**Implementation tool for**

**the NCEPOD report**

**‘Consolidation Required’**

Failure Modes and Effect Analysis (FMEA) diagrams

<https://www.ncepod.org.uk/2023cap.html>

**Failure Modes and Effects Analysis (FMEA)**

Failure Modes and Effects Analysis (FMEA) is a tool for conducting a systematic, proactive analysis of a process in which harm may occur. In an FMEA, a team representing all areas of the process under review convenes to predict and record where, how, and to what extent the system might fail. Team members can then work together to prioritise and develop improvements to prevent particular failures.

The FMEA tool prompts teams to review, evaluate, and record the following:

* Steps in the process
* Failure modes (What could go wrong?)
* Failure causes (Why would the failure happen?)
* Failure effects (What would be the consequences of each failure?)

Teams use FMEA to evaluate processes for possible failures and to prevent them by correcting the processes proactively rather than reacting to adverse events after failures have occurred. FMEA is particularly useful in evaluating a new process prior to implementation and in assessing the impact of a proposed change to an existing process.

We have produced an example of how FMEA can be used. A blank table has also been provided to be copied and adapted to your organisation’s needs.

For more information on quality improvement please see the following sources or contact your local Quality Improvement department:

**Instructions**

At the top of the table (below) identify a process identified in the study. In the left column, input steps involved in the process.

* **Failure Mode** [*What could go wrong?*]: List anything that could go wrong during that step in the process.
* **Failure Causes** [*Why would the failure happen?*]: List all possible causes for each of the failure modes identified.
* **Failure Effects** [*What would be the consequences of the failure?*]: List all possible adverse consequences for each of the failure modes identified.
* **Likelihood of Occurrence** (1–10): *On a scale of 1-10, with 10 being the most likely, what is the likelihood the failure mode will occur?*
* **Likelihood of Detection** (1-10): *On a scale of 1-10, with 10 being the most likely NOT to be detected, what is the likelihood the failure will NOT be detected if it does occur?*
* **Severity** (1-10): *On a scale of 1-10, with 10 being the most likely, what is the likelihood that the failure mode, if it does occur, will cause severe harm?*
* **Risk Profile Number (RPN):** For each failure mode, multiply together the three scores the team identified (i.e., *likelihood of occurrence x likelihood of detection x severity*). The lowest possible score will be 1 and the highest 1,000. To calculate the RPN for the entire process, simply add up all of the individual RPNs for each failure mode.
* **Actions to Reduce Occurrence of Failure**: List possible actions to improve steps in the process, especially for failure modes with the highest RPN)Tip: Teams can use FMEA to analyse each action under consideration. Calculate how the RPN would change if you introduced different changes to the system.

**Use RPNs to plan improvement efforts.**

Failure modes with high RPNs should be prioritised as the most important parts of the process to focus improvement efforts. Failure modes with low RPNs are not likely to affect the overall process much, even if eliminated completely, and they should therefore be at the bottom of the list of priorities.

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| Use the results of essential investigations to review the provisional diagnosis and severity of community-acquired pneumonia | | | | | | | | |
| **Steps in the process** | **Failure Mode** | **Failure Causes** | **Failure Effects** | **Likelihood of Occurrence (1-10)** | **Likelihood of Detection**  **(1-10)** | **Severity**  **(1-10)** | **Risk Profile Number (RPN)** | **Actions to Reduce Occurrence of Failure** |
| 1. Undertake a chest X-ray in patients with suspected community-acquired pneumonia within four-hours of arrival at hospital | Delay to the undertaking of a chest X-ray in a suspected pneumonia patient | Chest X-ray in pneumonia patients are not prioritised.  High volume of patients requiring a chest X-ray. | Delay to confirmed diagnosis of CAP.  Delay to optimal treatment of CAP patients. |  |  |  |  | Develop a Trust/Health board policy for a chest X-ray to be undertaken within four hours of presentation to hospital in suspected CAP patients. |
| 2. Provide a formal report within 12 hours of the X-ray to confirm the severity of the pneumonia | Formal chest X-ray report is delayed or not produced.  Treatment is not changed/poor antimicrobial stewardship. | Formal reporting of chest X-rays for all suspected CAP patients is not a Trust/Health board policy. | Underlying diagnoses may be missed.  Delay to changes in treatments for CAP patients. |  |  |  |  | Develop a Trust/Health board policy for providing a formal report within 12 hours of the chest X-ray. |
| 3. Use clinical support tools such as CURB65 and NEWS2, in combination with clinical judgement to determine the severity of the pneumonia and further investigations required | Clinical support tools are not routinely used |  |  |  |  |  |  | Audit the use of clinical support tools such as CURB65 |

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| Community Acquired Pneumonia study | | | | | | | | |
| **Steps in the process** | **Failure Mode** | **Failure Causes** | **Failure Effects** | **Likelihood of Occurrence (1-10)** | **Likelihood of Detection**  **(1-10)** | **Severity**  **(1-10)** | **Risk Profile Number (RPN)** | **Actions to Reduce Occurrence of Failure** |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |