

Reducing Mortality in Community Acquired Pneumonia Liverpool University Hospitals NHS Foundation Trust

The NICE (2014) guidance publication 'Pneumonia in Adult: Diagnosis & Management'¹ covers diagnosing and managing Community Acquired Pneumonia (CAP) in adults. Its aim is to improve the accurate assessment and diagnosis of pneumonia to help guide antibiotic prescription and ensure that people receive the right care. It estimates a mortality rate between 5% and 14% for patients admitted to hospital with CAP.

Background

Liverpool University Hospitals NHS Foundation Trust was established in October 2019, bringing together Aintree University Hospital NHS Foundation Trust and Royal Liverpool & Broadgreen Hospitals NHS Trust. The Royal Liverpool site took the decision in February 2019 to begin a programme of work to improve the delivery of care to patients diagnosed with CAP. A review of 2018 discharges in Secondary User Service (SUS) data showed that of the 2,827 patients diagnosed and coded as CAP, 451 died in hospital, a crude mortality rate of 16%. This was considerably above the overall north-west rate of 14.9%.

Liverpool University Hospitals NHS Foundation Trust currently participate in the Advancing Quality (AQ) programme which aims to ensure high reliability and reduce variation through a structured approach to embedding evidenced-based care, enabling the highest quality of care to be provided to every patient, every time. The AQ pneumonia measure set supports the NICE (2014) publication, monitoring five interventions to improve clinical outcomes.

AQ CAP Measures

- Oxygen assessment within 4 hours of hospital arrival
- Chest x-ray within 4 hours of hospital arrival
- Initial antibiotic selection for CAP
- CURB-65 Score documented in A&E, MAU or post take ward round
- Initial antibiotic received within 4 hours of hospital arrival

Each trust's CAP population is identified using International Classification of Disease version 10 coding (ICD-10). Details of these patients, or a statistically significant sample, are uploaded to AQ's Patient Intelligence and Quality System (PIQS). Data collectors at trusts then check that these patients have a documented diagnosis of pneumonia. Those without a confirmed diagnosis are excluded. In this cohort of validated pneumonia patients, Royal Liverpool had an in-hospital mortality of 17.0% for 2018 discharges (42 of 247 patients) compared to 12.8% for the validated AQ pneumonia population overall (429 of 3,351 patients).

Objective

After reviewing these data, Royal Liverpool decided to initiate an improvement programme with the overall objective of reducing in-hospital mortality for CAP patients to in line with or below the regional average by November 2019.

¹ National Institute for Health & Care Excellence (NICE)

Aims

To achieve this objective of mortality reduction, the following aims were identified:

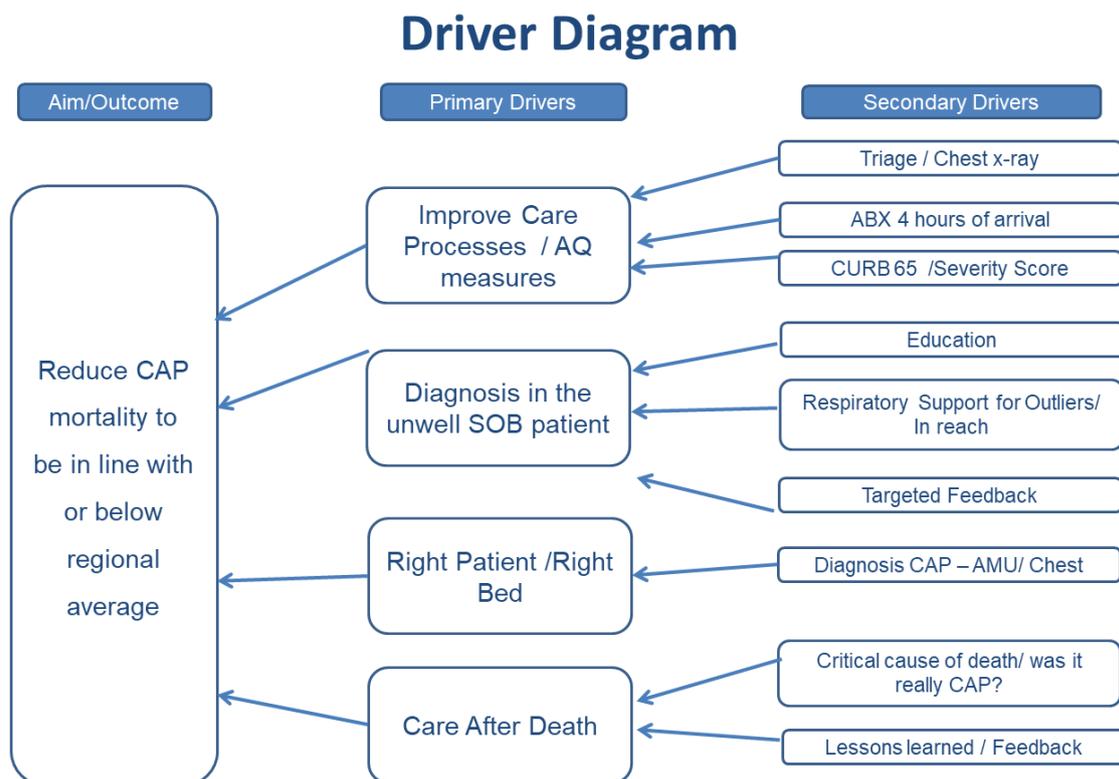
- Devise an E-learning programme to support early diagnosis and treatment of CAP
- Improve patient pathway ensuring the correct patient is allocated the correct bed
- Ensure accurate diagnosis
- Ensure accurate clinical coding

Actions

A visual summary of the following can be found in appendix 1.

Action One: Agree Aim & Devise Action an Plan

Reviewing these aims, the team identified key areas where improvement could be made. These formed the primary drivers for improvement. A steering group was established to monitor and coordinate the improvement programme.



Action Two: Patient Placement

Analysis of local Royal Liverpool data demonstrated that patients admitted via the Emergency Department (ED) and transferred to the Acute Medical Unit (AMU) had a reduced length of stay compared to patients transferred from ED to a ward, with a mean length of stay of 12.4 days for AMU patients and 16.1 days for non-AMU patients.

Action Three: Accurate Diagnosis

Preliminary analysis revealed that patients who received an appropriate diagnosis by the post-take ward round had a shorter length of stay, staying in hospital for a mean of 9.4 days compared to 18.9 days for patients with a diagnosis after this point. The trust now undertakes quarterly analysis of clinical coding data to ensure accuracy of diagnosis. This proactive approach ensures that recorded diagnoses reflect the patient's conditions.

Action Four: Timing of Clinical Interventions

AQ data shows that less than 1% of CAP patients are elective admissions and that the overwhelming majority present to the ED. The trust recently reintroduced the Manchester Triage tool to expedite early investigations for patients with suspected CAP. Patients who have a chest X-ray requested at triage are more likely to be diagnosed early and receive timely antibiotics.

Action Five: Education

Education was a key component of the plan. The CAP improvement programme was highlighted in the Patient Safety Bulletin, giving staff the opportunity to become involved. An e-Learning programme was devised using patient examples to support accurate and early diagnosis and treatment opportunities. This is now routinely completed by the organisation's multidisciplinary team. There are regular staff education sessions across all disciplines and clinical divisions. Clinical coders work with clinicians to improve coding of patient spells.

Action Six: Dashboard

To monitor mortality and length of stay, Royal Liverpool's business intelligence department developed a CAP-specific dashboard. Results from this are shared at the monthly Pneumonia Steering Group meetings. These analyses show a sustained downward trend in mortality. The dashboard is available on the trust intranet, enabling clinicians to easily access up-to-date information on pneumonia patients and get at-a-glance summaries.

Results

Analysis of CAP patient data from before and after the initiation of the improvement programme shows positive results. In-hospital mortality in SUS data was 16.9% (312 of 1,849 patients) for January - June 2018 discharges and 13.2% (148 of 1,117 patients) for the same period in 2019, below the regional average of 13.9%. In the validated AQ dataset, mortality fell between the two date periods from 19.4% (28 of 144 patients) to 13.8% (17 of 123 patients). Whilst this is still above the AQ average of 12.9% for January - June 2019, it is a significant fall and shows progress. Numbers are also relatively small and sensitive to change.

In addition to showing progress in mortality, the improvement work also yielded other valuable insights, some of which have already been referred to. They showed that patients receiving specialist care in the AMU do better for length of stay, with a mean saving of 3.5 days compared to non-AMU patients and also that patients receiving their pneumonia diagnosis by the post-take ward round spend much less time in hospital than those diagnosed after this point. Associated analyses showed that patients at Royal Liverpool tend to be diagnosed later than elsewhere, with 13.0% of patients

having their initial pneumonia diagnosis documented after the first finished Consultant episode in ICD-10 coding compared to 8.5% in the region as a whole. This does not, however, impact upon overall length of stay, with Royal Liverpool having a mean of 9 days for CAP, the same as the regional mean.

A visual summary of the results and the work supporting them can be found in appendix 2.

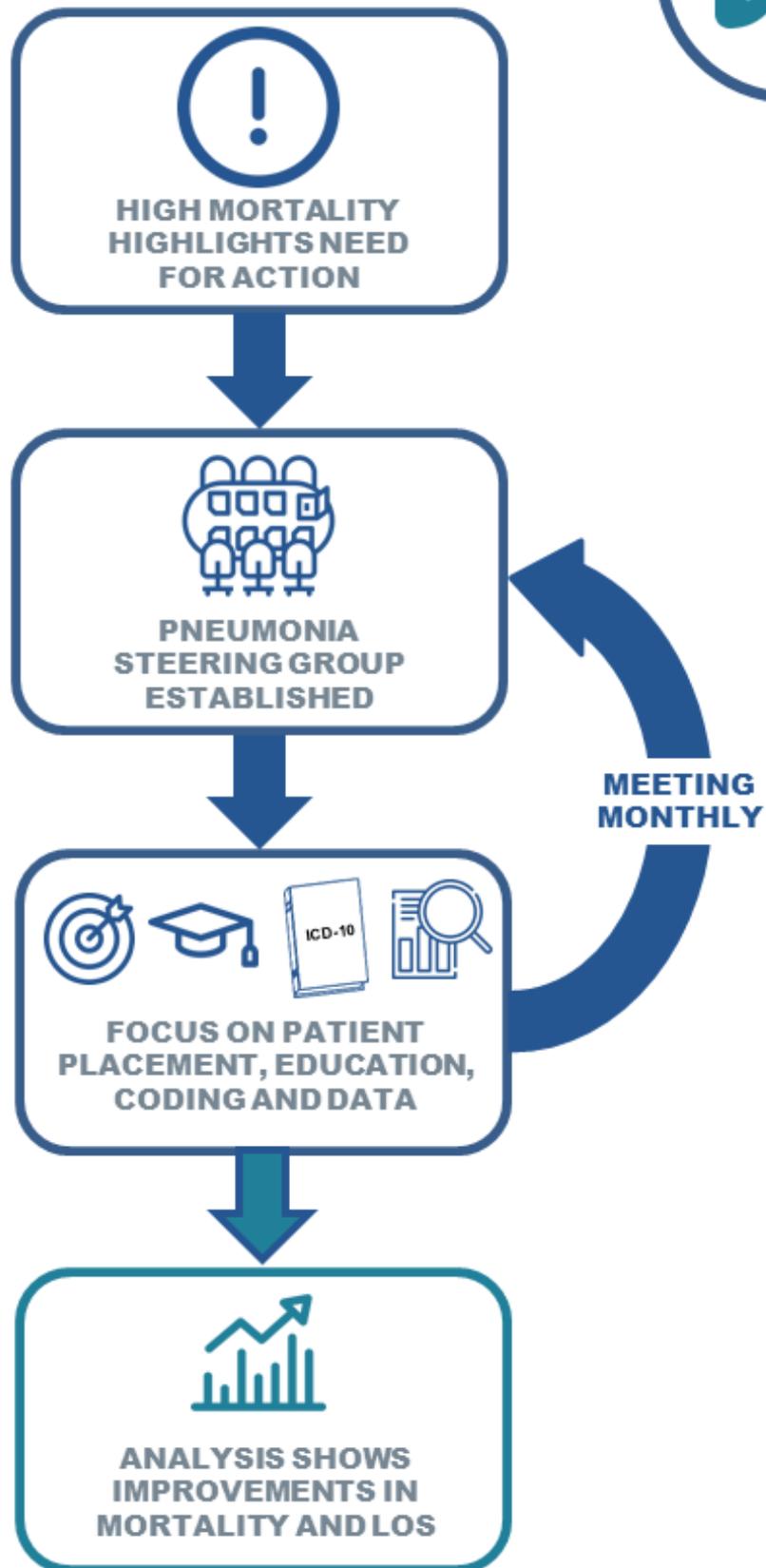
Key Findings

- A collective approach to improvement within an organisation stimulates critical thinking and supports the implementation of change
- Effective clinical leadership is required to consistently provide high quality, safe and efficient health care
- Standardised, evidence-based data is key to identifying improvement opportunities and evidencing the impact of actions taken to address them

References

National Institute for Health & Care Excellence. (2019). *Pneumonia in adults: diagnosis and management*. Available: <https://www.nice.org.uk/guidance/cg191>. Last accessed 22nd Jan 2020.

THE IMPROVEMENT PROCESS PNEUMONIA AT ROYAL LIVERPOOL





PNEUMONIA AT ROYAL LIVERPOOL

A SUMMARY OF THE WORK OF THE PNEUMONIA STEERING GROUP AND DATA DEEP DIVE *



MORE TIME TO DIAGNOSIS

13% OF PNEUMONIA PATIENTS AT ROYAL LIVERPOOL DIAGNOSED AFTER THE FIRST FINISHED CONSULTANT EPISODE COMPARED TO 8.5% FOR AQ OVERALL.



NOT AN OUTLIER FOR LOS

LONGER TIME TO DIAGNOSIS DID NOT AFFECT LENGTH OF STAY WHICH WAS A MEDIAN OF 9 DAYS, THE SAME AS AQ OVERALL.



AMU SAVES BED DAYS

PATIENTS ADMITTED TO THE ACUTE MEDICAL UNIT SPENT A MEAN OF 3.5 DAYS FEWER DAYS IN HOSPITAL COMPARED TO NON-AMU PATIENTS.



FALLING MORTALITY

IN-HOSPITAL MORTALITY FELL BY 3.7%, FROM 16.9% FOR JAN – JUN 18 DISCHARGES TO 13.2% FOR JAN – JUN 19 DISCHARGES.



ACCURATE DATA

COLLABORATION BETWEEN CLINICAL CODERS AND CLINICIANS TO ENSURE PNEUMONIA CORRECTLY CODED AND ENABLE MEANINGFUL MEASUREMENT.



E-LEARNING

WORK OF PNEUMONIA STEERING GROUP SUPPORTED BY E-LEARNING PACKAGE TO EDUCATE STAFF ABOUT THE ACCURATE DIAGNOSIS OF PNEUMONIA.

* FROM 2018/19 SECONDARY USER SERVICE (SUS) DATA AND LOCAL ROYAL LIVERPOOL DATA