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## Abstract

Neglected tropical diseases (NTDs) affect over one billion people worldwide. Although these diseases are most prevalent in low- and middle-income countries, especially in tropical and subtropical regions, they can also affect vulnerable individuals and communities within high-income countries, including the United States (US). Past research on NTDs in the US suggests that there is an unmet need for diagnosis and treatment within at-risk populations, and there is limited information available on existing state operational policies and programs. This study aimed to analyze state-level operational policies and programs for five NTDs previously reported in the US and known to have local transmission: Chagas disease, cysticercosis, soil-transmitted helminthiasis, dengue, and rabies. Departments of Health in 34 states considered to be at higher risk of these NTDs were contacted to ascertain willingness to provide information on policies and programs related to surveillance, notification, diagnosis, and treatment of each of these five diseases. Thirteen state departments of health completed a questionnaire. Responses show substantial variations between states. A majority of states reported operational policies in place for dengue and rabies, which focused on mandated health provider-to-state reporting, as well as guidelines or recommendations on screening, testing, and treatment. State policies and guidelines were less consistently reported for Chagas disease and cysticercosis and only one state reported any surveillance efforts for soil-transmitted helminths. Differences in types of surveillance systems were also found between each disease and each state. Results highlighted the fragmentation of the US public health system with respect to NTD management. Variability in state policies and reporting in addition to lack of active surveillance hinders the accurate measurement of NTD prevalence in the US and, as a result, limits the equitable and appropriate distribution of resources. The creation of consistent policy guidelines could reduce inconsistencies in reporting and prevent missed cases of NTDs in high-risk US populations. Additionally, greater domestic prioritization of NTD management should not compromise US support for international NTD control efforts, but rather should be leveraged to demonstrate greater US commitment and solidarity with partner countries.

Keywords: Neglected tropical diseases, disease control policy, Chagas disease, soil-transmitted helminthiasis, rabies, dengue, cysticercosis

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## 1. Introduction

Neglected Tropical Diseases (NTDs) are a group of twenty preventable diseases and conditions that primarily affect populations living in tropical areas of the world.<sup>1</sup> Although they predominantly affect impoverished people living in low- and middle-income countries due to inequalities in social determinants of health, NTDs are not absent from high-income countries.<sup>1</sup> However, the misconception that NTDs do not exist in high-income countries, including the US, results in a lack of awareness of these diseases among health care providers and policymakers.<sup>2</sup> While research on NTDs in the US has been sparse, case reports focused on individual diseases and a small number of reviews have studied the risk of transmission of the following NTDs within the US: Chagas disease, soil-transmitted helminthiasis (including *Strongyloides stercoralis*), cysticercosis, rabies, and dengue.<sup>3-5</sup>

Chagas disease affects an estimated 300,000 people in the United States, with the majority imported or brought into the country from Central/South America through triatomine bug or by vertical transmission from mother to fetus.<sup>6</sup> Locally transmitted cases have also been reported in the US.<sup>7-10</sup> Known risk factors for acquiring Chagas disease in the US include rural residence, lack of screening or cracks in housing structures, lack of air conditioning, having excess produce within houses, history of hunting or camping, and agricultural or outdoor work.<sup>2,3,11-13</sup> Many of these factors, especially inadequate housing and rural residence, are also associated with poverty.<sup>2,13,14</sup> Americans of low socioeconomic status, immigrants and racial minorities are the populations most vulnerable to NTDs. There is concern, based on inequalities in healthcare access and poor quality of information exchange between physician-patient, that their health risks are not being appropriately addressed.<sup>11,15-17</sup>

Similarly, dengue fever, cysticercosis, and soil-transmitted helminthiasis, while often related to travel, have also been reported to be transmitted in the US, especially in populations living in poverty. Dengue is a viral infection caused by a bite from an infected mosquito. It is locally transmitted or contracted within the area an individual lives or works, in Florida, Hawaii, Puerto Rico, and Guam.<sup>18-20</sup> In contrast, transmission of cysticercosis, a parasitic infection caused by tapeworms, increases with a lack of sanitation. Transmission has been reported in Arizona, California, Kansas, New Mexico, New York, and Oregon.<sup>5,21,22</sup> Soil helminths, which are parasitic worms that live within the soil, are associated with poor socioeconomic environments.<sup>3,23-27</sup> Local transmission of these diseases has been documented in southern states (Texas, Louisiana, Alabama, Florida), especially in areas of poverty.<sup>12,18,20,28</sup> This is most notably seen in Alabama, where 34% of the sampled population tested positive for *N. americanus*.<sup>3,28,29</sup>

Authors of these studies also have indicated that variation in the reporting of NTDs in the US has made it difficult to accurately assess prevalence and has raised concerns of underreporting for health surveillance purposes.<sup>2,4,30,31</sup> Inaccurate reporting on NTDs in the US can be attributed to limited funding and support for at-risk populations.<sup>4</sup> This is compounded by the tendency for at-risk populations of selected NTDs to be underinsured or uninsured groups with lack of access to testing and treatment.<sup>15-17,25</sup> Similarly, studies on physician and community knowledge suggest there is a lack of awareness of these diseases, which could result in underreporting.<sup>16,32,33</sup>

While recent studies have addressed the lack of knowledge in physician and at-risk populations within the US, there have been fewer studies examining operational policies for NTD surveillance, diagnosis, and control in the US, and

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<sup>1</sup> Social Determinants of Health are factors that impact individuals health outcomes that are non medical. They

include a person's income, education, housing, food, environment, etc. These factors can impact one's ability to receive healthcare and one's daily life.

none, to our knowledge, examining these policies and programs at the state level. Moreover, there is a substantial body of scholarship on the potential and actual effects of the COVID-19 pandemic on NTDs in other parts of the world.<sup>34,35,36</sup> While the US does not have formal NTD programs, it is hypothesized that there would have been impacts on case management and testing as health programs shifted to pandemic responses.<sup>37,38</sup> While some policy information is publicly available via state health departments and state public health legislation, little data on the actual status of operational policies and programs to detect and control NTDs is available online.

The purpose of this paper was to collect empirical data on state-level operational policies and programs for these five NTDs in order to better understand the current status of US NTD control approaches, as well as any potential impacts of the COVID-19 pandemic.

## 2. Methods

### 2.1 Data Collection

This study collected data from May 2022 to July 2022 in the form of a questionnaire. Thirty-four State Health Departments were contacted and, based on their exposure risk to selected NTDs and willingness to participate, were sent a questionnaire to individually complete. The states and territories initially chosen were those that had previously reported cases of any of the selected NTDs since 2012, states with higher percentages of poverty as reported by Census Bureau 2021, and those with higher immigration from countries endemic with selected NTDs. The following states were sent the questionnaire: Alabama, Arizona, Arkansas, California, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, South Carolina, Tennessee, Texas, US Virgin Islands, Utah, Virginia, West Virginia, Wisconsin, and Wyoming. Of these, thirteen

completed the questionnaire: Alabama, Arizona, Arkansas, Illinois, Kentucky, Maine, Michigan, Oregon, Pennsylvania, Tennessee, West Virginia, Wisconsin, and Wyoming.

State health departments were first contacted by email to ask if they would be willing to complete a questionnaire. The questionnaire was sent to email addresses obtained from the state's Department of Health website or received after contacting State Health Departments directly. One questionnaire was sent to each state or territory, with the request to have it completed by one or more state health department officials within infectious disease departments/zoonotic disease programs with knowledge of state-level data, policies, and programs on Chagas Disease, cysticercosis, dengue, soil-transmitted helminthiasis, and/or rabies. Repeated requests for participation and completion of surveys were sent to 34 targeted states. None of the officials' personal data (including name, email address, or phone number) was collected, retained, or used in the analysis of the results, and no follow-up questioning was conducted.

The questionnaire consisted of eight categorical and six open-ended questions designed to collect information on the following topics: surveillance systems, mandated disease reporting, screening policies, testing programs, treatment programming, and impacts of the COVID-19 pandemic on NTD programs within the state Departments of Health (Appendix 1). These categories were designed to gather information about disease prevention strategies (surveillance), programs for early detection and treatment of NTDs (screening and treatment), and the level of inconsistency in health policy with regards to variations in state disease reporting. Optional spaces were provided to clarify reasons for responses.

### 2.2 Data Analysis

Data from the categorical questions in the questionnaires were coded and entered into an Excel spreadsheet. Open-ended responses were analyzed thematically based on four categories: 1)

notification and surveillance; 2) screening and testing; 3) treatment and case management; 4) COVID-19 impacts.

Standardized definitions were used to analyze responses; these definitions and possible survey responses are defined below.

Notifiable or reportable diseases were defined as diseases considered reportable within a particular state. It is important to note that the list of notifiable diseases varies between states; however, some diseases are recommended to be notifiable in all states (nationally notifiable) by the Council of State and Territorial Epidemiologists (CSTE).<sup>39</sup> These recommended diseases are included in the CDC's National Notifiable Diseases Surveillance System (NNDSS).<sup>39</sup> Within this study, reporting for each disease was categorized as either "state-mandated", meaning that health providers are required to provide notification to local, county, or state authorities if one or more cases is detected, or "not state-mandated", meaning that notification was not mandatory.

This study also analyzed surveillance mechanisms using the CDC's definition of surveillance as an "ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice."<sup>40</sup> This included further classification as active surveillance (where health departments initiate regular weekly contact with providers to identify cases), passive surveillance (standardized reporting system such as the National Notifiable Diseases Surveillance System), or sentinel surveillance (a form of active surveillance that requires a "network of healthcare providers or hospitals to be recruited by the health department to regularly report specified health events in specific populations").<sup>41,42</sup> States could also respond that they had no surveillance system in place for the targeted diseases, and were further given the option to respond "unsure/NA". Based on their surveillance mechanism, states were then asked whether they considered each disease to occur continuously, sporadically, or seasonally.

Finally, to determine the capacity for early treatment and diagnosis, this study asked states about their screening operational policies or programs. Screening was defined as testing on an individual basis for patients who were considered high risk for a particular disease. Patients did not have to experience symptoms in order to be screened.

For COVID-19 impact, questions detailed the impact of the pandemic on the State Health Department's infrastructure and programming, as well as the ability for patients to receive screening and testing. The State Health Department's infrastructure was defined as changes in the proceedings of management of cases, number of human resources, and any changes made to the work environment that were needed to fit COVID-19 precautions.

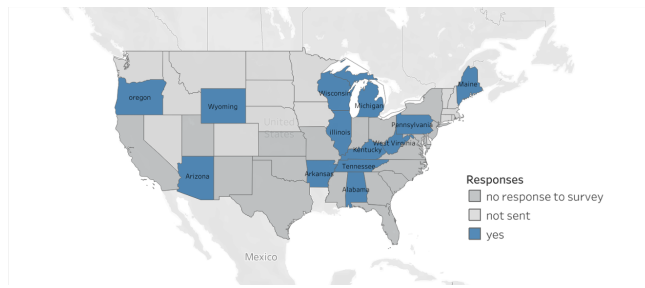
These definitions helped define categorical differences in the results found for each state's operational policies and procedures. Descriptive statistics were carried out to describe the results found within the outlined categories, and maps to compare findings between states were created in Tableau.

### **2.3 Ethics**

This study was reviewed and determined not to constitute human subjects research by Georgetown University's Institutional Review Board on May 31, 2022 ([STUDY00005232](#)).

### **3. Results and Discussion**

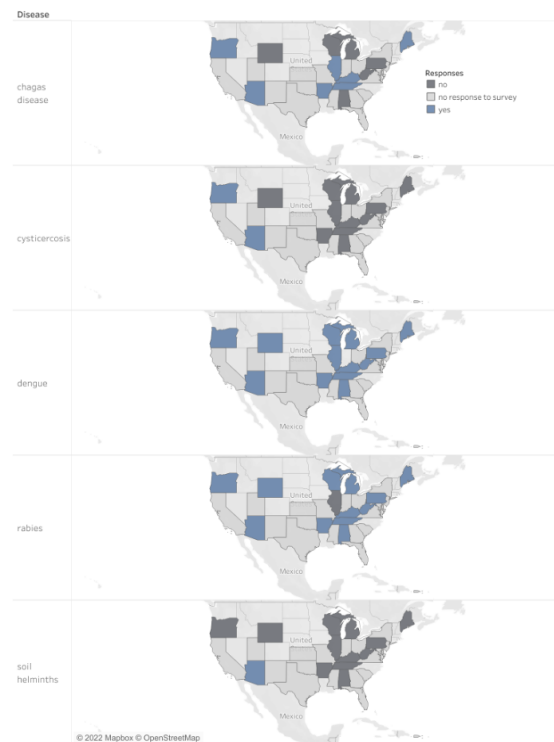
Of the 34 territories and states selected and contacted to determine their willingness to complete a questionnaire, 25 (73.5%) responded positively and were subsequently sent a questionnaire. Thirteen of the 25 states (52%) completed the questionnaire, for an overall response rate of 38.2% (Figure 1). Consistent with published literature, states described low incidence and minimal reported cases of Chagas disease, cysticercosis, human rabies, dengue, and soil helminths.<sup>2,18,29</sup> States also reported varying operational policies, guidelines and programs related to the selected NTDs.



**Figure 1.** Geographical view of responses to the survey from US state health departments. Figure was generated on Tableau. Responses to the survey were highlighted above.

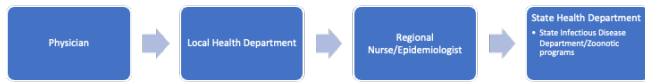
### 3.1 Surveillance and Notification

Almost all responding states (92.3%), required state reporting of dengue and rabies, which are also the only two of the five selected NTDs that are nationally notifiable to be reported to the CDC (Figure 2).<sup>43</sup> Consequently, it is logical that the majority of state legislatures have state-mandated reporting of nationally notifiable diseases in order to provide this data to national government. With regards to the one state’s survey response for rabies reporting, the information given, via the survey, not align with other documents available online.<sup>44</sup> State-mandated reporting for Chagas disease was reported by seven states, and sub-state reporting is mandated in Los Angeles County, California.<sup>43 45</sup> Mandatory notification of cysticercosis was reported only by Oregon and Arizona. State reporting of soil-transmitted helminthiasis was mandated by Arizona.<sup>21</sup>



**Figure 2.** States surveyed with mandated reporting of selected NTDs. Figure was generated on Tableau. State responses are categorized by NTD and by response to mandated reporting.

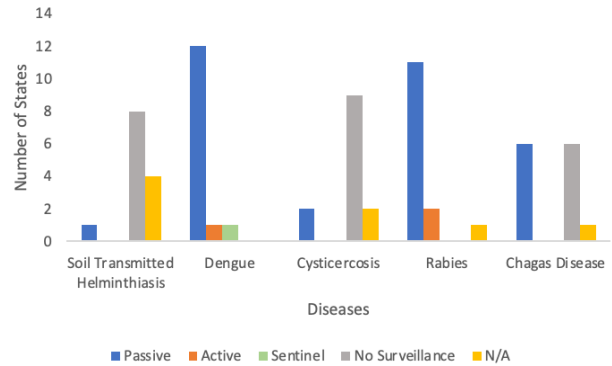
The state reporting process and standard reporting procedures were also detailed by surveyed states. According to states, physicians sent case reports to local health departments, state surveillance systems, regional nurses or epidemiologists, and state infectious disease department/zoonotic programs based on the state’s reporting system. Arizona, Tennessee, Pennsylvania, Wisconsin, and Michigan had notification systems whereby health providers reported to local or regional health departments before reaching state health departments. In the other surveyed states, health providers transmitted case data directly to the state health departments. These differences suggest a hierarchy of state reporting systems (Figure 3) that varied between states (protocol within some states require physicians to report to local administrators while other states require reporting directly to state health departments), which may be useful for identifying prevention measures as well as outbreaks.



**Figure 3.** Flow/Hierarchy of reports from physician to state health department. This figure was created in Excel and describes the hierarchy of disease reporting seen in some state health departments.

For diseases that were non-reportable within the state, the majority of states refrained from commenting on state reporting systems. However, Maine’s state health department did note that non-reportable diseases could still be reported by providers as unusual cases of disease, and likewise any outbreak of illness with potential public health significance should also be reported to the state health authorities; this could be a mechanism for the state health department to receive data on otherwise non-reportable NTDs.

Systems for surveillance of the selected NTDs also varied between diseases and from state-to-state (Figure 4). For diseases that were reportable in states, most surveillance systems were passive, with exception of rabies, with both Wyoming and Pennsylvania combining active and passive approaches. Passive surveillance systems, as outlined by past literature can include approaches such as blood donor screening. However, our questionnaire did not require surveyed states to specify the mechanism for surveillance.<sup>30</sup> Arizona also reported having sentinel surveillance for dengue near the border with Mexico; this was the only state that reported this type of surveillance system across all NTDs reviewed. For both soil-transmitted helminths and cysticercosis, all the states without mandated state reporting also reported no surveillance systems or were unsure of existing surveillance systems.

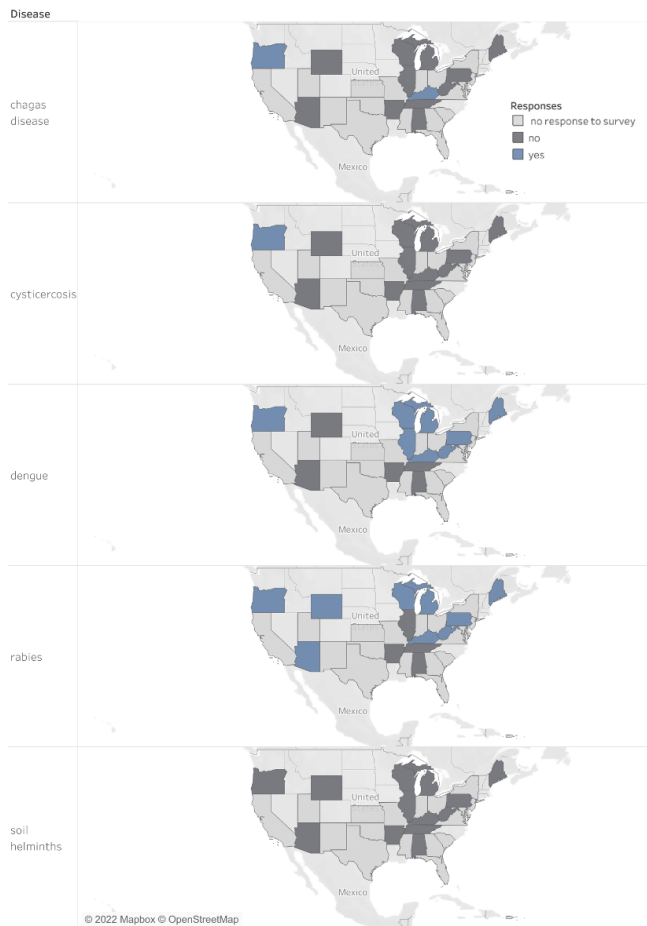


**Figure 4.** Types of surveillance systems used by surveyed states. Figure was generated in Excel and describes the breakdown of reporting type per disease category.

### 3.2 Screening and Testing

Case detection policies and screening programs of the selected NTDs in at-risk populations tended to be reported in states with mandatory state reporting of that disease or in states where the disease was nationally notifiable. The approaches used for screening and case detection varied between diseases and states. Dengue had state screening programs in six states, whereas state screening for Chagas disease was only reported by Oregon and Kentucky, both of which have state-mandated reporting for Chagas disease (Figure 5). Screening programs for rabies occurred in nine surveyed states for animals that came into contact (bitten or scratched) with humans, however, due to the rarity of human rabies, no state reported widespread human screening for rabies.<sup>46</sup> No states reported any screening programs in place for soil-transmitted helminthiasis. Minimal state screening programs for diseases may be due to limited resources, or if surveillance occurs at other levels of the health system. For example, since 2007, all US blood banks screen donors for Chagas disease before introducing donors' blood into the national registry, which helps prevent the asymptomatic spread of Chagas disease to blood recipients.<sup>47</sup> However, if these blood banks are operated by private or non-governmental entities, positive tests might not be reported to state health departments. This often occurs for diseases that are not

mandated to be reported at either the state or national level.<sup>47,48</sup> This is postulated to cause underreporting of non-notifiable diseases, especially if the state is unaware of trend data from blood banks.

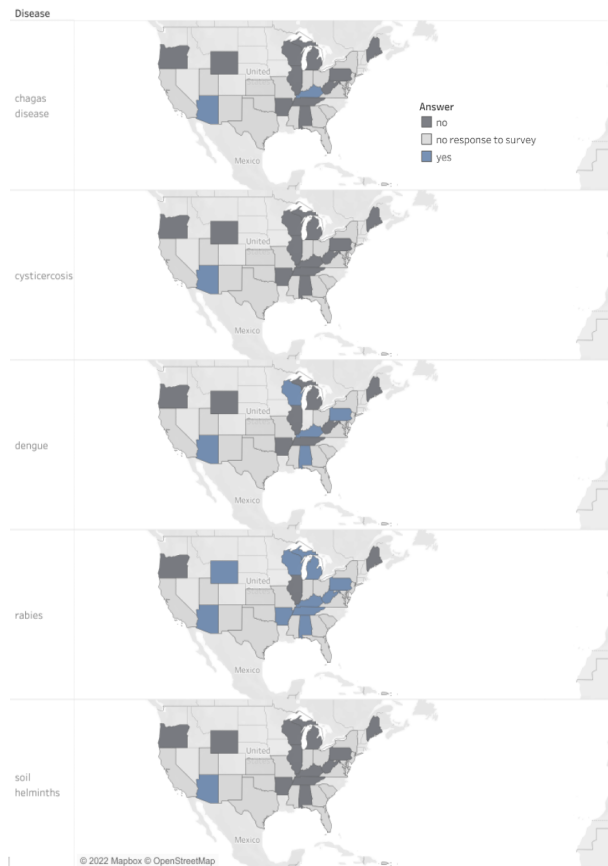


**Figure 5.** State health departments with screening policies and programs for selected NTDs. Figure was made in Tableau and describes states' responses to the inclusion and exclusion of screening requirements for the selected NTDs.

Similarly, there was an association between states having testing capabilities for diseases, and those diseases being reportable or surveyed nationally or at the state level. However, this was not always the case (Figure 6). For example, in Oregon, cysticercosis, rabies, dengue, and Chagas disease are all reportable to the state health department, yet no specific testing programs or capabilities were reported as being in place to detect cases. Overall, dengue, which is a nationally

notifiable disease, was only reported as having established testing programs in place in five of the 13 surveyed states (38.5%). Thus, there were minimal established programs designated to testing NTDs even within states that had mandated reporting of these NTDs. A lack of specific programs does not necessarily mean states do not have the ability to test for NTDs. As stated by the state health department of Wisconsin in their questionnaire response, testing and coordination of testing can be done even for diseases without state-mandated reporting. Some possible explanations for the low number of state testing designated programs are that testing for these diseases can be technically difficult and/or expensive, and there may be a lack of physician knowledge which results in low testing for symptomatic individuals. For example, to confirm a positive Chagas disease case, two different serological tests, targeting different antigens, must be performed.<sup>48,49</sup> Although one of these tests can be conducted by CDC free of charge, provided that the person has had a positive screening test, there may be a limited number of initial screening tests conducted by states due to perceived low risk. One potential solution to this issue could be creating screening sites at regional (i.e. multistate) networks for NTD diagnostics. This could increase the availability of testing without adding to the burden on individual state health systems.<sup>50,51</sup>

Another testing and screening barrier noted was cost of testing. For example, neurocysticercosis requires MRI or CT scans along with blood tests for diagnosis, of which MRIs and CT scans are frequently not covered by insurance.<sup>52</sup> To help overcome cost barriers to diagnosis and treatment, costs for NTD treatment could be covered by state health insurance schemes.



**Figure 6.** State health departments with testing policies and guidelines for selected NTDs. Figure was curated in Tableau and describes states' responses to the inclusion of testing guidelines of selected NTDs.

### 3.3 Treatment and Case Management

Five of 13 states with mandated state reporting of an NTD also reported having treatment guidelines in place for that disease. If the disease was not reportable, 12 out of 12 (100%) states reported no treatment policies or could not comment on specific recommendations or policies for case management of disease. For dengue, which was notifiable in all 13 surveyed states, four states (Alabama, Kentucky, Pennsylvania, and West Virginia) had specific treatment recommendations. Similarly, Alabama, Kentucky, Pennsylvania, West Virginia, and Wyoming reported having treatment guidelines for rabies. The only state that reported having treatment guidelines for Chagas disease was Kentucky. No states reported having treatment guidelines for

cysticercosis and soil-transmitted helminthiasis. It is worth noting that if states reported having no treatment policies in place, it did not imply that individuals were not able to receive treatment; instead, it meant that the State Health Departments did not provide recommended specific treatment approaches for that NTD. For example, Arizona and Illinois health departments specifically stated that treatment recommendations were left up to the health provider for all NTDs. At the state level, departments of health could ensure that clinicians and health-care facilities serving potentially higher risk groups have access to the CDC online disease treatment guidelines for these 5 NTDs, as this could guide patient care.

For states that reported treatment operational policies/guidelines, recommendations and treatment guidelines included Postexposure prophylaxis (PEP) and wound care for rabies, supportive care, and fluid therapy for dengue. Kentucky also developed “a reportable disease regulation with step-by-step guides to each reportable disease/infection” in order to provide physicians and individuals with knowledge about illnesses. As with screening and testing, the lack of treatment guidelines reported by state departments of health could reflect a resource-saving measure, especially if the incidence of the disease is considered too low to warrant the development and dissemination of specific guidelines. It also could indicate state emphasis on provider and patient autonomy during the provision of care.

### 3.4 Impact of COVID-19

The impact of COVID-19 was assessed by examining changes to state health department infrastructure, patients' ability to seek NTD-related services, and changes in operational abilities to detect, treat, and report NTDs. The results found that all (100%) of surveyed states reported changes in the management and organization of departments to fit new COVID-19 health guidelines. Ten of the 13 (76.9%) states surveyed reported virtual meetings and remote work environments due to COVID-19 prevention

strategies. Some states also reported hiring new staff or shifting staff responsibilities to fit the need of surveillance and case management of COVID-19 cases. Despite changes in staff and management, a majority of states surveyed (11 out of 13 or 84.5%) reported that there were minimal changes in reporting of NTDs. This could be due to challenges in analyzing the effects of COVID-19 on NTDs, since cases prior to COVID-19 were minimal. Limited case numbers before the pandemic make measuring the resilience of programming during adverse situations difficult. As such, the true impact of COVID-19 on at-risk individuals for NTDs may not yet be fully understood.

#### 4. Limitations

Due to the limited amount of state responses, and particularly the absence of responses from states including California, Florida, and Texas with substantial at-risk populations, there were limits to the generalizability of the data from the questionnaire.<sup>53,54,55</sup> Additionally, due to the short length and style of the questionnaire, there was limited opportunity to provide detailed explanations for why surveyed states had certain policies or programs for NTDs. The lack of detailed reasoning for blank answers limits the study's ability to draw conclusions about why certain states do not have more developed operational policies or programs for NTDs. Furthermore, no follow-up interviews were conducted based on questionnaire responses, and consequently, clarification, as well as further questioning, did not take place. Lack of follow up did not occur due to constraints of study resources.

Another limitation of this study is that state reporting of cysticercosis is different from that of taeniasis, while the World Health Organization considers these diseases to be interchangeable. Differences in case definitions have the potential to limit surveillance and this study's results. Further studies are needed to address the limitations of the questionnaire and gather data from states not reached in this study.

#### 5. Conclusions

This study sought to investigate the operational and reporting policies for NTDs within state health departments in the US. The results of this study suggest vast differences in the extent and consistency of epidemiological data collection between the five targeted NTDs, as well as variations in the recommendations and guidelines for the diseases, between states within the US. These differences reflect the varied nature of the policies within the US healthcare system. Additionally, the variation in implementation of policies suggests that there may be underreporting of NTDs, which could be further exacerbated by lack of funding in state health departments.<sup>51, 56</sup> It is nonetheless important to highlight these gaps when observed, notably for conditions like NTDs, which are closely linked to other aspects of societal and economic inequity, globally as well as in the US.

Importantly, this study adds to the growing literature that highlights the short-comings of a "case count" approach, or an approach that only uses the number of positive cases to identify at-risk patients, to surveillance.<sup>57</sup> In the future, additional focus should be placed on measuring the burden of NTDs in the US, but to do so accurately may require novel ways of ascertaining prevalence and incidence. For example, there may be opportunities to use health insurance or medical prescription data to track case management for certain NTDs, or to conduct serological studies on blood banks or other available clinical specimens (for pathogens other than *T. cruzi*).<sup>5</sup> Wastewater surveillance is highly sensitive and could potentially be used to track localized outbreaks of NTDs, especially if conducted in conjunction with surveillance for other pathogens or conditions of concern. This method has effectively been used in surveillance of other illnesses such as COVID-19.<sup>58</sup> Further research should also compare the changes in management, reporting, and treatment of other diseases during COVID-19 to NTDs in order to understand the true effects of COVID-19 on disease management. Additionally, an investigation on the perspectives of physicians and how COVID-19 impacted their management of

NTDs as well as other diseases should be conducted. These results would provide more insight into other barriers preventing NTD surveillance in the US and highlight additional recommendations.

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## Appendix 1. Questionnaire for data collection from state health departments.

### Background:

Neglected Tropical Diseases (NTD) affect over 1 billion people in tropical and subtropical areas, which are predominantly regions within low and middle-income countries.<sup>2</sup> Although these diseases primarily affect lower-income nations, they still affect the United States. The main neglected tropical diseases seen in the United States are rabies, Chagas disease, soil transmitted helminths (*Ascaris*, *Trichuris* and hookworm), cysticercosis, and dengue. This survey aims to analyze the distribution of these NTDs within states and to identify policies in place for surveillance, diagnosis, case management and reporting.

### Instructions:

Participation in this survey is voluntary and no personally identifiable data will be used in analysis of responses or shared with anyone outside the research team without express consent. Responses from the questionnaire will be analyzed qualitatively for common themes relating to policies and programs for NTDs in the United States. This survey questionnaire is directed toward state health officials with expertise on one or more of the following diseases: rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue. The following questions pertain to the reporting and tracing of these diseases as well as demographics related to at risk populations. Please answer the questions to the best of your knowledge.

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<sup>2</sup> World Health Organization. Accelerating work to overcome the global impact of NTDs: 2011–2020 Progress dashboard. [cited 13 October 2021].

Questionnaire:

Department/Agency name:

State:

1. How many cases of each of the following diseases have been detected in your state within the past a) one month; b) one year?

| Disease                    | Number of cases |               |
|----------------------------|-----------------|---------------|
|                            | Past one month  | Past one year |
| Rabies                     |                 |               |
| Chagas disease             |                 |               |
| Soil-transmitted helminths |                 |               |
| Cysticercosis              |                 |               |
| Dengue                     |                 |               |

2. What is the incidence of Chagas disease, soil transmitted helminths, and cysticercosis within your state? Please respond to each disease separately.

| Disease                    | Incidence |
|----------------------------|-----------|
| Rabies                     |           |
| Chagas disease             |           |
| Soil-transmitted helminths |           |
| Cysticercosis              |           |
| Dengue                     |           |

3. Based on question 1 and 2, are there risk factors for rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue specific to your state? If yes, what are the risk factors? *Please respond to each disease separately.*
4. Which human populations are considered high risk groups for rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue within your state? *Please respond to each disease separately.*
5. Does your state health department have screening policies or programs regarding the following diseases: rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue. Select all applicable.
  - Chagas disease
  - rabies
  - soil transmitted helminths
  - cysticercosis
  - dengue
6. Within your state, is there a system of reporting to state jurisdiction for any of the following diseases? If yes, check mark the following disease.
  - Chagas disease
  - rabies
  - soil transmitted helminths
  - cysticercosis
  - dengue
7. Within your state, is there a state testing program for any of the following diseases? If yes, check mark the following disease.
  - Chagas disease
  - rabies
  - soil transmitted helminths
  - cysticercosis
  - dengue
8. If you answered yes to question 6, to whom is reporting received and are these cases nationally notifiable? *Please respond to each disease separately.*
9. What type of surveillance system is used for the following disease in your state?

Chagas disease

- active  passive  sentinel  no surveillance  not sure/don't know

Rabies

- active  passive  sentinel  no surveillance  not sure/don't know

Soil Transmitted Helminths

- active  passive  sentinel  no surveillance  not sure/don't know

Cysticercosis

- active  passive  sentinel  no surveillance  not sure/don't know

Dengue

- active  passive  sentinel  no surveillance  not sure/don't know

10. If you answered yes to question 6 or 7, Are there treatment policies in your state? If yes, please describe each disease separately.

11. If you answered yes to question 6 or 7, are these diseases considered seasonal, continuous or sporadic for your state?

Chagas disease

- seasonal  continuous  sporadic

Rabies

- seasonal  continuous  sporadic

Soil Transmitted Helminths

- seasonal  continuous  sporadic

Cysticercosis

- seasonal  continuous  sporadic

Dengue

- seasonal  continuous  sporadic

12. Has COVID-19 affected the programs for surveillance, detection and reporting of rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue within your state? *Please respond to each disease separately and clarify if your state has programs and/or policies on the following categories.*

|                            | Programs/Policies: |           |           |                 |
|----------------------------|--------------------|-----------|-----------|-----------------|
| Disease                    | Surveillance       | Detection | Reporting | Case Management |
| Rabies                     |                    |           |           |                 |
| Chagas disease             |                    |           |           |                 |
| Soil-transmitted helminths |                    |           |           |                 |
| Cysticercosis              |                    |           |           |                 |
| Dengue                     |                    |           |           |                 |

13. Has COVID-19 affected individuals' ability to receive testing or seek care for rabies, Chagas disease, soil transmitted helminths, cysticercosis, and dengue within your state? Please respond to each disease separately.
14. Did COVID-19 change your state's department of health infrastructure? (This includes virtual meetings as well as shifting efforts to COVID-19 surveillance.)
15. If you are willing to be contacted for follow up questions or clarifications about the responses above, please provide a contact email address here:

