic and Demographic Predictors of Emergency Care Travel Time

Where an individual lives and what they own should matter when predicting estimated travel times to reach a hospital or clinic. In accord with standard LAPOP *Insights* reports, we predict individuals' responses to the travel time question with five socioeconomic and demographic factors: urban versus rural living environment, income, education, age, and gender.[6] To assess these factors in relation to perceived travel times, we use the 2016/2017 AmericasBarometer data to generate an OLS regression analysis.[7] The coding for the dependent variable remains the same: on a scale from 1 to 5, with higher values indicating longer perceived travel times to a hospital or clinic in the event of a serious injury. Figure 2 displays the regression results: urban (versus rural) residency, higher education, and greater income correlate with shorter estimated travel times, while older age (compared to the omitted, baseline category: under 25) is correlated with longer reported times. Gender is not statistically significant in our model.

On average in the LAC region (as shown in Figure 2), those in urban environments estimate significantly shorter times to get to a local hospital or clinic than those in rural areas. This makes sense given that urban environments have a much larger density of population, so hospitals should be closer to the average person in an urban areas. Therefore, urban travel times should be lower. In addition, Gaitan et al. (1998) note that centrally funded public health systems often place large government hospitals in larger cities, with smaller, less well-equipped primary care centers scattered throughout the country; the same may be true of other government-funded and private health care institutions. Many countries also only have organized prehospital transportation, like ambulance services, in larger cities.[8] Figure 2 shows that income is also an important predictor in shorter hospital arrival times.[9] This finding is consistent with scholarship on the issue. More costly, private hospitals provide transportation and better treatment to their patients; to the degree that

better-off individuals have greater access to such health care options, this could explain why individuals with higher incomes facing serious injuries or illness face significantly shorter hospital or clinic transportation times (see discussion in Gaitan et al. (1998)). Research conducted on access to health care in Latin America has also documented an association between more wealth and fewer barriers to access health care.[10]

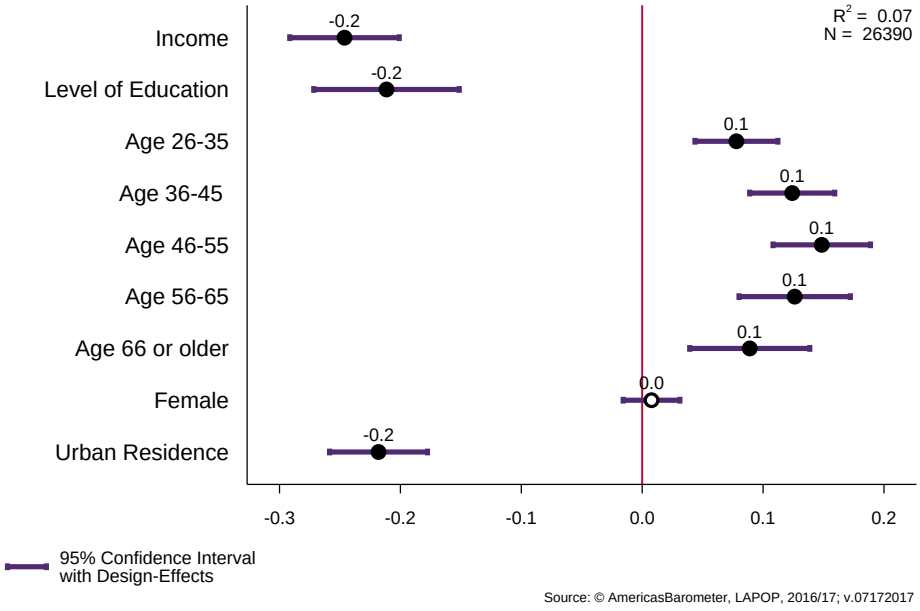


Figure 2: Socioeconomic and Demographic Predictors of Estimated Time to Urgent Health Services

Education is predictive of shorter perceived travel times. Previous research finds that, the higher the head of household's level of education, the lower the predicted time to access necessary medical care.[11] Higher education increases the likelihood that a person is aware of the healthcare services available.[12] Figure 2 aligns with this prior work: education has a significant negative correlation with the time one estimates it takes to reach a hospital or clinic in case of a health emergency.

Age has a significant positive correlation with time it takes to get to the hospital or clinic. Figure 2 shows that every age group above the 25

and under age cohort perceives longer hospital times than this younger group.[13] On the one hand, a positive correlation could make sense to the degree that older people are generally less mobile, which increases the amount of time it would take to get to a hospital or clinic. However, the results shown in Figure 2 do not single out the elderly, but rather show that all age cohorts outside the very youngest (25 and under) perceive longer response times. In trying to reason why this age correlation might exist, we found no prominent factor that predicted worse access to health care sites among older adults.

We did not expect gender to correlate with travel times to hospitals and clinics. We found a lack of empirical data on this topic for the LAC region, as well as a relative neglect of research on variation in time to travel to local hospitals and medical centers by gender. Yet, at the same time, within a household, we would not expect access to travel-related resources to be influenced by gender, so we would not expect significant variation in travel times between genders when other factors are kept constant. While the AmericasBarometer survey data shows a lack of correlation between the two factors, the connection between gender and healthcare access is still a factor that should be explored in studies of equity in healthcare.[14]

In summary, Figure 2 demonstrates that a subset of demographic and socioeconomic factors influences the LAC public's estimated travel times to a hospital or clinic. However, we think that limiting the analysis to these general variables fails to provide a fuller understanding of why certain populations estimate longer travel times to receive medical care. Therefore, in the next section, we consider several additional factors.

Local and Individual Resources Predict Healthcare Travel Time

Resources matter when it comes to minimizing the time it takes for an individual to travel to a hospital or health clinic for treatment. This was

documented in the above analysis, which showed a positive predicted effect for income. Here we consider four additional measures that reflect one's communal and personal resources: an individual's assessments of the quality of local roads, their evaluation of public health services, and their ownership of phones and vehicles.

The quality of local roads should matter because it could potentially affect the amount of time it takes to get to the hospital or clinic.[15] We use individuals' satisfaction with the quality of their streets, roads, and highways as a proxy for quality of local roads. That is, we assume individuals' assessments map on to the reality of their local infrastructure.

The second variable we predict to be correlated with hospital arrival times is satisfaction with healthcare services. Research shows that hospitals in the LAC region are comparatively less well-funded by their governments, which has consequences for the quality of care that patients receive when compared to the U.S. public system.[16] This extends to prehospital care as well, and studies show that several countries in the region lack sophisticated prehospital and on-location training efforts for paramedics and doctors.[17] Even if an area in the LAC region has an emergency response system, an underdeveloped system leaves individuals less satisfied with healthcare services.[18] A study in western Guatemala found that, even though the majority of people in the communities in this region had reasonable access to a health care post, these health posts do not provide a high quality of health services, and therefore people are less willing to travel to them.[19] Furthermore, areas with smaller hospitals and clinics might not be appropriate for serious injuries, to the extent that they do not provide as many services as larger, more resourced hospitals. Thus, individuals less satisfied with their local public healthcare services may travel further to get proper emergency medical care even if they have reasonable access to smaller hospitals or health posts. Consequently, poor perceptions of local healthcare services should be a significant predictor of perceived hospital arrival times.

Individuals' access to devices that connect them to the healthcare system also should predict how long it takes them to reach healthcare. In partic-

ular, we expect access to phones and vehicles to decrease the amount of time it takes to reach a hospital or health clinic. If a person owns a car, then they have the ability to transport themselves to the hospital. This would allow them to reach a hospital more quickly than someone who has to rely on other forms of transportation, such as walking, taking a taxi, or contacting the public emergency response system.[20] Access to a phone is a way to measure one's ability to access an emergency response system, assuming there is a response system in place in the country. Even if a person lives in an area without an emergency response system or with a poorly developed emergency response system, access to a phone still has the ability to affect the time it takes to reach the hospital or clinic. It can be seen as a measure of one's ability to coordinate a ride to receive medical attention and would likely decrease the amount of time it takes for them to reach the hospital or clinic, compared to someone who does not have a phone.

To test these expectations we performed an OLS regression analysis with data from the AmericasBarometer survey, controlling for the demographic and socioeconomic factors in Figure 2, and now adding these additional factors. The results are presented in Figure 3. All independent variables are coded to run from 0 to 1. Satisfaction with streets, roads, and highways[21] is coded to run from very dissatisfied to very satisfied. Satisfaction with healthcare services[22] is similarly coded so that the measure runs from very dissatisfied to very satisfied. Access to a car[23] is based on a question about how many cars or vehicles an individual has; in the analysis, we capture whether a person has, or does not have, a car. Access to a phone[24] is positive if the individual has either a landline phone, a cell phone, or both. In addition, we also include a measure of whether the individual has used health care services. This "having used health care services" variable[25] is measured by either a yes (1) or a no (0) to the question of whether the individual has used health care services in the past year. An individual who has used health care services has actually traveled to these facilities; thus, they have a more accurate estimate of how long it would take to get there. We also use this variable as a control because people who have visited health care facilities in the past year

have different experiences with, and ideas about, roads and satisfaction with health care services. In fact, Figure 3 reveals that individuals who have visited health care facilities estimate shorter times to get there. This correlation suggests that the real time it takes to get to a healthcare facility is shorter than the estimate of an individual who has not made the journey in the past year. Since there is minimal research done on this variable, we will not focus on it any further. However, the difference in the estimated times for people who have used these services and have not used them is interesting to note.

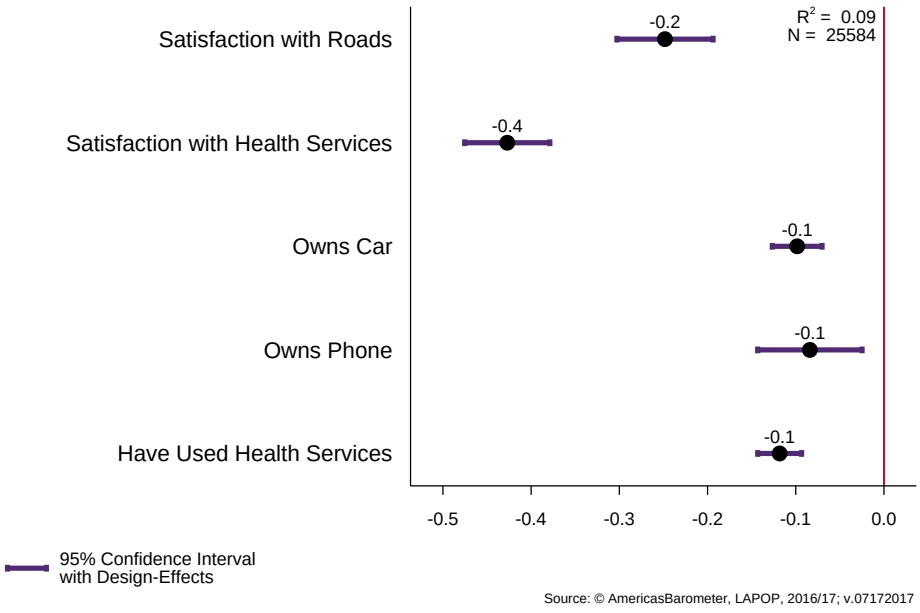


Figure 3: An Extended Model of Perceived Time to Urgent Medical Care

Figure 3 shows a significant negative relationship between satisfaction with roads and the amount of time predicted to reach a hospital or clinic, which falls in line with expectations for the variable. This means increased satisfaction with roads corresponds to a decrease in the expected amount of time it would take to get to the hospital. Since the question on the amount of time it takes to get to the hospital is coded as discrete, nonlinear time segments, the numerical value given by Figure 3

for the correlation cannot be translated to a numerical time decrease due to better road infrastructure. Instead, the coefficient should be assessed in terms of its direction (negative) and significance, and used as a relative comparison to the impact of other variables.

Figure 3 also finds a statistically significant negative correlation between satisfaction with health services and hospital arrival times. This indicates that, with higher satisfaction with the health care services in one's area, the predicted time it takes to get to the hospital is lower. We suspect that those who have a more positive perception of their local health services are more likely to have better developed emergency medical response systems and a higher quality of health services. A more satisfied individual is also more likely to seek out these services and thus have better information on how to get there. As we discussed earlier, dissatisfied individuals may elect to travel farther distances to get better emergency medical care and report the longer travel times to these more distant facilities, resulting in longer reported times than satisfied individuals.

For both access to a phone and access to a car, the results presented in Figure 3 meet our expectations. In both cases, the estimated relationship is significant and negative. With access to phone and access to car, there is a decrease in predicted time it takes to get to the hospital or clinic for emergency care.

Discussion

In the LAC region slightly less than a quarter of the population, on average, estimates that they would be able to travel to obtain urgent medical in under 10 minutes. Individuals' estimates of travel time are influenced by several socioeconomic and demographic factors. Having more years of education, a greater income, and/or an urban residence decreases the amount of time people report it will take them to reach a hospital or clinic for emergency care. Beyond these socioeconomic and demographic factors, transportation-related factors are key predictors. Owning a car

and having high satisfaction with roads both decrease the reported time to travel to reach urgent medical care. Additionally, owning a phone decreases estimates of the amount of time it takes to reach the hospital. We believe owning a phone is related to transportation because it can be used to coordinate a ride whether that be through the public emergency response system or through contacting someone with a car. Interestingly, satisfaction with health care services has the largest predicted effect on the amount of time to reach the hospital. The more satisfied a person is with their nation's health care services, the less time they believe it will take them to reach the hospital.

These findings have policy implications. Policymakers can use data on the role that transportation has on time to reach the hospital or clinic to create momentum for changes that improve the means of transportation for their citizens. These changes could include increasing accessibility to emergency medical transportation services and improving roads across the country as a whole. Additionally, policymakers may benefit from knowing which populations have the most difficult time reaching a hospital or clinic for critical care (see Figure 2). This information, combined with knowledge of the role that transportation plays in time to reach the hospital or clinic, could support policy changes that effectively target these populations. By pursuing a joint approach that both targets specific populations and improves transportation infrastructure as a whole, we anticipate that larger numbers of people will be able to reach the hospital or clinic more quickly. Additionally, the role that satisfaction with health services plays in the perceived amount of time to reach the hospital or clinic provides additional motivation to encourage policy changes that would increase patient services and satisfaction. In an ideal world, countries in the LAC region would be able to improve and implement policies, such as the ones mentioned above, in order to increase the amount of people that are able to reach critical care at a hospital or clinic in less than ten minutes. In an emergency medical situation, it is often imperative that a person is able to reach a hospital or clinic in less than ten minutes, and currently a large portion of the population in the LAC region reports that they are unable to do so.

Notes

1. Almeida–Filho et al. (2003); Atun et al. (2015).

2. Razzak and Kellerman (2002).

3. Razzak and Kellerman (2002).

4. The pie chart percentages came from averaging the data from each country to represent the entire region. There are six response options for this question: (1) Less than 10 minutes; (2) Between 10 and 30 minutes; (3) More than 30 minutes and up to an hour; (4) More than an hour and up to three hours; (5) More than three hours; (6) **[DON'T READ]** There is no such service available / I wouldn't go to one. For all analyses in this *Insights* report, response categories 5 and 6 have been combined. Each country's data is weighted equally despite their differing populations. This is to prevent higher populated countries like Brazil and Mexico from dominating the results shown in the pie chart and, therefore, possibly misrepresenting the regional country-average for the twenty countries. We note that, to focus on dynamics within the LAC region, the U.S. and Canada are not included in the analyses in this *Insights report*.

5. Kelly et al. (2016).

6. **Urban** is a variable coded into the sample (and is coded so that 1=urban and 0=rural). Income is a measure of the individual's reported household income (**Q10NEW**). Education reflects the level of schooling an individual reports having reached (**EDr**). Age is measured in years (**Q2**). Gender is a dichotomous measure coded by the interviewer (1=female and 0=male). All independent variables are coded to run from 0 to 1 in the analyses presented here.

7. Country fixed effects are included as controls in this analysis, and in the analysis for Figure 3, but are not shown for the sake of parsimony.

8. Gaitan et al. (1998).

9. Income is a question that has a high proportion of non-responses on most surveys, including the AmericasBarometer questionnaire (around 15% of the sample either does not know or does not answer this question). Therefore, we include a dichotomous measure of income missingness that accounts for the possibility that there is systematic

relationship between those who leave this question unanswered and their perceived travel times to urgent medical care facilities. The coefficient for this income missingness variable is -0.3, meaning those who do not answer the income question also report they reach the hospital in shorter times. This missingness measure is included as a control in the analysis shown in Figures 2 and 3, but not shown in the graphs.

10. Wallace and Gutiérrez (2005).

11. Wallace and Gutiérrez (2005).

12. Reyes–Ortiz et al. (2007); Wallace and Gutiérrez (2005).

13. Respondent age starts at 18 years of age in most countries and at the youngest 16, in countries where individuals who are 16 or older can vote (and therefore are considered adults for the purposes of the AmericasBarometer study).

14. See Almeida–Filho et al. (2003).

15. Razzak and Kellerman (2002).

16. Gaitan et al. (1998).

17. Annis (1981); Arreola–Risa et al. (1995); Razzak and Kellerman (2002).

18. Razzak and Kellerman (2002); Arreola–Risa et al. (1995); Gaitan et al. (1998).

19. Annis (1981).

20. Gaitan et al. (1998).

21. Satisfaction with local streets, roads, and highways is measured by **SD2NEW2** on the AmericasBarometer survey on a scale from 1 (very satisfied) to 4 (very dissatisfied). In our analysis, we reversed and rescaled the variable and assigned very dissatisfied to a 0 and very satisfied to a 1. This allows us to talk about the maximum change from 0 to 1 and how moving across the range of road satisfaction is related to perceptions of health facility travel time.

22. Satisfaction with local health services is measured by **SD6NEW2** on the AmericasBarometer survey on a scale from 1 (very satisfied) to 4 (very dissatisfied). We reversed and rescaled this variable, assigning very dissatisfied to a 0 and very satisfied to a 1.

23. Access to car is measured by **R5** on the AmericasBarometer survey. The answers range from no (0) to three of more (3), but for the purpose of our analysis, this variable was coded as 0 for no access or 1 for access to a car.

24. Access to a phone was measured by **R4** and **R4A** in the AmericasBarometer survey. In our analysis, an answer of yes to either question received a coding of 1 for access to a phone and no to both received a 0 for no access.

25. Having used health care services measured by the filter question asked prior to question **EXC15** in the AmericasBarometer survey.

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Troy Anderson (roy.h.anderson.iii@vanderbilt.edu) is a sophomore at Vanderbilt University, double majoring in Economics and Medicine, Health, & Society. He has always had a passion for foreign policy and international affairs since his childhood years in Switzerland, Japan, and Turkey.
Pranav Kodali (pranav.kodali@vanderbilt.edu) is a Biochemistry major at Vanderbilt with an interest in computational research methods. He also has a special interest in Latin America stemming from his years of Spanish education and six weeks spent studying sexual health education in Ecuador to construct new curricula.
Eden Singh (eden.s.singh@vanderbilt.edu) is a sophomore at Vanderbilt University majoring in Neuroscience. She plans to pursue a career in medicine and has an interest in access to healthcare institutions.
Samantha Speer (samantha.a.speer@vanderbilt.edu) is a sophomore at Vanderbilt University, double majoring in Mathematics and Computer Science with a minor in Economics. She enjoys applying her technical skills to social science research in hopes of fusing together her love of data analysis and political infrastructure.

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As a charter member of the American Association for Public Opinion Research (AAPOR) Transparency Initiative, LAPOP is committed to routine disclosure of our data collection and reporting processes. More information about the AmericasBarometer sample designs can be found at vanderbilt.edu/lapop/core-surveys.

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vanderbilt.edu/lapop
@lapop_barometro
@LatinAmericanPublicOpinionProject
lapop@vanderbilt.edu
+1-615-322-4033
230 Appleton Place, PMB 505, Suite 304, Nashville, TN 37203, USA