Bedford Borough COVID-19 Deep Dive

Bedford Borough Council; Public Health England; Joint Biosecurity Centre; Bedfordshire Hospitals NHS Foundation Trust; Bedfordshire Clinical Commissioning Group.

Published 4 August 2020.

Routine data as reported at 19 July 2020 unless otherwise stated.

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Appendices

Executive Summary

This report sets out the final findings of the collaborative 'Deep Dive' investigation into the high incidence rate of COVID-19 in Bedford Borough; the potential drivers of this, the interventions taken and further recommendations.

Two work streams were established that focussed on;

- The epidemiology of COVID-19 in Bedford Borough
- Local communications and engagement in response to the rate of infection.

A report of initial findings was published on 6 July (Appendix 5) with further actions and analysis taking place in a second phase to 24 July with the final report providing;

- Further up to date epidemiological analysis on the rates and potential drivers
- The recommended actions taken at the time of the interim findings, further subsequent actions and future recommendations
- The detailed reports of the workstreams as Appendices to the final report.

The investigation was jointly undertaken by Bedford Borough Council (BBC), Public Health England (PHE), the Joint Biosecurity Centre (JBC), Bedfordshire Hospitals NHS Foundation Trust and Bedfordshire Clinical Commissioning Group (BCCG).

This report is based on data reported up to 19 July 2020 unless otherwise stated. The report was due to be published on 28 July, but was delayed in order to incorporate further analysis received on the day of publication. Since the data in this report were finalised the 7-day incidence rate has increased, and for the week ending 26 July Bedford Borough had the 16th highest 7-day incidence rate among upper tier local authorities (UTLAs) in England (15.7 cases per 100,000 population).

1. The COVID-19 Rate in Bedford Borough

Bedford Borough Council in the East of England, has a higher cumulative rate of laboratory confirmed cases than the East of England and England. For the weeks commencing 8th and 15th of June 2020 Bedford Borough had one of the ten highest weekly rates in the country.

Since the end of May, Bedford Borough has a higher rate of persons tested per 100,000 population than seen regionally and nationally. In recent weeks there has been an overall decrease in persons tested per 100,000, however the rate is now consistent with regional and national averages and the number of people testing positive has come down.

In addition, the findings were;

- Most contacts are exposed to cases within the household setting and to household visitors, with exposures elsewhere remaining low.

- Over the last 14 days (5th to 18th July), the most common age groups of male cases were 30-39 and 60-69 years old. For female cases, the most common age groups were 20-29 and 30-39.

- Over the pandemic, Harpur ward in Bedford has the highest cumulative rate of cases. In the most recent week, Elstow and Stewartby had the highest rate of cases. Large areas of Bedford Borough have not seen any cases in the past 14 days.
- The majority of COVID-19 cases diagnosed in Bedford Borough are of White ethnic background and there was an increase in the proportion of Asian ethnic background in the 7-day period between 1st to 7th July. However, in recent weeks, a high proportion of cases had unknown/missing ethnicity in the data.

2. Understanding the Drivers behind the higher incidence rate

The review sought to understand the potential drivers behind the high rate. This included considering 3 questions;

2.1 Is the data on laboratory confirmed infections reliable?

Public Health England (PHE) East of England Field Service has reviewed the pillar 1 and pillar 2 test databases to check for duplication within and between each pillar and are satisfied that there is no duplication in the reported numbers.

Initial enquiries established that negative test results from outsourced testing facilities used by Bedford Hospital were not being routinely reported to PHE. This had the effect of artificially inflating the positivity rate for a period of time but does not affect the number of positive tests reported. This was reported in the interim findings and has been addressed by the hospital and PHE. We are now confident the data is reliable.

2.2 Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission of or severity of COVID-19 infection?

Bedford Borough is similar to other areas in the East of England in terms of the proportion of the population at risk from severe illness from COVID-19, the prevalence of heart, kidney and lung disease, the proportion of adults who are overweight and the proportion with dementia.

There are some sociodemographic factors which may contribute to increased transmission and severity of COVID-19 infection in Bedford Borough. These are;

- The proportion of households that are overcrowded is higher than the regional average.
- Compared to other UTLAs in the East of England, Bedford Borough has a high proportion of residents from Black, Asian and other ethnic minority (BAME) groups.
- Diabetes prevalence in Bedford Borough is higher than the regional average (7.2% vs. 6.7%).
- The rate of emergency admissions for chronic obstructive pulmonary disease is higher than the regional average (406 vs. 359 per 100,000).
- The number of care home beds per 100 persons aged 75+ is the second highest in the region.
- Analysis revealed that Harpur and De Parys Middle Super Output Areas[1] are more vulnerable to COVID-19, as a result of factors including care home density, deprivation, and prevalence of chronic health conditions.

[1] Middle super output areas (MSOAs) are geographical areas that are used for statistical reporting. The average population of a MSOA is 7,200. MSOA boundaries are not coterminous with ward boundaries.

However, no single sociodemographic factor appears to be driving the high incidence. Instead there are multiple potential contributory sociodemographic factors that must be accounted for in the local response.

2.3 Is there a clear focal point for the ongoing transmission in Bedford Borough, e.g. hospitals, care homes, workplaces, schools or specific communities?

There have been 50 suspected and confirmed COVID-19 outbreaks in Bedford Borough. An outbreak is defined here[2]. In a hospital this represents two or more cases, in a care home or school one or more cases.

In the last 14 days (5th to 18th July), there have been two outbreaks reported to the East of England Health Protection Team, one in a school and one in a care home. Of the 7 cases that a cluster has been identified for in the last 14 days, all were associated with a residential dwelling.

The number of COVID-19 outbreaks and incidents has ranged from one to a maximum of nine in week beginning 18 May 2020, remaining at four or less each week since week beginning 25 May 2020 to the present.

Whilst outbreaks have been recorded in a number of closed settings, including healthcare, care homes, custodial institutions and workplaces there is no evidence to indicate that they have contributed disproportionately to the higher observed incidence of COVID-19 in Bedford Borough. Effective systems are in place to rapidly identify and act on outbreaks in most closed settings, but improvements to the occupational data collected by the national NHS Test & Trace service are needed to ensure timely identification of workplace clusters and outbreaks.

Hospital

During the outbreak and for much of the lockdown period, almost all planned appointments and procedures were postponed in order to limit the risk of infection to patients both in and visiting the hospital as well as to create bed capacity. Therefore only those patients who needed urgent or emergency treatment were admitted. The number of inpatients during that time was largely comprised of patients with confirmed or suspected COVID-19 upon admission.

Over the first two weeks of June there were on average 36 inpatients with confirmed COVID-19 at Bedford Hospital. During the review there was found to be some evidence of transmission within the hospital, as noted in the interim report. This has been the case across the country reflecting both the high infectivity of the virus and the operational pressures on hospitals during this time. During the studied period of the month of June, a small number of patients who had presented with other conditions and had appeared to be asymptomatic upon admission but who in fact returned a positive swab result. These patients had either been in contact with or shared a ward area with others who were negative because of their initial asymptomatic presentation. The hospital identified this and applied its outbreak protocol, closing the relevant ward areas to admissions and restricting movement. There is little published comparative evidence of hospital-acquired COVID-19 in England, but what has been found at Bedford Hospital is consistent with the emerging international evidence and modelled estimates.

The Hospital continued, as it had done throughout the pandemic, with the appropriate use of Personal Protective Equipment (PPE). It has confirmed compliance at all stages of the outbreak with

[2] https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection#preparing-for-an-assessment

the use of PPE and always followed the directives from PHE. In fact the trust made a decision to introduce the use of face masks across the organisation ahead of the national guidance change. As an additional assurance the review of PPE provisions and their correct usage at ward level is led by the matrons and evidenced with daily check lists. The Trust increased the amount of fit testing[3] for staff including training key staff in all the main areas. The trust undertakes continuous audit of supply and use of PPE and this remains a top priority.

Care Homes

Up until 15 July 2020 a total of 43 outbreaks and clusters had been reported in Bedford Borough's 78 CQC registered care homes (55.1%). In terms of the proportion of homes that have reported an outbreak Bedford Borough is ranked 8 of 12 local authorities within the East of England PHE (rank 1 = 34.8% and rank 12 = 62.9%).

Workplace

20 cases at a very large distribution centre were confirmed between 01/04/2020 and 17/06/2020. Effective and prompt action between PHE, Bedford Borough and the employer to identify and exclude contacts and implement control measures was undertaken.

Two outbreaks relating to East of England Ambulance Trust (EEAST) were reported, though at the time these were not notified to the Council. In June two cases were confirmed at the EEAST call centre. The ambulance trust carried out extensive contact tracing and 38 people were asked to self-isolate as a precaution. There was an earlier unlinked outbreak at the ambulance station, where there were four confirmed cases. Additional control measures were introduced following both incidents, and no further positive cases have been reported.

Schools

There were 2 outbreaks in Primary Schools. In the first there was 1 confirmed case. Their bubble comprising 9 children and 2 teachers was asked to self- isolate.

In the second there were 2 confirmed cases (the first reported on 13/6/2020) in different year groups. Two bubbles were advised to self-isolate which included 16 pupils and 4 teachers and a further bubble was sent home for operational reasons.

In summary for the range of settings, following analysis, there was no single focal point identified for the higher rate of COVID-19 infection in Bedford Borough. Cases from health and care, occupational, institutional and educational settings did not contribute disproportionately to the pattern of infection. Instead there are multiple contributory causes and sociodemographic factors that must be accounted for in the local response. As such, and conscious of these multiple factors, partners implemented a series of actions including an enhanced communications and engagement plan targeting specific groups to try and mitigate risk.

[3] The process to ensure that equipment e.g. masks, fits appropriately to the member of staff.

3. Actions Taken

A comprehensive series of recommendations were made in the initial findings, most with completion dates in June.

These recommendations are shown below in Table 1 with their current status. As can be seen, significant progress has been made in implementation of the actions.

Crucially, given the high rate and the concerns raised, alongside the epidemiological, testing and data actions, a series of targeted communications and engagement actions were also agreed and implemented immediately and these are further described below the table 1.

Table 1

Theme	Action	Owner	Status 21 July
Reliability of laboratory confirmed infections data	1. Bedford Hospital negative tests will be uploaded to PHE database	Bedford Hospital / PHE	Completed 16 July.
Sociodemographic factors associated with transmission	2. Ongoing review of Google Mobility trends and consideration of novel data sources and advanced analytical approaches that could support the local area	Joint Biosecurity Centre	The JBC Data Team is finalising a comparative report comparing soci-economic factors related to COVID-19 transmission across 4 UTLAs. Report expected to be released by 31 July
	3. Ensure targeted communications and engagement based on possible contributory sociodemographic factors	All partners through the Communications and Engagement workstream	See section below. Approach should continue in future communications and engagement activities.
Current pattern of COVID-19 infection	4. Improve the completeness of ethnicity data, for example, by linking testing data to Hospital Episode Statistics	Public Health England	Linkage to HES has been completed and the ethnicity within the epidemiological report provides this breakdown. Nationally there will be further work to continue to improve completeness.
Focal points for transmission - Hospital	5. The additional 12 SAMBA II machines, together with the additional personnel, be made operational.	Bedford Hospital	Completed 26th June and the machines are fully operational.
	6. Reporting of swabbing data to be reviewed.	Bedford Hospital	Completed but under constant review. Processes have been revised to ensure that swabs are reported.
	7. Additional supplies of the reagent compound be procured so to enable the testing capability to be maximised.	Bedfordshire CCG	This remains a significant risk and is carried forward in further

			recommendations (24).
	8. Establish an epidemiological database of COVID-19 cases, based on the data set from the Deep Dive. This will utilise the PHE Epidata database with support from PHE.	Bedford Hospital	Completed. The hospital elected to use its own database rather than PHE's Epidata database.
	9. Increase plotting of COVID19 patient care ward movements of all cases retrospectively and prospectively.	Bedford Hospital	Actioned and ongoing.
	10. Continue to identify all transmission events and act to mitigate, having regard to the assistance provided during the Deep Dive in plotting time relations of COVID19 cases.	Bedford Hospital	Actioned and ongoing.
	11. Ensure that a process of rapid testing of patients is introduced	Bedford Hospital	Completed 26th June.
	12. Continue to review and monitor the training and usage of PPE as part of ongoing good practice.	Bedford Hospital	Ongoing programme.
Focal points for transmission – Care homes	13. Establish whether any further enhancements to care home surveillance can be identified.	Bedford Borough Council with support from PHE	Completed. New recommendations identified for the final report.
Focal points for transmission – Workplaces	14. Establish more timely and informative sharing of data from NHS Test & Trace	PHE	The council is now receiving a daily data file from PHE. Work to improve data quality is ongoing at a regional and national level.
	15. Establish whether any further enhancements to workplace surveillance information sharing can be identified	Bedford Borough Council and PHE	Ongoing, target date for completion 14 August 2020.
Focal points for transmission – Community	16. Ensure based on the emerging guidance that processes are aligned so as to improve cluster detection and new transmission networks in the community.	Bedford Borough Council and PHE	The updated PHE epidemiological analysis identifies household clusters. Cluster analysis of postcode data to inform local action will be an ongoing programme of work.
Testing availability	17. Review the availability of access to the Mobile Test Units so as to provide maximum availability.	Bedfordshire Local Resilience Forum (BLRF) Community Settings Testing cell	Ongoing via BLRF.
Overarching	18. All partners cited in this document are to hold each other to account and ensure that actions are completed.	All partners	Through the Deep Dive Oversight Board.

Progress of note has been made in;

- Testing capacity at Bedford Hospital.

Testing capacity at the hospital has improved markedly since the introduction of the 12 Samba II machines and the increased capacity at both the Bedford and Luton & Dunstable labs the speed of aggregating results (including staff test results) has increased. However, testing throughput remains limited due to the current allocation of reagent compound and the Trust is working closely with NHS England/Improvement to ensure the timely supply of reagents used by the Panther Test apparatus (the larger batch testing machines). Increasing the hospital allocation of reagent compound will enable Panther Test apparatus to be fully exploited and increase testing throughput to well in advance of the circa 400 tests/day anticipated.

- Patient tracking at Bedford Hospital

Since the initial findings the Trust has, with PHE Field (Epidemiology) Service East of England, worked to develop an innovative tool that allows the Trust to track patients in near real time and support: visualisation of patients' COVID-19 status; visualisation of screening activity per ward; sharing of data with wards and clinical staff; epidemiological analysis.

Communications and Engagement

Effective communications and engagement was essential to the response, encouraging willing compliance for residents. A shared narrative was agreed between partners at the start of the 'deep dive' which formed the basis for the communications messaging, especially in the initial phase of awareness raising, and around the findings of the interim report.

"The latest data from Public Health England shows that Bedford Borough has the highest levels of Coronavirus infections in the East of England. Due to the high infection rate, Bedford Borough Council and local NHS organisations are working with Public Health England and the Joint Biosecurity Centre to investigate why rates of infection here aren't falling as quickly as other areas."

The approach adopted in the plan had the following aim, delivered in three phases:

- Assess whether community behaviours may be contributing to a differential pattern of COVID-19 in Bedford Borough.
- Encourage residents in Bedford Borough to stay home and observe stringent infection control measures as a result of increased infection rates in the Borough;
- Build confidence in the handling of COVID-19 by accurately communicating the process and findings from the 'deep dive' to residents.
- Influence national messaging to support more localised narratives around outbreaks and potential outbreaks.

As phases two and three of the communications plan were rolled out, the messaging was evolved to take account of the findings of the study team, to ensure a responsible, accurate and informed tone and balance was struck.

A number of 'trusted voices' were asked to become spokespeople for the 'deep dive' to ensure messages reached the community. These included

- The Mayor of Bedford Borough, Dave Hodgson,
- Councillor Louise Jackson, Portfolio Holder for Public Health and Wellbeing,
- Dr Roshan Jayalath (Kings Street Surgery), a number of other GPs for affected wards, and
- Local celebrities including Top Gear's Rory Reid (Kempston Resident) and former Oakley resident and long distance runner, Paula Radcliffe MBE.

Appendix 3 of the report contains the detailed communications and engagement plans. Communications and engagement activities continue to be a key focus and will remain so during the pandemic.

4. Conclusions and further recommendations

Analysis of the deep dive data has not identified a single focal point for the higher rate of COVID-19 infection in Bedford Borough. Instead there are multiple potential contributory sociodemographic factors that must be accounted for in the local response.

Whilst outbreaks and clusters of cases have been reported in a number of settings, no specific settings or communities appear to account disproportionately for the higher incidence of COVID-19 overall, with most contacts exposed to cases within the household setting and to household visitors.

The Deep Dive provided an opportunity for enhanced collaborative, multi-agency working at local, regional and national level, underpinned by systematic epidemiological analysis and experiential learning.

Good progress on the actions and recommendations arising from the earlier phases has been made (see sections 4 and 5) and a number of these including testing, hospital processes, communications and engagement will continue to be progressed.

Further recommendations for partner organisations are;

Theme	Action	Owner
Communications and Engagement	19. Continue strengthening multi agency communications and engagement to ensure that local guidance is communicated to support awareness and encourage behaviour change.	Bedford Borough Outbreak Control Group[4]
	20. Increased engagement with community cultural and faith leaders to ensure we reach seldom heard groups and use trusted voices to communicate the message.	Bedford Borough Outbreak Control Group
	21. Engagement with neighbouring CCGs and upper tier councils to share learning, resources and best practice; to support other affected areas, where possible.	Bedford Borough Outbreak Control Group
	22. Establish community champions to engage with our BAME and other communities as 'trusted voices'.	Bedford Borough Outbreak Control Group
Testing	23. Continue to ensure sufficient testing capacity across the system.	Bedford Borough Outbreak Control Group
	24. Ensure sufficient supply of reagent to the hospital.	Bedfordshire CCG

[4] The multi-agency officer group responsible for implementing the Local Outbreak Control Plan. See https://www.bedford.gov.uk/covid19 for the Local Outbreak Control Plan including governance arrangements.

Data sharing	25. Build on the work sharing data and information and routinely disseminate timely and robust data.	Bedford Borough Outbreak Control Group
Care homes and domiciliary care	26. All Care homes should complete, on a daily basis, the CQC Capacity Tracker.	Care Homes
	27. PHE will work with Care Standards and Public Health to improve the clarity and accuracy of the Care Home Situation reports that are sent in the event of an outbreak.	PHE and Bedford Borough Council
	28. Government to confirm its approach to asymptomatic testing of domiciliary care staff and service users, including testing of directly employed carers and those they care for.	Government
Workplaces	29. Improve the collection of contextual data from the NHS Test & Trace programme including routine identification of workplace	Government
Outbreak control	30. All outbreaks, including those in healthcare settings and workplaces e.g. hospitals, ambulance trusts, to be reported to the Director of Public Health in line with the new responsibilities that UTLAs have in relation to Local Outbreak Control Plans. This includes notification of staff self-isolation.	All partners

1. Introduction

Bedford Borough Council in the East of England, has a higher cumulative rate of laboratory confirmed cases than the East of England and England. For the weeks commencing 8th and 15th of June Bedford Borough had one of the ten highest weekly rates in the country.

The positivity rate (the proportion of individuals tested who are positive) has decreased in recent weeks, and the difference between Bedford Borough and the regional and national rates has reduced.

Since the end of May, Bedford Borough has a higher rate of persons tested per 100,000 population than seen regionally and nationally. In recent weeks there has been an overall decrease in persons tested per 100,000, however the rate is now consistent with regional and national averages and the number of people testing positive has come down.

As a result of the relatively high rate of infection, and to understand why rates of infection in Bedford Borough weren't falling as quickly as other areas, the Deep Dive with Bedford Borough Council, Public Health England (PHE), the Joint Biosecurity Centre (JBC), Bedfordshire Hospitals NHS Foundation Trust and Bedfordshire Clinical Commissioning Group was established during June to answer the following questions:

1) What is driving the differential pattern of COVID-19 infection in Bedford Borough, and
2) What interventions can be put in place to address this?

Two work streams were established that focussed on;

1. The epidemiology of COVID-19 in Bedford Borough
2. Local communications and engagement in response to the rate of infection.

Interim findings published on 6 July (Appendix 5) summarised progress to date (focusing predominantly on the local epidemiology) and interim recommendations to be implemented immediately.

This report therefore builds on the interim report and contains:

- Further up to date epidemiological analysis on the rates and potential drivers
- The recommended actions taken at the time of the interim findings, further subsequent actions and future recommendations.

2. What is the pattern of COVID-19 infection in Bedford Borough compared to other areas and who is most affected?

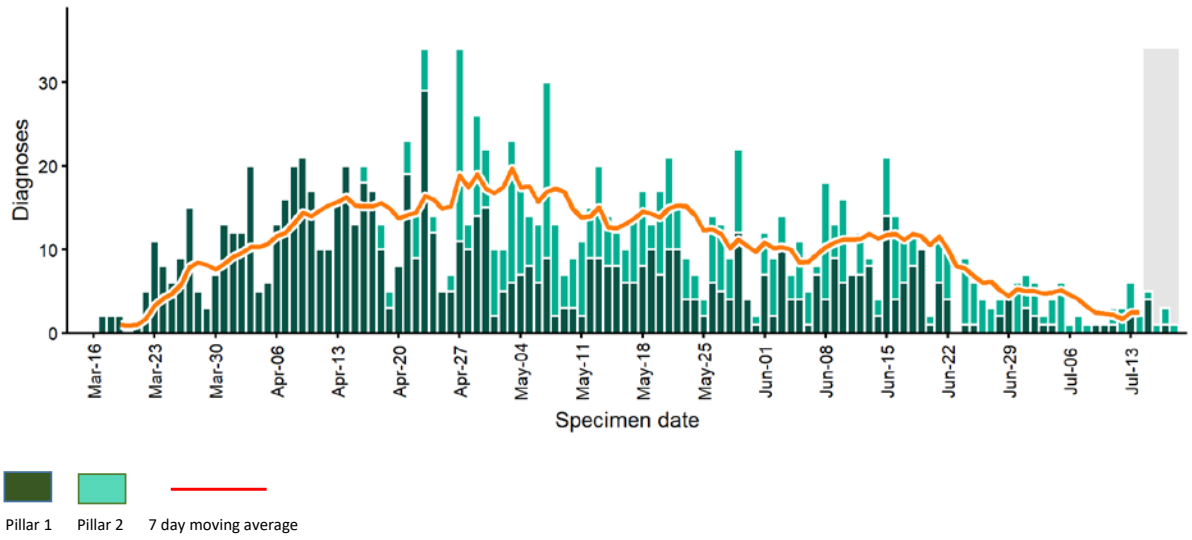
2.1 Numbers of cases and trends

Since the first confirmed case in Bedford Borough (with a specimen date of 13th March 2020) there have been **1,295** cases of COVID-19 diagnosed amongst residents of Bedford Borough[5].

Bedford Borough has a higher cumulative rate of laboratory confirmed cases (754.6 per 100,000) than the East of England (386.9) and England (453.0). For recent data, Bedford Borough has the 42nd highest 7-day incidence rate in England (9.9 per 100,000).

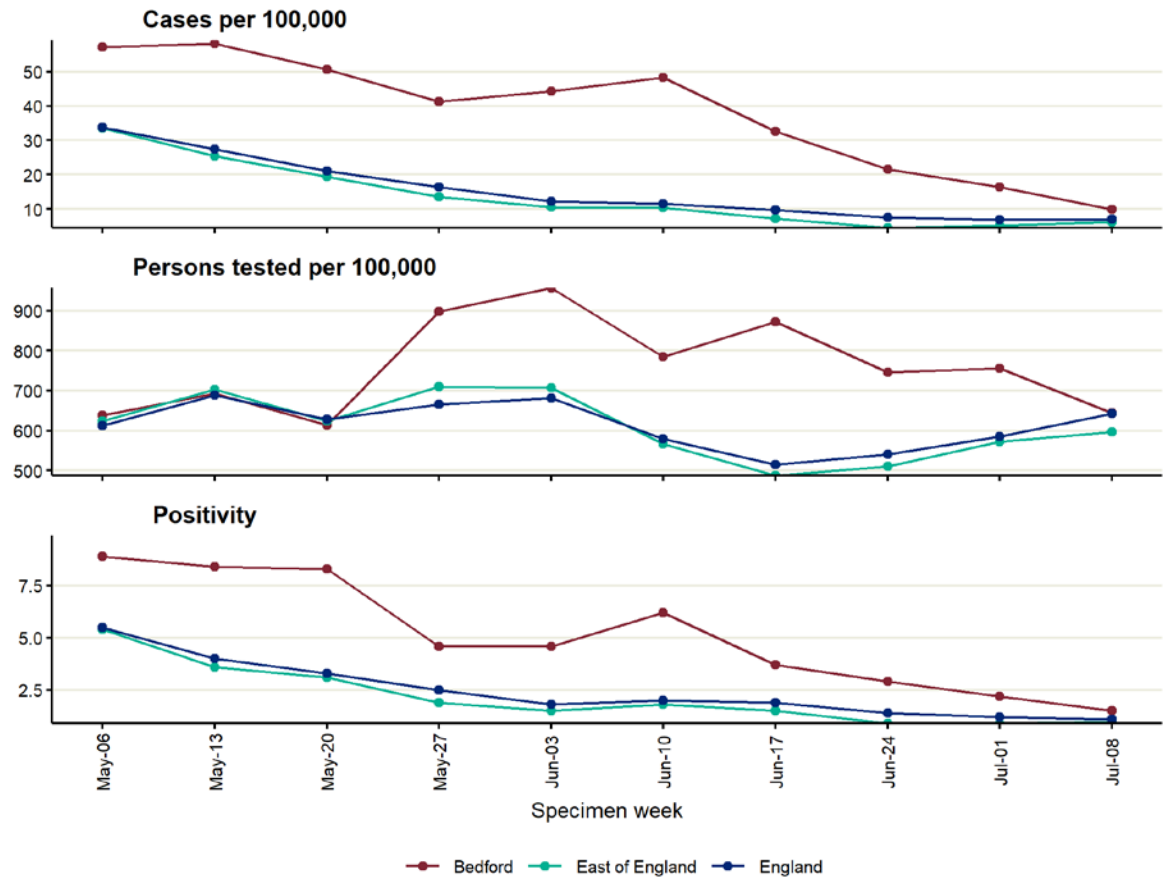
The number of laboratory confirmed cases of COVID-19 peaked in late April and has declined overall since, however, there were two periods when the number of cases started to increase again, first in mid-May and then again in mid-June. For the weeks commencing 8th and 15th of June Bedford Borough had one of the ten highest rates in the country. Since then, case numbers have been declining again (Figure 1) with the difference between Bedford Borough and the regional and national rates lessening. Figure 2

Figure 1. Epidemic curve of daily confirmed COVID-19 cases over time in Bedford Borough, by specimen date (March 13 2020 to July 18 2020).
4 most recent days subject to reporting delay - indicated by grey background



[2]. 9:00am on July 19 2020

Figure 2. Figure 5. Persons tested and cases diagnosed per 100,000 population and positivity per week in Bedford Borough, East of England, and England (May 5th to July 14th 2020).
4 most recent days subject to reporting delay. May 5th starting point due to expansion of testing from this time



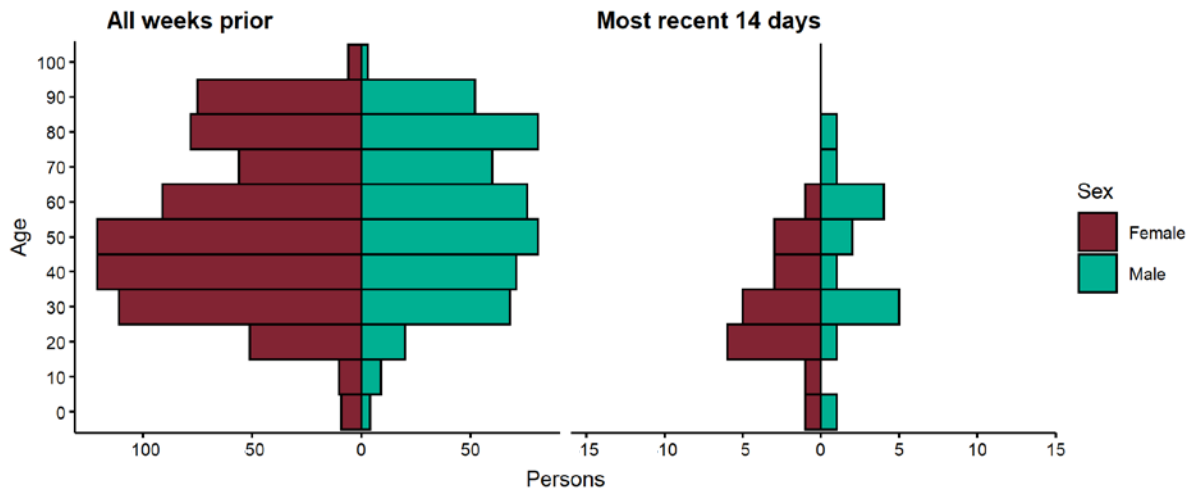
The proportion of individuals who test positive (the positivity rate) has been decreasing over recent weeks, and the difference between Bedford Borough and the regional and national rates has decreased.

Since the end of May, Bedford Borough has a higher rate of persons tested per 100,000 population than seen regionally and nationally, except for the most recent week when the testing rates are all similar. In recent weeks, there has been an overall decrease in persons tested per 100,000 in Bedford Borough, however the rate has converged with, and is now consistent with, the regional and national rates.

2.2 Demographic characteristics

Over the last 14 days (5th to 18th July), the most common age groups of male cases were 30-39 and 60-69 years old. For female cases, the most common age groups were 20-29 and 30-39.

Figure 3. Age-sex pyramid for confirmed cases in past 14 days (July 5 2020 to July 18 2020) and prior (March 13 2020 to July 4 2020).

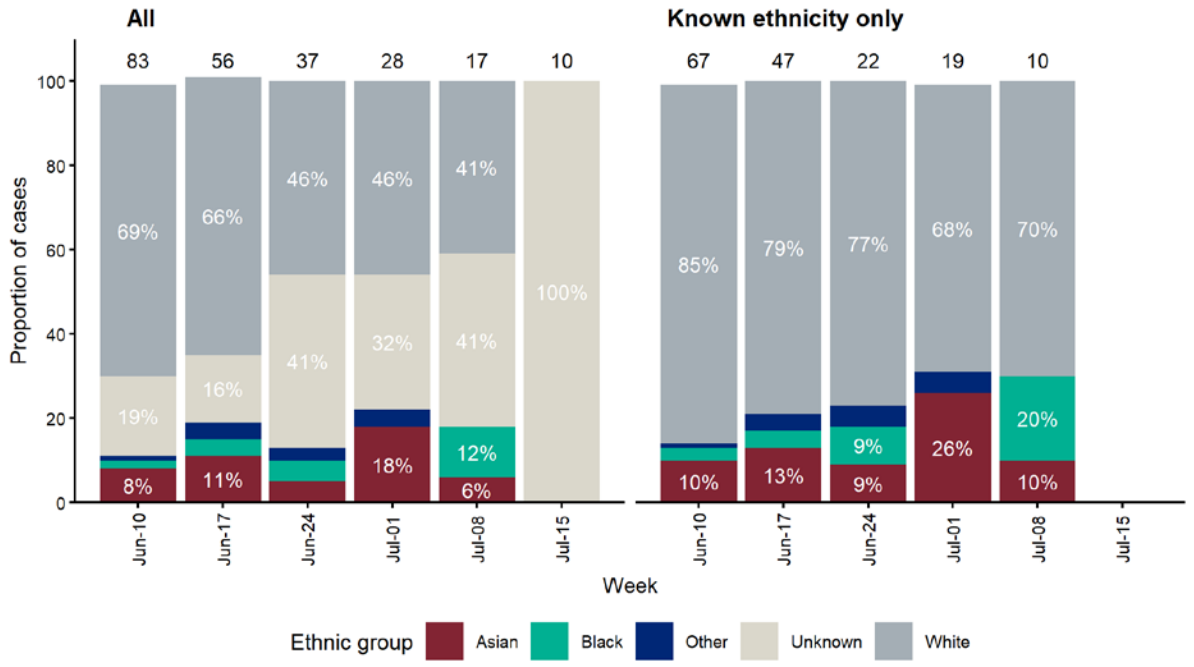


See Appendix 1 Figures 6, 7, 9 for detail.

The majority of COVID-19 cases diagnosed in Bedford Borough are of White ethnic background and there was an increase in the proportion of Asian ethnic background in the 7-day period between 1st to 7th July. However, in recent weeks, a high proportion of cases had unknown/missing ethnicity.

Figure 4. Weekly distribution of ethnic groups among confirmed cases in Bedford Borough, last 6 weeks.

Most recent bar is 4 days subject to reporting delay, all other bars are complete 7 day periods. Denominator printed on top of bars



2.3 Locations of cases within Bedford Borough

Geographical wards

- Over the course of the pandemic, Harpur ward in Bedford has the highest cumulative rate of cases and this may reflect the number of care homes in that location. In the most recent week, Elstow and Stewartby had the highest rate of cases. Large areas of Bedford Borough have not seen any cases in the past 14 days (5th to 18th July). (See Appendix 1 for breakdown).

3. What is driving the differential pattern of COVID-19 infection in Bedford Borough?

In order to answer this, the deep dive considered the following points:

3.1 Is the data on laboratory confirmed infections reliable?
3.2 Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission of or severity of COVID-19 infection?
3.3 Is there a clear focal point for the ongoing transmission in Bedford Borough, e.g. hospitals, care homes, workplaces, schools or specific communities?

3.1. Are the data on laboratory confirmed infections reliable?

Microbiological surveillance of COVID-19 infections is undertaken by reporting virological test results from individuals by laboratories to the Public Health England Second Generation Surveillance System (SGSS). Patient records of those attending for medical care have been the historic basis of reporting to SGSS and are now termed pillar 1 tests. SGSS has been updated to include individual COVID-19 reports generated from contact with the National Health Service Covid19 Test and Trace system and are now termed pillar 2 tests.

- PHE East of England Field Service has reviewed the pillar 1 and pillar 2 test databases to check for duplication within and between each pillar and are satisfied that there is no duplication in the reported numbers.
- Initial enquiries established that negative test results from outsourced testing facilities used by Bedford Hospital were not being routinely reported to PHE. This had the effect of artificially inflating the positivity rate for a period of time but does not affect the number of positive tests reported. This was reported in the interim findings and has been addressed by the hospital and PHE. We are now confident the data is reliable

3.2. Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission or severity of COVID-19 infection?

Bedford Borough is similar to other areas in the East of England in terms of the proportion of the population at risk from severe illness from COVID-19, the prevalence of heart, kidney and lung disease, the proportion of adults who are overweight and the proportion with dementia (see Appendix 4 for detailed tables).

There are some sociodemographic factors which may contribute to increased transmission and severity of COVID-19 infection in Bedford Borough. These are;

- The proportion of households that are overcrowded is higher than the regional average.
- Compared to other UTLAs in the East of England, Bedford Borough has a high proportion of residents from BAME groups.
- Diabetes prevalence in Bedford Borough is higher than the regional average (7.2% vs. 6.7%).
- The rate of emergency admissions for chronic obstructive pulmonary disease is higher than the regional average (406 vs. 359 per 100,000).

- The number of care home beds per 100 persons aged 75+ is the second highest in the region.
- Analysis revealed that Harpur and De Parys Middle Super Output Areas[6] are more vulnerable to COVID-19, as a result of factors including care home density, deprivation, and prevalence of chronic health conditions.

However, no single sociodemographic factor appears to be driving the high incidence. Instead there are multiple potential contributory sociodemographic factors that must be accounted for in the local response.

3.3. Is there a clear focal point for the ongoing transmission in Bedford Borough, e.g. hospitals, care homes, workplaces, schools, or specific communities?

There have been 50 suspected and confirmed COVID-19 outbreaks in Bedford Borough. An outbreak is defined here[7]. In a hospital this represents two or more cases, in a care home or school one or more cases.

In the last 14 days (5th to 18th July), there have been two outbreaks reported to the East of England Health Protection Team, one in a school and one in a care home. Of the seven cases that a cluster has been identified for in the last 14 days, all were associated with a residential dwelling

The number of COVID-19 outbreaks and incidents in HPZone[8] has ranged from one to a maximum of nine in week beginning 18 May 2020, remaining at four or less each week since week beginning 25 May 2020 to the present.

Whilst outbreaks have been recorded in a number of closed settings, including healthcare, care homes, custodial institutions and workplaces there is no evidence to indicate that they have contributed disproportionately to the higher observed incidence of COVID-19 in Bedford Borough. Effective systems are in place to rapidly identify and act on outbreaks in most closed settings, but improvements to the occupational data collected by the national NHS Test & Trace service are needed to ensure timely identification of workplace clusters and outbreaks.

Clusters are identified using two different methods:

- **Residential clusters** based on case address (identified by PHE Epicell cluster team): Defined as two or more COVID-19 confirmed cases in the same property within 14 days of each other. Property classifications are derived from matching residential address of cases to Ordnance Survey AddressBase, which provides a unique property registration number and property type.
- **HPZone cluster/outbreaks** (entered into HPZone case management system by Health Protection Teams): Operational definitions where a cluster is defined as a number of cases with possible but unconfirmed epidemiological link, and an outbreak is a number of cases with highly probable or confirmed epidemiological link.

In HPZone, the following situations are also identified:

[6] Middle super output areas (MSOAs) are geographical areas that are used for statistical reporting. The average population of a MSOA is 7,200. MSOA boundaries are not coterminous with ward boundaries.
[7] https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection#preparing-for-an-assessment
[8] PHE Web based data collection tool.

- Issue: Where there is a local situation that requires monitoring
- Threat: A wider situation which required long term monitoring and planning

NHS Hospitals and other inpatient facilities

During the outbreak and for much of the lockdown period, almost all planned appointments and procedures were postponed in order to limit the risk of infection to patients both in and visiting the hospital, as well as to create bed capacity. Therefore only those patients who needed urgent or emergency treatment were admitted. The number of inpatients during that time was largely comprised of patients with confirmed or suspected COVID-19 upon admission.

Over the first two weeks of June there were on average 36 inpatients with confirmed COVID-19 at Bedford Hospital. During the review there was found to be some evidence of transmission within the hospital, as was noted in the interim report. This has been the case across the country reflecting both the high infectivity of the virus and the operational pressures on hospitals during this time. During the studied period of the month of June, a small number of patients who had presented with other conditions and had appeared to be asymptomatic upon admission but who in fact returned a positive swab result. These patients had either been in contact with or shared a ward area with others who were negative because of their initial asymptomatic presentation. The hospital identified this and applied its outbreak protocol, closing the relevant ward areas to admissions, and restricting movement.

Analysis by PHE of all hospital admissions with a first positive COVID-19 test between 14th March and 9th July 2020 revealed that admissions peaked on 31st March at 19 and declined to under 5 admissions a day from 9 July (Appendix 2). A total of 552 patients who were admitted had a positive test either prior to or following admission. Of the 487 who returned a positive test after they were admitted, 20% had a lead time from admission to positive specimen date of greater than 7 days. This is generally interpreted as being consistent with infection having been acquired during hospital admission as described above. There is little published comparative evidence of hospital-acquired COVID-19 in England, but what has been found at Bedford Hospital is consistent with the emerging international evidence and modelled estimates.

A timeline of ward movements was completed for all patients during the June period. The Hospital continued as it had done throughout the pandemic with the appropriate use of PPE. It has confirmed compliance at all stages of the outbreak with the use of PPE and always followed the directives from PHE. In fact the trust made a decision to introduce the use of face masks across the organisation ahead of the national guidance change. As an additional assurance the review of PPE provisions and their correct usage at ward level is led by the matrons and evidenced with daily check lists. The Trust increased the amount of fit testing[9] for staff including training key staff in all the main areas. The trust undertakes continuous audit of supply and use of PPE and this remains a top priority.

It has been recognised that testing provision at Bedford Hospital has been through a number of different suppliers (including Addenbrookes and PHE), and this has complicated the testing process which was outside of the control of the hospital. The Trust highlighted the problems with the lengthy waits for results relatively early in the pandemic and requested that the lab used was changed to another who could process and report results in a more timely way. Longer turnaround times for test results were experienced in the earlier stages due to the pressure on the initial lab compounded by the rapid ramping up of testing in the general public. We understand that they

[9] The process to ensure that equipment e.g. masks, fits appropriately to the member of staff.

were overwhelmed with the numbers of tests being sent to them and therefore there was an impact on waiting times for those using the facility for their tests. The new lab which was contracted had a turnaround time of 24 to 48 hours which was an improvement, but it is acknowledged that this still wasn't fast enough to identify COVID-19 positive patients at the time of admission. In recognition of this the Trust has introduced near-patient testing (through the provision of 12 Samba II machines) on the Bedford site that now assist in the identification of asymptomatic patients in a more timely fashion. The Samba II machines were not available at the start of the pandemic and were introduced first at Cambridge University Hospitals in early April and then rolled out nationally (in limited numbers) thereafter.

The Trust's testing programme currently includes testing all inpatients on first admission, and subsequently throughout their admission, all elective patients prior to surgery, and point prevalence testing of asymptomatic front line staff on a rolling basis.

Testing capacity at the hospital has improved markedly since the introduction of the Samba II machines and the increased capacity at both the Bedford and Luton & Dunstable labs the speed of aggregating results (including staff test results) has increased. However, testing throughput remains limited due to the current allocation of reagent compound, and the Trust is working closely with NHS England/Improvement to ensure the timely supply of reagents used by the Panther Test apparatus (the larger batch testing machines). Increasing the hospital allocation of reagent compound will enable Panther Test apparatus to be fully exploited and increase testing throughput to well in advance of the circa 400 tests/day anticipated.

The figures for Bedford Hospital COVID-19 testing capacity are summarised in the table below.

Test Demand	A&E Admissions c50/day	Inpatient Testing c50/day	Staff Testing c200/day	Total Demand c300 tests/day
Capacity	Samba II output 96 tests/day	Panther Machines c65 tests/day (on current reagent allocations)	Panther Machines c450 tests/day (requires 7 times more reagent allocations)	Current capacity c161 tests/day Potential capacity c546 tests/day

It is essential that adequate reagent is provided to the Trust if an adequate testing capability is to be sustained. Whilst additional resource has been made available to the hospital, it remains insufficient to service the anticipated demand.

Concerns were raised in the early phase that Bedford Hospital was routinely reporting circa 150 'patients isolated pending swab results', compared to circa 25 for the Luton and Dunstable Hospital. An investigation by the Trust confirmed that whilst both hospitals were swabbing patients in the same way, Bedford Hospital data included swab results outstanding for patients who were asymptomatic and screened on admission as well as those with suspected COVID-19, whereas the Luton and Dunstable data only included patients who were suspected to be COVID-19 positive. This was addressed by the trust.

One hospital outbreak of COVID-19 was reported in Bedford Borough at a private healthcare facility. The outbreak was reported to the PHE Heath Protection Team on the 9th April 2020. In total, 23 staff were reported to have symptoms, four of which tested positive for COVID-19. There were no confirmed cases among the hospital's patients. The outbreak was closed on the 7th of May, following 14 days of no symptomatic staff or patients.

Care homes

There are a total of 152 care settings in Bedford Borough that are being supported and monitored by the Council and its partners, including residential and nursing homes for older people (N=35), residential homes for people with learning disabilities and/or mental ill health (N=41), extra care housing (N=11), supported living (N=24) and domiciliary care providers (N=41). 78 of these settings are CQC registered care homes.

Care home outbreaks

Up until 15 July 2020 a total of 43 outbreaks and clusters had been reported in Bedford Borough's 78 CQC registered care homes (55.1%). In terms of the proportion of homes that have reported an outbreak Bedford Borough is ranked 8 of 12 local authorities within the East of England PHE Centre (rank 1 = 34.8% and rank 12 = 62.9%).

There were no statistically significant differences in the number of cases per case home, although it is important to note that this finding could be confounded if the size of care homes in Bedford Borough differs from the regional pattern.

Analysis provided some evidence to suggest that care home outbreaks in Bedford Borough are significantly longer than those of other local authorities in the East of England, and this this could be consistent with multiple seeding events as suggested by some of the epidemic curves.

However, when examining the distribution of interval length for Pillar 1, Bedford Borough is not an outlier when including care homes with a single case. A major difference between Bedford Borough and other local authorities in the East of England is not that the longest outbreaks are longer, but there are more care home with single cases and fewer care homes with short interval outbreaks (i.e. outbreaks where there are a small number of cases in a relatively short space of time). This could be due to differences in testing practices.

Supporting infection prevention and control in care homes

The Council is actively supporting the care sector to prevent COVID-19 transmission, and together with partners has taken the following steps:

- Regular communications regarding guidance, funding, staff wellbeing etc. have been sent directly to the care settings by the council throughout the pandemic.
- A clinical lead was identified for each care home on 29th May 2020, and they provide general support and a minimum weekly check in with each home.
- All care homes were offered training on donning and doffing PPE during May with 'mop up' sessions in early June, as part of the 'train-the-trainer' scheme led by Bedfordshire Clinical Commissioning Group.
- A multi-agency Bedfordshire Care Providers Operational Group was established on 28th April 2020 and meets weekly to review and plan for the effective management of outbreaks in care settings.
- Throughout the pandemic the Council has been supporting care providers with emergency PPE requirements if they have been unable to procure it from their normal routes.
- All care homes and residential living settings have been able to receive whole home testing since 8th June 2020.
- Domiciliary care providers will be offered free Infection Prevention and Control training by 31st July 2020.

Local care home surveillance

Care Homes notify Public Health England when they become aware of a new case (or cases) and the details are recorded PHE's HPZone case management system. They are not required to notify subsequent cases in an outbreak. The CQC requires care homes to complete a return every weekday, known as the Capacity Tracker, which includes information on the number of residents with COVID-19, bed capacity, workforce, PPE and resilience. Regular completion of the capacity tracker helps to ensure that local partners have the intelligence they need to ensure the safety and resilience of the care system. From the latest return, dated 17 July 2020, 37 homes (47%) had completed the tracker in the last 24 hours and a further 37 homes (47%) had completed in the last 7 days. Two homes (3%) had not completed it in the last week and two (3%) had never completed the tracker

In addition to notifications from PHE and monitoring the CQC activity tracker the Council Care Standards team has regular contact with all care home and home care providers, contacting each of them at least once a week and more frequently if required. The outcomes of the contact are recorded on a comprehensive dashboard which includes:

- Staffing sickness levels, whether staff are working across multiple establishments
- Whether the setting pays statutory sick pay
- Whether the home is open or closed and vacancy levels
- Cases suspected and confirmed, separately for residents and staff
- Date of last positive test in the setting
- Deaths, COVID-19 and non-COVID-19 related
- PPE levels, confidence in using PPE and the ordering processes
- Food levels
- Availability of and confidence in using medical equipment, e.g. thermometers and pulse oximeters
- Any other concerns or issues

The Council's Care Standards team also use relevant information that they receive from partners including the CCG and ELFT (the community health provider) to inform conversations with the care homes, for example following up with those that may not have attended infection prevention and control training or a swabbing seminar.

When care settings become aware of a positive case they inform the Care Standards team directly, which means they are already aware of the majority of notifications that they receive from PHE. The team will immediately contact the home to discuss what actions they have taken and will be taking, and to confirm that they are adhering to the relevant infection prevention and control guidance. The team also re-send the relevant guidance and flowcharts by email.

Domiciliary care staff and service users are at potential risk of COVID-19 transmission due to the nature of the close care provided and the requirement of staff to travel between service users' homes. Whilst they are not required to complete the CQC Capacity Tracker, domiciliary care, extra care and supporting living providers are contacted weekly by the Care Standards team to establish whether there have been any reported cases or service resilience issues. Weekly staff testing and four-weekly resident testing is being rolled out to all care homes by September, and government has committed to implementing whole-home asymptomatic testing for staff and residents in extra care and supported living settings. It is not yet clear whether government will implement a similar approach for domiciliary care staff and service users.

The Care Standards team has reported that homes have at times struggled with a lack of continuity in the support from the PHE Covid-19 Response Cell. The team also reported that the clarity and accuracy of the outbreak situation reports sent by PHE could be improved.

The public health team monitors the PHE East of England Daily Patch Report and confirms that the Care Standards team is aware of any newly identified outbreaks or clusters in care homes.

The Council does not presently have access to the data to undertake detailed analysis of care setting outbreaks based on data from, the CQC Capacity Tracker, local dashboard or PHE HPZone. Routine access to resident-level personal information on COVID-19 infection, illness or death is not currently accessible to the local authority. The Care Standards team, working with Public Health, is however able to maintain good situational awareness and respond quickly to care homes situations as they arise.

Workplaces

The Council has established a COVID-19 Infection Control Team, led by Environmental Health to promote safe working practices, deal with complaints and requests for assistance from employees and members of the public, and respond to reports of cases, clusters and outbreaks in local workplaces in Bedford Borough.

Limitations in the contextual data supplied by the NHS Test & Trace service can delay identification of likely workplace transmission. Businesses are being asked to notify cases, clusters and outbreaks to the Local Authority as well as PHE.

Environmental Health Officers have written to high risk workplaces (including warehouses and meat processing plants) to offer guidance and support. Working with the Public Health team the Environmental Health Officers have developed a set of COVID-19 Frequently Asked Questions for workplaces, outlining employer and employee responsibilities under Health & Safety legislation. An infection control checklist has also been produced for use by EHOs in the event of another local workplace outbreak. The first batch of National Action cards for businesses and other community settings were published on 24/07/2020[10].

Notable workplace outbreaks

20 cases at a very large distribution centre were confirmed between 01/04/2020 and 17/06/2020. Limitations in the workplace data received by PHE delayed notification of the outbreak to the Council, and so this critical information was not provided until RIDDOR reports[11] were received on 02/06/2020, alerting the Council to 11 employees that had tested positive to date. At that point effective action was taken by PHE, Bedford Borough Council and the employer to identify and exclude contacts and implement control measures.

Two outbreaks relating to East of England Ambulance Trust (EEAST) were reported. In June two cases were confirmed at the EEAST call centre. The ambulance trust carried out extensive contact tracing and 38 people were asked to self-isolate as a precaution (though at the time these were not notified to the Council). There was an earlier unlinked outbreak at the ambulance station, where there were four confirmed cases. Additional control measures were introduced following both incidents, and no further positive cases have been reported

Schools

[10] https://www.gov.uk/government/publications/reporting-outbreaks-of-coronavirus-covid-19
[11] Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013.

There were 2 outbreaks in Primary Schools. In the first there was 1 confirmed case. Their bubble comprising 9 children and 2 teachers was asked to self- isolate.

In the second there were 2 confirmed cases (the first reported on 13/6/2020) in different year groups. Two bubbles were advised to self-isolate which included 16 pupils and 4 teachers and a further bubble was sent home for operational reasons.

In summary for the range of settings, following analysis, there was no single focal point identified for the higher rate of COVID-19 infection in Bedford Borough. Cases from health and care, occupational, institutional and educational settings did not contribute disproportionately to the pattern of infection. Instead there are multiple contributory causes and sociodemographic factors that must be accounted for in the local response. As such, and conscious of these multiple factors, partners implemented a series of actions including an enhanced communications and engagement plan targeting specific groups to try and mitigate risk.

4. What interventions did we put in place?

A comprehensive series of recommendations were made in the initial findings, most with completion dates in June; these were grouped against the following themes;

- Reliability of lab confirmed infections data
- Sociodemographic factors associated with transmission
- Current pattern of COVID-19 infection
- Focal points for transmission - Hospital
- Focal points for transmission – Care homes
- Focal points for transmission – Workplaces
- Focal points for transmission – Community
- Testing availability
- Overarching

These actions are shown below with their current status. As can be seen, significant progress has been made in implementation of the actions.

Crucially, given the high rate and the concerns raised, alongside the epidemiological, testing and data actions an enhanced series of targeted communications and engagement actions (under Action 3) were also agreed and implemented immediately and these are described in more detail following.

Table 1

Theme	Action	Owner	Status 21 July
Reliability of laboratory confirmed infections data	1. Bedford Hospital negative tests will be uploaded to PHE database.	Bedford Hospital / PHE	Completed 16 July
Sociodemographic factors associated with transmission	2. Ongoing review of Google Mobility trends and consideration of novel data sources and advanced analytical approaches that could support the local area.	Joint Biosecurity Centre	The JBC Data Team is finalising a comparative report comparing soci-economic factors related to COVID-19 transmission across 4 UTLAs. Report expected to be released by 31 July.
	3. Ensure targeted communications and engagement based on possible contributory sociodemographic factors.	All partners through the Communications and Engagement workstream	See section below. Approach should continue in future communications and engagement activities.
Current pattern of COVID-19 infection	4. Improve the completeness of ethnicity data, for example, by linking testing data to Hospital Episode Statistics.	PHE	Linkage to HES has been completed and the ethnicity within the epidemiological report provides this breakdown. Nationally there will be further work to continue to improve completeness.

Focal points for transmission - Hospital	5. The additional 12 SAMBA II machines, together with the additional personnel, be made operational.	Bedford Hospital	Completed 26th June and the machines are fully operational.
	6. Reporting of swabbing data to be reviewed.	Bedford Hospital	Completed but under constant review. Processes have been revised to ensure that swabs are reported.
	7. Additional supplies of the reagent compound be procured so to enable the testing capability to be maximised.	Bedfordshire CCG	This remains a significant risk and is carried forward in further recommendations (24)
	8. Establish an epidemiological database of COVID-19 cases, based on the data set from the Deep Dive. This will utilise the PHE Epidata database with support from PHE.	Bedford Hospital	Completed. The hospital elected to use its own database rather than PHE's Epidata database.
	9. Increase plotting of COVID19 patient care ward movements of all cases retrospectively and prospectively.	Bedford Hospital	Actioned and ongoing.
	10. Continue to identify all transmission events and act to mitigate, having regard to the assistance provided during the Deep Dive in plotting time relations of COVID19 cases.	Bedford Hospital	Actioned and ongoing.
	11. Ensure that a process of rapid testing of patients is introduced.	Bedford Hospital	Completed 26th June.
	12. Continue to review and monitor the training and usage of PPE as part of ongoing good practice.	Bedford Hospital	Ongoing programme.
Focal points for transmission – Care homes	13. Establish whether any further enhancements to care home surveillance can be identified.	Bedford Borough Council N.B: with support from PHE	Completed. New recommendations identified for the final report.
Focal points for transmission – Workplaces	14. Establish more timely and informative sharing of data from NHS Test & Trace.	PHE	The council is now receiving a daily data file from PHE. Work to improve data quality is ongoing at a regional and national level.
	15. Establish whether any further enhancements to workplace surveillance information sharing can be identified.	Bedford Borough Council and PHE	Ongoing, target date for completion 14 August 2020.

Focal points for transmission – Community	16. Ensure based on the emerging guidance that processes are aligned so as to improve cluster detection and new transmission networks in the community.	Bedford Borough Council and PHE	The updated PHE epidemiological analysis identifies household clusters. Cluster analysis of postcode data to inform local action will be an ongoing programme of work.
Testing availability	17. Review the availability of access to the Military Mobile Test Units so as to provide maximum availability.	Bedfordshire LRF Community Settings Testing cell	Ongoing via BLRF.
Overarching	18. All partners cited in this document are to hold each other to account and ensure that actions are completed.	All partners	Through the Deep Dive Oversight Board.

Effective communications and engagement was essential to the response, encouraging willing compliance for residents.

The Communications and Engagement workstream was established to review current initiatives to assess whether community behaviours were contributing to a differential pattern of COVID-19 in Bedford Borough and also to raise awareness of the increase in Coronavirus infection rates in Bedford Borough and to engage with local communities to encourage compliance of local guidance around COVID-19.

The approach adopted in the plan had the following aim, delivered over three phases:

- Assess whether community behaviours may be contributing to a differential pattern of COVID-19 in Bedford Borough;
- Encourage residents in Bedford Borough to stay home and observe stringent infection control measures as a result of increased infection rates in the Borough;
- Build confidence in the handling of COVID-19 by accurately communicating the process and findings from the 'deep dive' to residents;
- Influence national messaging to support more localised narratives around outbreaks and potential outbreaks.

A shared narrative was agreed between partners at the start of the 'deep dive' which formed the basis for the communications messaging, especially in the initial phase of awareness raising, and around the findings of the interim report.

A number of 'trusted voices' were asked to become spokespeople for the 'deep dive' to ensure messages reached the community. These included

- The Mayor of Bedford Borough, Dave Hodgson,
- Councillor Louise Jackson, Portfolio Holder for Public Health and Wellbeing,
- Dr Roshan Jayalath (Kings Street Surgery), a number of other GPs for affected wards, and
- Local celebrities including Top Gear's Rory Reid (Kempston Resident) and former Oakley resident and long distance runner, Paula Radcliffe MBE.

A number of different channels were used to disseminate the message and partner agencies took a joined-up approach to cross-promoting material, so there was consistency of message and additional impact delivered.

In phase one, communications activity included:

Table 2

What?	Who?	When?
National media The Times, CNN, Sky News, i-newspaper, Telegraph, Press Association	Subscribers	30 June
Regional news programmes ITV Anglia / BBC Look East	All residents	14 June, 16 June, 22 June, 23 June, 25 June, 26 June, 30 June, 1 July, 2 July, 7 July
Local radio including In2beats, BBC 3 Counties Radio and Heart FM	Specific community groups	16 June, 19 June, 30 June, 2 July, 3 July, 7 July
Online media – Bedford Independent articles Bedford Times And Citizen Cranfield & Marston Vale Chronicle	All residents	19 June, 20 June, 24 June, 28 June, 30 June, 3 July, 6 July
Mosque Radio Transmitters	Muslim Community	19 June 26 June
Elected Member Social media and WhatsApp groups	Community groups, faith groups	29 June
Bedford Borough Council E-newsletters	Subscribed Residents	19 June, 22 June, 25 June, 3 July, 7 July, 10 July
Social media messaging, including advertising	All residents	
Email distribution letters	Care homes	
Snapchat creative	Young people	26 June
Instagram	Young people	26 June
Video message from Dr Roshan Jayalath – encouraging people to take care because of relaxing of lockdown rules	All residents	13 June
Posters, social media and newsletters via BPHA	Housing association tenants	
Voluntary sector engagement	Bedford CVS- 1083 community and voluntary sector organisations	
Bedfordshire Alert	Bedford Borough residents signed up to receive alerts from the emergency services – (circa.20k residents)	25 June
Internal communications messaging	Bedfordshire Hospitals NHS Foundation Trust staff	Throughout

Throughout the campaign there was significant reach and engagement across partners social media platforms and extensive coverage in local and regional and national media. Together these mediums engaged with local residents and sparked discussions as demonstrated through social media commentaries, showing an awareness of the current situation in Bedford Borough.

Significantly, there didn't appear to be anything from a community behavioural perspective that was contributing to a higher rate of infection in Bedford Borough and that largely the community were very compliant to observing government guidelines. Whilst there appears to be no evidence that there was anything contributory to a higher infection rate, the Communications and Engagement workstream decided to generate a more intense campaign to mitigate any risk and to help drive home awareness within the community. Following this anecdotal reports from the Police on 'Super Saturday' were that residents were acting responsibly and there was no need for the Police to educate, engage and encourage residents to follow local guidance.

5. What further actions were undertaken?

Hospital tracking

As the deep dive progressed and greater knowledge and learning was acquired, further actions and interventions were put in place.

Since the initial findings the Trust has, with PHE Field (Epidemiology) Service East of England, worked to develop an innovative tool that allows the Trust to track patients in near real time and support: visualisation of patients' COVID status; visualisation of screening activity per ward; sharing of data with wards and clinical staff; epidemiological analysis.

Data can now be combined into an automatically generated, shareable timeline and ward movement depiction tool. This allows:

i) Visualisation of patient placement on the ward now, and their SARS-CoV-2 status;
ii) Visualisation of per patient timelines, including SARS-CoV-2 status, and screening activity;
iii) Visualisation of screening activity per ward;
iv) Sharing of this data to ward matrons and senior nursing staff, as well as Infection Control Teams and Site Teams. This is currently being rolled out.
v) An integrated data set suitable for more complex epidemiological analyses has been developed and is maintained on a daily basis.

Collectively these elements represent an important component of maintaining situational awareness going forward.

Communications and engagement

As phases two and three of the communications and engagement plan were rolled out, the messaging was evolved to take account of the findings of the study team, to ensure a responsible, accurate and informed tone and balance was struck.

Further pre-active targeted communications was undertaken;

- To engage with community leaders to enlist their support in communicating with different groups and the seldom heard who may not be following the guidance or in an 'at risk' group;
- Bespoke targeting of communities as the data uncovered which parts of the community was most at risk.

The following channels were used;

Table 3

What?	Who?	When?
Facebook and Twitter	All residents / community groups	Throughout
Trusted Voices – Paula Radcliffe video	All residents / young people	Throughout
Trusted voices –Rory Reid video	All residents	Throughout
Videos from local politicians including Mayor Dave Hodgson,	All residents	Throughout

Cllr Louise Jackson and Mohammed Yasin MP		
Shared messaging with councillors to share via their channels, including WhatsApp	Community groups	Throughout
Videos in BSL and different languages Inc. Urdu, Bengali, Guajarati, Romanian, Italian, Polish.	Community groups	25 June – 11 July
Press release ahead of Super Saturday and videos from GPs, Mayor and Chief Constable	All residents	4 July
Face coverings campaign to encourage take up	All residents	23 June – 30 July
Internal communications messaging such as: • Updates on local situation • Tailored guidance for all staff on wearing face masks (mainly applicable to staff working in non-clinical areas that were unfamiliar with the need to wear face masks	Bedfordshire Hospitals NHS Foundation Trust staff	Throughout

As at 21 July we have seen the following 'reach' from the social media activities targeted in Bedford Borough:

Why We Wear Ours

Twitter	Facebook	Instagram
47,560	111,758	2,434

Easing of lockdown

Twitter	Facebook	Instagram
8,206	124,095	393

Social distancing ONLY

Twitter	Facebook	Instagram
10,796	42,669	143

Stay Alert guidelines / coronavirus is still in our communities (Inc. social distancing)

Twitter	Facebook	Instagram
47,843	200,538	729

These are positive figures and recognise the scale and scope of the communications and engagement undertaken by the partners and in particular the communications teams within the Council, Hospital and CCG.

Further details of the communications activities can be found in **Appendix 3**. Communications and Engagement activities continue to be a key focus and will remain so during and beyond the pandemic.

6. Conclusion and further recommendations

Analysis of the deep dive data has not identified a single focal point for the higher rate of COVID-19 infection in Bedford Borough. Instead there are multiple potential contributory sociodemographic factors that must be accounted for in the local response.

Whilst outbreaks and clusters of cases have been reported in a number of settings, no specific settings or communities appear to account disproportionately for the higher incidence of COVID-19 overall, with most contacts exposed to cases within the household setting and to household visitors.

The Deep Dive provided an opportunity for enhanced collaborative, multi-agency working at local, regional and national level, underpinned by systematic epidemiological analysis and experiential learning.

Good progress on the actions and recommendations arising from the earlier phases have been made (see sections 4 and 5) and a number of these including testing, hospital processes, communications and engagement will continue to be progressed.

Further recommendations for partner organisations are;

Theme	Action	Owner
Communications and Engagement	19. Continue strengthening multi agency communications and engagement to ensure that local guidance is communicated to support awareness and encourage behaviour change.	Local Outbreak Control Group[12]
	20. Increased engagement with community cultural and faith leaders to ensure we reach seldom heard groups and use trusted voices to communicate the message.	Local Outbreak Control Group
	21. Engagement with neighbouring CCGs and upper tier councils to share learning, resources and best practice; to support other affected areas, where possible.	Local Outbreak Control Group
	22. Establish community champions to engage with our BAME communities as 'trusted voices'.	Local Outbreak Control Group
Testing	23. Continue to ensure sufficient testing capacity across the system.	Local Outbreak Control Group
	24. Ensure sufficient supply of reagent to the hospital.	Bedfordshire Clinical Commissioning Group
Data sharing	25. Build on the work sharing data and information and routinely disseminate timely and robust data.	Local Outbreak Control Group
Care homes and domiciliary care	26. All Care homes should complete, on a daily basis, the CQC Capacity Tracker.	Care Homes
	27. PHE will work with Care Standards and Public Health to improve the clarity and accuracy of the Care Home Situation reports that are sent in the event of an outbreak.	PHE and Bedford Borough Council

[12] The multi-agency officer group responsible for implementing the Local Outbreak Control Plan. See https://www.bedford.gov.uk/covid19 for the Local Outbreak Control Plan including governance arrangements.

Care homes and domiciliary care	28. Government to confirm its approach to asymptomatic testing of domiciliary care staff and service users, including testing of directly employed carers and those they care for.	Government
Workplaces	29. Improve the collection of contextual data from the NHS Test & Trace programme including routine identification of workplace.	Government
Outbreak control	30. All outbreaks, including those in healthcare settings and workplaces e.g. hospitals, ambulance trusts, are reported to the Director of Public Health in line with the new responsibilities that UTLAs have in relation to Local Outbreak Control Plans. This will include notification of staff self-isolation.	All partners

Public Health England

Appendix 1

Epidemiology of laboratory-confirmed COVID-19 cases in Bedford Borough, East of England

File information:

- Rendered on July 20 2020 at 12:33 for data reported up to 9:00am on July 19 2020.
- Counts below 5 have been suppressed
- For queries regarding this report please email EFEU@phe.gov.uk

Data sources

Data are derived from HPZone, SGSS, and the Unified Dataset. The cleaned PHE COVID-19 daily linelist is prepared by PHE EpiCell.

Summary

Bedford Borough Council in the East of England, has a higher cumulative rate of laboratory confirmed cases (754.6 per 100,000) than the East of England (386.9) and England (453.0). For recent data, Bedford Borough has the 42nd highest 7-day incidence rate in England (9.9 per 100,000).

The number of laboratory confirmed cases of COVID-19 peaked in late April and has declined overall since, however, there were two periods when the number of cases started to increase again, first in mid-May and then again in mid-June. Since then, case numbers have been declining

In recent weeks, most laboratory confirmed cases have been diagnosed through Pillar 2. There has been a decrease in the number of cases diagnosed through pillar 1 since mid-June.

Since the end of May, Bedford Borough has a higher rate of persons tested per 100,000 population than seen regionally and nationally, except for the most recent week when the testing rates are all similar. In recent weeks, there has been an overall decrease in persons tested per 100,000 in Bedford Borough, whereas there has been a recent increasing trend in the East of England and England.

The positivity rate in Bedford Borough has been consistently higher than the regional and national (England) rates, but has declined in recent weeks, with the difference between Bedford Borough and the regional and national rates lessening.

Over the last 14 days (5th to 18th July), the most common age groups of male cases were 30-39 and 60-69 years old. For female cases, the most common age groups were 20-29 and 30-39.

The majority of COVID-19 cases diagnosed in Bedford Borough are of White ethnic background and there was an increase in the proportion of Asian ethnic background in the 7-day period between 1st to 7th July. However, in recent weeks, a high proportion of cases had unknown/missing ethnicity.

Over the pandemic, Harpur ward in Bedford has the highest cumulative rate of cases. In the most recent week, Elstow and Stewartby had the highest rate of cases, followed by Kempston Rural. Large areas of Bedford Borough have not seen any cases in the past 14 days.

In the last 14 days, there have been 2 outbreaks reported to the East of England Health Protection Team, 1 in a school and 1 in a care home. Of the 7 cases that a cluster has been identified for in the last 14 days, all were associated with a residential dwelling.

Conclusions

- Although Bedford Borough has historically had higher case rates than seen regionally and nationally, case rates have been decreasing over recent weeks
- Most recent cases are of working age and are resident in wards of the Bedford urban area
- Most contacts are exposed to cases within the household setting and to household visitors, with exposures elsewhere remaining very low

Exceedance detection

Note on interpretation: Not all exceedances will require public health action. Daily exceedances should be considered alongside other available indicators.

Bedford Borough has an exceedance rating of GREEN, based on combined Pillar 1 and 2 case data for the 14 day period from July 5 2020 to July 18 2020. The most recent four days are subject to reporting delay, so care is required in interpreting these as they are liable to change as more data is reported.

Figure 1. Time-series plots for Bedford Borough (combined Pillar 1 and 2 data) The red line is the 99% threshold, the blue line is the expected or average number of cases per 100 tests each day which is predicted from the regression model. The grey line and points are the observed number of cases per 100 tests in the baseline period, i.e. the six weeks of data that are used in the exceedance algorithms regression model. The black line and points are the observed number of cases per 100 tests in the 14-day investigation period. The orange points are the observed number of cases per 100 tests in the last four. The green dashed line is the total number of tests (pillar 1 and pillar 2 tests combined) each day in the LTLA.

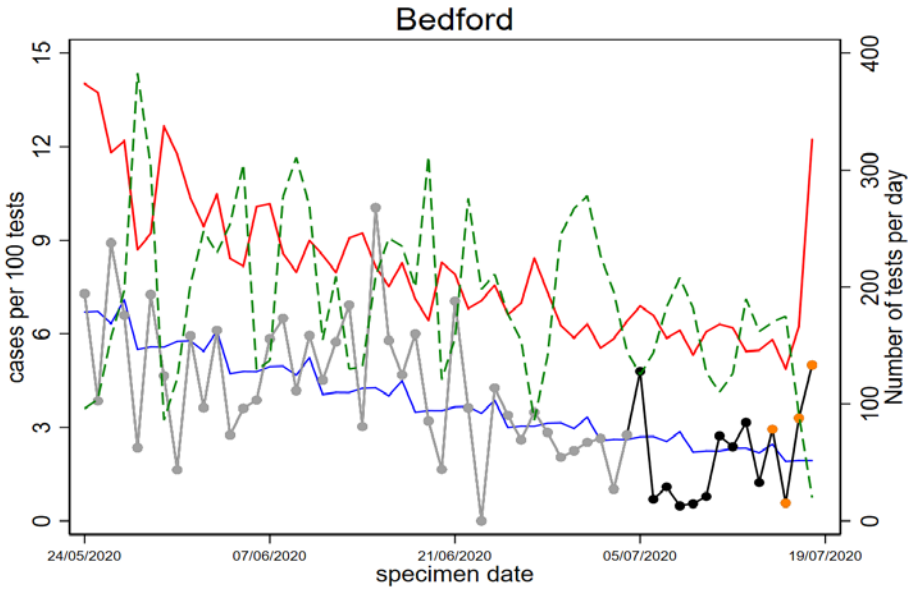


Table 1. RAG rating and outcome of exceedance algorithm The table shows O = Observed cases over the 10-day investigation period; E = Expected cases over derived from a forecast from the log-linear quasi-Poisson model used in the exceedance algorithm; mean X = The average of the 10 daily exceedance scores Xi; max X = The maximum daily exceedance score (Xi) over the 10-day investigation period; O>T = number of days during the 10-day period where the observed number of reported cases (O) is above the threshold T (upper one-sided 99% prediction limit); O>E = The number of days during the 10-day period where the observed number of reported cases is above the forecast expected (average) number derived from the model used in the exceedance algorithm; IRR = Estimate of the relative change each day in the number cases from the log-linear quasi-Poisson model; 95% CI = 95% confidence interval around the estimated incidence rate ratio (IRR).

RAG	Observed (O)	Expected (E)	mean X	max X	No. days O exceeds Expected	No. days O exceeds Threshold	IRR	lower 95% CL	upper 95% CL
GREEN	36	47.78	-0.12	0.5	7	0	0.92	0.874	0.969

Comparison to other LTLAs

Table 2. Rate of COVID-19 per 100,000 per week in most recent 7 day period with complete data (July 8 2020 to July 14 2020) and prior 7 day period (July 1 2020 to July 7 2020), for 5 LTLAs with highest rate in most recent week and Bedford Borough *4 most recent days excluded due to reporting delays. Relative change based on incidence rate ratio p value <0.05*

Rank (Highest incidence)	LTLA	Region	Rate per 100,000 population			
			Prior 7 days (2020-07-01 to 2020-07-07)	Most recent 7 days (2020-07-08 to 2020-07-14)	Absolute difference	Relative change
1	Leicester	East Midlands	126.1	96.6	-29.5	Decrease
2	Blackburn with Darwen	North West	38.3	51.7	13.4	=
3	Pendle	North West	49.2	45.9	-3.3	=
4	Oadby and Wigston	East Midlands	35.1	45.6	10.5	=
5	Herefordshire, County of	West Midlands	2.1	45.3	43.2	Increase
42	Bedford Borough	East of England	16.3	9.9	-6.4	=

Case numbers and rates

As of 9:00 on July 19 2020, 1295 COVID-19 cases have been reported in Bedford Borough; 754.56 per 100,000 population. 36 have been reported in the prior 14 days: 10 from Pillar 1 testing and 26 from Pillar 2.

Note on interpretation: Data is deduplicated to one count per person. Some pillar 2 duplicates remain (multiple tests per person) which may overestimate count and rate of persons tested and underestimate positivity.

Table 3. Number and rate per 100,000 population of confirmed cases and persons tested, and positivity in Bedford Borough, East of England, and England (up to July 18 2020)

Period	Area	Pillar	Cases	Tests	Cases per 100,000	Persons tested per 100,000	Positivity
Most recent 14 days	**Bedford Borough**	**Pillar 1**	**10**	**654**	**5.8**	**381.1**	**1.5**
		Pillar 2	**26**	**1359**	**15.1**	**791.9**	**1.9**
		Total	**36**	**2013**	**21.0**	**1172.9**	**1.8**
	East of England	Pillar 1	163	26671	2.5	412.2	0.6
		Pillar 2	489	42377	7.6	655.0	1.2
		Total	652	69048	10.1	1067.2	0.9
	England	Pillar 1	1525	226898	2.7	405.3	0.7
		Pillar 2	5655	428404	10.1	765.3	1.3
		Total	7180	655302	12.8	1170.7	1.1
Total	**Bedford Borough**	**Pillar 1**	**828**	**6203**	**482.5**	**3614.3**	**13.3**
		Pillar 2	**467**	**10081**	**272.1**	**5873.9**	**4.6**
		Total	**1295**	**16284**	**754.6**	**9488.2**	**8.0**
	East of England	Pillar 1	16176	197148	250.0	3047.2	8.2
		Pillar 2	8858	306306	136.9	4734.4	2.9
		Total	25034	503454	386.9	7781.6	5.0
	England	Pillar 1	163146	1716999	291.5	3067.3	9.5
		Pillar 2	90438	2710590	161.6	4842.3	3.3
		Total	253584	4427589	453.0	7909.6	5.7

Figure 2. Numbers of daily persons tested for COVID-19 cases over time in Bedford Borough, by specimen date (up to July 18 2020) *4 most recent days subject to reporting delay - indicated by grey background*

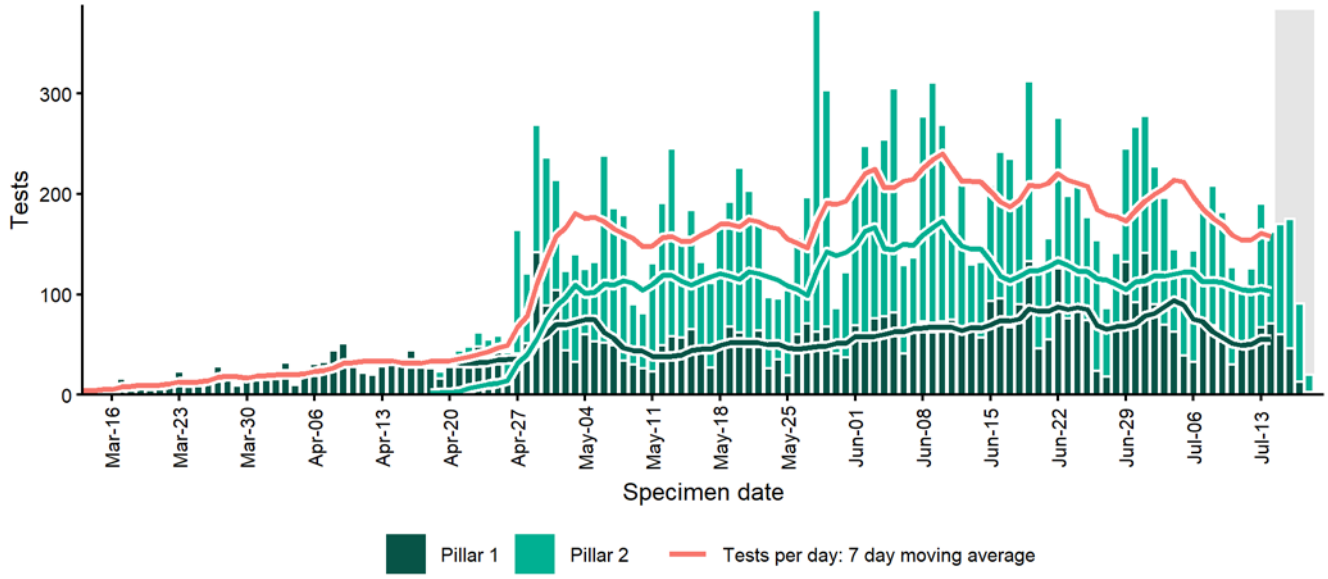
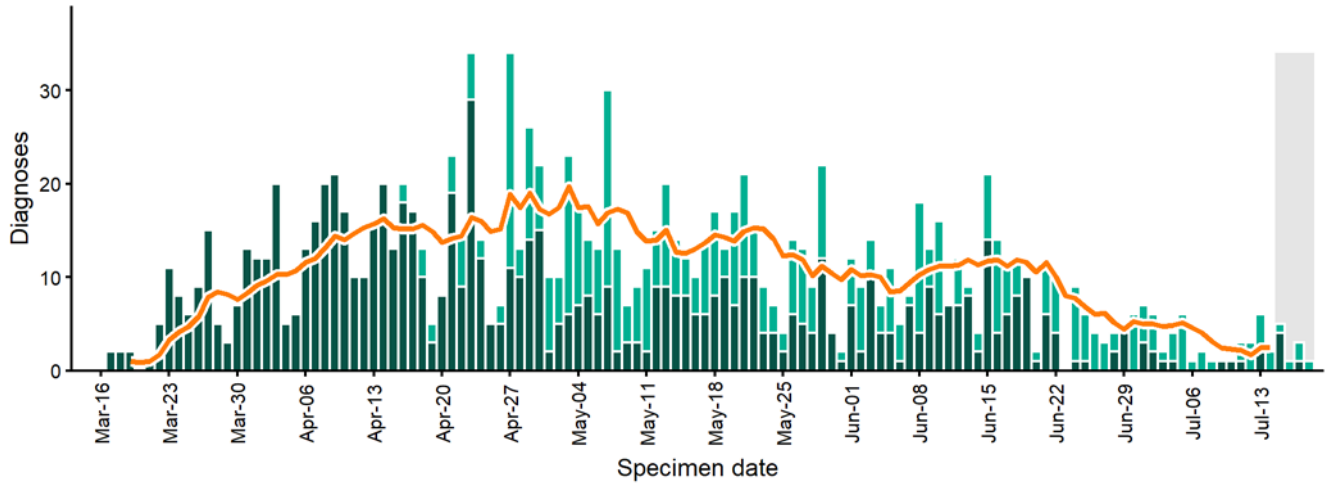


Figure 3. Epidemic curve of daily confirmed COVID-19 cases over time in Bedford Borough, by specimen date *4 most recent days subject to reporting delay - indicated by grey background*

A) March 13 2020 to July 18 2020



B) July 5 2020 to July 18 2020

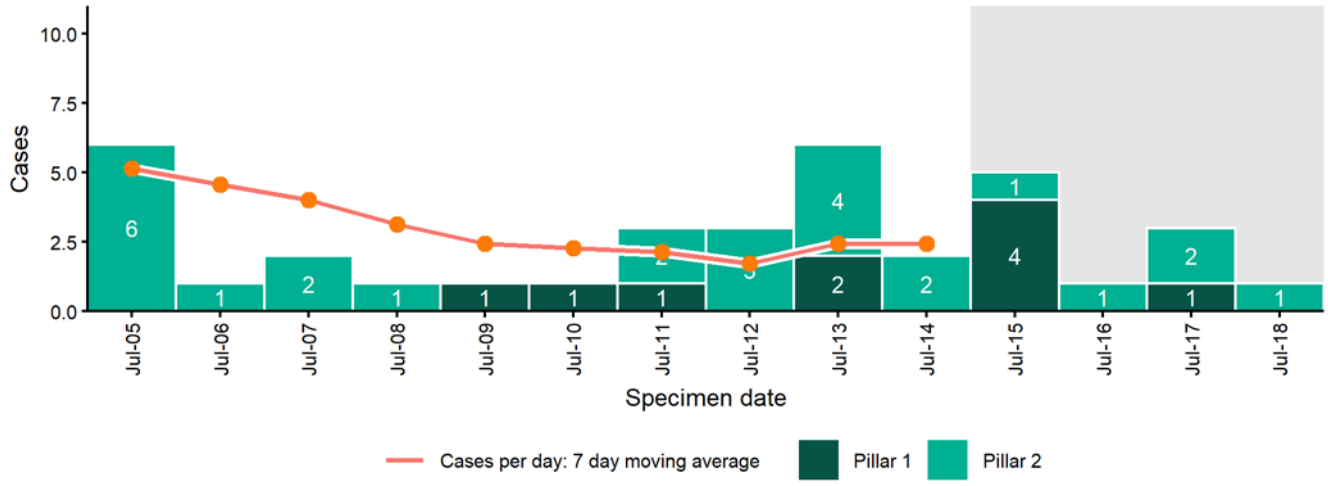


Figure 4. Persons tested and cases diagnosed per 100,000 population and positivity (%) per week in Bedford Borough by pillar (May 5th 2020 to July 14 2020) *4 most recent days subject to reporting delay. May 5th starting point due to expansion of testing from this time*

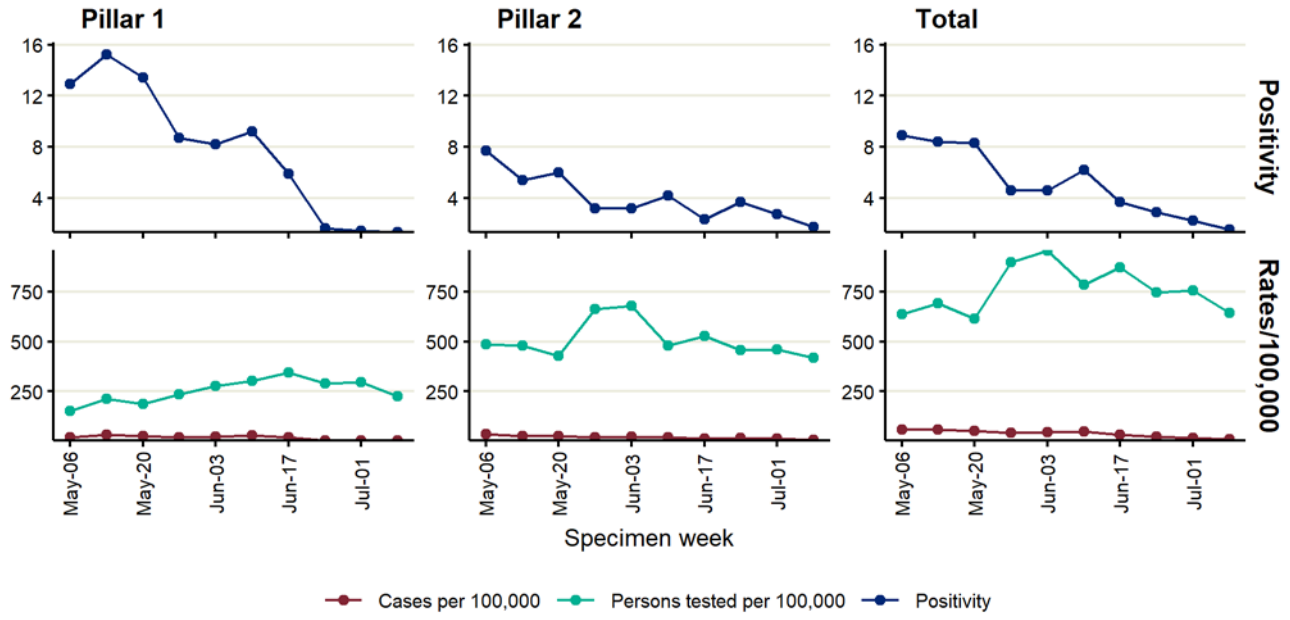
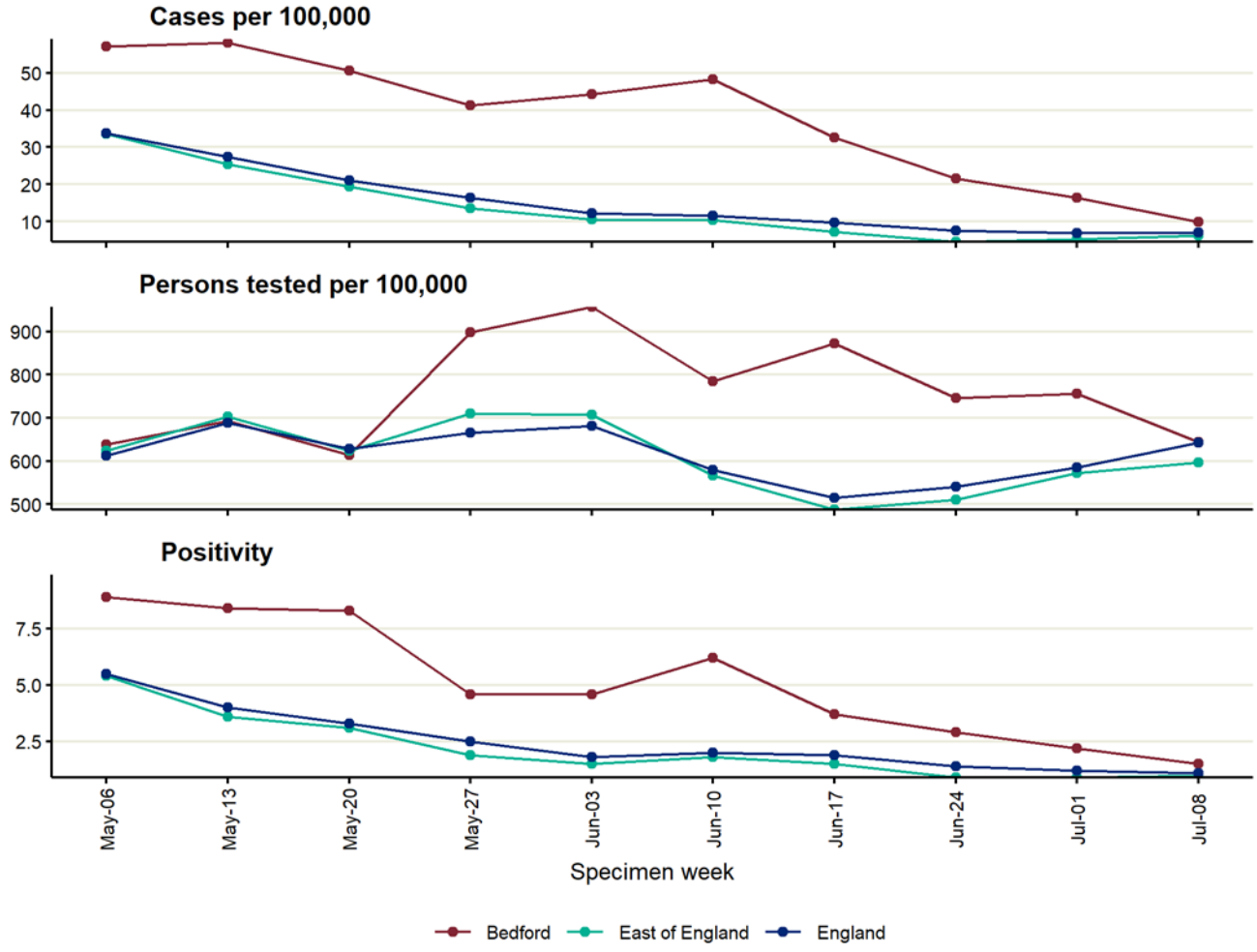


Figure 5. Persons tested and cases diagnosed per 100,000 population and positivity per week in Bedford Borough, East of England, and England (May 5th 2020 to July 14 2020) *4 most recent days subject to reporting delay. May 5th starting point due to expansion of testing from this time*



Demographic characteristics of confirmed cases

Figure 6. Age-sex pyramid for confirmed cases in past 14 days (July 5 2020 to July 18 2020) and prior (March 13 2020 to July 4 2020) *Age-sex pyramid by pillar in Appendix*

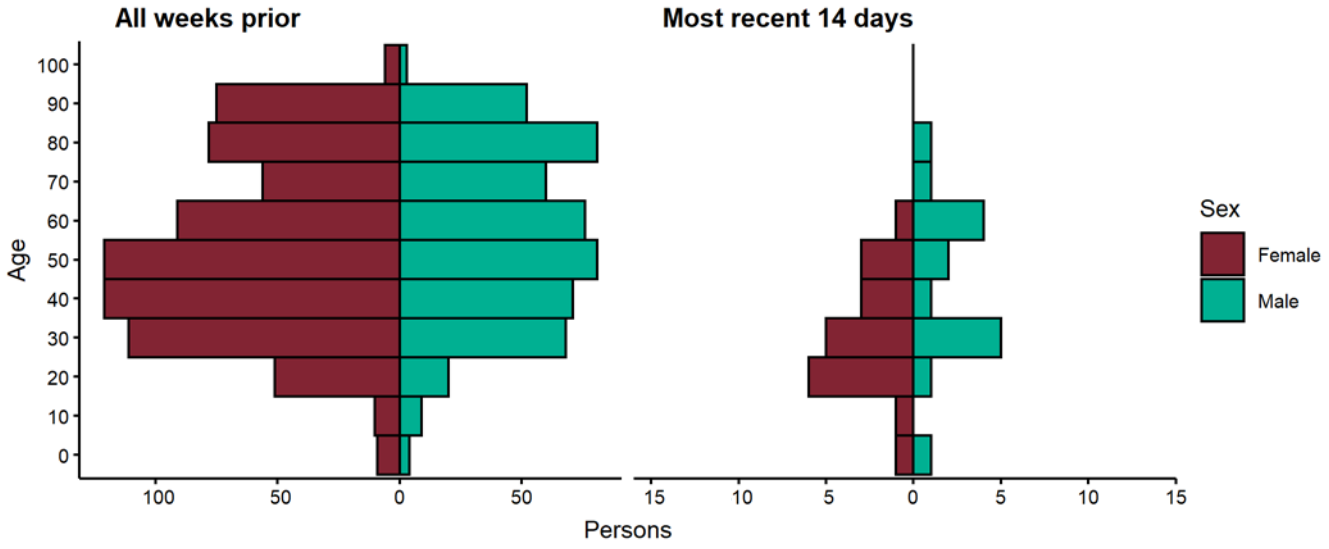


Figure 7. Epidemic curve of daily confirmed COVID-19 cases over time in Bedford Borough by age group (March 13 2020 to July 18 2020)

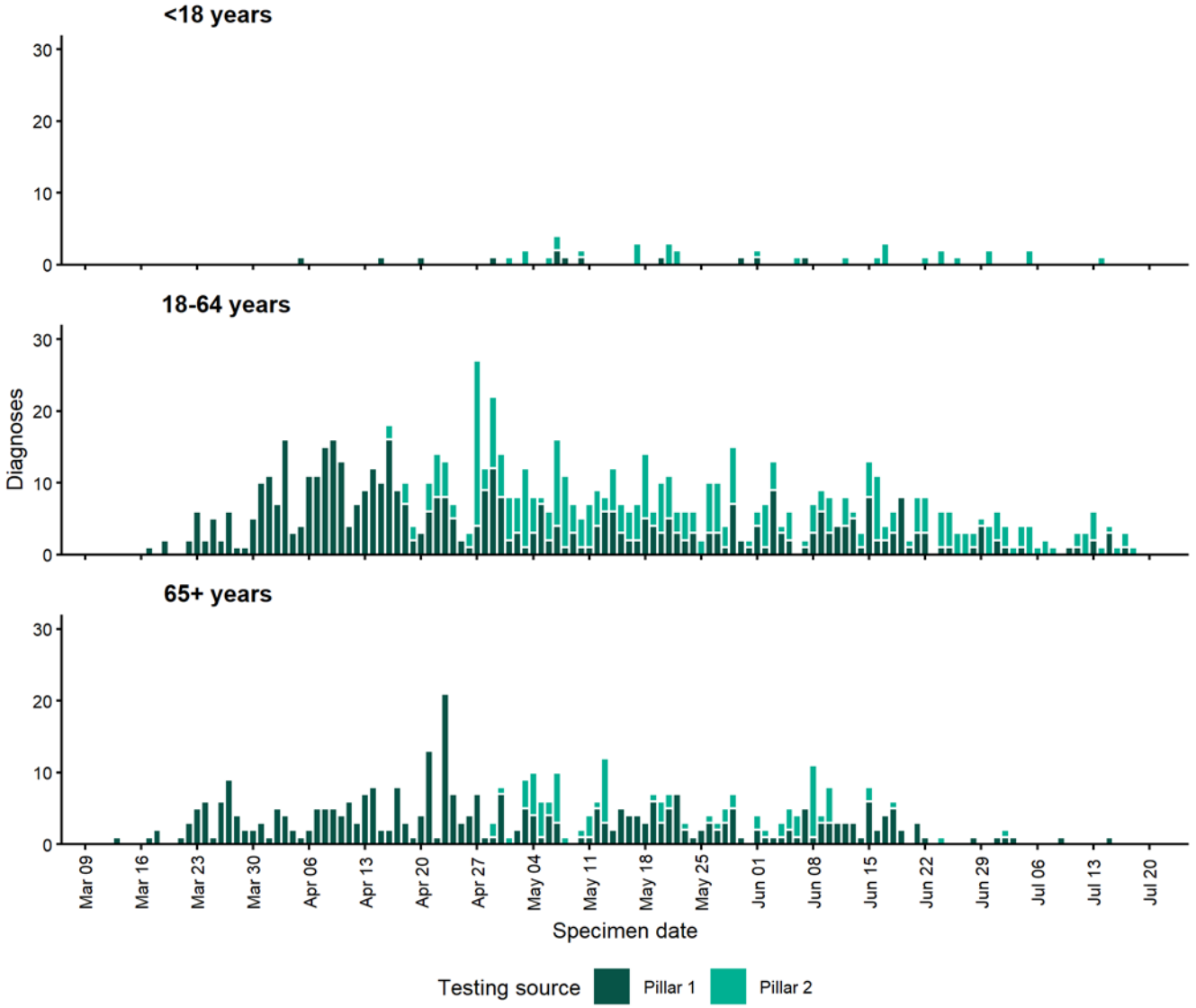


Figure 8. Weekly distribution of ethnic groups among confirmed cases in Bedford Borough, last 6 weeks
Most recent bar is 4 days subject to reporting delay, all other bars are complete 7 day periods. Denominator printed on top of bars

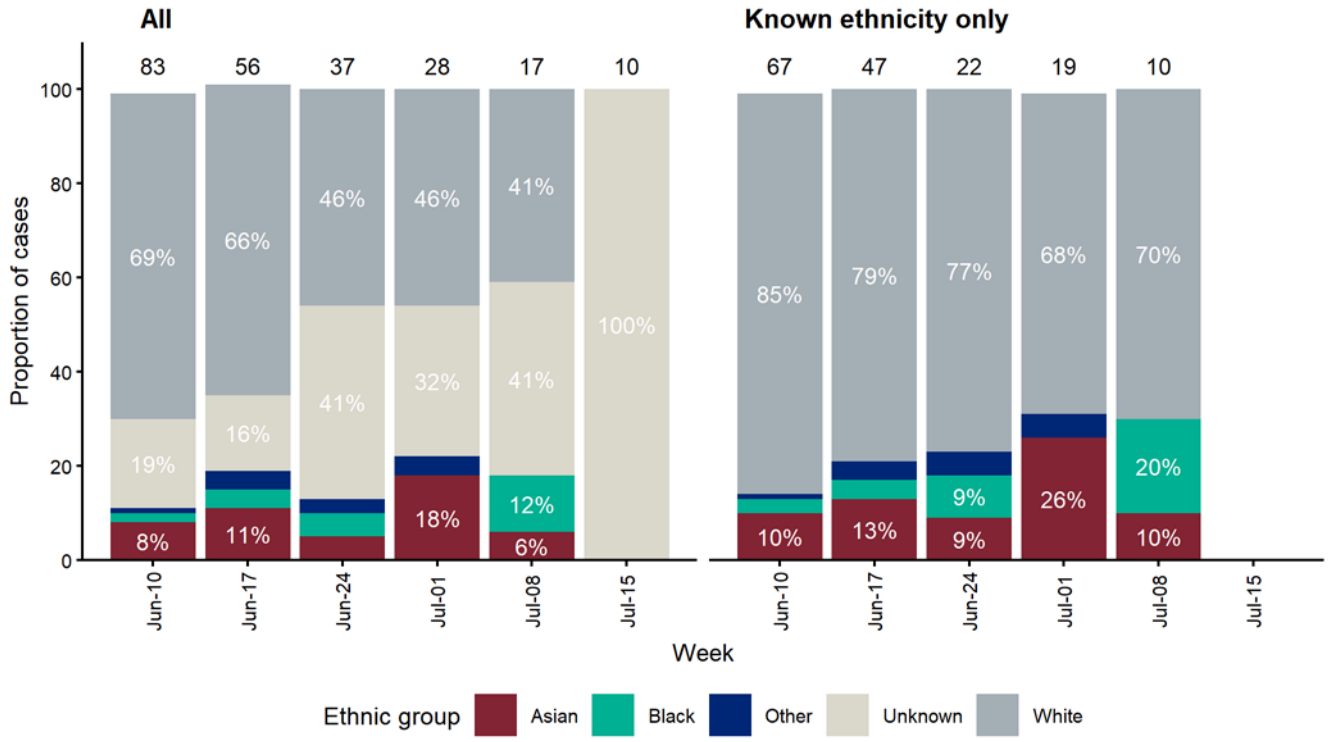
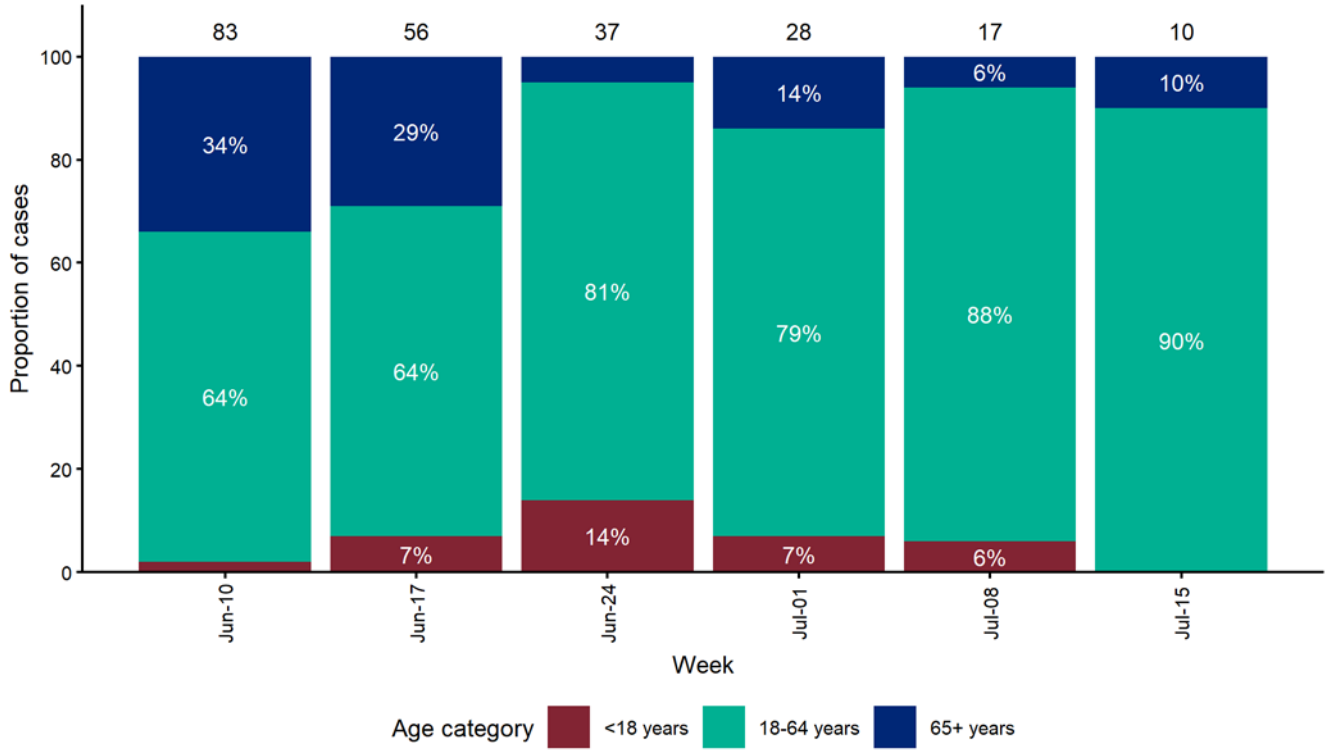


Figure 9. Weekly distribution of age groups among confirmed cases in Bedford Borough, last 6 weeks
Most recent bar is 4 days subject to reporting delay, all other bars are complete 7 day periods. Denominator printed on top of bars



Location of residence of cases

Table 4. Rate of COVID-19 per 100,000 per week in most recent 7 day period with complete data (July 8 2020 to July 14 2020) and prior 7 day period (July 1 2020 to July 7 2020), for wards in Bedford Borough *4 most recent days excluded due to reporting delays. Relative change based on incidence rate ratio p value <0.05 - please interpret carefully as increases or decreases to rates in some areas may be deemed insignificant (represented by "=") at ward level but may still represent increases due to local outbreaks. Table ordered by ward with highest to lowest rate.*

Rank (Most recent rate)	Ward	Total		Prior week (2020-07-01 to 2020-07-07)		Most recent week (2020-07-08 to 2020-07-14)		Change in rate between two weeks	
		Cases	Rate	Cases	Rate	Cases	Rate	Absolute difference	Relative
1	Elstow and Stewartby	37	861.9	0	0.0	*	*	*	=
2	Kempston Rural	38	596.1	*	*	*	*	*	=
3	Cauldwell	119	1086.9	0	0.0	*	*	*	=
4	Oakley	12	324.4	0	0.0	*	*	*	=
5	Harrold	13	311.7	0	0.0	*	*	*	=
6	Clapham	31	673.2	0	0.0	*	*	*	=
7	Wilshamstead	29	553.1	0	0.0	*	*	*	=
8	Wootton	25	457.2	0	0.0	*	*	*	=
9	De Parys	71	1019.5	*	*	*	*	*	=
10	Castle	75	898.2	*	*	*	*	*	=
11	Harpur	141	1620.3	5	57.5	*	*	*	=
12	Queens Park	76	816.2	10	107.4	*	*	*	Decrease
13	Goldington	57	591.3	*	*	*	*	0.0	=
14	Brickhill	52	648.4	*	*	0	0.0	*	=
15	Bromham and Biddenham	33	497.5	*	*	0	0.0	*	=
16	Eastcotts	32	715.7	*	*	0	0.0	*	=
17	Great Barford	53	646.4	0	0.0	0	0.0	0.0	=
18	Kempston Central and East	54	759.8	0	0.0	0	0.0	0.0	=
19	Kempston North	33	889.5	0	0.0	0	0.0	0.0	=
20	Kempston South	60	1507.9	0	0.0	0	0.0	0.0	=
21	Kempston West	30	466.9	0	0.0	0	0.0	0.0	=
22	Kingsbrook	82	846.2	*	*	0	0.0	*	=
23	Newnham	36	459.9	0	0.0	0	0.0	0.0	=
24	Putnoe	44	634.2	0	0.0	0	0.0	0.0	=
25	Riseley	22	646.5	0	0.0	0	0.0	0.0	=
26	Sharnbrook	19	494.3	*	*	0	0.0	*	=
27	Wyboston	21	582.2	0	0.0	0	0.0	0.0	=

Outbreaks, clusters, and exposures

Clusters are identified using two different methods:

- **Residential clusters** based on case address (identified by Epicell cluster team): Defined as two or more COVID-19 confirmed cases in the same property within 14 days of each other. Property classifications are derived from matching residential address of cases to Ordnance Survey AddressBase, which provides a unique property registration number (UPRN) and property type.
- **HPZone cluster/outbreaks** (entered into HPZone case management system by Health Protection Teams): Operational definitions where a cluster is defined as a number of cases with possible but unconfirmed epidemiological link, and an outbreak is a number of cases with highly probable or confirmed epidemiological link.

In HPZone, the following situations are also identified:

- Exposure: Where a person or a number of people have been exposed
- Issue: Where there is a local situation that requires monitoring
- Threat: A wider situation which required long term monitoring and planning

The following definitions for time periods apply:

- **New situation**: A residential cluster with first specimen date within the most recent 14 day period, OR an HPZone situation logged within the most recent 14 days period.
- **Ongoing situation**: A residential cluster with most recent specimen date within the most recent 14 day period but the first specimen date prior to this, OR an HPZone situation first logged more than 14 days ago but still open at any point within the last 14 days (including those that have been closed in the last 14 days)

Table 5. Proportion of cases in Bedford Borough in residential clusters within past 28 days, by specimen date and property type of cluster *Based only on Epicell identification of residential clusters in the last 28 days using case address*

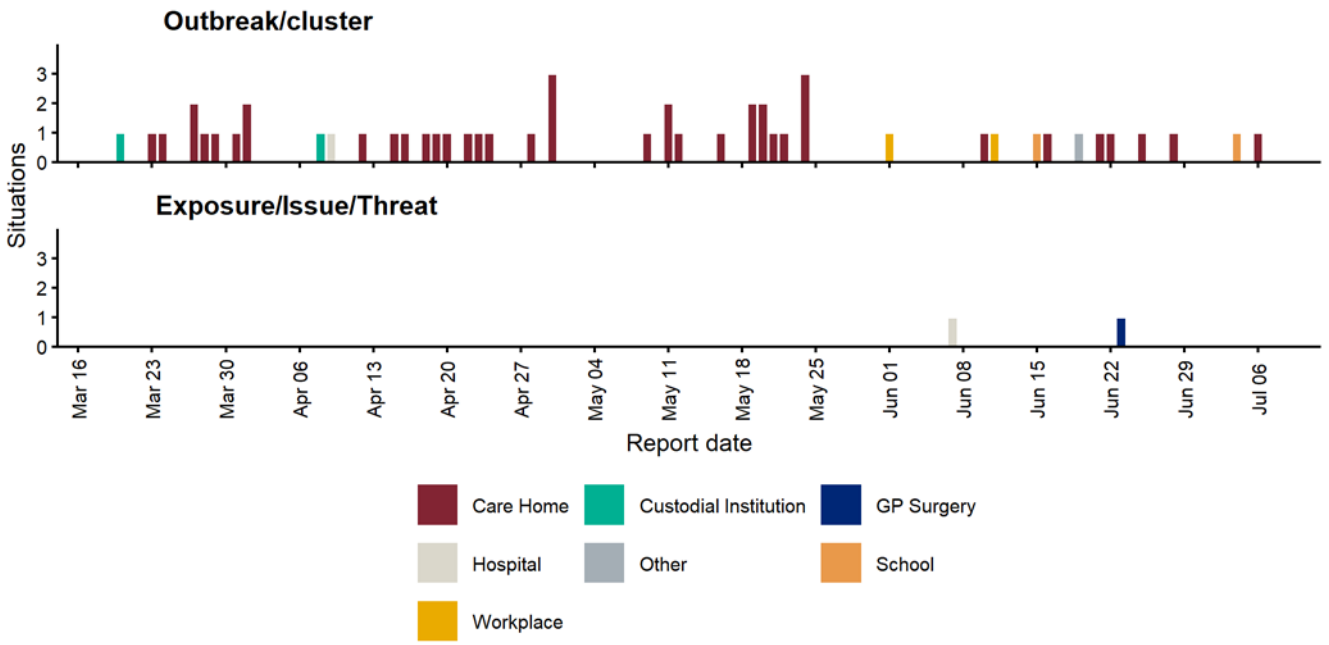
Setting type	Prior 14 days (June 21 2020 to July 4 2020)		Most recent 14 days (July 5 2020 to July 18 2020)	
	No. cases	Proportion	No. cases	Proportion
No known cluster	59	76.6	29	80.6
Cluster	18	23.4	7	19.4
Residential dwelling	17	22.1	7	19.4
Other	1	1.3	0	0.0

Table 6. Numbers of clusters/outbreaks identified in Bedford Borough in 14 days (July 5 2020 to July 18 2020), by property type associated with the cluster/outbreak, and whether or not the situation is included in HPZone data

Setting Type	Situation in HPZone		Not in HPZone*		Total	
	New	Ongoing	New	Ongoing	New	Ongoing
Care Home	1	9	0	0	1	9
Residential dwelling	0	0	1	2	1	2
School	1	0	0	0	1	0
Custodial Institution	0	2	0	0	0	2
Workplace	0	2	0	0	0	2
Total	2	13	1	2	3	15

**Based on residential clusters detected in linelist only*

Figure 10. Epicurve of COVID-19 situations recorded in HPZone in Bedford Borough (March 13 2020 to July 18 2020)*



*Situations on 1st and 11th June relate to workplaces. Those on the 15th and 4th July relate to schools.

Key Situations of interest in Bedford Borough

There have been 10 situations of interest since March 2020 related to Bedford Borough postcodes. The number is comparable to other Local Authorities in the East of England regions. These have occurred in custodial, healthcare, workplace and educational settings. In each instance, the HPT has supported with risk assessments and provided advice on control measures and enhanced surveillance

Mapping of cases and situations

Figure 12A. Map of new COVID-19 cases from Pillar 1 and 2 testing by LSOA overlaid with new outbreaks/clusters in Bedford Borough

Past 14 days (July 5 2020 to July 18 2020)

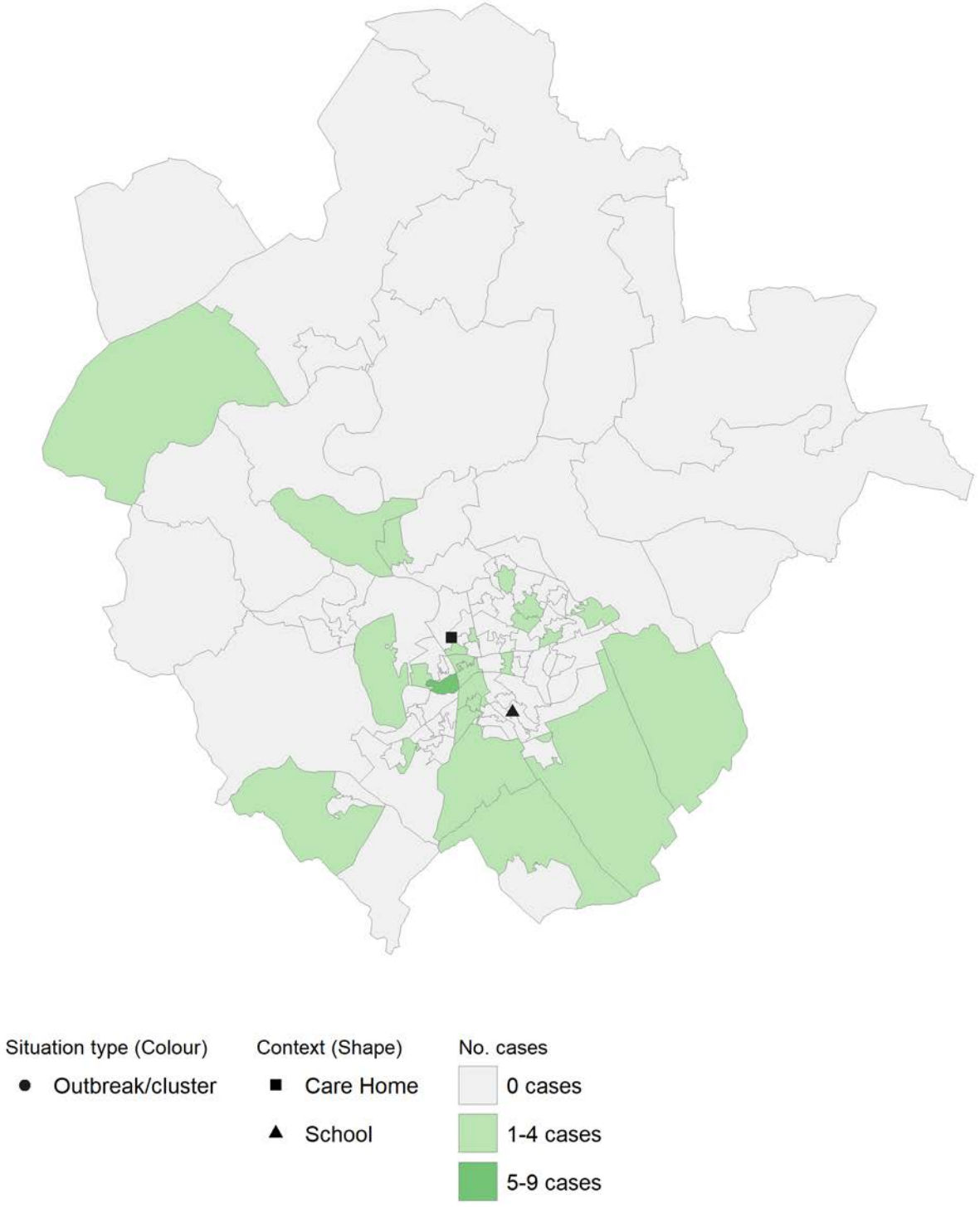
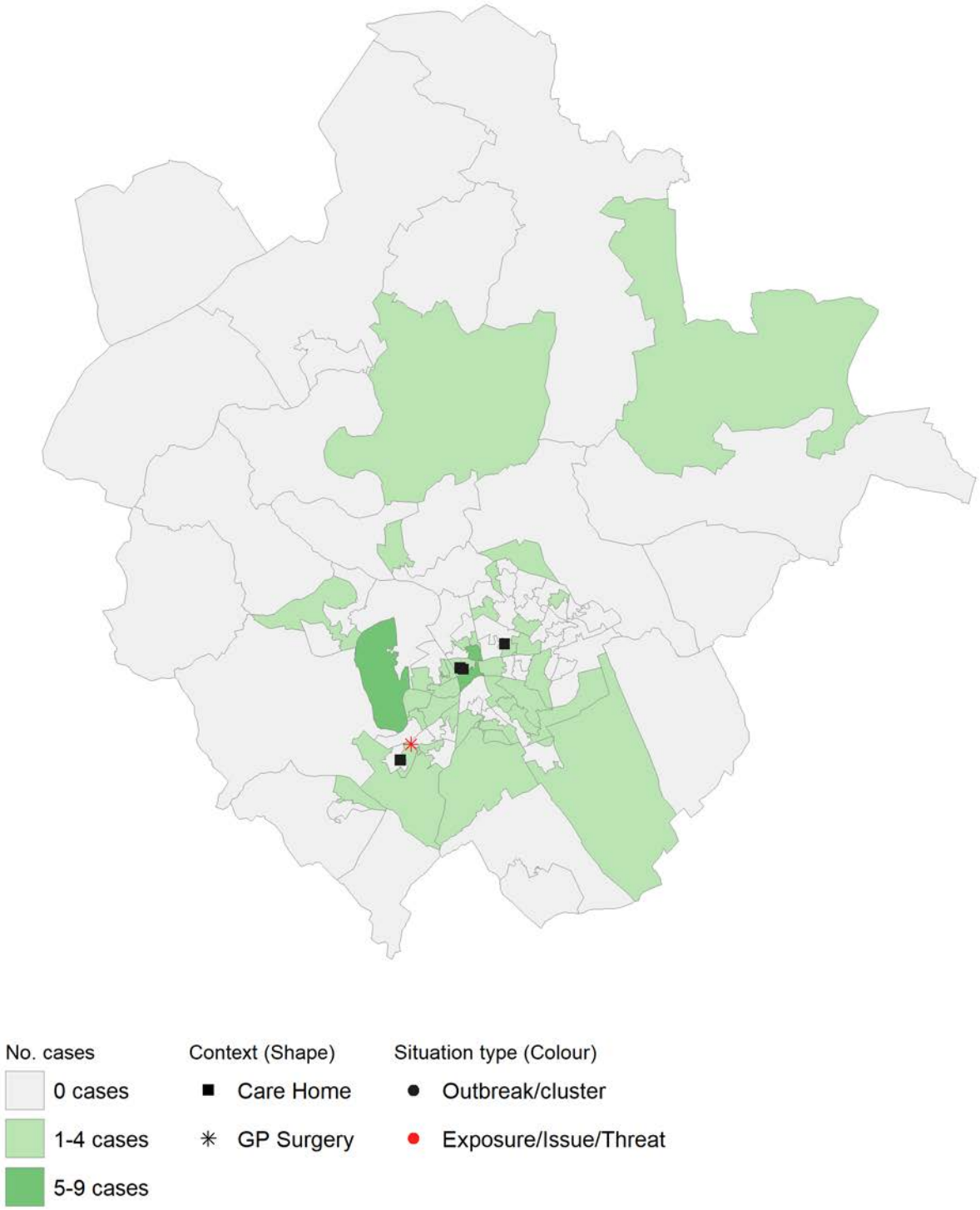


Figure 12B. Map of new COVID-19 cases from Pillar 1 and 2 testing by LSOA overlaid with new outbreaks/clusters in Bedford Borough

Prior 14 day period (June 21 2020 to July 4 2020)



Contact tracing data

Most exposures assessed by the NHS Test and Trace service in Bedford Borough have involved households and household visitors. In Bedford Borough, the proportion of contacts in households is 76.5% and 13.5% are household visitors.

A high proportion of household contacts in Bedford Borough were uncontactable or their follow up failed. Uncontactable refers to those where insufficient contact details were provided to contact the person. Reasons to be categorized as 'failed' include non-response to the automated invite or phone calls, refusal to take part in contact tracing, or an individual was unable to take part as they were an inpatient or too unwell and it was not possible to complete the contact tracing with someone on their behalf. Contacts with a status of not complete are recoded to follow up failed if not resolved after 5 days. Contacts whose addresses are unknown are assigned to the geographies of their index cases

Figure 13. Contacts by exposure/activity setting and current contact tracing outcome in Bedford Borough (May 28 2020 to July 16 2020)

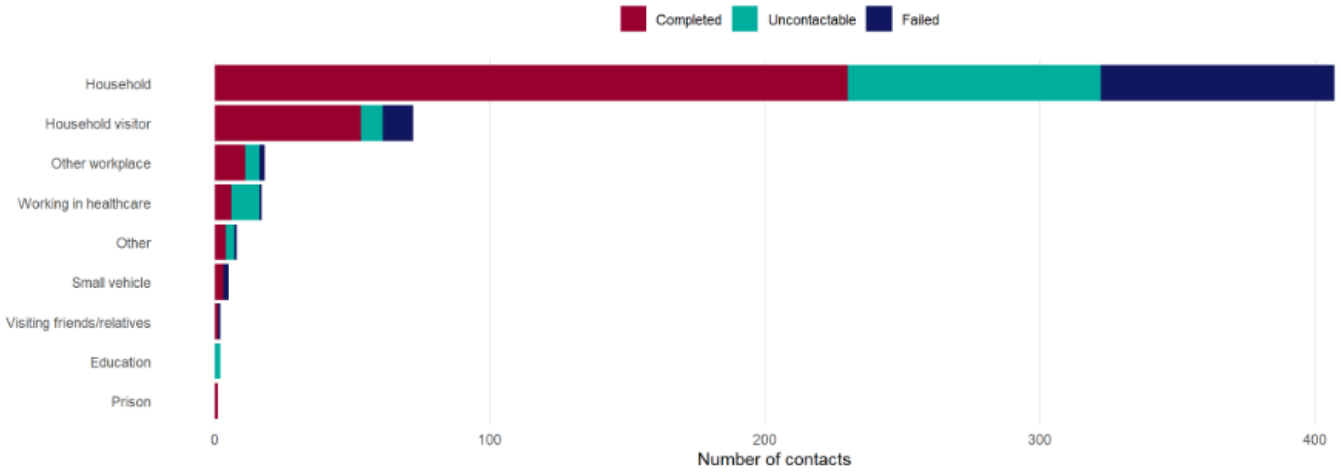
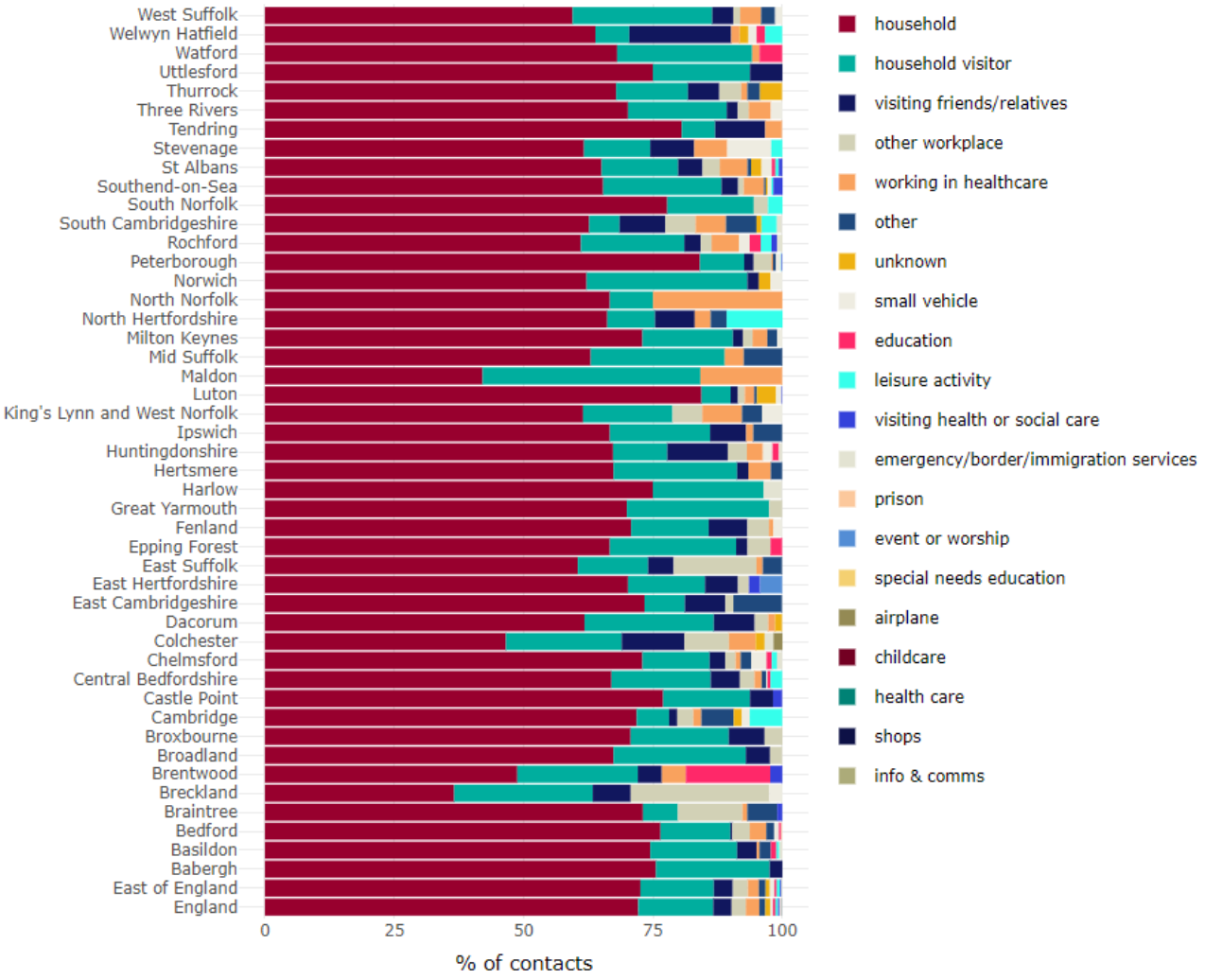


Figure 14: Contacts by exposure/activity setting and lower-tier local authority in East of England, since 28 May 2020 to 16 Jul 2020 (NHS Test and Trace)



Appendix 2

Background

Following the completion of the 'Deep Dive' interim report published 6 July 2020, work has been ongoing in Bedford Hospital to ensure that the rapid, resilient microbiological testing provision is linked to informative, regularly updated hospital epidemiological reporting. This work has been led by Bedford Hospitals, with support from PHE Field (Epidemiology) Service, East of England.

Summary

Bedford Hospital has created a data base of demographic and clinical details of all patients admitted to the hospital who has had a positive COVID-19 laboratory test result: including the first admission after a positive result (for cases tested in the community), the first admission in which an inpatient had a positive result, and all admissions thereafter.

- Five hundred and fifty-two patients have been admitted to Bedford Hospital associated with a positive COVID-19 test result with dates of admission ranging from 20 January to 12 July 2020. These 552 patients have been admitted 699 times (median 1 admission).
- The number of admissions peaked on 31 March 2020 with 19 admissions, then declined to under five admissions per day on 9 July 2020 with three admissions on 12 July 2020.
- The earliest positive COVID-19 specimen dates ranged from 14 March to 9 July 2020
- 65/552 (12%) of cases were admitted with a positive COVID-19 test result before admission.
- 487/552 (88%) of cases were admitted prior to a positive COVID-19 test result.
- One fifth of those admitted prior to a positive COVID-19 test result (99/487) had a lead time from admission to earliest positive COVID-19 specimen date of greater than 7 days. This is generally interpreted as being consistent with infection having been acquired during hospital admission.
- There is little published comparative evidence of hospital-acquired COVID-19 in England, but what has been found at Bedford Hospital is consistent with the emerging international evidence and modelled estimates.[1,2,3]
- Of the 552 total cases, 481 (87%) were ethnically white (White British, Irish, any other white ethnic background) and 71 (13%) were of other ethnicities.
- Of 552 cases, 195 (35.3%) died during admission. Deaths after discharge were not recorded.
- The observed COVID-19 hospital mortality rate in this vulnerable group is consistent with the limited evidence from other hospitals in England.[1,4]
- The proportion of deaths was not significantly different between white (35%) and non-white (37%) ethnicity patients.

[1] Rickman, HM. et al. Nosocomial transmission of COVID-19: a retrospective study of 66 hospital-acquired cases in a London teaching hospital. Clinical Infectious Diseases, https://doi.org/10.1093/cid/ciaa816. Accessed 30 July 2020.
[2] Zhou, Q. et al. Nosocomial infections among patients with COVID-19, SARS and MERS: a rapid review and meta-analysis. Annals of Translational Medicine, https://doi.org/10.21037/atm-20-3324. Accessed 30 July 2020.
[3] Evans, S. et al. The impact of testing and infection prevention and control strategies on within-hospital transmission dynamics of COVID-19 in English hospitals. https://www.medrxiv.org/content/10.1101/2020.05.12.20095562v2.full.pdf. Accessed 30 July 2020.
[4] Santorelli, G. et al. COVID-19 in-patient hospital mortality by ethnicity. Wellcome Open Research, https://wellcomeopenresearch.org/articles/5-86. Accessed 30 July 2020.

Methods

Data has been integrated from the following Bedford Hospital data sources:

- Extramed (bed management software) – ward movements and bed positioning of patients
- Patient administration system – admissions, hospital episodes
- ICE - Results reporting system – SARS-CoV-2 microbiology tests, including rapid (Samba) tests
- CHKS (external provider of Hospital Benchmarking data) – patient Charlson scoring

This data is currently integrated into an Access database every day.

This data has been combined into an automatically generated, shareable timeline and ward movement depiction tool. This can be opened with Excel, and allows:

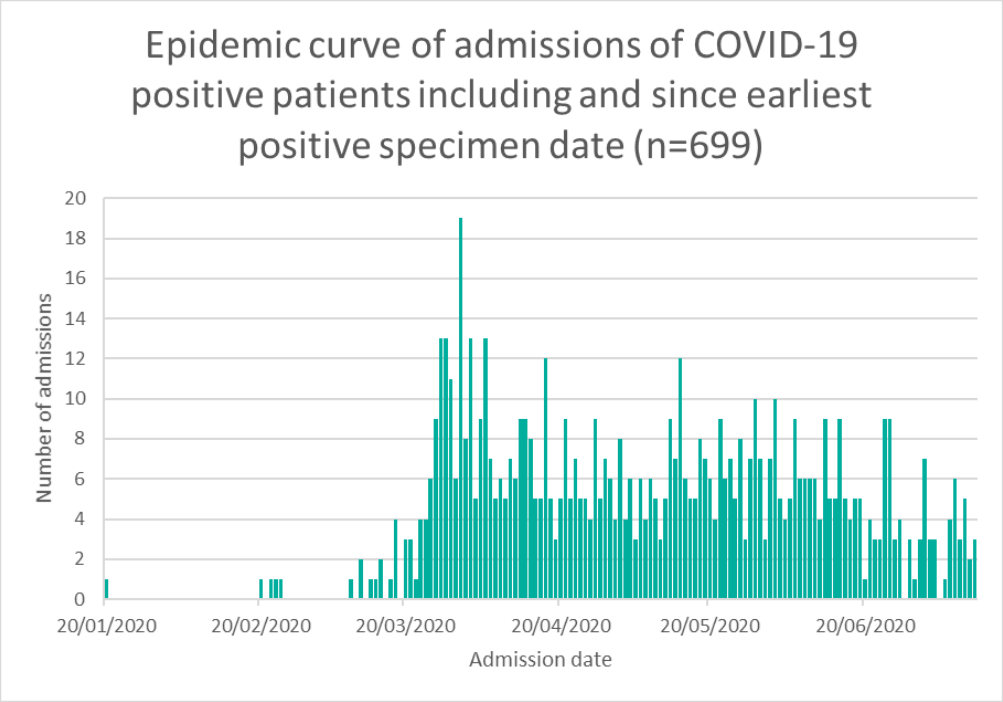
i) Visualisation of patient placement on the ward now, and their SARS-CoV-2 status.
ii) Visualisation of per patient timelines, including SARS-CoV-2 status, and screening activity.
iii) Visualisation of screening activity per ward.
iv) Sharing of this data to ward matrons and senior nursing staff, as well as Infection Control Teams.
v) An integrated data set suitable for more complex epidemiological analyses to be made available. This comprises separate tables of admission data (from the patient administration system) linked to tables containing microbiological results.

Activities (i)-(iv) were developed by Bedford Hospital after discussions with PHE Field Service East of England, and review of the PHE TICL Timeline plotting tool. Activity (v) has led to ongoing work developing reports which can be regenerated regularly, to maintain situational awareness. Analyses of this data source as at 15 July 2020 are presented in this report.

Results

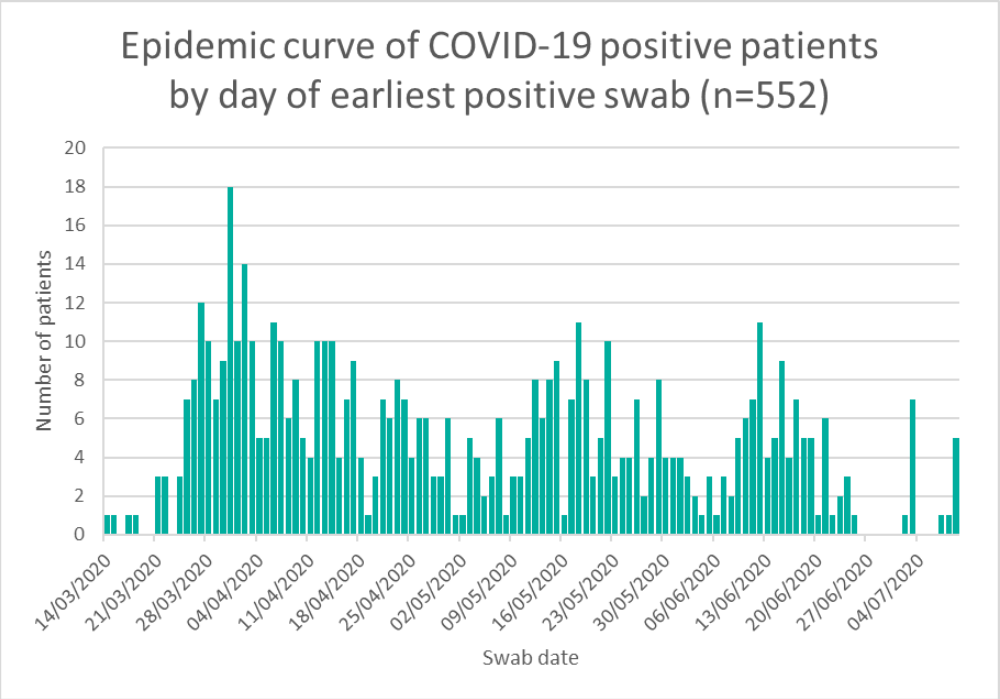
As at 15 July, a total of 552 patients have been admitted to Bedford Hospital associated with a positive COVID-19 test result. These 552 patients have been admitted 699 times (median 1 admission, range 1 to 5 admissions). The dates of admission ranged from 20 January to 12 July 2020. The number of admissions peaked on 31 March 2020 with 19 admissions, then declined to under five admissions per day on 9 July 2020 with three admissions on 12 July 2020 (Figure 1).

Figure 1. Dates of all admissions of patients who have had positive COVID-19 test result, including the first admission after a positive result (for cases tested in the community), the first admission in which an inpatient had a positive result, and all admissions thereafter



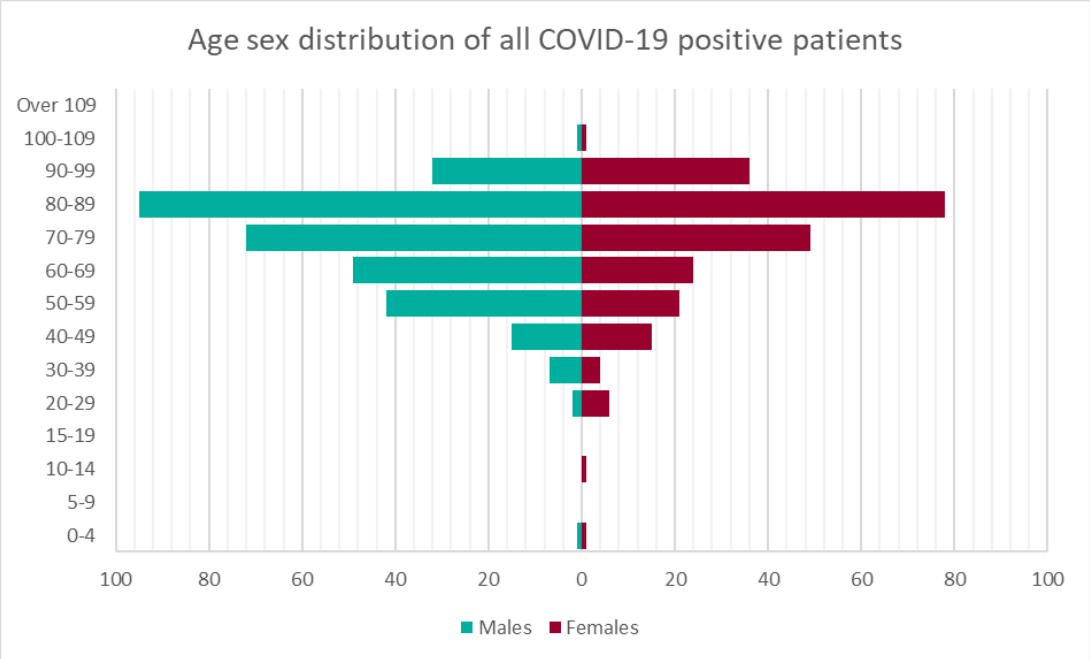
A slightly different picture is seen if we consider the epidemic curve by earliest positive COVID-19 test results (Figure 2). The earliest positive COVID-19 test results ranged from 14 March to 9 July 2020 with a peak of 18 cases swabbed on 31 March 2020, a second peak of 11 cases on 18 March; and a third peak also of 11 cases on 12 June 2020 followed by a decline. There were five patients with earliest positive COVID-19 specimen date on 9 July 2020.

Figure 2. Distribution of dates of first positive COVID-19 test among persons admitted to Bedford Hospital



Cases ranged from under one year to 102, with a median 78 years of age. Males accounted for 316 (57%) and females for 236 (43%) of the 552 cases (Figure 3).

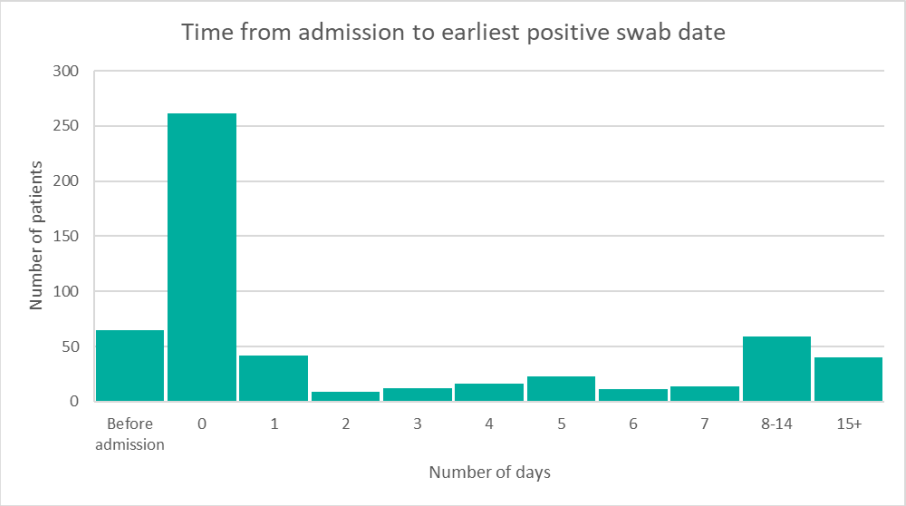
Figure 3. Age sex distribution of admitted individuals with positive COVID-19 tests



Fewer than five women were pregnant at time of positive COVID-19 specimen date (number suppressed). Sixty five of 552 (11.8%) cases were admitted with a positive COVID-19 test result

before admission. Two hundred and sixty-one (47.3%) cases had a COVID-19 positive specimen result on the day of admission; and 99 (18%) had positive specimen more than seven days after admission, an interval consistent with within hospital transmission (Figure 4).

Figure 4. Admission to first positive test distribution



Four hundred and eighty one of 552 (87%) cases were ethnically British, Irish, or White; and 71 (13%) of other ethnicities (Table 1).

Table 1. Ethnicity of admitted patients. Numbers have been suppressed for categories with fewer than five individuals.

Ethnicity	Number of patients	%
White British	438	79.3
Irish	8	1.4
Any other White background	35	6.3
White background subtotal	*481*	*87.1*
White and Black African	<5	-
White and Asian	<5	-
Any other mixed background	<5	-
Indian	9	1.6
Pakistani	<5	-
Bangladeshi	<5	-
Any other Asian background	6	1.1
Black Caribbean	11	2.0
Black African	12	2.2
Any other Black background	5	0.9
Chinese	<5	-
Any other ethnic group	11	2.0
Not stated	6	1.1
Other background subtotal	*71*	*12.9*
Grand total	552	100.0

There was no significant difference in the proportion of patients who died during admission between white and non-white ethnicity. One hundred and sixty nine of 481 (35%) ethnically white patients died, compared to twenty-six deaths in 71 (37%) non-white patients, Relative Risk (95% confidence Interval) RR = 0.97 (0.69, 1.335) p=0.807.

Conclusions

Bedford Hospital has improved its surveillance of COVID-19. The hospital was hit by a surge of COVID-19 cases on 31 March 2020 and has since experienced declining trends, probably in part due to decreased incidence in the community in line with regional and national declines resulting from Lock Down. Recently, enhanced testing provision has been made available, including rapid testing, and the decline has been sustained.

Only a minority of patients were from Black, Asian or other minority ethnic communities, and they were at no obvious risk of greater mortality than other patients.

The work done as part of the 'Bedford Borough Deep Dive' project has delivered the tools for enhanced situational awareness going forward. The hospital is now generating daily Situation Reports of the space-time relations of the COVID-19 cases, shared with Matrons on wards as well as the Infection Prevention and Control (IPC) team, to search for space time overlaps in wards and bays, generate hypotheses, and target infection control and screening efforts where appropriate. These analyses may, going forward, provide early indications of both indirect and direct person-to-person transmission, and should be continued as part of the IPC program. In addition, it is important that descriptive epidemiological studies of the type described here are used as part of routine managerial processes by the hospital going forward. We suggest this should occur daily, and at weekends if required.

PHE Field Service East of England will continue to work with Bedford Hospitals to support these important goals.

Prepared by M Reacher, L Reeve and D Wyllie, PHE Field Epidemiology East of England, Institute of Public Health Cambridge CB2 0SR 28 July 2020

Appendix 3 Communications and Engagement

Purpose

The Bedford Deep Dive was set up to establish what is driving the differential pattern of COVID-19 infection in Bedford Borough, with a specific focus of:

1. What is driving the differential pattern of COVID-19 infection in Bedford Borough by comparison to the national picture?
2. What interventions can be put in place to address this differential?

A Communications and Engagement (C&E) workstream was established to assist with the Deep Dive.

The purpose of the Communications and Engagement work stream was to review current initiatives and to assess whether community behaviours were contributing to a differential pattern of COVID-19 in Bedford Borough. In addition to raise awareness of the increase in infection rates in Bedford Borough, to ensure engagement with local communities and encourage compliance with local guidance around COVID-19.

Context

With lockdown easing nationally, town centres and night time economy businesses opening, the timing of the deep dive into continuing high rates of infections in Bedford Borough, meant that residents were receiving mixed messages, with local guidance being more cautious (because of the high infection rates) to that coming from government and the relaxing of restrictions across the country.

Bedford Borough is a diverse community with many nationalities and cultures amongst the population. There is also a commuter population, with residents travelling to neighbouring towns for work, and the outbreak of Coronavirus had exposed and exacerbated health inequalities in the town.

A communications and engagement plan was developed in collaboration between Bedford Borough Council, NHS Bedfordshire Luton and Milton Keynes Clinical Commissioning Group, and Bedfordshire Hospitals NHS Trust, to address these issues.

Aims

The aims of the plan were to:

- Assess whether community behaviours may be contributing to a differential pattern of COVID-19 in Bedford Borough
- To encourage residents in Bedford Borough to stay home and observe stringent infection control measures as a result of increased infection rates in Bedford Borough;
- Communicate the process and findings from the ‘deep dive’ to residents;
- To influence national messaging to support more localised narratives around outbreaks and potential outbreaks.

Approach

The approach adopted in this plan was set into three phases:

Initial response:

- To agree a shared narrative with all involved agencies to ensure the delivery of one clear message for residents;
- To explore the use of different digital platforms to engage with a range of audiences;
- To deploy trusted voices including the Mayor of Bedford Borough, cultural and faith leaders, Councillors, GPs, MPs and local celebrities.

Second phase:

- Respond to resident feedback to address concerns;
- To engage with community leaders to enlist their support in communicating with different groups and the seldom heard who may not be following the guidance or in an 'at risk' group;

Third phase:

- Bespoke targeting of communities as the data uncovered which parts of the community was most at risk.

Audiences:

Inform The Mayor of Bedford Borough Councillors GPs Foundation Trust Governors / CCG Governing Body Patient representatives and committees Bedfordshire and Luton Resilience Forum	**Engage** Bedford Borough Council Members and Officers Faith leaders Cultural leaders Bedford GPs Business leaders Parents Young people **Targeted engagement in third phase:** Cultural and Faith leaders in Kingsbrook and Queens Park wards Women – 30-59 Healthcare workers
Monitor Media coverage Social media commentary	**Involve and inform** Residents Healthwatch Shielding patients Residents with long term conditions Faith groups Community groups

Messaging:

An initial narrative (below) was agreed at the start of the 'deep dive' which formed the basis for the communications messaging, especially in the initial phase of awareness raising, and around the findings of the interim report.

"The latest data from Public Health England shows that Bedford Borough has the highest levels of Coronavirus infections in the East of England. Due to the high infection rate, Bedford Borough Council and local NHS organisations are working with Public Health England and the Joint Biosecurity Centre to investigate why rates of infection here aren't falling as quickly as other areas.

"These organisations are closely examining the data from Bedford, so that steps can be taken to bring infection rates down in the borough. Work is also underway with other partner organisations including the emergency services to raise awareness of this local situation."

As phases two and three were rolled out and data showed the infection rate on a downward trajectory, the messaging was evolved to take account of the findings of the study team, to ensure a responsible, accurate and informed tone and balance was struck:

- Stay home if possible, infection rates in Bedford remain high;
- Keep 2m apart from others if you go out
- It is mandatory to wear face coverings on public transport;
- Wearing a face covering will help protect you in crowded places
- Wash your hands regularly with soap and water for at least 20 seconds, or hand sanitizer, if you are unable.

Spokespeople

A number of key spokespeople were identified as 'trusted leaders' throughout the campaign. These included:

- The Mayor of Bedford Borough, Dave Hodgson;
- Councillor Louise Jackson, Portfolio Holder for Public Health and Wellbeing, Bedford Borough Council
- Patricia Davies, Accountable Officer, Bedfordshire, Luton and Milton Keynes Clinical Commissioning Groups;
- Bedford based GPs including Dr Roshan Jayalath, Dr Vijay Nayar, Dr Vinita Manjure, Dr Vidya Das;
- Dr Nicola Smith, Clinical Chair of Bedfordshire, Luton and Milton Keynes Clinical Commissioning Groups;
- David Carter, CEO of Bedfordshire Hospitals NHS Foundation Trust;
- Local 'celebrities' including Olympian Paula Radcliffe and former Top Gear presenter and Kempston resident, Rory Reid;
- Local business owners.

Channels:

A number of different channels were used to disseminate the message. Partner agencies took a joined-up approach to cross-promoting material, so there was consistency of message and additional impact delivered.

In phase one, activity included:

What?	**Who?**	**When?**
National media The Times, CNN, Sky News, i-newspaper, Telegraph, Press Association	Subscibers	30 June
Regional news programmes ITV Anglia / BBC Look East	All residents	14 June, 16 June, 22 June, 23 June, 25 June, 26 June, 30 June, 1 July, 2 July, 7 July
Local radio including In2beats, BBC 3 Counties Radio and Heart FM	Specific community groups	16 June, 19 June, 30 June, 2 July, 3 July, 7 July
Online/Local media – Bedford Independent Bedford Times And Citizen Cranfield & Marston Vale Chronicle	All residents	19 June, 20 June, 24 June, 28 June, 30 June, 3 July, 6 July

Mosque Radio Transmitters	Muslim Community	19 June 26 June
Elected Member Social media and WhatsApp groups	Community groups, faith groups	29 June
Bedford Borough Council E-newsletters	Subscribed Residents	19 June, 22 June, 25 June, 3 July, 7 July, 10 July
Social media messaging, including advertising	All residents	
Email distribution letters	Care homes	
Snapchat creative	Young people	26 June
Instagram	Young people	26 June
Video message from Dr Roshan Jayalath – encouraging people to take care because of relaxing of lockdown rules	All residents	13 June
Posters, social media and newsletters via BPHA	Housing association tenants	
Voluntary sector engagement	Bedford CVS- 1083 community and voluntary sector organisations	
Bedfordshire Alert	Bedford residents signed up to receive alerts from the emergency services – (circa.20k residents)	25 June
Internal communications messaging	Bedfordshire Hospitals NHS Foundation Trust staff	Throughout

As part of phase two, the messaging was applied through the following channels:

What?	**Who?**	**When?**
Facebook and Twitter	All residents / community groups	Throughout
Trusted Voices – Paula Radcliffe video	All residents / young people	Throughout
Trusted voices –Rory Reid video	All residents	Throughout
Videos from local politicians including Mayor Dave Hodgson, Cllr Louise Jackson and Mohammed Yasin MP	All residents	Throughout
Shared messaging with councillors to share via their channels, including whatsapp	Community groups	Throughout
Videos in BSL and different languages inc. Urdu, Bengali, Guajarati, Romanian, Italian, Polish.	Community groups	25 June – 11 July
Press release ahead of Super Saturday and videos from GPs, Mayor and Chief Constable	All residents	4 July
Face coverings campaign to encourage take up	All residents	23 June – 30 July
Internal communications messaging such as: • Updates on local situation	Bedfordshire Hospitals NHS Foundation Trust staff	Throughout

• Tailored guidance for all staff on wearing face masks (mainly applicable to staff working in non-clinical areas that were unfamiliar with the need to wear face masks		

In Phase three, following the publication of the interim report, communications and engagement was further targeted to include:

What?	Who?	When?
Engagement event with Cultural and Faith leaders	BAME community / Faith groups	15 July
Targeted communications to Kingsbrook and Queen's Park residents – with GPs from local surgeries	Queen's Park and Kingsbrook residents	17 July
Targeted patient text messages from London Road and Queen's Park surgeries to patients – in different languages	Queen's Park and London Road surgery patients	17 July
Supermarket banners – encouraging face coverings, social distancing	All residents	18 July
Videos in BSL and different languages inc. Polish, Urdu, Bengali, Guajarati, Punjab, Romanian, Italian.	Community groups	25 June – 20 July
Road signage	All residents – entering town centre	15 July onwards
Environmental health engagement	All businesses / employees	22 June onwards
BBC News – Hugh Pymm – avoiding Lockdown	All residents	9 July

Findings

Throughout the campaign there was significant reach and engagement across partners social media platforms and extensive coverage in local and regional and national media. Together these mediums engaged with local residents and sparked discussions as demonstrated through social media commentaries, showing an awareness of the current situation in Bedford Borough.

Resident participation in the social media campaign around face coverings resulted in local residents, clinicians and business owners sharing their own photographs in face coverings with the CCG for inclusion and Councillors became more involved – with The Mayor of Bedford Borough Council, Dave Hodgson and Councillor Louise Jackson, Portfolio Holder for Health and Wellbeing encouraging engagement. The campaign started mid-June, before coverings became mandatory in shops and supermarkets, and so the campaign was able to shift emphasis towards encouraging people to prepare for the introduction of the new legislation.

The use of trusted voices, whether Elected Members, GPs, local businesses, faith and cultural leaders and celebrities increased the penetration of message. This could be seen

through the face coverings campaign, which saw an increase in community engagement with residents posting images of themselves wearing their face coverings – encouraging people to act responsibly and protect the Borough.

Overall, the campaign enjoyed real engagement from residents and using a range of mediums including print, digital, radio and TV promoted key messages on across platforms to maximise the reach across the community. .

Significantly, there didn't appear to be anything from a community behavioural perspective that was contributing to a higher rate of infection in Bedford Borough and that largely the community were very compliant to observing government guidelines. Whilst there appears to be no evidence that there was anything contributory to a higher infection rate, the Communications and Engagement workstream decided to generate a more intense campaign to mitigate any risk and to help drive home awareness within the community. Following this anecdotal reports from the Police on 'Super Saturday' were that residents were acting responsibly and there was no need for the Police to educate, engage and encourage residents to follow local guidance.

Further recommendations:

- Continued multi agency communications and engagement through collaborative working to ensure that local guidance is communicated to support awareness and encourage behaviour change.
- Continued engagement with elected members, community, cultural and faith leaders.
- Continued use of trusted voices to communicate key messages.
- Engagement with neighbouring CCGs and neighbouring council's to share learning, resources and best practice, to support other affected areas, where possible.

Evaluation

Why We Wear Ours

Twitter	Facebook	Instagram
47,560	111,758	2,434

Easing of Lockdown

Twitter	Facebook	Instagram
8,206	124,095	393

Social Distancing Only

Twitter	Facebook	Instagram
10,796	42,669	143

Stay Alert guidelines / coronavirus is still in our communities (inc. social distancing)

Twitter	Facebook	Instagram
47,843	200,538	729

Appendix 4

Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission of or severity of COVID-19 infection?

Table of Contents

Summary

- Bedford Borough is similar to the East of England average on many measures of vulnerability to COVID-19. The prevalence of diabetes is higher than the regional average, as is the rate of emergency hospital admissions for chronic obstructive pulmonary disease (COPD).
- There are a higher number of care home beds per elderly population, but other static measures of transmissibility are similar.
- Mobility is higher than the England average, but follows a similar trend.
- Some evidence to suggest that that the pattern of care homes outbreaks in Bedford Borough has differed from other parts of the East of England, with more single case outbreaks and fewer short interval multiple case outbreaks.
- The Bedford Borough Council Care Standards team, working with Public Health England, is maintaining good situational awareness and responding quickly to care home issues.

Severity of disease

The most important risk factors for severe disease and death are age, cardiac disease, chronic pulmonary disease, chronic kidney disease, dementia and obesity[1,2]. Bedford Borough has a lower than average proportion of the population at risk of severe disease, as indicated by the proportion who are eligible for the seasonal influenza vaccination (Table 1). The prevalence of diabetes is higher than the regional average, but otherwise the proportion of the population with long term conditions associated with increased severity of COVID-19 is similar to the regional average. The number of emergency hospital admissions for COPD per 100,000 is higher than the regional average.

Table 1: Risk factors for severe disease in Bedford Borough and the East of England.

Indicator	Bedford Borough	East of England average (range)
% population at risk of severe illness from COVID-19	26.9	27.7 (22.8-31.4)
Coronary heart disease prevalence, %	2.9	3.1 (2.4-3.7)
Chronic kidney disease prevalence, %	3.9	3.9 (2.3-5.2)
Dementia prevalence 65+ years, %	4.4	4.3 (3.7-5.4)
Diabetes prevalence, %	7.2	6.7 (5.8-8.2)
% adults overweight or obese	63.9	63.3 (60.1-70.6)
Emergency hospital admissions for COPD per 100,000	406	359 (322-535)

The % at risk of severe illness is estimated from the population eligible for influenza vaccination. Prevalence is calculated from QOF data, so there may be reporting biases, and shown as % of the practice population. % overweight or obese was calculated from the Active Lives survey. Emergency admissions for COPD are directly age standardised per 100,000 population. Source: PHE fingertips and PHE analysis of COVID-19 risk factors based on populations eligible for influenza vaccination

[1] Docherty, A.B., Harrison, E.M., Green, C.A., Hardwick, H.E., Pius, R., Norman, L., Holden, K.A., Read, J.M., Dondelinger, F., Carson, G. and Merson, L., 2020. Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study. BMJ, 369.
[2] Williamson, E., Walker, A.J., Bhaskaran, K.J., Bacon, S., Bates, C., Morton, C.E., Curtis, H.J., Mehrkar, A., Evans, D., Inglesby, P. and Cockburn, J., 2020. OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. MedRxiv.

Table 2 shows that Bedford Borough is more ethnically diverse than the East of England average, but it has a similar proportion of Asian residents to Peterborough (11.7%) and fewer than Luton (30.0%).

Table 2: Percentage of Black, Asian and minority ethnic groups Bedford Borough and the East of England from the 2011 Census.

% Ethnicity	Bedford Borough	East of England average (range)
White	80.5	90.8 (54.7-96.5)
Asian	11.4	4.8 (1.5-30.0)
Black	3.9	2.0 (0.5-9.8)
Mixed	3.4	1.9 (1.2-4.1)
Other	0.7	0.5 (0.3-1.5)

Source: Office for National Statistics.

Transmission factors

There are several static and dynamic proxy measures of contact. Static measures include deprivation, household over-crowding, and care home data. Dynamic measures, such as the Google mobility trends, uses data from consenting users to determine the busyness of different types of places within the local area also the amount of time spent in residential areas.

The data in Table 3 suggest Bedford is at higher risk of COVID-19 transmission than some other areas due to a higher proportion of overcrowded households and a higher density of care home beds, but with the exception of care home beds, Bedford it is not the most extreme in the region.

Table 3: Potential indicators of higher transmission.

Indicator	East of England average (range)	Bedford Borough
Rank of average IMD score	N/A (40-137)	96
Rank of average IDAOPI score	N/A (41-138)	106
Overcrowded households %	3.6 (2.4-5.6)	4.3
Care home beds per 100 persons aged 75+	9.3 (7.5-11.4)	11.4
Nursing home beds per 100 persons aged 75+	3.8 (2.7-6.3)	4.1

IMD (index of multiple deprivation) and IDAOPI (income deprivation affecting older person index) are ranked among upper tier local authorities from 1 (most deprived) to 151 (least deprived). Overcrowding is calculated using the bedroom occupancy rating from ONS census data. Source PHE Fingertips, CQC, ONS.

Mobility

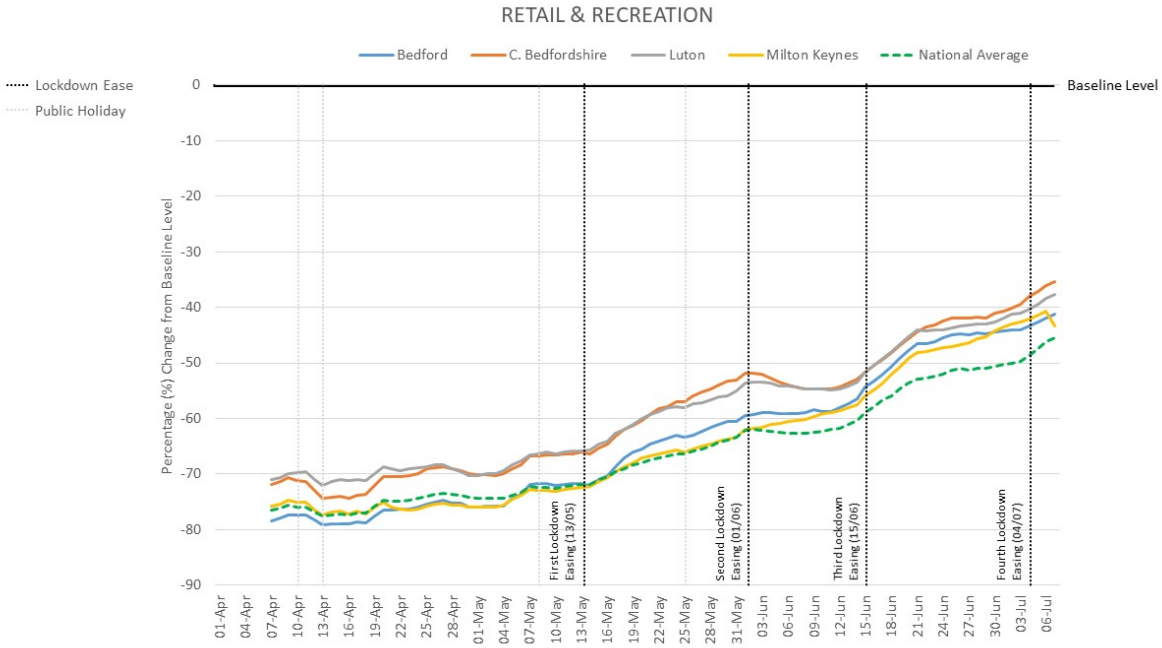
Using data provided by Google Analytics in the form of 'Community Mobility Reports', mobility and location busyness for Bedford Borough was compared to its near neighbours: Central Bedfordshire, Luton and Milton Keynes, and the national average, in order to identify and assess whether the higher level of COVID-19 transmission in Bedford Borough could be attributed to these metrics. There are six data sets included within these reports which are Retail and Recreation, Grocery and Pharmacy, Parks, Transit Stations, Workplaces and Residential. The data included spans 01 Apr – 07 Jul 2020. Mobility data in Bedford Borough and its surrounding upper tier local authorities (UTLAs) have continued to follow the national trends. Bedford was above the UK average in three out of six metrics, albeit marginally, closely mirroring the national pattern and therefore not assessed as abnormal (Figure 1). There remain a few anomalies in the data e.g. Luton seeing a far lower and Central Bedfordshire a far higher rate of Transit Station mobility when compared to national average, which could warrant to a variety of social and demographic factors and also indicate differing rates of cross-UTLA movement. However, despite these slight deviations from the national picture there is no evidence to suggest that that the mobility patterns observed have contributed to increased infection rates within the borough.

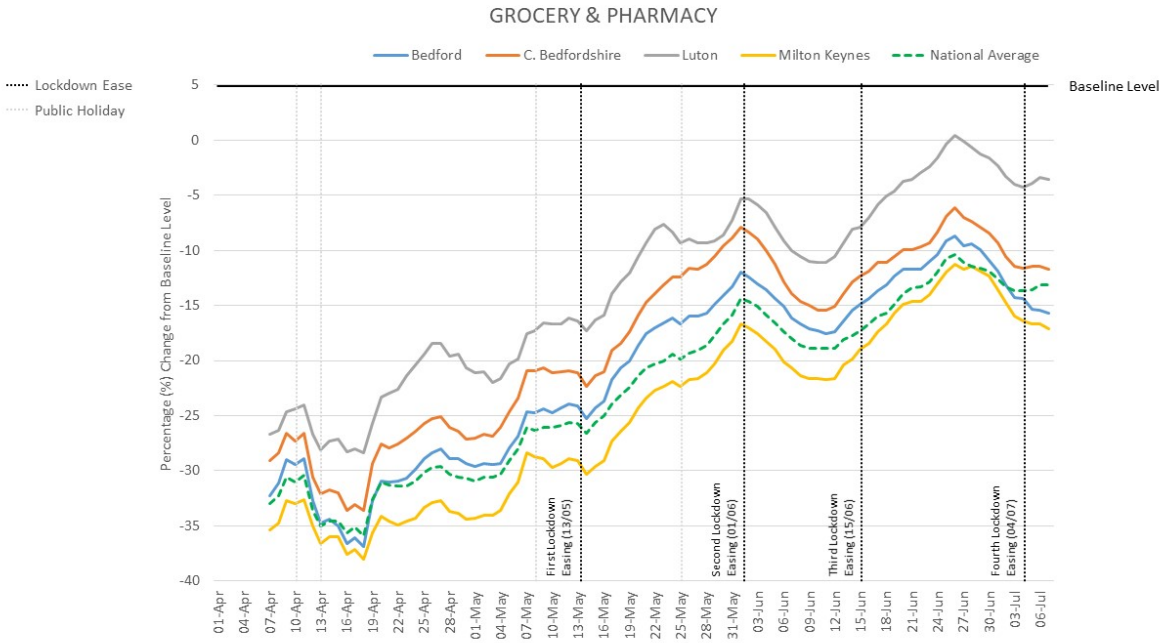
Small area analysis

Despite no clear differences at the UTLA level, there may be variation in factors at lower level geographies that influence the transmission of COVID-19. The Small Area Vulnerability Index for COVID-19 (SAVI) is a composite of factors linked to risk of COVID-19 mortality estimated at a medium super output area level (geographies with an average population of 7,200 people). The factors taken into account are the proportion from Black, Asian and minority ethnic groups, income deprivation, proportion aged over 80, living in care homes, living in overcrowded housing and hospital admission for chronic illness[3]. The method used was a multivariable Poisson regression that adjusted for the regional spread of the pandemic. It is important to note that MSOA boundaries are different to ward boundaries. This method highlighted Harpur and De Parys as the most vulnerable MSOAs in Bedford Borough. Care home density is known to be a contributing factor to case counts in both Harpur and De Parys.

[3] Small Area Vulnerability Index (SAVI), Konstantinos Daras & Benjamin Barr https://pldr.org/dataset/e6kl0/small-area-vulnerability-index-savi

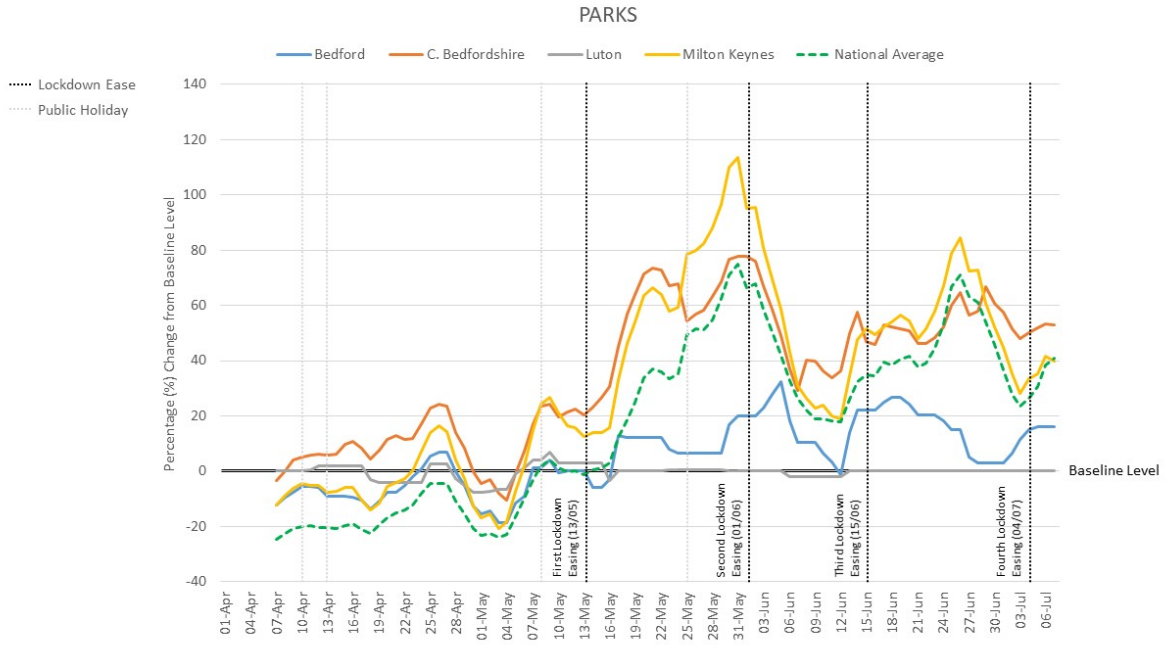
Figure 1: Google mobility trends for Bedford and the surrounding areas for retail & recreation, grocery & pharmacy, parks, transit stations, workplaces and residential

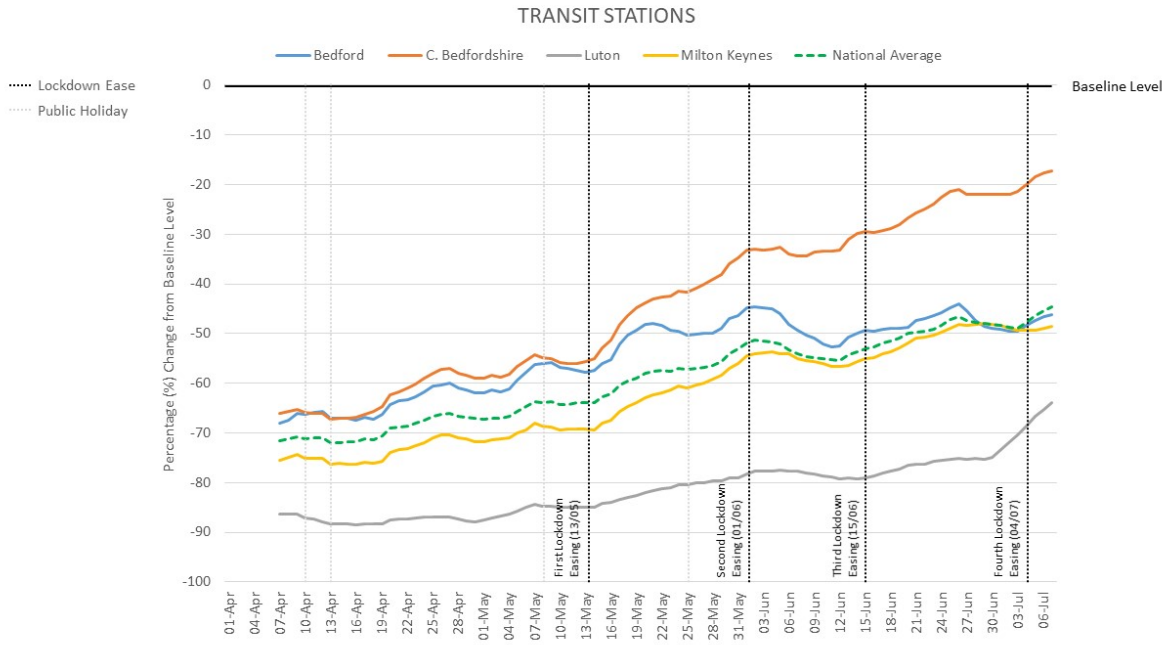




Source: https://www.google.com/covid19/mobility

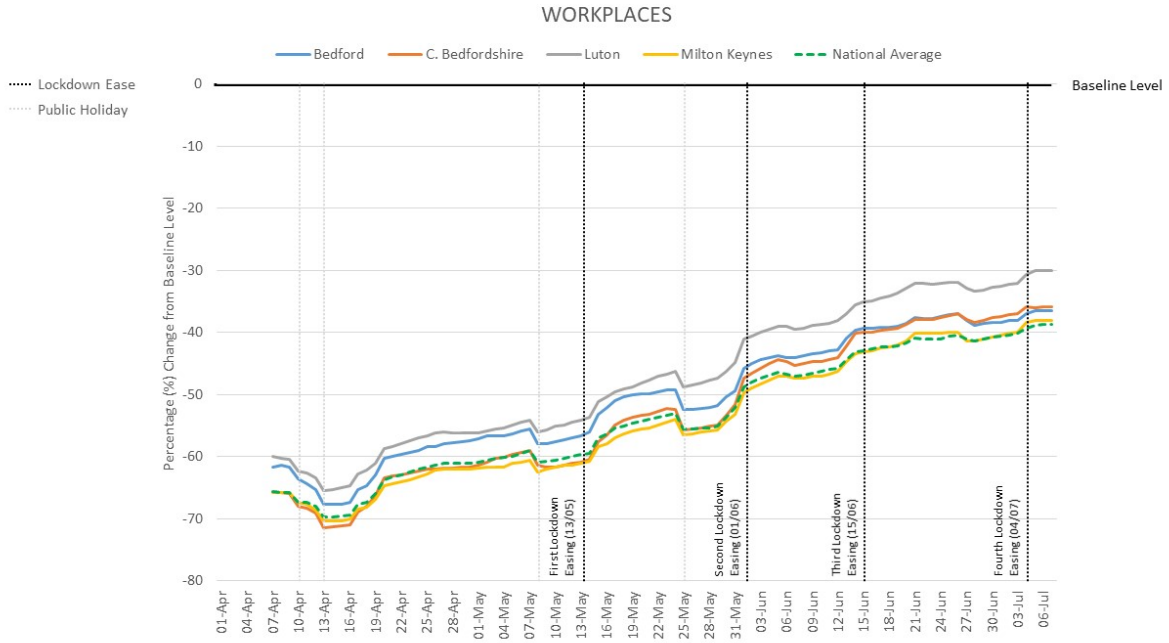
Figure 1. Continued.

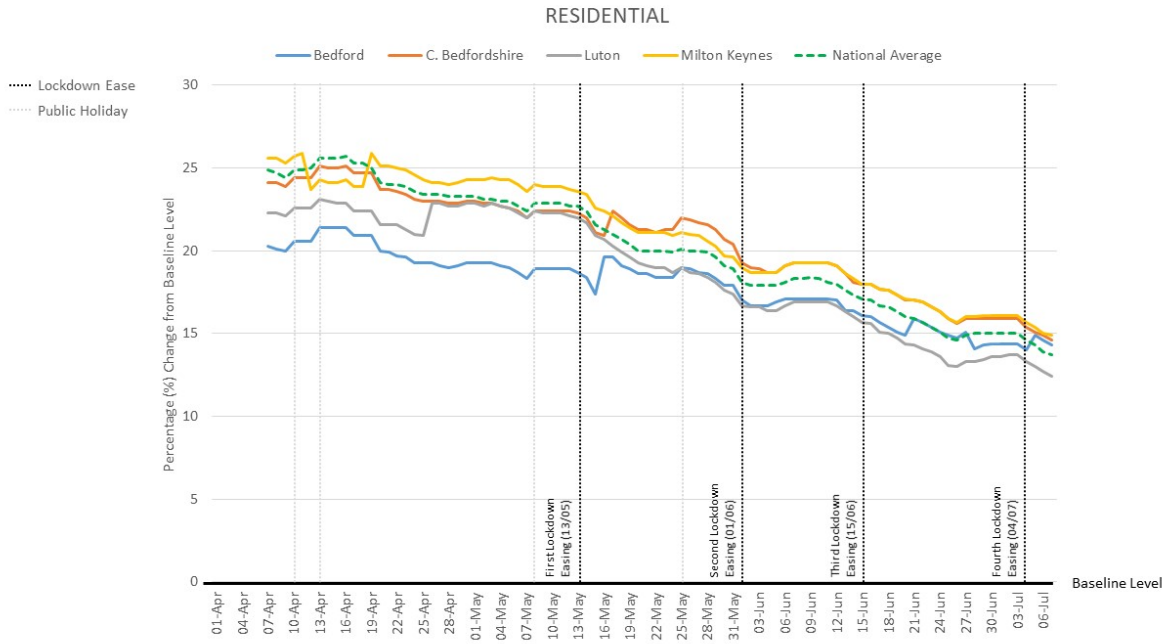




Source: https://www.google.com/covid19/mobility

Figure 1. Continued





Note that residential is calculated differently and on a different scale. Source: https://www.google.com/covid19/mobility

Care homes

There are a total of 152 care settings in Bedford Borough that are being supported and monitored by the Council and its partners, including residential and nursing homes for older people (N=35), residential homes for people with learning disabilities and/or mental ill health (N=41), extra care housing (N=11), supported living (N=24) and domiciliary care providers (N=41). 78 of these settings are CQC registered care homes.

Outbreaks

Up until 15 July 2020 a total of 43 outbreaks and clusters had been reported in Bedford Borough's 78 CQC registered care homes (55.1%). In terms of the proportion of homes that have reported an outbreak Bedford Borough is ranked 8 of 12 local authorities within the East of England PHE Centre (rank 1 = 34.8% and rank 12 = 62.9%).

PHE provided two datasets, one for Pillar 1 tests and one for Pillar 2 tests, which gave total number of cases and time interval between the first and last case in a care home. This included data from 1st March to 31st May. These datasets were derived from SGSS (Second Generation Surveillance System). The median number of cases and median interval are shown in Table 4. Combining these two datasets, patients in 59 care homes were tested and 37 had at least one case (note that these figures could be affected by the delay in reporting some negative tests). Care homes where there was only a single case were excluded. A non-parametric statistical test, the Wilcoxon rank sum test, was used to compare the number of cases per home and the time interval between Bedford Borough and the East of England. There was no statistically significant difference in the number of cases per case home in Pillar 1 or Pillar 2 data. It is important to note that this finding could be confounded if the size of care homes in Bedford Borough differs from the regional pattern. The median interval from the Pillar 1 outbreaks was 10 days longer than the regional median; this was statistically significant.

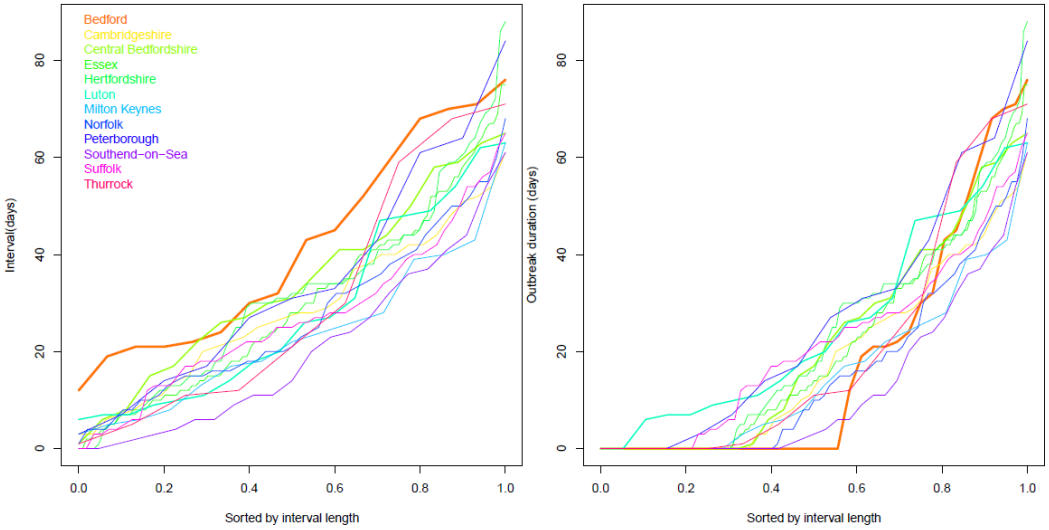
Table 4: Number of cases and interval between first and last case from the PHE HPZone system

	Pillar	East of England (range)	Bedford Borough	p-value
Median interval (days)	1	27 (5-37.5)	37.5	0.02
	2	5 (0-17)	17	0.47
Median number of cases	1	6 (2-8)	7	0.89
	2	4 (2-8)	4	0.65

To investigate this further, the distribution of the intervals for each UTLA in the East of England was plotted (Figure 2). The plot on the left shows Bedford Borough (orange line) had longer interval lengths than the other UTLAs. The plot on the right shows the distribution of interval lengths when data on care home having single cases is included. Single cases, by definition, have an interval of zero. In this plot, Bedford Borough does not appear to be an outlier. This is due to the combination of a larger proportion of care homes with single cases and the lack of shorter intervals in the data from Bedford Borough. This suggests that a major difference between Bedford Borough and other local authorities in the East of England is not that the longest outbreaks are longer, but there are more care home with single cases and fewer care homes with short interval outbreaks. This could be

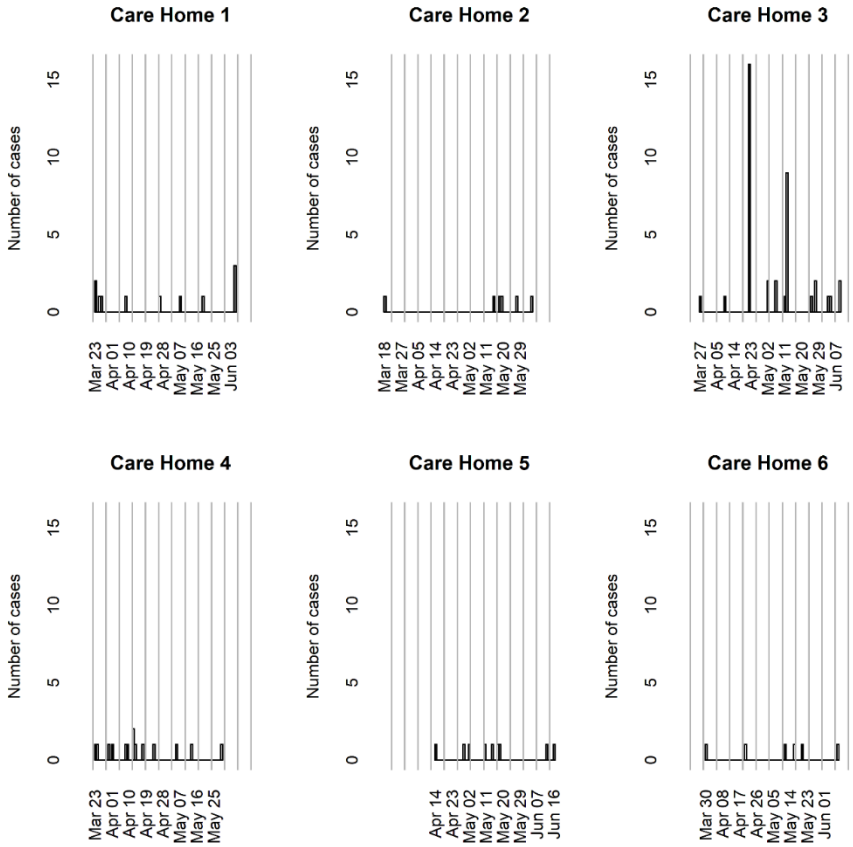
due to differences in testing practices. The interpretation of this analysis will also be affected by the size of care homes.

Figure 2: Plot of the distribution shape of the interval (outbreak length). These plots show the distribution of interval lengths in care homes. The data is sorted and then plotted along a 0-1 x-axis. This allows the comparison of the distribution of the different UTLA. The graph on the left excludes intervals where the number of cases is one, the graph on the right includes all the intervals. Bedford is shown with a thicker orange line.



It should be noted that the definition of an outbreak is two or more epidemiologically linked cases, and the interval between the first and last case in a care home will sometimes be longer than the length of an outbreak. The number and timing of probably care home cases was extracted from SGSS by matching on postcode. Epidemic curves were plotted for the six care homes in Bedford Borough with the longest intervals (Figure 3). Large time gaps between cases is suggestive of cryptic transmission (from undetected cases) or multiple introductions. For example, there is a large gap between the first and second case in Care Home 2. The subsequent cases could be epidemiologically linked to each other, but it is unlikely they are epidemiologically linked to the first case in mid-March.

Figure 3: Epidemic curves for the six care homes with the longest interval between the first and last case. The grey vertical lines are spaced by a week.



Comparison of the outbreak data collected by the CQC Care Home Capacity Tracker and the PHE HPZone system showed similar trends, indicating that the CQC Care Home Capacity Tracker is a useful tool for the local system to monitor the incidence of care home outbreaks.

Surveillance and control

Supporting Infection Prevention and Control in Care Homes

The council is actively supporting the care sector to prevent COVID-19 transmission, and together with partners has taken the following steps:

- Regular communications regarding guidance, funding, staff wellbeing etc. have been sent directly to the care settings by the council throughout the pandemic.
- A clinical lead was identified for each care home on 29th May 2020, and they provide general support and a minimum weekly check in with each home.
- All care homes were offered training on donning and doffing PPE during May with 'mop up' sessions in early June, as part of the 'train-the-trainer' scheme led by the BLMK Commissioning Collaborative.
- A multi-agency Bedfordshire Care Providers Operational Group was established on 28th April 2020 and meets weekly to review and plan for the effective management of outbreaks in care settings.

- Throughout the pandemic the Council has been supporting care providers with emergency PPE requirements if they have been unable to procure it from their normal routes.
- All care homes and residential living settings have been able to receive whole home testing since 8th June 2020.
- Domiciliary care providers will be offered free Infection Prevention and Control training by 31st July 2020.

Local surveillance

Care homes notify Public Health England when they become aware of a new case (or cases) and the details are recorded PHE's HPZone case management system. They are not required to notify subsequent cases in an outbreak. The CQC requires care homes to complete a return every weekday, known as the Capacity Tracker, which includes information on the number of residents with COVID-19, bed capacity, workforce, PPE and resilience. Regular completion of the capacity tracker helps to ensure that local partners have the intelligence they need to ensure the safety and resilience of the care system. From the latest return, dated 17 July 2020, 37 homes (47%) had completed the tracker in the last 24 hours and a further 37 homes (47%) had completed in the last 7 days. Two homes (3%) had not completed it in the last week and two (3%) had never completed the tracker.

In addition to notifications from PHE and monitoring the CQC activity tracker the Council Care Standards team has regular contact with all care home and home care providers, contacting each of them at least once a week and more frequently if required. The outcomes of the contact are recorded on a comprehensive dashboard which includes:

- Staffing sickness levels, whether staff are working across multiple establishments
- Whether the setting pays statutory sick pay
- Whether the home is open or closed and vacancy levels
- Cases suspected and confirmed, separately for residents and staff
- Date of last positive test in the setting
- Deaths, COVID-19 and non-COVID-19 related
- PPE levels, confidence in using PPE and the ordering processes
- Food levels
- Availability of and confidence in using medical equipment, e.g. thermometers and pulse oximeters
- Any other concerns or issues

The Council's Care Standards team also use relevant information that they receive from partners including the CCG and ELFT (the community health provider) to inform conversations with the care homes, for example following up with those that may not have attended infection prevention and control training or a swabbing seminar.

When care settings become aware of a positive case they inform the Care Standards team directly, which means they are already aware of the majority of notifications that they receive from PHE. The team will immediately contact the home to discuss what actions they have taken and will be taking, and to confirm that they are adhering to the relevant infection prevention and control guidance. The team also re-send the relevant guidance and flowcharts by email.

Domiciliary care staff and service users are at potential risk of COVID-19 transmission due to the nature of the close care provided and the requirement of staff to travel between service users'

homes. Whilst they are not required to complete the CQC Capacity Tracker, domiciliary care, extra care and supporting living providers are contacted weekly by the Care Standards team to establish whether there have been any reported cases or service resilience issues. Weekly staff testing and four-weekly resident testing is being rolled out to all care homes by September, and government has committed to implementing whole-home asymptomatic testing for staff and residents in extra care and supported living settings. It is not yet clear whether government will implement a similar approach for domiciliary care staff and service users.

The Care Standards team has reported that homes have at times struggled with a lack of continuity in the support from the PHE Covid-19 Response Cell. Additional communication with care homes may be required to ensure that the homes understand how to contact the PHE Covid-19 Response Cell, and have awareness of the rota system that PHE operates. The team also reported that the clarity and accuracy of the outbreak situation reports sent by PHE could be improved.

The public health team monitors the PHE East of England Daily Patch Report and confirms that the Care Standards team is aware of any newly identified outbreaks or clusters in care homes.

The Council does not presently have access to the data to undertake detailed analysis of care setting outbreaks based on data from, the CQC Capacity Tracker, local dashboard or PHE HPZone. Routine access to resident-level personal information on COVID-19 infection, illness or death is not currently accessible to the local authority. The Care Standards team, working with Public Health, is however able to maintain good situational awareness and respond quickly to care homes situations as they arise.

Appendix 5

Bedford Borough COVID-19 Deep Dive Interim Findings

Bedford Borough Deep Dive Group (Bedford Borough Council; Public Health England; Joint Biosecurity Centre; Bedfordshire Hospitals NHS Foundation Trust; Bedfordshire, Luton and Milton Keynes Commissioning Collaborative).

Published 6 July 2020. Routine data as reported at 28 June 2020

Background

The weekly rate of COVID-19 infection in Bedford Borough has diverged from the East of England average since the end of April. Bedford Borough had one of the ten highest rates in the country for the weeks commencing 8th and 15th of June, but it should be noted that the rate of pillar 1 and pillar 2[1] laboratory confirmed infections has fallen since the initial peak in April and we have not seen a surge of infections in recent weeks.

The Deep Dive with Bedford Borough Council, Public Health England (PHE), the Joint Biosecurity Centre (JBC), Bedfordshire Hospitals NHS Foundation Trust and Bedfordshire, Luton and Milton Keynes Commissioning Collaborative aims to answer the following questions:

1) What is driving the differential pattern of COVID-19 infection in Bedford Borough, and
2) What interventions can be put in place to address this?

Two work streams have been established – one focused on the epidemiology of COVID-19 in Bedford Borough, the other to consider local communications and engagement. Interim findings summarise progress to date (focusing predominantly on the local epidemiology) and interim recommendations, including the next steps before the final report.

What is driving the differential pattern of COVID-19 infection in Bedford Borough?

In order to answer this, we need to consider the following points:

1) Are the data on laboratory confirmed infections reliable?
2) Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission of or severity of COVID-19 infection?
3) What is the current pattern of COVID-19 infection in Bedford Borough, and who is most affected?

[1] Pillar 1: swab testing in PHE labs and NHS hospitals for those with a clinical need, and health and care workers. Pillar 2: swab testing for the wider population.

4) Is there a clear focal point for the ongoing transmission in Bedford Borough, e.g. hospitals, care homes, workplaces, schools or specific communities?

The Deep Dive final report will also consider what is the likely future trend for the area and how effective are various interventions in outbreak prevention and management in Bedford Borough.

1. Are the data on laboratory confirmed infections reliable?

Microbiological surveillance of COVID-19 infections is undertaken by reporting virological test results from individuals by laboratories to the Public Health England Second Generation Surveillance System (SGSS). Patient records of those attending for medical care have been the historic basis of reporting to SGSS and are now termed pillar 1 tests. SGSS has been updated to include individual COVID-19 reports generated from contact with the National Health Service Covid19 Test and Trace system and are now termed pillar 2 tests.

- The PHE East of England Field Service has reviewed the pillar 1 and pillar 2 test databases to check for duplication within and between each pillar and are satisfied that there is no duplication in the reported numbers.
- Initial enquiries established that negative test results from outsourced testing facilities used by Bedford Hospital were not being routinely reported to PHE. This has had the effect of artificially inflating the positivity rate but does not affect the number of positive tests reported (see Action 1).

2. Is Bedford Borough different to other areas in the East of England in terms of sociodemographic factors associated with transmission of or severity of COVID-19 infection?

- Analysis of Google Mobility data by the Joint Biosecurity Centre did not reveal any differential patterns in population mobility (e.g. relating to transport hubs, shopping, work or recreation) that could contribute to the higher rate of infection (see Action 2).
- Bedford Borough is similar to other areas in the East of England in terms of the proportion of the population at risk from severe illness from COVID-19, the prevalence of heart, kidney and lung disease, the proportion of adults who are overweight and the proportion with dementia.
- There are some sociodemographic factors which may contribute to increased transmission and severity of COVID-19 infection in Bedford Borough (see Action 3):
    - The proportion of households that are overcrowded is higher than the regional average (4.3% vs. 3.6%), but lower than Luton, Peterborough, Southend and Thurrock.
    - Compared to other Upper Tier Local Authorities (UTLAs) in the East of England Bedford Borough has a high proportion of residents from Black, Asian and other ethnic minority (BAME) groups. Peterborough has a similar pattern of ethnicity and Luton has the highest proportion of residents from BAME groups.
    - Diabetes prevalence in Bedford Borough is higher than the regional average (7.2% vs. 6.7%).

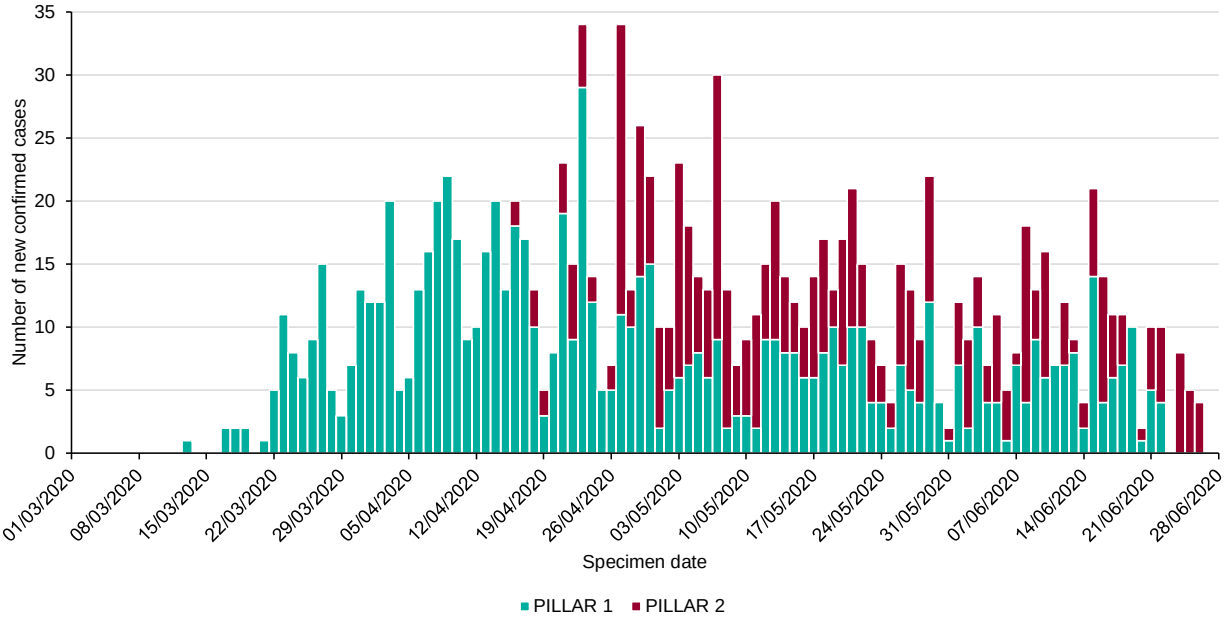
- The number of care home beds per 100 persons aged 75+ is the second highest in the region (11.4) behind Southend-on-Sea (12.9%).
- Small area analysis revealed that Harpur and De Parys Medium Super Output Areas are more vulnerable to COVID-19, as a result of factors including care home density, deprivation, prevalence of chronic health conditions.

3. What is the current pattern of COVID-19 infection in Bedford Borough, and who is most affected?

Since the first confirmed case in Bedford Borough who had a specimen date of 13th March 2020, there have been 1,221 cases of COVID-19 diagnosed amongst residents of Bedford Borough[2]. Overall, 5% of the cases in the East of England have been residents of Bedford Borough, while Bedford Borough's population represents 2.8% of the population of the East of England.

Figure 1 outlines the daily number of confirmed COVID-19 cases by testing pillar in Bedford Borough. There have been 801 (66%) and 420 (34%) cases identified via pillar 1 and 2, respectively, in Bedford Borough. The first positive Covid19 specimen date for a Bedford resident was 13 March 2020, with peaks of 34 reports with positive specimen dates on each of 23 April and 27 April 2020, followed by a sustained decline, to below 15 cases per day since 15 June 2020.

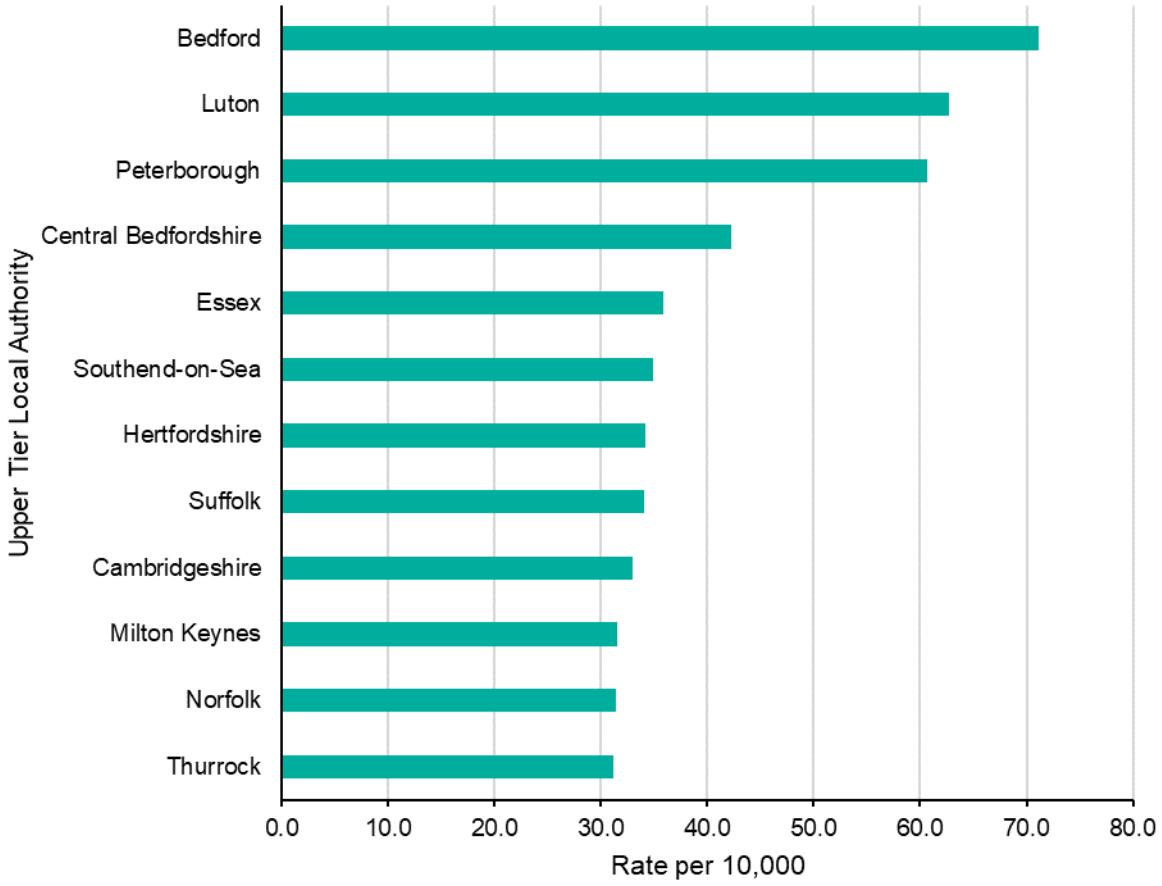
Figure 1 – Daily number of confirmed COVID-19 cases in Bedford Borough by testing pillar (Source: SGSS)



Overall, Bedford Borough has a crude cumulative case rate of 71 cases per 10,000 residents and the East of England region has a crude rate of 37 per 10,000. Bedford Borough has the highest rate of COVID-19 cases in the East of England region by upper tier local authority (UTLA), followed by Luton (63 per 10,000) and Peterborough (61 per 10,000), as shown by figure 2.

[2] Data up until 28/6/2020, data for the most recent 5 days subject to change due to reporting delays.

Figure 2 – Crude cumulative case rates per 10,000 population of UTLAs in the East of England (Source: SGSS)



By week, the crude rate of new COVID-19 cases diagnosed in Bedford Borough residents has been declining overall since a peak during the week commencing 6th April 2020 for pillar 1 and week commencing 27th April for pillar 2, with a decrease in weekly rate also being observed regionally for the East of England and nationally for England (figure 3).

Figure 3 – Crude rate per 10,000 population of weekly confirmed cases in Bedford, East of England, and England (up to June 28 2020) (Source: SGSS - retrieved from the PHE nationally produced epidemiological report for Bedford)

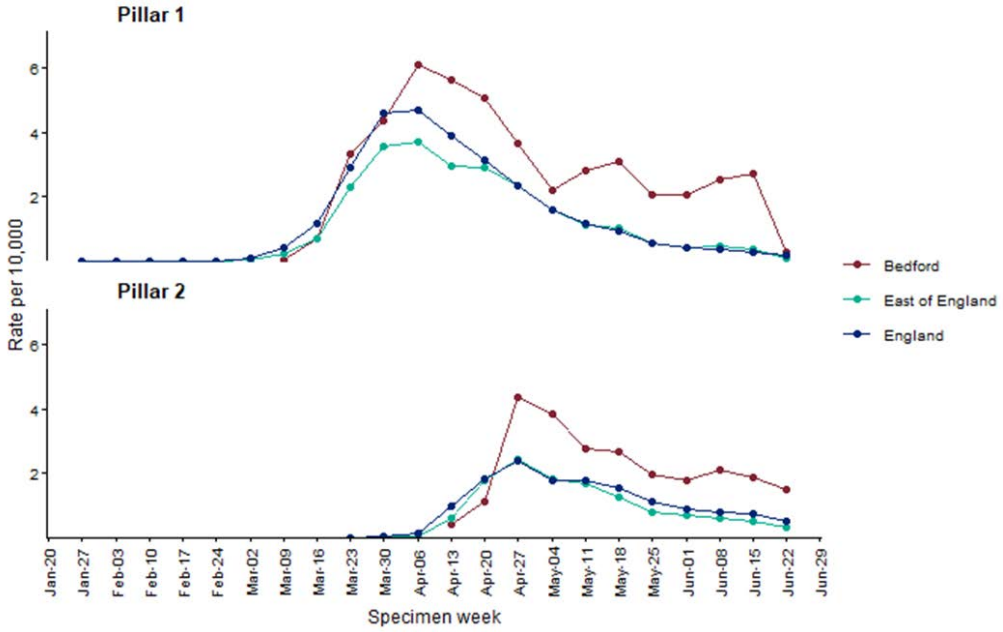


Figure 4 outlines the cumulative crude rate of COVID-19 cases in Bedford Borough by lower super output area (LSOA). Rates are generally highest in the LSOAs of the urban areas of Bedford and Kempston, apart from two LSOAs in Riseley and Wyboston where the high rates are believed to reflect the locations of known settings. When looking at these rates over the past month (27 May – 27 June 2020), figure 5, the LSOAs with the highest rates are still found in the Bedford urban area. Further work is needed to fully cross-reference the LSOA data with known care home situations in order to establish whether there is higher community transmission in the identified LSOAs (see Action 3).

Figure 4 – Cumulative crude rate per 10,000 of confirmed COVID-19 cases by LSOA, Bedford Borough (Source: SGSS)

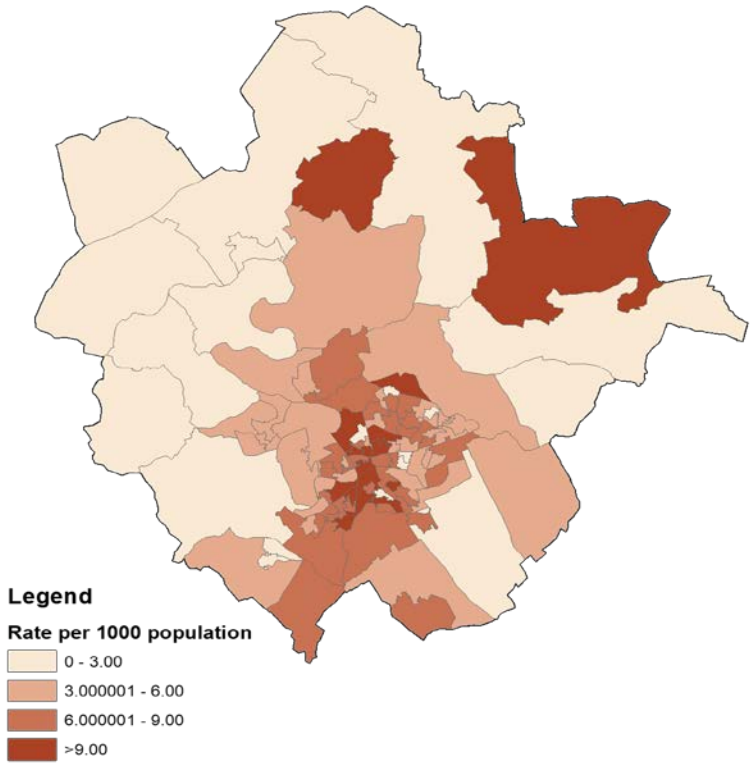


Figure 5 – Crude rate per 10,000 of confirmed COVID-19 cases between 27 May – 27 June 2020 by LSOA, Bedford Borough (Source: SGSS)

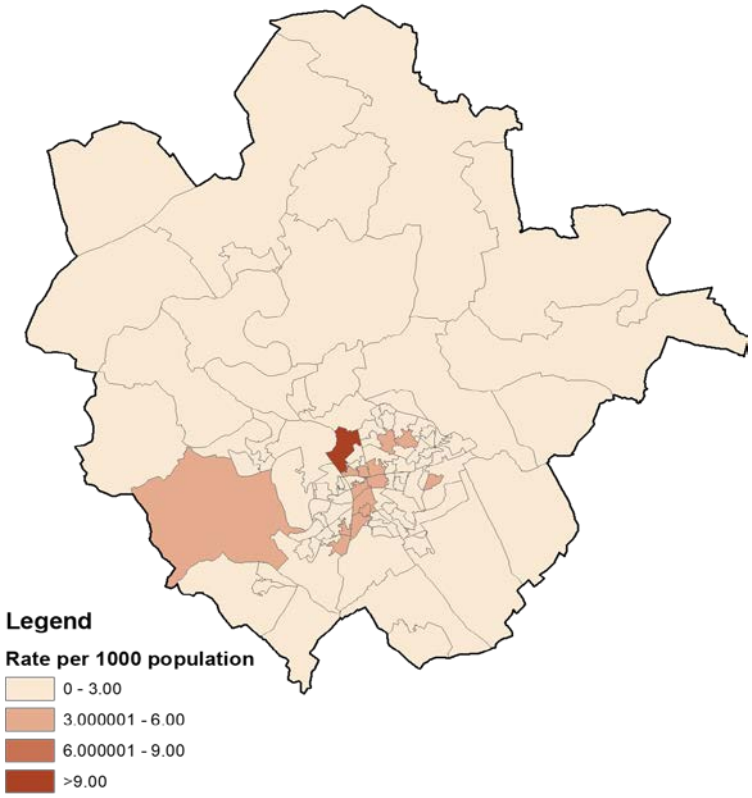
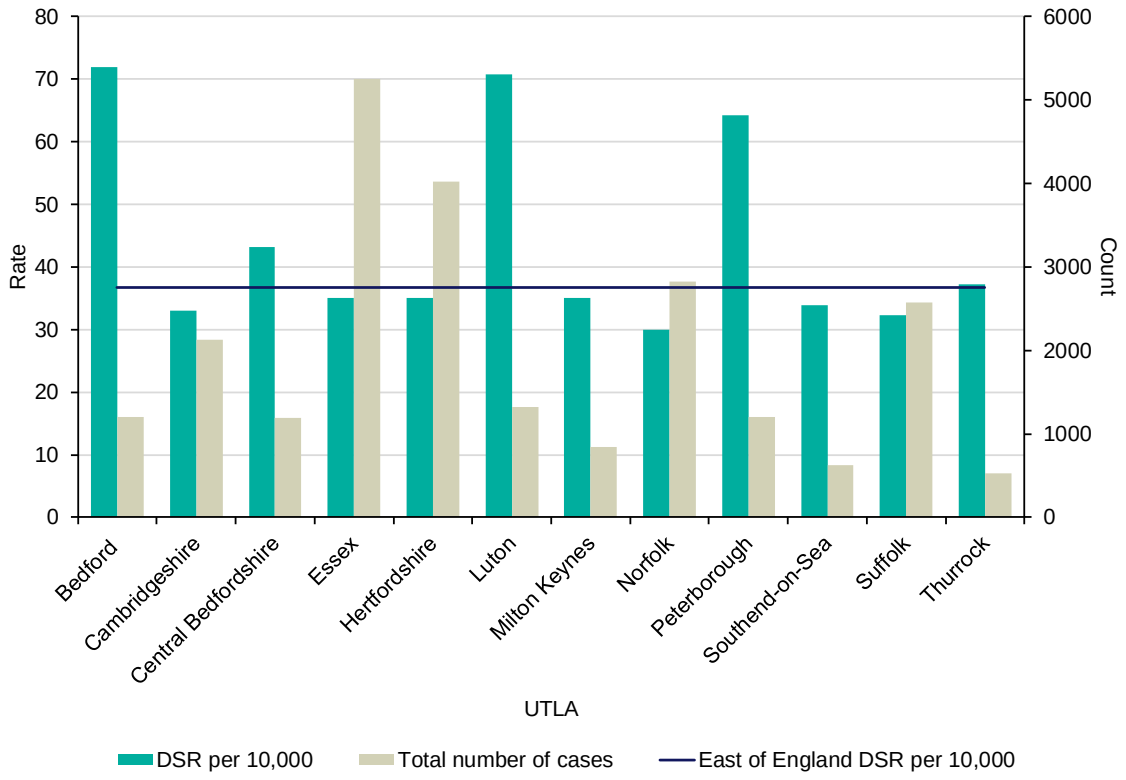


Figure 6 displays age standardised rates (i.e. rates of infection per 10,000 people adjusted for differences in the age structures of the local authority populations), for each UTLA in the East of England region. Here Bedford Borough has the highest directly standardised rate (DSR) of 72 per 10,000, which is more similar to the second and third highest DSRs seen in Luton (71 per 10,000) and Peterborough (64 per 10,000) than when considering the crude rates (figure 2). This suggests that differences in the age structure in Bedford Borough, compared to the other local authorities could be partly responsible for higher observed crude rate. Further description of the demographics of local COVID-19 infection is provided below.

Figure 6 – Age standardised rates per 10,000 of confirmed COVID-19 cases by UTLA in the East of England (Source: SGSS)



Who is most affected?

711 (58%) of cases in Bedford Borough have been female and 506 (42%) have been male. The highest number of cases have been observed in females aged 30 to 59 years old (see Action 3).

The occupation or setting of the person from which the COVID-19 specimen was collected was similar in Bedford Borough to the rest of the East of England. In pillar 1 reports the proportion with no information on setting or occupation was 2% for Bedford and 8% for the East of England. For pillar 1 tests Hospital/NHS trust, care home and healthcare worker[3] accounted for 85% of cases for the East of England and 94% for Bedford Borough. For pillar 2 testing, the proportion of reports lacking information on setting or occupation was 29% in Bedford and 36% for the East of England.

[3] In the context of COVID-19 testing healthcare workers are individuals who self-identify as working in health or care settings, including medical staff, nursing staff and nursing auxiliaries.

The most common setting and occupation recorded was again healthcare accounting for 34% of reports from Bedford Borough and also from the East of England.

It has not been possible to analyse COVID-19 infections by ethnicity, due to poor data completeness (see Action 4).

4. Is there a clear focal point for the ongoing transmission in Bedford Borough, e.g. hospitals, care homes, workplaces, schools, or specific communities?

Surveillance of incidents and outbreaks has been conducted by Public Health England Health Protection units using a cloud-based application called HP Zone. Refinements have been made to the definitions of incidents and out breaks attributed to COVID-19.

The number of COVID-19 outbreaks and incidents in HP Zone has ranged from one to a maximum of nine in week beginning 18 May 2020, remaining at four or less each week since week beginning 25 May 2020 to the present.

NHS Hospitals and other inpatient facilities

One hospital outbreak of COVID-19 was reported in Bedford Borough at a private healthcare facility. The outbreak was reported to the PHE Heath Protection Team on the 9th April 2020. In total, 23 staff were reported to have symptoms, four of which tested positive for COVID-19. There were no confirmed cases among the hospital's patients. The outbreak was closed on the 7th of May, following 14 days of no symptomatic staff or patients.

In the previous two weeks there have been 57 confirmed COVID-19 cases that had contact with Bedford Hospital, primarily COVID-19 positive inpatients together with newly admitted patients. On one ward, four patients who were asymptomatic on admission tested COVID positive on 14 June. The hospital identified this outbreak at the time and closed the relevant non-COVID ward to new admissions on 15 June. Upon retrospective review of the patient ward movements timeline, this ward was identified to have several COVID-19 cases that were confirmed positive after spending a number of days admitted to the ward.

A timeline of ward movements was completed for all patients in the last two weeks who had contact with the acute non-COVID ward. Of the cases who had previous contact with the ward, the majority had contact in the 7 days prior to testing positive for COVID-19. The majority were present on the ward at the same time as other COVID-19 cases, and half the cases remained on the ward after testing positive (see Actions 5 to 12).

The Trust has assured itself that the appropriate enhancements in response to this situation have been made with regards to the provision and use of PPE. This has included reviewing the daily checklists of PPE provisions and their correct usage at ward level led by the matrons.

It has been recognised that testing provision at Bedford Hospital has been through a number of different suppliers (including Addenbrookes and PHE), and this has complicated the testing process. Whilst longer turnaround times for test results were experienced in the earlier stages of the pandemic, a turnaround time of 24 to 48 hours has been the recent experience of the hospital, but it is acknowledged that this still isn't fast enough to identify COVID-19 positive patients at the time of admission. In recognition of this the Trust has introduced near-patient testing (through the provision

of eight Samba II machines) that will assist in the identification of asymptomatic patients in a more timely fashion (see Action 5).

The Trust's testing programme currently includes testing all inpatients on first admission, and subsequently throughout their admission, all elective patients prior to surgery, and point prevalence testing of asymptomatic front line staff on a rolling basis.

Testing capacity at the hospital has improved markedly over the last week and the speed of aggregating results (including staff test results) has increased. However, testing throughput remains limited due to the current allocation of reagent compound and the Trust is working closely with NHS England/Improvement to ensure the timely supply of reagents used by the Panther Test apparatus. Increasing the hospital allocation of reagent compound will enable Panther Test apparatus to be fully exploited and increase testing throughput to well in advance of the circa 400 tests/day anticipated (see Action 7).

The figures for Bedford Hospital COVID-19 testing capacity are summarised in the table below.

Test Demand	A&E Admissions c50/day	Inpatient Testing c50/day	Staff Testing c200/day	Total Demand c300 tests/day
Capacity	Samba II output 96 tests/day	Panther Machines c65 tests/day (on current reagent allocations)	Panther Machines c450 tests/day (requires 7 times more reagent allocations)	Current capacity c161 tests/day Potential capacity c546 tests/day

It is essential that adequate reagents are provided to the Trust if an adequate testing capability is to be sustained. Whilst additional resource has been made available to the hospital, this remains insufficient to sustain anticipated demand (see Action 7).

IIMARCH reporting[4] has recently been introduced by the NHS to record summaries of outbreaks of COVID-19 in NHS commissioned services, with reports made to NHS England/Improvement.

The comprehensive nature of this review process has allowed the Trust to identify a number of opportunities to track patients in an improved manner. The Trust is being assisted by PHE in setting up a COVID-19 case register which will record all cases age, ethnicity, outcome, and duration of stay (see Actions 8 to 10).

Concerns had been raised that Bedford Hospital was routinely reporting circa 150 'patients isolated pending swab results', compared to circa 25 for the Luton and Dunstable Hospital. An earlier investigation by the Trust confirmed that whilst both Trusts were swabbing patients in the same way, Bedford Hospital data included swab results outstanding for patients who were asymptomatic and screened on admission as well as those with suspected COVID-19, whereas the Luton and Dunstable data only included patients who were suspected to be COVID-19 positive (see Action 6).

[4] IIMARCH (Information, Intent, Method, Administration, Risk Assessment, Communications and Humanitarian Issues) is a structured briefing format used by emergency responders.

Care homes

There have been 50 suspected and confirmed COVID-19 outbreaks in Bedford Borough, 42 of which were in care homes. Regionally, most COVID-19 outbreaks have been in care homes (89%), with a lower number of outbreaks being reported compared to the peak of the pandemic in April 2020, largely due to a reduction in care home outbreaks.

There are a total of 152 care settings in Bedford Borough that are being supported and monitored by the Council and its partners, including residential and nursing homes for older people (N=35), residential homes for people with learning disabilities and/or mental ill health (N=41), extra care housing (N=11), supported living (N=24) and domiciliary care providers (N=41). 78 of these settings are CQC registered care homes.

A similar proportion of care homes in Bedford Borough have had suspected or confirmed COVID-19 outbreaks as other local authorities in the East of England (54% compared to a regional median of 52%), and the average number of residents and/or staff affected per outbreak is also similar. There was evidence to suggest that outbreaks tested under pillar 1 in Bedford Borough care homes were on average 10 days longer than the regional average (37.5 days vs. 27 days). For pillar 2 the difference was 12 days (17 vs. 5) but the difference was not statistically significant. Longer outbreaks could be consistent with multiple introductions of COVID-19 into care homes (see Action 13).

Supporting Infection Prevention and Control

The council is actively supporting the care sector to prevent COVID-19 transmission, and together with partners has taken the following steps:

- Regular communications regarding guidance, funding, staff wellbeing etc. are sent directly to the care settings.
- A clinical lead has been identified for each care home and they provide general support and a minimum weekly check in with each home.
- All care homes have been offered training on donning and doffing PPE as part of the 'train-the-trainer' scheme led by the BLMK Commissioning Collaborative.
- A multi-agency Bedfordshire Care Providers Operational Group has been established and meets weekly to review and plan for the effective management of outbreaks in care settings.
- The Council has been supporting care providers with emergency PPE requirements if they have been unable to procure it from their normal routes.
- Since the 11th May 2020 all care homes for older people have been able to receive whole home testing, and since the 8th June whole home testing has been available to all care homes, including those for under 65s with learning disabilities or mental health problems.
- Domiciliary care providers will be offered free Infection Prevention and Control training in the coming weeks.

Local surveillance

In addition to notifications from PHE and monitoring the CQC activity tracker the Council Care Standards team has regular contact with all care home and home care providers, contacting each of them at least once a week and more frequently if required. The outcomes of the contact are recorded on a comprehensive dashboard which includes:

- Staffing sickness levels, whether staff are working across multiple establishments
- Whether the setting pays statutory sick pay
- Whether the home is open or closed and vacancy levels

- Cases suspected and confirmed, separately for residents and staff
- Date of last positive test in the setting
- Deaths, COVID-19 and non-COVID-19 related
- PPE levels, confidence in using PPE and the ordering processes
- Food levels
- Availability of and confidence in using medical equipment, e.g. thermometers and pulse oximeters
- Any other concerns or issues

The Care Standards team also use relevant information that they receive from partners including the CCG and ELFT (the community health provider) to inform conversations with the care homes, for example following up with those that may not have attended infection prevention and control training or a swabbing seminar.

When care settings become aware of a positive case they inform the Care Standards team directly, which means they are already aware of the majority of notifications that they receive from PHE. The team will immediately contact the home to discuss what actions they have taken and will be taking, and to confirm that they are adhering to the relevant infection prevention and control guidance. The team also re-send the relevant guidance and flowcharts by email.

The public health team monitors the PHE East of England Daily Patch Report and confirms that the Care Standards team is aware of any newly identified outbreaks or clusters in care homes.

The Council does not presently have the data to undertake detailed analysis of care setting outbreaks based on data from, the CQC Capacity Tracker, local dashboard or PHE HP Zone. Routine access to resident-level personal information on COVID-19 infection, illness or death is not currently accessible to the local authority (see Action 13).

Workplaces

There has been one identified workplace outbreak. Twenty individuals who worked at the same warehouse tested positive, with 18 between the 25th May and the last case on 17th June. Within this group, there were two clusters of three and four individuals that were epidemiologically linked.

The Council has established a COVID-19 Infection Control Team, led by Environmental Health to promote safe working practices, deal with complaints and requests for assistance from employees and members of the public, and respond to reports of cases, clusters and outbreaks in local workplaces in Bedford Borough.

Limitations in the contextual data supplied by the NHS Test & Trace service can delay identification of likely workplace transmission. Businesses are being asked to notify cases, clusters and outbreaks to the Local Authority as well as PHE (see Actions 14 and 15).

Environmental Health Officers have written to high risk workplaces (including warehouses and meat processing plants) to offer guidance and support. Working with the Public Health team the EHOs have developed a set of COVID-19 Frequently Asked Questions for workplaces, outlining employer and employee responsibilities under Health & Safety legislation. An infection control checklist has also been produced for use by EHOs in the event of another local workplace outbreak.

Schools

Since schools in Bedford Borough began to open to more year groups on 1st June there have been two confirmed cases of COVID-19 in one primary school. There is no evidence to indicate that schools are a contributory factor in the ongoing transmission of COVID-19 in Bedford Borough.

Custodial institutions

There were two COVID-19 situations reported in custodial institutions in Bedford Borough. Cases identified in prison residents are usually attributed to the local authority of the prison and would count towards that local authority's case numbers and rate (unless the prison resident's home address is used instead, which would need to be reviewed for each unique situation).

The first was an outbreak of COVID-19 at Yarls Wood Immigration Removal Centre, where there were approximately 24 symptomatic or confirmed cases among staff and residents between 15th March and 30th April 2020.

The second COVID-19 situation in a custodial institution setting was at HMP Bedford, which was reported to the Health Protection Team on 8th April 2020. This situation was closed on 27th June 2020 after no symptomatic residents had been reported since 10th June 2020.

Community clusters

PHE has access to detailed information on laboratory confirmed COVID-19 cases, including postcode of residence. Since 2nd July the local authority has been given access to a weekly data file that includes pseudonymised[5] records of positive tests and positive cases.

Potential community clusters were identified where there were multiple cases with the same postcode (excluding CQC registered Care Home postcodes) and then filtered by excluding cases that were more than 14 days apart. The numbers and size of these potential clusters are shown in the Table below, and the explanation for these apparent clusters could be community transmission within or between households, occupational transmission (especially in the health and social care settings) or coincident transmission from different sources. Further analysis could examine whether it is consistent that a healthcare worker is the index case in these potential clusters (see Action 16).

Cluster size	Number of clusters	Wards
5	3	Harrold, Chellington & Turvey; Cauldwell & Elstow; Shortstown & Wixams
4	8	Brickhill; Goldington (2 clusters); Queens Park; Kingsbrook; Kempston Central & East; Kempston West & South (2 clusters)
3	18	Not yet analysed
2	120	Not yet analysed

[5] Pseudonymisation is a data management procedure by which personally identifiable information fields within a data record are replaced by an alternative identifier called a pseudonym. This makes the data record less identifiable while remaining suitable for data analysis.

What interventions can be put in place?

The weekly rate of COVID-19 infection in Bedford Borough has been consistently higher than the East of England average, and one of the ten highest rates in the country for the weeks commencing 8th and 15th June. However, it is important to note that the rate of local COVID-19 infections has fallen since the initial peak in April and we have not seen a surge of infections in recent weeks. The weekly rate of infections is falling (see Figure 1).

Analysis of the deep dive data has not identified a single focal point for the higher rate of COVID-19 infection in Bedford Borough. No specific settings or communities are highlighted, instead there are multiple potential contributory sociodemographic factors that must be accounted for in the local response.

Our communities along with the hospital and other health care settings, our care homes, workplaces, schools and custodial institutions must maintain a high level of adherence to prevention measures and ensure suspected outbreaks are reported swiftly to the local authority and PHE.

Further work is required to improve the epidemiology recording and analysis of COVID-19 cases in Bedford Hospital and to review occupational health arrangements. Enhancements to COVID-19 testing in the hospital are required and ongoing assistance is being provided by the PHE East of England Field Epidemiology Unit to Bedford Hospital to achieve this.

1. What actions have already been taken?

- A comprehensive joint communications strategy has been established, with the aim of:
    - Encouraging residents of Bedford Borough to stay home and observe stringent infection control measures as a result of the increased infection rate in the Borough.
    - Building confidence in the local management of COVID-19 by accurately reporting the findings from the 'Deep Dive' to residents.
    - To influence national messaging to support more localised narratives around outbreaks and potential outbreaks.
- Progress to date includes:
    - A series of videos have been developed in different languages; broadcast TV and radio interviews have been undertaken including input from Elected Members and GPs.
    - Social media messaging has continued, supported by LRF partners.
    - Targeted communications have been developed for faith groups.

2. What further actions are necessary?

Although these are interim findings, initial recommendations have been identified for immediate action. These are structured by theme and assigned to organisations. It should be recognised that further recommendations may be identified for the final report.

Theme	Action	Owner
Reliability of lab confirmed infections data	1. Bedford Hospital negative tests will be uploaded to PHE database	Bedford Hospital / PHE
Sociodemographic factors associated with transmission	2. Ongoing review of Google Mobility trends and consideration of novel data sources and advanced analytical approaches that could support the local area	Joint Biosecurity Centre
	3. Ensure targeted communications and engagement based on possible contributory sociodemographic factors	All partners through the Communications and Engagement workstream
Current pattern of COVID-19 infection	4. Improve the completeness of ethnicity data, for example, by linking testing data to Hospital Episode Statistics	PHE
Focal points for transmission - Hospital	5. The additional eight SAMBA II machines, together with the additional personnel, be made operational. N.B: This was completed 26th June and the machines are fully operational.	Bedford Hospital
	6. Reporting of swabbing data to be reviewed.	Bedford Hospital
	7. Additional supplies of the reagent compound be procured so to enable the testing capability to be maximised.	Bedfordshire, Luton and Milton Keynes Commissioning Collaborative
	8. Establish an epidemiological database of COVID-19 cases, based on the data set from the Deep Dive. This will utilise the PHE Epidata database with support from PHE.	Bedford Hospital
	9. Increase plotting of COVID19 patient care ward movements of all cases retrospectively and prospectively.	Bedford Hospital
	10. Continue to identify all transmission events and act to mitigate, having regard to the assistance provided during the Deep Dive in plotting time relations of COVID19 cases.	Bedford Hospital
	11. Ensure that a process of rapid testing of patients is introduced. N.B: This was completed 26th June.	Bedford Hospital
	12. Continue to review and monitor the training and usage of PPE as part of ongoing good practice.	Bedford Hospital
Focal points for transmission – Care homes	13. To identify whether any further enhancements to care home surveillance can be identified.	Bedford Borough Council N.B: with support from PHE

Theme	Action	Owner
Focal points for transmission – Workplaces	14. Establish more timely and informative sharing of data from NHS Test & Trace	PHE
	15. To identify whether any further enhancements to workplace surveillance information sharing can be identified	Bedford Borough Council and PHE
Focal points for transmission – Community	16. Ensure based on the emerging guidance that processes are aligned so as to improve cluster detection and new transmission networks in the community.	Bedford Borough Council and PHE
Testing availability	17. To review the availability of access to the Military Mobile Test Units so as to provide maximum availability.	Bedfordshire LRF Community Settings Testing cell
Overarching	18. All partners cited in this document are to hold each other to account and ensure that actions are completed.	All partners