 doi:10.20944/preprints202006.0060.v1

COVID-19 in Care Homes: atypical presentations and high mortality rates mean outbreak management needs to include health and social care

Early identification of atypical clinical signs, and complete segregation of cases, not cohorting, is essential

Dr Anna Down[1]
Dr Arjun Dhillon[1]
Dr Graham Stretch[1]

[1] Argyle Health Group, 128 Argyle Road, Ealing, London, W13 8ER

Abstract

Watching the international COVID-19 epidemics unfold during February and early March 2020, we began to highlight how outbreaks in care homes were inevitable, given the vulnerable patients in close proximity, and pressures on social care to help relieve pressure on the NHS. We suggested public health measures would significantly impact on care homes. Specifically we felt all homes would have multiple individuals isolated within days of introduction of guidance requiring isolation of new cough (or fever), and that a clear definition of an outbreak would be needed that differentiated COVID19 from influenza.

We share the experiences of a GP practice looking after 900 nursing or dual registration care homes in the London Borough of Ealing in the early stages of the COVID19 Pandemic 2020. We believe that the altered presentation of cases of COVID19 in care homes contributed to the size of outbreaks, and that keeping COVID19 out of homes is the only way to manage this disease, with early isolation and complete segregation of positive and negative cases. We have seen over 300 suspected cases resulting in four fold (n=175) average monthly death rates, three fold usual issue of anticipatory medications, and approximately 32% mortality rate (up to 43% in over 90's).

Discharge pathways from hospital and admissions to care homes must be clear and robust. COVID19 naïve patients should not be admitted to units with outbreaks and COVID19 positive patients should not be admitted to anything other than a designated "hot" home until risk of contagion is passed. Some patients are testing positive at over 30 days since initial mild symptoms.

Care homes are not designed for isolation and cohorting

We began highlighting the practical issues with implementing formal guidance very early in the pandemic. The long incubation period for COVID19 means that it is very difficult to track cases when isolation was advised for any particular individual. Once there is more than one suspected case on any unit it can be assumed that there are several. True isolation is not possible – this would mean closing room doors, and all staff entering to use required personal protective equipment (PPE), for a minimum of 14 days.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 June 2020 doi:10.20944/preprints202006.0060.v1

Care homes are designed as institutions to care for people needing additional help and increased social interaction. They are not designed for isolation and social distancing. Many homes do not have en-suite bathrooms for every room. Even where homes are divided into multiple units; laundry, kitchens, maintenance and management will be shared across the home. Moving residents into cohorts within the same building has not contained infection, and has worsened it in some cases. Bigger homes have more staff and movement between units and these are the homes that have had outbreaks. Homes with large outbreaks have had up to 65% of residents infected, despite following guidelines and using PPE. Clinical staff may also work across units and in several homes.

Patients with dementia who remain mobile wander the units freely, interacting with staff and other residents. It is not possible to isolate these patients without considerable distress. These are patients who struggle to understand or remember information about social distancing.

Pattern of cases

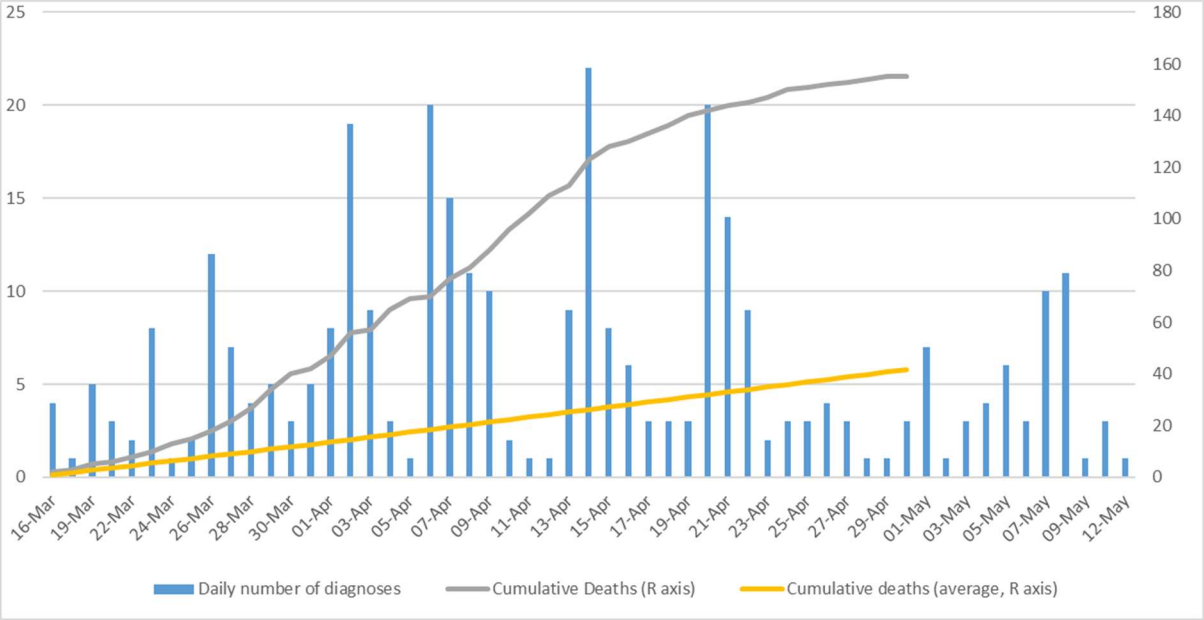
To date we have 321 patients with confirmed or suspected COVID19, out of 825 patients registered at 1st March, involving 28 units across 13 homes.

Our first clinically suspected cases (cough and fever) were seen on 4th and 5th March 2020 in Homes A and B. Despite our concerns, guidance was that they did not fit the travel criteria case definition at that time and they were unlikely to be infected. One of these was subsequently confirmed as COVID-19 infection on 11th March 2020 after re-admission to hospital two days earlier with ongoing marked respiratory symptoms. Multiple suspected cases were then observed from 16th March onwards, in concentrated outbreaks on specific units within a few homes, including Home B. Deaths on these units commenced from 20th March.

We can clearly see across the whole cohort that there are defined peaks in infection occurring 6-10 days after the index case(s) (Figure 1). For those diagnosed at each of the peaks, patients were significantly more unwell at presentation than earlier cases on the same unit. Once an outbreak (defined as 2 or more cases on the same unit within 14 days) was established, changes to infection control and management did not seem to alter the numbers of following cases. Across different homes, R0 appears to be between 4 and 5 in subsequent waves.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 June 2020 doi:10.20944/preprints202006.0060.v1

Figure 1. **Pattern of cases and deaths in Ealing nursing homes 16/3-12/5/2020**



Box 1: Admission to care homes

Preventing the introduction and transmission of COVID19 into care homes is the only way to manage this disease, with early isolation and complete segregation of positive and negative cases. Admissions of patients negative for COVID19 and asymptomatic into homes with known outbreaks provides clear risks to that individual of transmission. Discharge pathways from hospital and admissions to care homes must be clear and robust. COVID19 positive patients should not be admitted to anything other than a designated “hot” home until risk of contagion is passed.

Admissions into homes of COVID19 positive patients has increased or initiated outbreak situations, by allowing exposure of patients not previously exposed. Our data demonstrates outbreaks in several homes with new or re-admissions in the preceding 20 days.

Admissions of COVID19 negative and asymptomatic patients into homes with known outbreaks presents clear risks to that individual (knowing that complete isolation/containment is not possible) and should be avoided. We have seen patients in this position who have gone on to develop COVID19 and at least one has died.

Detailed analysis of Home C has correlated 3 re-admissions and 1 new admission from hospital over the 14 day period in mid-March before their outbreak started. Three of the 4 residents had been tested for COVID19 but 4-7 days prior to discharge – all 3 of these subsequently became symptomatic of COVID19 and died. One had not been tested, and then developed a cough 3 weeks later. In Home D, three residents with fever or chest signs were re-admitted without testing in mid-March.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 June 2020 doi:10.20944/preprints202006.0060.v1

Clinical Presentations

As at 12th May 2020 the case definition for COVID19 remains T>37.8ºC or a new cough[1]. This is not sufficient to identify the disease in many, particularly the frail, elderly and those with dementia. In our experience, fever symptoms are very rarely seen in patients over 75 years old; temperature exceeding 38ºC has previously almost exclusively been associated with influenza rather than bacterial respiratory infections but is not always prominent.

In this population sudden loss of appetite or reduction in oral intake is indicative of likely COVID-19 infection. “Silent” hypoxia seems to correlate to delirium, and increased lethargy. Patients have also presented with loose stool, low oxygen saturations, or cyanosis as the only sign. These presentations increase falls risk. Early recognition of these signs now allows earlier isolation and implementation of infection control guidance, reducing exposure to others.

Box 2: Clinical presentations:
Symptoms and clinical presentation do not fit “cough & fever” pattern[1], and there appears to be a long symptomatic period. Recognising the symptoms and signs early is crucial. The most frequent symptoms have been sudden loss of appetite (36%), and low oxygen saturations (28%), 21% were drowsy/lethargic/confused. Sudden reductions in oral intake including medications are thought to be due to anosmia and/or sore throat.

In Homes C and D, we audited records of 122 patients who were resident from 1st march. Table 1 gives a breakdown of significant symptoms at the time of presentation (each patient may exhibit more than one symptom), showing similar results to international comparisons[2] though anosmia and anorexia appear more prominent in our patients.

Table 1. Presenting symptoms and signs in Homes C and D

	Number of patients (%)
Total number of patients in home	122
Suspected or confirmed cases of COVID19	78 (64%)
Tests/imaging that confirmed infection	38 (31%)
Cough	22 (28%)
Described as “chesty”	12 (15%)
T37.5-37.7C	7 (9%)
T37.8-37.9C	17 (22%)
T>38.0C	5 (6%)
Sudden loss of appetite	28 (36%)
Low oxygen saturations	22 (28%)
Drowsy/lethargic/confused	17 (22%)
Fall	1
Vomiting	2
Raised serum glucose	1
Headache	1

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 7 June 2020 doi:10.20944/preprints202006.0060.v1

Two with a positive swab appear to have been genuinely asymptomatic throughout. At least three patients had only a low grade fever (37.6-37.8 ºC) measured on ONE occasion and for two of these temperatures were recorded 30-33 days prior to testing – raising the possibility of very long periods of essentially asymptomatic carrier status or transmission.

Clinical management of cases

Early in the pandemic, almost all symptomatic cases were managed in the care homes, with very few admissions to hospital. Even where admission was decided upon by a GP, there were cases not thought suitable for conveyance by the ambulance service, or not suitable for admission from A&E. Care homes are not designed or staffed as “mini-hospitals”, and generally a unit would not be expected to manage multiple very sick patients with very little equipment. They do not have access to oxygen supplies.

For patients with persistently low oxygen saturations and respiratory distress, we prescribed oxygen via concentrators. This appeared to significantly reduce fatigue, distress and improve symptoms, and allowed some to resume eating and drinking. The oxygen requirement was titrated to symptoms rather than saturation levels where needed.

Support for eating and drinking was provided by the homes, with adjustments to medication formulations where needed. ‘Sick Day’ rules were enforced and training for homes provided (https://www.therapeutics.scot.nhs.uk/polypharmacy/sick-day-rules/). Medicines optimisation requires both pharmacy and nursing input to manage safely.

Longstanding advance care plans show many patients want to stay at home for end of life care or when unwell, with a significant minority wanting escalation to hospital for potentially reversible causes. On the ground, it bears consideration what advance care plans look like in a pandemic –a scenario where one is shut in your room with very little interaction, from staff that may well be temporary and who are looking after multiple unwell patients at the same time without support, is probably not what most were envisaging when making advanced decisions. All decisions around escalation and resuscitation should be individualised and adapted to the current situation.

Anticipatory medications were managed by the pharmacy team and sent rapidly to the homes where patients were deteriorating. Anticipatory medications were provided for 39 patients in March and 47 in April, over 3 times the usual rate of prescribing. Of note we experienced temporary supply issues of diamorphine and morphine in our area during this period.

The course of illness in COVID19 remains unpredictable, and can be a very long timeline of (so far) up to 6-8 weeks of relapsing-remitting symptoms which makes ongoing management more intensive for several weeks after initial presentation. However, more appears to be reversible or amenable to supportive care than previously thought.

 doi:10.20944/preprints202006.0060.v1

Testing needs to be used alongside clinical diagnosis

Homes need to be supported to access testing but also aware of the limitations of test results. Whilst positive tests are useful to confirm cases, there are risks associated with relying on this to inform next steps. Homes need to be supported to recognise a clinical diagnosis of COVID19 and not wait for either more cases or test results before isolating a patient. They also need to be aware that a negative test does not change management, confirm the absence of COVID19 or mean isolation/PPE use can be relaxed. Where there are significant established outbreaks in a home we see little additional benefit to testing all residents unless there is a pathway to manage results.

Testing across the homes under our service has been in line with public health policy, meaning early testing was patchy and often with a marked delay after outbreaks started, raising the possibility of false negatives as patients subsequently recovered, or that patients died before testing was possible.

Early results from testing whole homes where outbreaks have been established show there are still asymptomatic positive patients. There is often a long period of apparent symptoms. Guidance on how long to isolate patients for appears to underestimate the potential for virus transmission in these cases. We have now seen several cases where testing has given a positive result over 30 days since initial symptoms. This has also been seen in international case studies[3].

Death rates

Across the service as a whole we have seen death rates four times monthly average since 20th March 2020. We have had a total of 60 deaths in March (average 2014 – 2019: 28.2) and 115 deaths in April 2020 (average 2014 – 2019: 29.7). 55% of the deaths in April stated COVID19 on the MCCD, with a further 13% where we have not yet had cause of death confirmed but where it is likely to be COVID19. Some units have lost 50% of patients over a 10 day period.

The death rate across (clinically or laboratory) diagnosed cases of COVID19 amongst our total cohort of patients is currently 32%. However, the long timeline of symptoms means this would be expected to increase even in the absence of new diagnoses. The average time from diagnosis to death so far has been 6.3 days (range of 0-29 days).
As expected, mortality rates increase with age. We show that >40% of those aged over 90 years who have been diagnosed with COVID19 have subsequently died.

Conclusions

The impact of COVID19 on care home patients and mortality rates would suggest that they should be regarded as exhibiting moderate or severe/critical symptoms and therefore potentially remain contagious for their entire illness course. This is likely to be longer than 14 days, with ongoing positive tests at over 30 days in several cases. This is vitally important when considering how to manage care home residents who are unwell (or those in hospital who may need a care home placement on discharge).

It is important that guidelines recognise alternative patterns of symptoms, and the limitations on what can practically be achieved within care homes. This is imperative when we have up to 65% of patients affected and 32% mortality rates.

True isolation within one building is not possible. Patients who are negative for COVID19 and those who are positive for COVID19 must be separated completely. There is a need for separate sites – not cohorting with the same home. Interventions could also include supporting homes with significant outbreaks to close to admissions for 14 days, allowing containment and management of infection control and staff sickness.

We believe it is possible to alter the course of outbreaks and reduce impact if multi-agency working is implemented and clear pathways exist. A whole system approach including health and social care, homes and clinicians is required. All symptomatic (or tested positive) care home residents need to be immediately isolated, in a safely managed location with their own supportive requirements met. This may require hospital admission for diagnosis and initial support. No patient should be admitted to a care home until at least 14 days post diagnosis –this may need to be longer for those with or recovering from severe or critical symptoms. Admissions of negative patients to homes needs to consider potential exposure. The safety and suitability of beds must be considered rather than availability, both for the individual and the other residents and staff in a home.

References

1. Public Health England Guidance. Flow chart for management of a suspected case of COVID-19 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/881389/20200427_COVID-19_flow_chart_v11.pdf
2. Aguilar RB, P Hardigan P, Mayi B et al. Current Understanding of COVID-19 Clinical Course and Investigational Treatments *{Published online 2020.04.19];* doi: https://doi.org/10.1101/2020.04.19.20071548
3. Arons MM, Hatfield KM, S C Reddy SC et al. Presymptomatic SARS-CoV-2 infections and transmission in a skilled nursing facility. N Engl J Med. DOI: 10.1056/NEJMoa2008457.

Acknowledgements

We would like to acknowledge the patients and their families who we look after in the care homes during this exceedingly difficult time. We would also want to highlight the staff in the care homes who have worked tirelessly through this period to look after their residents. We would like to thank the entire team at Argyle Health Group, West London NHS Trust and Ealing CCG without who this work would not be possible

 doi:10.20944/preprints202006.0060.v1

Conflicts of Interest
We have the following interests to declare:

All authors are all employed by the Argyle Health Group.
Dr Anna Down is Macmillan GP for Ealing CCG
Dr Arjun Dhillon is Caldicott Guardian and Clinical Director at NHS Digital
Dr Graham Stretch is Clinical Director of Brentworth PCN, President of the Primary Care Pharmacy Association, and received honorarium for speaking advisory board activities for AstraZeneca, Astellas and Amgen