

# Quality Improvement Toolkit



## Achieving Appropriate Periprocedural Pain Management in Interventional Radiology

### Introduction:

Interventional radiologists (IRs) address pain every day, whether by treating pathologies directly causing pain, or by inducing and attempting to mitigate intraprocedural pain. As the range of conditions expands for which the field of interventional radiology offers therapies, pain management has become an increasingly important component of an IR's daily practice. Through implementation of precise and tailored pain management strategies, IRs can minimize patient discomfort and distress during these procedures. Furthermore, reduced pain levels improve procedural success and contribute to a positive patient experience.

Pain management is critically important in interventional radiology and warrants thorough physician education due to its impact on patient outcomes and quality of life. IRs are in a unique position to manage pain in inpatient and outpatient settings. A multidisciplinary approach to pain management is often needed, offering IRs opportunities to collaborate with other specialties to provide a holistic and individualized treatment plan. This toolkit, developed by the Society of Interventional Radiology's (SIR's) Practice Improvement and Change Committee (PICC), explores various factors in periprocedural pain control and offers IRs tools to improve patient care and outcomes.

### Data collection planning

In the early stage of project development, the IR should consider what type of data they will be analyzing throughout the process. Data collection planning will ensure that collected data will be useful and reliable for performance improvement without excessive resource investment, either cost or time.<sup>1</sup>

When determining what data to collect consider the following:

- Why are we collecting the data?
- What data analysis tools will be used to display the data (e.g., run chart, control chart)?
- What type of data is needed?
- Where in the process can we get this data and from who?

Keep in mind that the goal is to collect data with minimal effort, with minimal chance for error and with periodic audits to ensure accuracy and completeness.

The following is an example of how a patient encounter may trigger the need for a quality improvement project, in this instance regarding periprocedural pain management.

## CASE STUDY

A 46-year-old woman undergoes uterine fibroid embolization (UFE), and after a short stay in the post-procedural recovery unit, the patient is discharged by the recovery nurse with generic post-procedure discharge instructions. She picks up a short 2-day course of oxycodone tablets from the hospital pharmacy before driving home with her husband. A few hours later, the patient calls the hospital operator, stating that she has severe pelvic pain not relieved by the oxycodone. The operator connects the patient to the on-call interventional radiologist who advises the patient to go to the emergency room for further evaluation. The patient tells the emergency department physician that she had severe pain while caring for her young children at home as she was getting them ready for bed and then cleaning the house. She is admitted to the internal medicine floor overnight for pain control while her husband stays at home watching their children. She is discharged the next day with instructions to alternate over-the-counter analgesics, with revised dose instructions for the oxycodone.

The interventional radiologist who took the patient's phone call overnight speaks with the physician who performed the UFE. They both remark that there seems to be a significant rate of admissions after UFE due to inadequate pain control. They decide to create a list utilizing a fishbone diagram of various factors in the periprocedural care that contribute to pain control (see figure 1).

## Uterine Fibroid Embolization

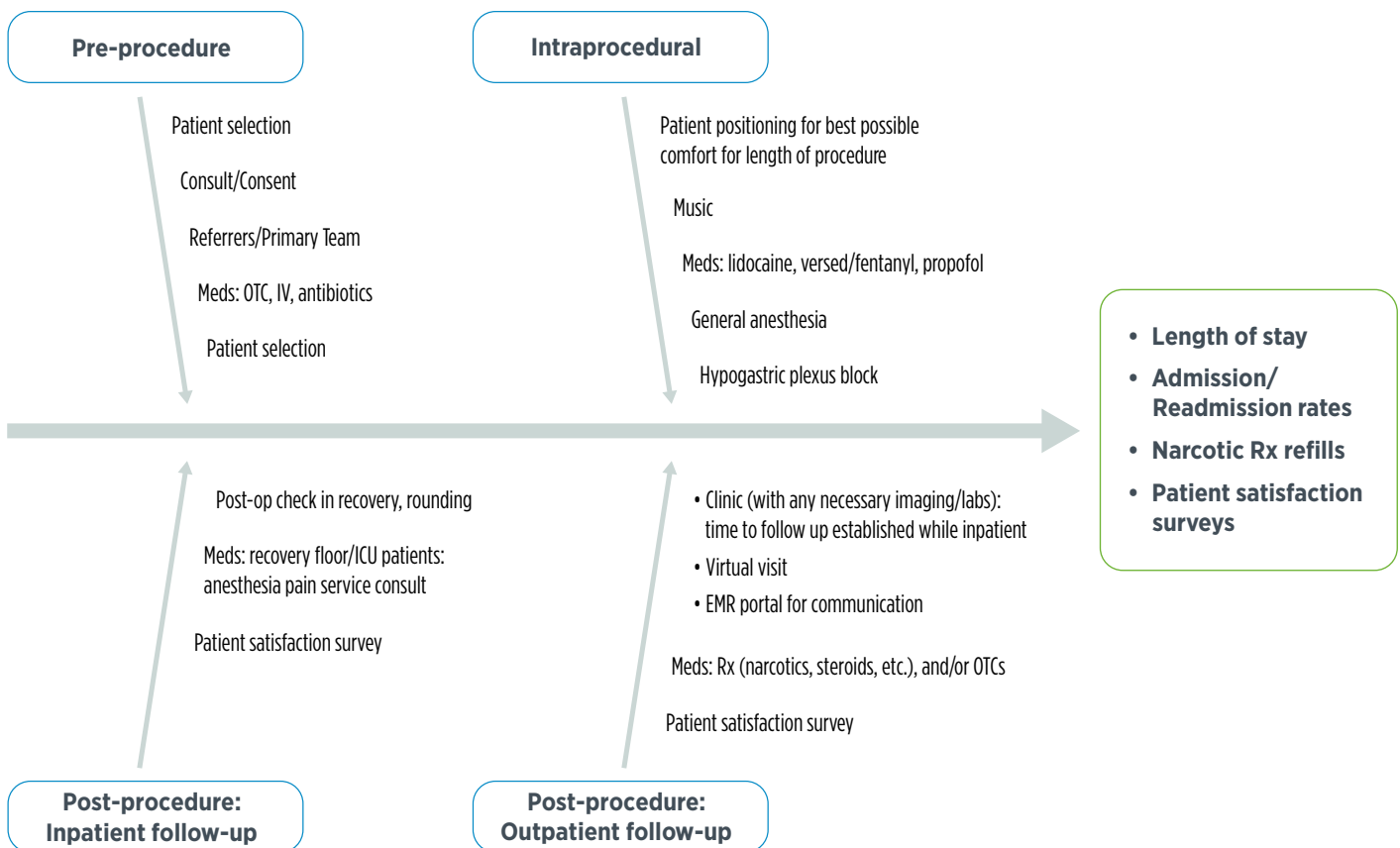


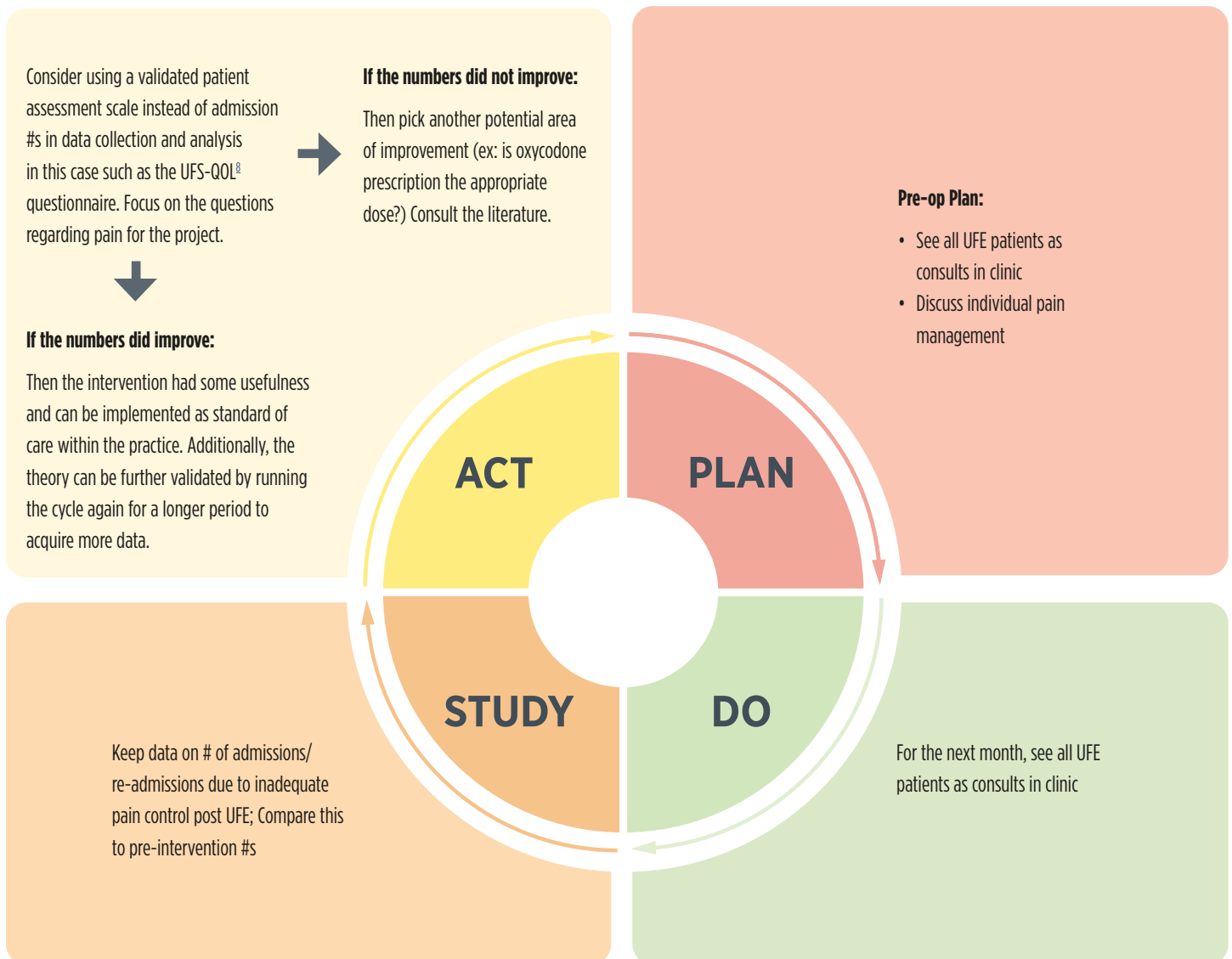
Figure 1: Uterine fibroid embolization Ishikawa (fishbone) diagram.

This fishbone diagram demonstrates multiple factors that contribute to periprocedural pain control in interventional radiology procedures. While not all-inclusive, this is meant to serve as a general guide that any IR can use to apply to any aspect of a patient's pain management. Validated pain scales such as the Visual Analogue Scale can be used to evaluate pain at any step of the process.<sup>2</sup> Additionally, IRs can use patient satisfaction surveys to evaluate the effectiveness of pain management, understand the factors influencing pain, as well as the extent to which these align with patient expectations.<sup>3-5</sup> The use of various pain management techniques, including the use of medications or regional nerve blocks,<sup>6,7</sup> alongside practice variables and settings, such as outpatient-based labs compared to inpatient procedures, present unique considerations that can significantly impact quality metrics. Data collected can be used to drive continuous improvement and make evidence-based changes.

## Current evidence and analysis

For the UFE patient above, suppose this practice does not routinely see all their UFE patients in clinic for a consult before the procedure. This does not allow the IR the opportunity for a discussion with the patient about their individual needs for a post-procedure recovery plan. The practice decides to run a PDSA (plan, do, study, act) cycle to see if seeing all their UFE patients as consults before the procedure improves pain management. The metric they choose for post procedure pain management is admissions for pain management.

### PDSA cycle example:



## Data analysis

After the QI project has been developed, data collection methods have been established, and the results are ready for analysis, consider which of the following data analysis tools will best reflect the impact that the change has had on this patient population.<sup>9</sup>

Tool	Graph or chart	When to use
Control chart	 <p>A control chart with a vertical axis from 0 to 12 and a horizontal axis with months from JAN to APR. A central horizontal line is at 5. Two control lines are at approximately 4.5 and 5.5. Data points fluctuate around the center line, with a notable spike in March.</p>	<p>If acceptable limits are clearly defined, a control chart should be used to show whether data points are within the upper control limits or lower control limits. They can help assess stability, monitor conditions that may require action and show consecutive run of results in any pattern.</p>
Histogram	 <p>A histogram with a vertical axis from 0 to 12 and a horizontal axis with categories Q1, Q2, Q3, and Q4. The bars represent frequencies: Q1 is 4, Q2 is 10, Q3 is 8, and Q4 is 4.</p>	<p>To show the frequency or number of occurrences of a particular event, use a histogram.</p>
Pareto chart	 <p>A Pareto chart with a vertical axis from 0 to 12 and a horizontal axis with categories Q1, Q2, Q3, and Q4. The bars represent frequencies: Q1 is 10, Q2 is 8, Q3 is 4, and Q4 is 3. An orange line represents the cumulative percentage. Data points are labeled as (3,8, 6,6), (6,6, 9,4), (1,3,8), and (9,4, 12,2).</p>	<p>Put a histogram in a descending order of frequency to show the root cause and corresponding number of defects contributed by them. The 80-20 rule, which the Pareto chart is based upon, states that 80% of the outcomes come from 20% of the sources.</p>
Scatter diagram	 <p>A scatter diagram with a vertical axis from 0 to 12 and a horizontal axis from 1 to 6. Six data points are plotted, showing a positive correlation. An orange trend line is drawn through the points.</p>	<p>To show relation between two variables, graph pairs of numerical data with a variable on each axis to identify relations. Correlations between variables can be seen if the points fall along a line or curve. Closer points to the line indicate stronger correlation.</p>
Run chart	 <p>A run chart with a vertical axis from 0 to 12 and a horizontal axis with months from JAN to JULY. A central horizontal line is at 9. Data points fluctuate around the center line, with a notable spike in April.</p>	<p>Collect and chart data over an extended period to find trends or patterns in the process.</p>

Pain management is an integral component of many interventional radiology practices and this toolkit provides a valuable framework for interventional radiologists to optimize their pain management service line. By conducting studies, employing PDSA cycles, and using tools like the fishbone diagram, interventional radiologists can systematically evaluate patient care at every step. This toolkit enables IRs to refine pain management techniques, minimize patient discomfort, improve overall outcomes, and provide exceptional patient-centered care.

## References

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