Integration of Multiple Surveillance Systems to Track COVID-19 in the U.S. Army Population

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ABSTRACT
Introduction: The coronavirus disease (COVID-19) pandemic presented unique challenges for surveillance of the military population, which include active component service members and their family members. Through integrating multiple Department of Defense surveillance systems, the Army Public Health Center can provide near-real-time case counts to Army leadership on a daily basis.

Materials and Methods: The incidence of COVID-19 was tracked by incorporating data from the Disease Reporting System Internet, laboratory test results, Commanders’ Critical Incidence Reports, reports from the Centers for Disease Control and Prevention military liaison, and media reports. Cases were validated via a medical record review for all Army beneficiaries. Descriptive analyses were performed using Microsoft Excel and SAS 9.4 to measure demographic frequencies.

Results: In the first year of the pandemic from February 1, 2020 to February 28, 2021, a total of 96,315 COVID-19 cases were reported to the Disease Reporting System internet, the Army’s passive surveillance system, of which 95,429 (99%) were confirmed and 886 (1%) were probable. A total of 76 outbreak reports were submitted from 14 Army installations. The proportion of Army beneficiaries with severe illness was low: 2,271 (2.4%) individuals required hospitalization and 269 (0.3%) died. Installations in Texas reported the highest proportion of confirmed—not hospitalized cases ($n = 19,246, 20.7%$), confirmed—hospitalized cases ($n = 1,037, 45.7%$), and deaths ($n = 137, 50.9%$) as compared to other states with Army installations.

Conclusions: The pandemic has demonstrated the need for a robust public health enterprise with a focus on data collection, validation, and analysis, allowing leaders to make informed decisions that may impact the health of the Army.

INTRODUCTION
The coronavirus disease (COVID-19) pandemic presented unique challenges for the surveillance of the military population because of its dynamic nature. This population comprises active component (AC) service members (SMs) who are required to maintain readiness throughout their training, missions, or deployments. In addition, SMs are often accompanied by family members (i.e., beneficiaries) that may travel frequently between civilian and military communities. Beneficiaries of current or former SMs are also eligible for care at military treatment facilities (MTFs), and many may seek care through their civilian healthcare providers. Further complicating surveillance initiatives are thousands of Army recruits traveling across the country throughout the year to begin Initial Entry Training at one of four Army training installations, or leaving for and returning from holiday block leave in December and January, respectively. National Guard and Reserve personnel may also be deployed to Army installations or to other locations throughout the United States or abroad. Army retirees are less likely to live on an Army installation but are eligible to receive care at an MTF, similar to recruits, National Guardsmen, and Reservists. Surveillance of the Army population must encapsulate each of the aforementioned beneficiaries. Because younger individuals such as recruits and some AC SMs are more likely to be asymptomatic carriers of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) (which is highly transmissible between close contacts$^{2,3}$) and older individuals are more at risk for severe

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illness, the timely and accurate surveillance of this unique population is mission-critical to Army leadership.

Before the COVID-19 pandemic, the U.S. Army Public Health Center (APHC) was responsible for monitoring the burden of reportable medical conditions among the Army beneficiary population, including AC SMs, recruits, National Guardsmen, Reservists, retirees, and family members of current and former SMs. The APHC can access Department of Defense (DoD) laboratory and diagnostic records from encounters performed within the Military Health System (MHS); information on patients who sought care outside of the MHS is not reliably available, although individual records may be accessed by request. Since 2010, the Disease Reporting System Internet (DRSi), the Army’s passive surveillance system for reportable medical events (RMEs), has tracked the incidence of reportable medical conditions for the Army beneficiary population.

The DRSi is a web-based system that is available to Army public health professionals at Army installations to report cases of RMEs. Seventy RMEs, including infectious diseases and some nonbattle illnesses and injuries, are reportable for the Army beneficiary population. The U.S. Air Force and U.S. Navy also utilize their own DRSi pages to report the cases of RMEs. Although surveillance of RMEs is performed throughout the military, each service’s public health hub is responsible for validating and surveilling cases reported to its respective DRSi. Although strategies to review and validate cases reported to the DRSi vary among the services, they collaborate on case definitions for RMEs as well as policies for adding new reportable conditions, such as COVID-19, to the DRSi.

The DoD initially established COVID-19 surveillance policies for the military beneficiary population in February 2020. These policies were updated throughout the pandemic, and changes to the case definition were made as more information about the virus became available. The DRSi COVID-19 case report page includes questions about the patient’s date of symptom onset, date of diagnosis, location of diagnosis (the installation and/or MTF), laboratory test type and result, symptom status, hospitalization status (includes admission date, discharge date, and location of hospitalization), death status (includes death date), exposure history, travel history, and a comments section to capture any other relevant information. On January 19, 2021, questions pertaining to vaccination status and date of initial vaccination were added to the COVID-19 case report page.

Cases of COVID-19 are reported to the DRSi according to a DoD case definition, which has mirrored the national COVID-19 case definition as written by the U.S. Centers for Disease Control and Prevention (CDC). The earliest case definition was in effect from 1 February to April 6, 2020 to facilitate surveillance of patients under investigation for COVID-19. Following the availability of COVID-19 laboratory tests throughout the United States and within the MHS laboratories, the case definition was updated from April 7, 2020 to December 9, 2020, and then further refined on December 10, 2020 to match the CDC’s August 2020 case definition update. From April 7, 2020 to December 10, 2020, confirmed cases of COVID-19 included patients with a positive SARS-CoV-2 nucleic acid detected by a molecular amplification test. Probable cases of COVID-19 included patients with no confirmatory COVID-19 testing but who had symptoms consistent with COVID-19, no other more likely alternative diagnosis, and were epidemiologically linked to a confirmed case. Probable cases could alternatively include patients who had a positive antigen or antibody test and symptoms consistent with COVID-19 or were epidemiologically linked to a confirmed case. Patients whose death certificates listed COVID-19 as a cause of death but lacked confirmatory testing could also be counted as probable. On December 10, 2020, the DoD’s COVID-19 case definition removed positive antibody results as a determinant from the probable case definition.

During the study period, reports of SARS-CoV-2 reinfections were infrequent in the civilian population. Research and guidelines for reinfections are dynamic, but the CDC has suggested that adults who have recovered from SARS-CoV-2 infection, who become symptomatic after a 90-day period following initial infection, and for whom an alternative diagnosis has been ruled out should be evaluated for SARS-CoV-2 reinfection with consultation from an infectious disease expert. The members of the Army beneficiary population were considered reinfect ed if their initial and subsequent infections were sequenced, and a different variant of the virus was identified in both instances. Although some samples are randomly sequenced to identify new variants in this population, sequencing patient samples for both SARS-CoV-2 infections was not performed within the MHS during the surveillance period.

The purpose of this article is to document the extensive process of conducting surveillance of COVID-19 among the Army beneficiary population in the first year of the pandemic, from February 1, 2020 to February 28, 2021. Although multiple COVID-19 outbreaks have been described for the military population and the burden of COVID-19 among military members with comorbidities has been documented, the APHC’s surveillance methods utilized during the COVID-19 pandemic and a complete record of COVID-19 cases for the Army beneficiary population in the first year of the pandemic have not been published. Extensive efforts were established to respond to and validate the high number of COVID-19 cases reported in the Army beneficiary population to ensure that the Army’s surveillance system could track incidence of COVID-19 accurately and in near real time.

METHODS

Surveillance Methods and Sources
The APHC monitored the incidence of COVID-19 within the Army beneficiary population from February 1, 2020...
to February 28, 2021 by leveraging multiple data sources, including DRSi, DoD laboratory test results, Commanders’ Critical Incidence Reports (CCIRs), diagnosis and syndromic data from the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), reports from the CDC military liaison, and media reports (see Fig. 1). Per DoD policy, all COVID-19 cases in the Army beneficiary population were required to be recorded in the DRSi.\textsuperscript{13,25} Although the APHC is responsible for monitoring RMEs in the Army beneficiary population, the APHC maintained a COVID-19 DoD master list of cases for the entire military population for the Armed Forces Health Surveillance Division (AFHSD). The U.S. Air Force School of Aerospace Medicine provided the APHC with a weekly validated list of Air Force–reported cases, which were integrated into the APHC DoD master list and shared with AFHSD daily.

Ensuring that all confirmed and probable cases of COVID-19 were reported to the DRSi was the primary focus of leveraging multiple DoD data sources. Before the pandemic, the DRSi was well established across all Army installations with multiple points of contact at each location that were responsible for reporting cases. DRSi data are immediately available to view or download upon submission by the MTF. Each submitted case report was reviewed and validated daily or flagged for edits by a team of APHC epidemiologists. The validation process included a medical record review of the patient’s laboratory record, encounter notes, hospitalization notes (if applicable), and contact tracing notes (if digitized in the patient’s medical record) via the Armed Forces Health Longitudinal Technology Application or MHS GENESIS, the DoD’s electronic medical records systems. If any information from the medical record was missing or inaccurately recorded in the DRSi report, the report was then flagged in the DRSi for the original recorder to edit, or the edits were made directly to the report by APHC epidemiologists. If a patient was hospitalized, APHC epidemiologists reviewed the electronic medical records to validate the hospitalization and enter the admission and discharge dates and whether the patient recovered or expired. This information was then entered into the DRSi case report. The case was then flagged in the DRSi case report if not already provided by the reporter. Cases without documentation of positive laboratory results (e.g., drive-through testing) or cases misclassified as confirmed or probable that did not meet the case definition were re-classified as “Not a Case” in the DRSi and subsequently removed from the APHC’s COVID-19 master case list.

CCIRs are short summaries of individual cases and/or outbreaks of COVID-19 written by public health officers or other military points of contact at an installation and distributed to leadership via email as needed. Given that CCIRs are not validated against medical records and there was no specific direction on the type of information to include in a CCIR, information was often reported more quickly via CCIRs than through standard medical data systems. After receiving the CCIRs, APHC epidemiologists reviewed them and verified the provided information against the patient’s medical records. If the case met the COVID-19 case definition, it was reported to the DRSi. If the case did not meet the case definition, the CCIR was logged separately and a description of the missing information was included (e.g., patient demographics, laboratory results, etc.). The APHC did not receive CCIRs written by its Navy or Air Force counterparts.

Laboratory tests performed within the DoD are captured in the laboratory results database at APHC. The APHC receives this data daily for the purpose of identifying and validating SARS-CoV-2-positive laboratory results among Army beneficiaries, reporting results internally, and tracking DRSi reporting timeliness (i.e., how much time elapsed between the result date and the report date) and completeness (i.e., the percentage of laboratory-positive patients that were reported). To facilitate timely and complete reporting, installations are regularly notified of laboratory-positive COVID-19 patients that have not been reported to DRSi. Because of the significant increases in COVID-19 incidence in the United States and globally and the inability of some locations to sustain the reporting demand, the APHC maintained a substantial backlog of unreported SARS-CoV-2 laboratory-positive cases in July 2020-February 2021. The APHC contacted the MTFs with backlogged cases, and every effort was made to report them.

Over time, some data sources were found to be less reliable and were discontinued. ESSENCE data were initially included to supplement the DoD laboratory data and DRSi case reports but were later determined to be redundant and were subsequently discontinued. Additionally, media reports and reports from the CDC military liaison became less necessary as the DRSi data became increasingly more reliable over time.

Two methods were developed to identify and remove duplicate cases using SAS 9.4. The primary method involved creating a unique identifier consisting of a combination of the patient’s Social Security Number (SSN) and date of birth. Occasionally, errors in a case’s DRSi profile resulted in mismatching identifiers for the same case (e.g., an incorrect SSN was entered). These duplicate cases were identified by flagging repeated full names across records. Common reasons for which cases were removed included identical information submitted for the same case, a potential re-infection was indicated but was not confirmed via sequencing, or patient profile errors resulted in cases being submitted multiple times (e.g., two cases were submitted for the same patient, but one had an incorrect identifier). Patients who were reported more than once were subsequently reviewed and removed from the master list if sequencing was not performed or an infectious disease physician did not diagnose the patient as having been reinfected.

Outbreaks of COVID-19 were reported to the DRSi via the system’s outbreak reporting module. The module allows individual cases to be linked to an outbreak report and provides an outbreak summary, including how many cases were tested, how many tested positive, what symptoms
were experienced, and the outbreak investigation and mitigation efforts. The APHC did not provide a threshold for the number of COVID-19 cases necessary to define an outbreak, but instead encouraged installations to either report outbreaks they suspected had occurred within their population or report to the outbreak module if the public health team began responding to or investigating a potential outbreak at their installation. Additional outbreaks were reported through
CCIRs and communicated via email. The APHC requested that all outbreaks were reported to the DRSi; however, issues with identifying when outbreaks had occurred as opposed to community-wide increases as the pandemic intensified were difficult to ascertain. Additionally, in February 2020-August 2020, an emphasis was placed on reporting individual cases, not on reporting outbreaks, as a large backlog of individual laboratory-positive cases grew throughout the summer and into the fall. Reminders to report outbreaks did not occur until approximately September 2020, following improvements to the DRSi outbreak reporting module and a reduction in the number of backlogged cases.

Statistical Analysis
Descriptive analyses were performed using Microsoft Excel and SAS 9.4 to measure demographic frequencies. The incidence rates for specific populations were not calculated because of the dynamic nature of the Army beneficiary population and the mixture of non-Army beneficiaries (such as Navy or Air Force) within Army beneficiary populations at select installations. Additionally, the population of dependents is not captured in DoD databases.

The population included in the surveillance efforts comprises all current and retired Army SMs and their families, Department of the Army civilians, Army recruits and cadets, and Air Force or Navy SMs and their families who were tested or diagnosed at an Army installation. Army beneficiaries who were diagnosed or tested at non-Army installations may have been reported to the DRSi and tracked by the APHC but were not included in this analysis.

All data presented are from the DRSi following efforts as described above to capture the most precise case counts of COVID-19 within this population. Cases that were described in CCIRs and other data sources that did not meet the DoD’s COVID-19 case definition are not included in this analysis.

RESULTS
As of February 28, 2021, a total of 96,315 COVID-19 cases were reported to the DRSi by Army facilities and validated by the APHC. Of those cases, 95,429 (99%) were confirmed, and 886 (1%) were probable (Table 1). The proportion of Army beneficiaries with severe illness was low. In total, 2,271 (2.4%) individuals required hospitalization for their illness, and 269 (0.3%) died. Trends observed in the Army beneficiary population largely coincided with trends in the civilian population and the mixture of non-Army beneficiaries (such as Navy or Air Force) within Army beneficiary populations at select installations. Additionally, the population of dependents is not captured in DoD databases.

The majority of nonhospitalized confirmed cases were among males (n = 63,039, 67.9%) and individuals aged 18-29 (n = 48,718, 52.4%). Army recruits represented approximately 10% of all cases reported to the DRSi but were implicated in most of the outbreak reports submitted. This was expected given the high number of Army recruits and Army AC SMs that were routinely tested for COVID-19, and the frequent close contact among Army recruits throughout their training and within their living situations.

The highest proportion of hospitalizations was observed in the retiree population, whose members are older and whose exposures to the virus are likely similar to those of their counterparts in the civilian population (n = 766, 33.7%). The highest percentage of hospitalizations by age group was observed in the 50-64 year olds (n = 658, 29.0%). The CDC found this age group to be 25 times more likely to be hospitalized for COVID-19 compared to 5-17-year-olds.26 In contrast, individuals aged 65-85+ in the general U.S. population were between 35 and 80 times more likely to be hospitalized for COVID-19. Therefore, the increase in individuals aged 50-64 years that were reported as hospitalized in the Army surveillance data may in part be because of individuals in this age group who receive most of their care through the MHS as opposed to through their civilian healthcare provider or the Veterans Administration Health Care System. Although MTFs attempt to capture all COVID-19 cases among their population, many diagnoses and hospitalizations that occurred outside of the MHS were likely missed.

Installations in Texas reported the highest proportion of confirmed—not hospitalized cases (n = 19,246, 20.7%), confirmed—hospitalized cases (n = 1,037, 45.7%), and deaths (n = 137, 50.9%) as compared to installations reporting from other states. This outcome is in part because of the state’s having a higher number of large installations that were reporting cases to the DRSi, including Fort Bliss, Fort Hood, Joint Base San Antonio, and U.S. Army North (ARNORTH). Additionally, the Brooke Army Medical Center at Joint Base San Antonio and the William Beaumont Army Medical Center at Fort Bliss treated non-DoD civilian patients throughout the course of the surveillance period. These two hospitals accepted civilian patients because of the high demand for hospital beds at local, non-DoD hospitals throughout the surveillance period and periods of increased burden of COVID-19 throughout the state.

A total of 76 outbreak reports were submitted to the DRSi from 14 installations. One outbreak report was excluded because of incompleteness, leaving a total of 75 outbreak reports from 14 installations. On average, outbreaks affected 30 individuals (range 2-167; median 20; SD = 33.7) (data not shown).

As of March 1, 2021, a total of 3,899 CCIRs had been received from 37 installations; 1,310 (33%) of these reports were validated and reported to the DRSi. Over one-third of the CCIRs received could not be validated or did not meet the COVID-19 surveillance case definition (n = 1,457, 37%). The remaining 1,132 (29%) CCIRs detailed laboratory test and healthcare supply availability or other local COVID-19-related concerns. Of the 35 outbreaks reported through CCIRs, 7 were also reported to the DRSi. Outbreaks reported via CCIRs most often affected recruits
### TABLE I. COVID-19 Status Among Reported Army Beneficiaries from 1 February 2020 to 28 February 2021

|                         | Confirmed—not hospitalized | Confirmed—hospitalized | Probable | Death |
|-------------------------|----------------------------|------------------------|----------|--------|
|                         | \( n \)                   | \( \% \)                | \( n \)  | \( \% \) |
| **Total**               | 92,889                    | 96.4                   | 2,271    | 2.4    |
| **Gender**             |                            |                        |          |        |
| Male                    | 63,039                    | 67.9                   | 1,435    | 63.2   |
| Female                  | 29,850                    | 32.1                   | 836      | 36.8   |
| **Age group**           |                            |                        |          |        |
| 0-4                     | 1,446                     | 1.6                    | 17       | 0.7    |
| 5-17                    | 5,352                     | 5.8                    | 13       | 0.6    |
| 18-29                   | 48,718                    | 52.4                   | 250      | 11.0   |
| 30-39                   | 17,419                    | 18.8                   | 225      | 9.9    |
| 40-49                   | 9,353                     | 10.1                   | 248      | 10.9   |
| 50-64                   | 8,515                     | 9.2                    | 658      | 29.0   |
| 65-74                   | 1,558                     | 1.7                    | 438      | 19.3   |
| 75-84                   | 401                       | 0.4                    | 266      | 11.7   |
| 85+                     | 127                       | 0.1                    | 156      | 6.9    |
| **Military status**    |                            |                        |          |        |
| Active component        | 46,756                    | 50.3                   | 314      | 13.8   |
| Recruits                | 10,293                    | 11.1                   | 26       | 1.1    |
| Cadets                  | 587                       | 0.6                    | 1        | 0.0    |
| National Guard          | 2,884                     | 3.1                    | 20       | 0.9    |
| Reserves                | 1,867                     | 2.0                    | 18       | 0.8    |
| Dependents              | 21,448                    | 23.1                   | 673      | 29.6   |
| Retirees                | 5,220                     | 5.6                    | 766      | 33.7   |
| Other                   | 3,834                     | 4.1                    | 453      | 19.9   |
| **Service**            |                            |                        |          |        |
| Army                    | 80,115                    | 86.2                   | 1,362    | 60.0   |
| Other services          | 12,774                    | 13.8                   | 909      | 40.0   |
| **Installation state** |                            |                        |          |        |
| Alaska                  | 1,184                     | 1.3                    | 5        | 0.2    |
| Alabama                 | 875                       | 0.9                    | 7        | 0.3    |
| Arizona                 | 600                       | 0.6                    | 2        | 0.1    |
| California              | 896                       | 1.0                    | 6        | 0.3    |
| Colorado                | 4,108                     | 4.4                    | 102      | 4.5    |
| Connecticut             | 13                        | 0.0                    | 0        | 0.0    |
| Washington, DC          | 42                        | 0.0                    | 0        | 0.0    |
| Florida                 | 129                       | 0.1                    | 0        | 0.0    |
| Georgia                 | 11,998                    | 12.9                   | 234      | 10.3   |
| Hawaii                  | 930                       | 1.0                    | 41       | 1.8    |
| Illinois                | 3                         | 0.0                    | 0        | 0.0    |
| Kansas                  | 2,382                     | 2.6                    | 18       | 0.8    |
| Kentucky                | 6,487                     | 7.0                    | 77       | 3.4    |
| Louisiana               | 1,012                     | 1.1                    | 13       | 0.6    |
| Maryland                | 3,046                     | 3.3                    | 163      | 7.2    |
| Missouri                | 5,804                     | 6.2                    | 77       | 3.4    |
| Mississippi             | 1                         | 0.0                    | 0        | 0.0    |
| North Carolina          | 8,066                     | 8.7                    | 159      | 7.0    |
| New Jersey              | 1                         | 0.0                    | 0        | 0.0    |
| New Mexico              | 79                        | 0.1                    | 0        | 0.0    |
| New York                | 1,777                     | 1.9                    | 11       | 0.5    |
| Oklahoma                | 3,728                     | 4.0                    | 19       | 0.8    |
| Pennsylvania            | 411                       | 0.4                    | 11       | 0.5    |
| Puerto Rico             | 119                       | 0.1                    | 4        | 0.2    |
| South Carolina          | 5,443                     | 5.9                    | 11       | 0.5    |
| Texas                   | 19,246                    | 20.7                   | 1,037    | 45.7   |
| Virginia                | 4,943                     | 5.3                    | 109      | 4.8    |
| Washington              | 3,677                     | 4.0                    | 88       | 3.9    |
| Outside of the United States | 5,889 | 6.3 | 77 | 3.4 |
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FIGURE 2. Reported COVID-19 cases and seven day average among Army beneficiaries from 1 February 2020 to 28 February 2021.

(822 cases, 51.1%) and involved 46 cases on average (range 3-166; median 33; SD = 41.8) (data not shown).

During the surveillance period, a total of 1,326,333 laboratory tests were performed, of which 102,046 (7.69%) were positive. On average, the rate of positive results per month among the global Army beneficiary population was 6.39% (range: 3.21%-13.14%). From February 1, 2020-February 28, 2021, the APHC COVID-19 surveillance team contacted installations about 10,358 positive laboratory results that were not reported to the DRSi. Without this effort, approximately 11% of COVID-19 cases could have been missed in the surveillance system. The largest backlog of unreported cases—6,881—occurred on January 25, 2021. Holiday block leave schedules may have contributed to this number, as nearly half of the unreported cases were attributed to recruits, cadets, and Active Duty SMs across training sites (n = 3,284, 48%).

From February 1, 2020-February 28, 2021, a total of 882 duplicate cases were identified; these constituted less than 1% of all reported cases. On average, approximately 80 duplicate cases were reported per month (SD = 66) and subsequently removed from the APHC COVID-19 master list.

DISCUSSION

Surveillance of COVID-19 cases within the Army beneficiary population was a complicated endeavor because of a number of contributing factors, such as reporting cases from both DoD and civilian entities, a dynamic population whose missions may have conflicted with public health mitigation recommendations, and access to health care within and outside of the MHS. Moreover, leadership and public health officials needed real-time case updates, which required timely reporting and accurate information. Although reporting through DRSi helped with this initiative, competing reporting requirements of state and local public health departments, along with inadequate resourcing at every MTF, hampered COVID-19 reporting. Additionally, service differences among the reporting processes may have impeded COVID-19 data completeness for case capture and made direct comparisons between services impossible. Despite these factors, the APHC was able to maintain a reporting system that balanced timely reporting of the Army’s surveillance data, validation of cases, and case capture.

The APHC’s surveillance methods required daily monitoring from nine full-time epidemiologists and a supervisory epidemiologist. The SARS-CoV-2 pandemic stressed the Center’s surveillance and reporting capabilities, but through a unique blend of identifying and validating cases, surveillance of COVID-19 was accurate and reliable to help Army leadership make informed decisions throughout the first year of the pandemic. The process required daily maintenance and updates to ensure that all cases were reported and that the data in the DRSi were reliable. Before the COVID-19 pandemic, one to two epidemiologists were responsible for reviewing and validating the RME case reports submitted to the DRSi on a daily basis. On average, approximately 20,500 RMEs were reported to the Army’s DRSi per year from 2011 to 2019. In 2020, over 80,000 cases were reported to the system, representing an approximate 230% increase in reported cases (Fig. 3). The APHC required additional help with this increased burden and borrowed assistance from multiple APHC epidemiologists whose expertise was in injury epidemiology or behavioral health.

At Army installations, COVID-19 cases were reported to the DRSi by Army Public Health Nurses, epidemiology technicians, and other public health professionals. Because of the pandemic and the requirement to report all cases of
COVID-19 to the DRSi, the number of DRSi users increased significantly. From February 2020 to February 2021, a 309% increase in the number of new DRSi users was documented as compared to the average number of new users in the previous 5 years. To ensure that all cases were reported accurately and all new users received the same type of training, epidemiologists at the APHC provided weekly training sessions that were required for all new users. This training included a 30-minute online presentation by APHC epidemiologists and allowed time for questions and answers. Approximately 265 DRSi users received this training from March 25, 2020 to November 4, 2020. In November 2020, an online training program that provides a certificate of completion was developed for all subsequent new users. From November 9, 2020 to February 28, 2021, a total of 193 students completed the online course and were then granted access to the DRSi. This online program ensured that all individuals that utilized the system received standardized training from DRSi subject matter experts.

The gaps in disease surveillance as discussed by Ambrose et al.11 existed across Army installations leading into and persisting during the COVID-19 pandemic. High turnover as well as resource and staffing constraints significantly impacted the ability of Army MTFs to report cases within 2 business days per Army policy.10 A lack of manpower significantly contributed to issues in reporting timeliness for a number of installations, as demonstrated by the backlog of unreported cases. Further, the complexity of available data from different systems, some of which had limited accessibility, contributed to reporting completeness for COVID-19 and other reportable conditions. Future studies could evaluate the impact of COVID-19 on the completeness of reporting other RMEs among the military population to both the DRSi and the local public health departments.

Reliable, accurate, near real-time surveillance systems were expected to be widely available throughout the COVID-19 pandemic, both outside of the MHS and within it. However, the expertise, training, access to resources and staff, and data availability must first be established before such a surveillance system can exist. The efforts described herein required sacrifices to other surveillance and public health efforts at the APHC and are therefore unlikely to be permanent once the COVID-19 pandemic has ended. Yet the COVID-19 pandemic has established the need for a more robust public health enterprise with a focus on data collection, validation, and analysis, so leaders can always make informed decisions that may impact the health of the Army.

In the next pandemic, service public health enterprises must attempt to standardize the surveillance processes between services. Improvements to the communication between departments, installations, and public health enterprises should be developed. Before and throughout the COVID-19 pandemic, the services’ surveillance efforts varied, with different sources utilized and different data validation techniques incorporated. Further, attempts to simplify the data reporting process is crucial for the future success of these surveillance systems. A more rigid data collection, data management, and reporting process must be implemented before the next pandemic and utilized regularly across all services. Implementing these updates and changes to the DoD’s surveillance system could effectively mitigate the spread of new infectious diseases in the next pandemic.

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None declared.
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