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Responding to COVID-19 in Long-Term Care: A Public Health Nursing Approach

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Abstract

COVID-19 disproportionately impacts older adults and those with underlying medical conditions; advanced age, physical frailty, and medical comorbidities place them at particularly high risk for adverse consequences of COVID-19. Patients living in congregate long-term care settings are also at substantial risk of transmission due to a combination of medical, social, and environmental vulnerabilities. They require close and prolonged contact with caregivers who assist with activities of daily living. Many suffer from cognitive impairments that interfere with universal masking and social distancing. Moreover, healthcare staff in these settings are likely to be low-wage workers, new immigrants, with limited English proficiency and health literacy. They are more likely to live in overcrowded settings and work several jobs across multiple facilities. All of these resident and staff level factors combine to potentiate the risk of infection in these settings. Alameda County Public Health Department, in its efforts to prevent, contain, and mitigate the spread of COVID-19 in these challenging environments, established a COVID-19 Long-Term Care Facility (LTCF) Outbreak Team comprised of public health nurses drawn from across the public health workforce. Applying a public health framework, these LTCF Outbreak Nurse Investigators worked intensively with a wide variety of high risk long-term care settings to implement effective mitigation and early intervention strategies in order to prevent the most consequences of COVID-19.Responding to COVID-19 in Long-Term Care

Background

Since early in the pandemic, the risk for transmission of COVID-19 among residents and staff of long-term care facilities (LTCF) has been recognized. The first outbreak of COVID-19 reported in the United States occurred in a skilled nursing facility in Kirkland WA in March 2020. The first Alameda County outbreak was reported in a LTCF on March 24th, followed by a second large outbreak on April 1. In response, a LTCF Outbreak Task Force was convened. A three-part plan established an Outreach Team to focus on prevention and anticipatory guidance, an Outbreak Team to focus on containment and mitigation of active outbreaks, and a LTC Partnership to harness the resources and support of hospitals and healthcare system partners [1,2].

Between March 24 and August 31, 2020 a total of 164 outbreaks were reported in Alameda County long-term care facilities. Outbreaks in these facilities accounted for 2034 cases and 145 deaths. Due to the rapid escalation of outbreaks, the LTCF Task Force focused heavily on outbreak response. This paper highlights the work of our LTCF Outbreak Team of public health nurses.

Staffing

PHNs: 9 Outbreak Nurse Investigators, 1 Intake Nurse, 1 Lead Nurse, 1 Nurse Manager/LTCF Outbreak Task Force Lead.Nurses were drawn from across the public health workforce and had little experience with communicable disease response and no of experience working in long-term care. Nurses primarily came from case management, child welfare, and maternal/child health units. Administrative support: 1.5 administrators and 3 data entry staff Early in LTCF outbreak mitigation efforts, the LTCF Outbreak Team, guided by the Task Force Leader, was given substantial latitude to develop a comprehensive disease control and prevention response based on 1) established Acute Communicable Disease unit protocols for non-pandemic scenarios, 2) existing evidence, and 3) published guidance out of Centers for Disease Control and Prevention (CDC) and the California Department of Public Health (CDPH). In early April, much about COVID-19 was still unknown. Asymptomatic and presymptomatic transmission was, as yet, unconfirmed. Personal Protective Equipment (PPE) was in limited supply. Testing was, for the most part, unavailable.

The situation required the Team to apply strategies based on available evidence with the flexibility to pivot weekly and sometimes daily based on new developments and abrupt changes in guidance. It required "design thinking" approaches that involved prototyping protocols and workflows, then redesigning as needed. It required learning quickly and moving on. The work demanded a measure of leadership and shared governance by all Team members. Frontline nurses actively participated in building the structures of an effective pandemic response, modifying practices as the science evolved, rethinking our scope and reach to make limited resources go farther. It required teamwork, ingenuity, open lines of communication, long hours, persistence, and dedication. What emerged was a team of nurse leaders and an effective, adaptive model for outbreak investigations in high risk or congregate settings.

Facilities

The Alameda County LTCF Outbreak Team followed outbreaks in a variety of care settings. The facilities included skilled nursing facilities (SNF), assisted living facilities, licensed board and care homes, Intermediate Care Facilities for the Developmentally Delayed (ICF/DD), Mental Health Rehabilitation Centers (MHRC), and a Long-term Acute Care Hospital (LTACH). The facilities varied by licensing agency, resident population, size, and staffing. The social model programs (assisted-living, board and care homes, MHRC) rarely had access to licensed medical personnel and only minimal knowledge of disease transmission or infection control principles. Some facilities were very large with hundreds of residents and others were small, intimate settings with only 4 to 6 residents. The variety of settings posed daunting challenges to effective management and required a flexible and adaptable model for public health nursing support and interventions.

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Definition

Alameda County Public Health Department elected to set triggers for outbreak investigation lower than those of California Department of Public Health. Outbreak investigations were launched for reports of any confirmed COVID-19 (+) results in either residents or staff or suspected outbreaks of two or more residents and/or staff with symptoms consistent with COVID-19 developed within 72 hours. This decision was initially made by the Department's Acute Communicable Disease unit at a time when community transmission of COVID-19 was still low and LTCF Outbreaks increasing at slower rates. Eventually, as new outbreaks increased, the Team deliberated about increasing thresholds for outbreak investigation but collectively elected to continue with narrower triggers for early response. 25 to 30% of initial reports involved only one COVID-19 (+) healthcare worker. The Team found that these facilities benefited from early aggressive intervention with testing, rigorous infection control, immediate work exclusion of COVID-19 (+) staff, and cohorting of residents.

Model

ACPHD Acute Communicable Disease unit, largely staffed by public health nurses, takes a supportive stance when responding to infectious disease outbreaks in LTCF residents and staff. The LTCF Outbreak Team, likewise, followed a non-punitive approach, partnering with facilities that were struggling to contain and mitigate outbreaks of COVID-19 under extraordinarily stressful circumstances. This type of approach was critical to gaining the trust and cooperation of facilities and encouraged smooth, open channels of communication.

Per CDPH case and outbreak definitions, facilities were required to report a single case or cluster of suspected cases of COVID-19 in residents or staff. These reports were taken by the LTCF Intake Nurse who performed initial intake assessment to determine if the report constituted an LTCF Outbreak. Assessment included: number of confirmed or suspected cases, nature of symptoms, approximate infectious period, last date of work, census, level of preparation and knowledge.

Once an outbreak was confirmed, an LTCF Outbreak Nurse Investigator was assigned to the facility and expected to make contact with the facility point-of-contact (POC) by close of business or, if reported after 3 PM, by the following noon.

The assigned Outbreak Nurse Investigator completed an initial investigation and directed each facility to all relevant guidance from CDC, CDPH and Alameda County. The nurses reviewed the Alameda County Public Health Department Outbreak Control Recommendations with point by point instructions for intervention. Over the course of the outbreak, the nurses worked with the facility POCs to ensure the following:

Isolation of affected residents

Work exclusion for affected staff

Plan for facility wide testing

Coordination of testing resources

Review of floor map and instructions for isolation and cohorting/quarantine

Introduction of line lists

Requirements for notification and signage

Recommended infection control practices, training, and monitoring

Recommended environmental controls

Education on transmission-based precautions including PPE use for standard, contingency, and crisis scenarios

Education on active clinical monitoring for atypical signs and symptoms of COVID-19 in a population of frail elders

Education and reinforcement of close monitoring for signs and symptoms of clinical deterioration from COVID-19

Instructed facilities to complete confidential morbidity reports for all COVID-19 (+) residents for State and County data tracking purposes

Reviewed PPE burn rate calculator and offered referrals for resource requests through regional supply system

Assessment of staffing needs, guidance on proactive planning for absences, and referrals for urgent staffing requests

Ordered facility closure to new admissions if appropriate

Guided clearance from transmission-based precautions and resident movement between cohorted facility areas Outbreak Nurse Investigators interacted with their facility POCs each weekday. These contacts primarily occurred by telephone; materials were shared by encrypted email. Demands on the nurses' time were heavy, particularly at the outset and whenever test results were received.

Large numbers of positive results precipitated staffing crises and posed significant challenges to effective cohorting of residents and their care. Nurses poured over floor maps and test results with administrators to recommend sound cohorting strategies and to identify clusters that might indicate lapses in infection control practices. Nurses also spent hours following up on resource requests, coordinating testing resources, analyzing and rectifying line lists. These line lists were a key tool for tracking data on residents and staff who tested positive or developed symptoms of COVID-19 and included demographic information, symptomology, hospitalizations, and deaths; they allowed nurses to accurately calculate COVID-19 attack rates, determine epi-linkages, and analyze epicurves to further guide outbreak response efforts.

Outbreaks were coded according to acuity, a dynamic measure which changed as the outbreak proceeded. High acuity outbreaks could include new reports, high attack rates, low facility knowledge, non-compliance, staffing and/or testing challenges. As the outbreaks began to resolve, acuity levels generally diminished until the period of surveillance ended and the outbreak could be closed. High acuity outbreaks frequently occurred in a bimodal pattern:

Large numbers of COVID-19 (+) residents and staff were identified in the first several rounds of testing with very high attack rates upward of 80%. In these facilities, nurses advised close clinical monitoring and helped to navigate staffing crises.

In other outbreaks, attack rates were relatively low but positive cases continued to be detected week after week of serial response driven testing. In these outbreaks, identifying and addressing infection control lapses was the highest priority.

Outbreaks were initially followed until no changes to the line list (no new confirmed or suspected cases) for two incubation periods or 28 days. As the pandemic proceeded, the pace of new outbreaks increased, and as staff resources were stretched, this surveillance period was decreased to two consecutive rounds of response driven testing yielding no further positive results AND a minimum of 14 days since first case was detected.

Resources

LTCF Outbreak Team drew from a variety of resources to inform prevention, containment, and mitigation efforts. ACPHD posted its own guidance and links to key CDPH All Facility Letters (AFLs) and CDC guidance on its webpage. Nurses developed then followed ACPHDs "Suspected or Confirmed COVID-19 Outbreak Control Recommendations". The Team also worked closely with CDPH's Healthcare Associated Infections (HAI) Program for onsite assessments and telephonic consultations. Due to extremely heavy caseloads, the LTCF Outbreak Nurse Investigators were not consistently able to perform site visits to assess cohorting strategies and infection control practices. Though resources were limited, the HAI Program was able to send trained infection preventionists to Alameda County to complete onsite assessments and make recommendations 3-4 days per month. These visits proved to be invaluable for identifying problematic practices or high-risk situations that would otherwise have gone undetected if relying solely on telephonic contact.

Partnerships

The LTCF Outbreak Team benefited from strong partnerships with CDPH Licensing & Certification and California Department of Social Services Community Care Licensing Division (CCLD). The Team worked hard to establish relationships within the regional offices and were able to leverage relationships with surveyors assigned to these facilities to support compliance with infection control and testing recommendations and to more effectively communicate ACPHD guidance. Nurses were able to flag concerns about noncompliance with recommended COVID-19 containment efforts and work with licensing agencies to support more effective intervention.

LTCF Outbreak Team also worked closely with our MHOAC and Emergency Operations Center to coordinate deployment of emergency personnel during staffing crises. We worked with our Medical Reserve Corps to deploy swabbing teams and with our Public Health Laboratory for prompt testing of priority samples. Finally, we were in the early stages of a collaboraton with the Office of the LTC Ombudsman to develop trainings for frontline workers at social model facilities.

Data

Data collection was a critical priority from the outset. The LTCF Outbreak team developed a comprehensive spreadsheet that included key data points for tracking outbreaks. This information was updated daily based on Daily Outbreak Reports completed by nurses for each of their facilities. This Outbreak Dashboard allowed the Team to record and track both quantitative and qualitative elements of outbreaks. It also allowed sharing of information with the after- hours Duty Officers, our licensing partners, epidemiology unit, and LTC partner group.

The LTCF Outbreak data team was also responsible for entering Alameda County LTCF data into the California CalREDIE system. Individual cases had to be linked to outbreaks and extensive epidemiological data entered upon outbreak closure. The data team was also tasked to enter COVID-19 (+) LTCF work exclusion requests into our Disease Containment database.

As the pandemic proceeded and data entry became more onerous, Alameda County joined California's new CalConnect pilot to test and develop a statewide database for case investigation and contact tracing. An ACPHD LTCF Outbreak Nurse Investigator played a major role in guiding the buildout of the CalConnect data platform to include relevant and user-friendly outbreak functions that would improve efficiency and avoid duplication.

Challenges

There were seemingly endless challenges involved in building a comprehensive COVID-19 response in these high-risk long-term care environments. As mentioned, nurses were drawn from across the Department with little expertise in outbreak response. Nurses learned the subject matter quickly by absorbing enormous amounts of new and ever-changing information, listening carefully to the concerns of facility staff, participating in State sponsored infection control calls, studying CDC and CDPH guidance, researching the latest literature, and utilizing all available resources. Challenges can be categorized as internal to the LTCF Outbreak Team and external to the LTCF environment. A summary of the most daunting challenges included.

LTCF Outbreak Team Level

1.The caseloads of the Outbreak Nurse Investigators were unacceptably high and became unmanageable as the pace of new outbreak reports and the acuity of outbreaks began to overwhelm staffing resources. A manageable caseload was calculated to be 4.5-5 outbreaks per nurse. By the end of August, the LTCF Outbreak Team was managing a caseload of 76 outbreaks involving 1178 confirmed cases. This translated into assignments of 8-10 facilities per full-time, experienced nurse.

2.Training and precepting was a time-consuming but necessary element of the work. In order to relieve heavy caseloads and provide reinforcements, it was necessary to identify additional nurses across the department and from outside registries to step in and join the Team. Public health outbreak investigation requires a unique skill set and demands study, practice, and experience. Nurses assigned to the team from an outside registry generally did not have public health experience and training involved precepting inexperienced nurses in the principles and practice of public health nursing. New trainees required didactic training, orientation to workflows, and were assigned to shadow multiple phone calls and meetings until they were prepared to co-manage outbreaks with more experienced nurses. A new trainee was equipped to handle a full caseload only after 6 weeks of intensive precepting.

3.Limited on-site capacity detracted from the Outbreak Nurse Investigators' ability to accurately assess a facility's compliance with recommended infection control practices. At times the nurses were able to accompany CDPH Healthcare Associated Infections Program infection preventionists for on-site assessments. These were invaluable opportunities that allowed Outbreak Nurse Investigators to visit the facility, improve communications with their POCs, communicate a sense of partnership, see firsthand the layout of the facility, and observe patient care and infection control practices.

4.Testing coordination required an inordinate amount of time. Navigating an extremely resource limited environment, nurses worked to locate and arrange testing as fast and efficiently as possible but this was time-consuming and often not productive. A more effective approach would have been to offload this responsibility to unlicensed staff to perform linkage, referral, and coordination.

5.Prevention efforts were impeded by the pace and volume of new LTCF outbreaks and by the sheer breadth of resources required to launch and sustain the pandemic response. Medical Reserve Core volunteers who were originally tasked to perform LTCF outbreak prevention and outreach were diverted to other areas of the response and the focus quickly moved from outreach to outbreak. As result there was always the feeling of "chasing our tails": without aggressive prevention, the number of outbreaks continued to climb.

Facility Level

1.Diversity of LTCF settings. Most outbreaks occurred in skilled nursing facilities with licensed staff, laboratory contracts, a medical director, and some familiarity with infection control. But a sizable number of outbreaks occurred in nonmedical facilities with limited training in infection control or experience with PPE and essentially no access to laboratories or testing services. Additionally, small, intimate settings posed serious challenges to effective isolation and cohorting.

2.High anxiety/stress environments: due to fear and knowledge deficits, reports of COVID- 19 (+) residents or staff sometimes precipitated staffing crises (particularly in the early stages of the pandemic). Facility leadership was under under enormous pressure trying to cover basic staffing needs while implementing enhanced infection control measures, attempting to follow new and challenging guidance and to comply with local, state, and federal reporting requirements.

3.Residents in these facilities were extremely vulnerable due to medical fragility, functional impairments, and prevalence of psychiatric or cognitive comorbidities. Many of these facilities contended with behavioral challenges that prevented effective implementation of universal masking, social distancing and infection control protocols. Transmission was extremely difficult to control in memory care and mental health facilities where attack rates were often very high.

4.Staff in Alameda County LTCF were low-wage workers, often new immigrant with limited English proficiency and/or low health literacy. These workers came from communities hardest hit by COVID-19. They often lived in overcrowded housing and worked several jobs across multiple facilities. Moreover, they could not afford lost wages and sometimes worked while sick. Symptom onset reported to case investigators was often much earlier than that listed on a facility line list. Employers also had vested interest in maintaining staffing and discouraging absenteeism. All of these factors combined to create a very unsafe situation ripe for disease transmission.

5.Facility staff were challenged to follow complex and frequently changing guidance. For facility staff with low health literacy, proper use of PPE was a challenge particularly when complicated by instructions for reuse and extended use. Lack of leadership or expertise in infection control challenged effective performance of the continuous monitoring necessary to maintain strict compliance with infection control practices.

6.Healthcare system challenges were numerous. COVID-19 (+) dialysis patients were routed to a different County for dialysis treatments, necessitating long and exhausting medical transport multiple days per week. It was particularly stressful for the health professionals at these sites when patients declined to continue with dialysis in the face of these challenges. Furthermore, frequently nonemergency medical transport companies declined to serve residents at facilities with an active COVID-19 outbreak or charged additional costs to the facility.

7.Facility layouts in older facilities often created barriers to effective cohorting. As the pandemic evolved, guidance around cohorting became more complex with recommendations for three and sometimes even four separately cohorted areas for COVID-19 (+), COVID-19 (-), and "observation" units for residents with undetermined status.

8.Coordination of testing posed perhaps the biggest challenge for Outbreak Nurse Investigators as well as for facility administrators. In Alameda County, testing resources that met the needs of LTCF were extremely limited between April and August 2020. Challenges varied according to facility type and size of outbreak. Nonmedical facilities (assisted-living, board and care homes) often had no access to licensed medical personnel qualified to perform swabbing. Even skilled nursing facilities struggled with swabbing capacity due to staffing and PPE shortages as well as the need to consolidate testing over 1-2 days. Early in the pandemic, facilities with lab contracts found that their laboratories could only process a small number of tests at a time. As capacity grew the challenges changed. Supplies were, at times, scarce and turnaround times unacceptably long. Even by the end of August turnaround times routinely exceeded 72 hours, limiting the utility of mass testing efforts. For non-medical facilities (assisted- living, board and care) mobile testing was extremely scarce. The County Medical Reserve Corps of volunteers provided swabbing but were not initially able to act as an ordering provider. Administrators were challenged to contact individual primary care providers and family members to gather orders and consents before testing could proceed. For response driven testing to truly make a difference it should have proceeded within hours of the first report of a COVID-19 (+) resident or staff. Instead these facilities were attempting to contain outbreaks by relying primarily on active monitoring and infection control measures in the absence of rapid and effective testing.

9.Support from the broader healthcare system was generally lacking. As previously mentioned, Alameda County's LTCF COVID-19 Outbreak Task Force included an LTC Partnership which aimed to leverage the resources of acute care hospitals and other healthcare system partners to support long-term care facilities. Preventing and containing outbreaks in long-term care is critical to ensuring capacity and flow across the entire continuum of care particularly in the event of hospital surge when LTCFs must be available to accept discharges of COVID-19 recovering patients who no longer require hospitalization. Unfortunately, the LTC Partnership's success at harnessing additional healthcare system resources was modest. A few of the hospital systems did provide PPE and limited training for their directly contracted area facilities but were unable to provide staffing or more substantial assistance.

10.Since maintaining a COVID-19 (+) unit involved a significant strain on resources, facilities were reluctant to accept COVID-recovering patients. Contrary to ACPHD guidance, they frequently required a test-based strategy for accepting hospital discharges. Reluctance to being classified as an outbreak facility and distrust of changing recommendations created powerful obstacles to more functional patterns of patient flow from acute to long-term care. The LTCF Outbreak Team was frequently called upon to intervene with facilities who were unwilling to accept new or readmissions.

11.Defunding the public health system over decades (needs to be expanded…)

12.Warehousing low income older adults in substandard facilities fueled by a for-profit healthcare system (needs to be expanded…)

Recommendations

Adequate staffing

The LTCF Outbreak Team struggled with a constantly increasing number of outbreaks and insufficient numbers of nurses. A more sustainable model would staff one Outbreak Nurse Investigator per 4.5 outbreaks, one Team Lead for every 8 frontline nurses, and two dedicated public health nursing supervisors. Additionally, a dedicated Task Force Director with intimate knowledge of LTCF Outbreak Team operations should provide strategic planning and develop policies and protocols to better support LTCF outbreak response. Devising data collection practices to document the work and efficacy of the LTCF Outbreak Team is essential to ensuring adequate staffing.

On-site PHN visits

Outbreak Nurse Investigators would routinely perform at least one site visit in the course of outbreak response and surveillance. An initial assessment to guide ongoing intervention would focus nursing interventions on problematic practices unique to an outbreak or facility. Site visits also improve communication, promote relationship and teambuilding and reinforce the public health department's role as a supporter rather than an enforcer. Site visits are time-consuming, however, and would necessitate an expansion of the PHN workforce and reduction in overall caseloads.

Public Health Department infection preventionists

Public Health Departments should directly employee infection preventionists with capacity to perform recurrent on-site facility assessments, confirm compliance with recommended guidance, and provide ongoing auditing and monitoring. These IP's would provide training to clinical leadership and implement immediate corrective actions when infection control lapses are identified. In-house infection preventionists would also serve to extend the reach of telephone-based Outbreak Nurse Investigators, acting as the on-site arm of the public health nursing team.

Prevention

As noted, LTCF Outbreak Task Force included a branch that initially was intended to provide anticipatory guidance and prevention. Our Outreach Team relied on the support of volunteers who made phone calls to all LTCF to review County guidance and alert facilities to available resources. However, because the Task Force was established just as the number of reported outbreaks escalated, resources were almost immediately diverted from outreach to outbreak response. Going forward, a dedicated and stable team of trained outreach workers should be deployed to provide preventive guidance and ensure adequate preparation. This team should have capacity to make site visits and should be trained to perform infection control assessments, provide recommendations, and follow-up to ensure implementation. The Outreach Team would sponsor regular All Facility calls to review guidance, communicate updates, provide targeted education and information through webinar trainings and guest speakers. The Outreach Team could be led by a public health nurse with expertise in infection prevention and control and staffed by LVNs, community health outreach workers, and health educators.

Specialized teams

The LTCF Outbreak Team responded to outbreaks in a wide variety of high risk congregate care settings. As noted, there were tremendous variations in facility size, resident population, staffing, degree of preparation, and experience. The Team found that non-medical facilities who lacked licensed staff and basic knowledge of infection control required enormous amounts guidance, education, and testing support. Ideally, LTCF outbreak would be organized into separate teams assigned by facility type and licensing agency so that the Outbreak Nurse Investigator teams could develop specialized knowledge for more targeted response.

Testing

Until widespread unsupervised self swabbing becomes a reality, full-service mobile testing should be funded and ready to deploy to all LTCF for screening and response-driven testing. Directing samples across a network of laboratories will ensure adequate capacity, avoidance of backlogs, and maintenance of acceptable turnaround times. In this way, "assurance testing" can be accomplished within tight time frames and results can be received and shared with public health in in a reliable, timely fashion. As aggressive CMS screening requirements are implemented, simplicity and efficiency will become even more critical. Under CMS rules, facilities may be required to test all healthcare workers up to twice weekly. With new technology evolving quickly, options will expand. Though currently point-of-care rapid antigen tests have lower sensitivities, ease of use will allow frequent testing and immediate work exclusion of COVID-19 (+) workers.

Ultimately, it is absolutely necessary that prevention move further "upstream", that testing be made universally available and that aggressive contact tracing occur. Such approaches will reduce background community transmission, leading to fewer LTCF staff infections, minimizing transmission to residents, and driving down the need for reactive or response driven testing. Addressing the need for universal assurance testing and following up with prompt contact tracing will ultimately offload LTCF outbreak response by reducing the number and size of outbreaks and allowing our LTCF work to shift its focus from reaction to prevention.

Testing-creating a public option

In order to achieve universally accessible assurance testing, we must commit to funding a public testing option. Access to testing would be assured regardless of insurance status. Many LTCF (and other low wage, essential) workers are un- or under-insured, employed part time or simply unable to afford steep payroll deductions for insurance premiums. As a result, it is imperative that testing is subsidized and that blanket standing orders are issued by public health officials so that logistical barriers to testing are removed.

Hotels for worker isolation and quarantine

LTCF workers must have access to safe, supported housing in order to isolate away from household and community contacts. Even COVID-19 (-) workers in the midst of an outbreak should have the option to maintain distance from others in the household through supportive housing.

Staff pay

Hazard pay" should be implemented for LTCF workers providing direct patient care during a COVID-19 outbreak. This will reduce staff absenteeism and prevent staffing crises. Even more importantly, LTCF staff pay should be raised to a living wage. Direct care staff could then afford to work in a single facility reducing the risk of disease transmission across multiple facilities. Paid sick leave is essential in order to ensure that workers with suspected or confirmed COVID-19 (or close contacts to COVID-19 patients) can appropriately isolate or quarantine.

Continuum of care

As mentioned, efforts to leverage broader healthcare system resources had limited success. Alameda County, not unlike much of the American healthcare landscape, is stymied by the discontinuity between public health and the broader healthcare delivery system. In 2019, an average of $11,600 per American was spent on healthcare delivery compared to just $56 per American on funding of state and local health departments [3,4]. The COVID-19 pandemic has spotlighted this lack of integration between public health and medical care. Public health approaches such as masking, social distancing, and infection control must occur on a continuum alongside lifesaving medical treatments, testing technologies, and medications.

Our currented fragmented approach to pandemic response has particularly dire consequences in long-term care which serves some of our most vulnerable older adults and employs some of our lowest wage workers. A larger, more fundamental reform of the healthcare system is beyond the scope of this article but it is imperative that we consider the local continuum of care in our efforts to prevent, contain, and mitigate COVID-19 in LTCF. This continuum of care starts with masking, social distancing, and shelter in place orders. It continues with early identification through testing and aggressive contact tracing. At the same time, hospital surge planning must extend beyond the acute care arena to support safe and reliable post-acute care. Avoidance of discharge to congregate settings is the first choice and requires expansion of home health services-skilled nursing, respiratory therapy, occupational and physical therapy, as well as caregiver services to assist with activities of daily living and promote full recovery. Home health staff will require comprehensive training on safe care of COVID-19 recovering patients outside of institutional settings. Post-acute planning must also involve an infusion of resources into our congregate long-term care facilities. As noted, this means ensuring a living wage and hazard pay. It means integrating assurance testing for staff into everyday operations. It also will require extensive training and 24/7 clinical leadership with background and expertise in infection prevention and control. Such improvements will require a reconsideration of how long-term care is delivered and a focus on quality over profit.

Conclusion

LTCF COVID-19 outbreak response in Alameda County required an extraordinary degree of teamwork, ingenuity, and perseverance. It required working outside of conventional roles and existing hierarchy. It forced flexibility and innovation as pre-pandemic protocols became obsolete. Alameda County Public Health Department's LTCF Outbreak Team of public health nurses forged a path toward an effective model of COVID-19 outbreak investigation in specialized, congregate settings with our highest risk residents. A long circuitous journey undoubtedly lies ahead as we continue to manage active outbreaks while building a stronger upstream capacity for prevention and early detection. COVID-19 response work will continue to evolve as knowledge expands and as vaccination becomes a reality, allowing us to move from crisis to longer range management. We must learn from the pearls of our experience and use them to shine a light on the failures of our healthcare system that disconnect public from individual health and acute from long-term care; we must use all we have learned to build a more functional and ethical system of care for our most vulnerable residents and our caregiving workforce.

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