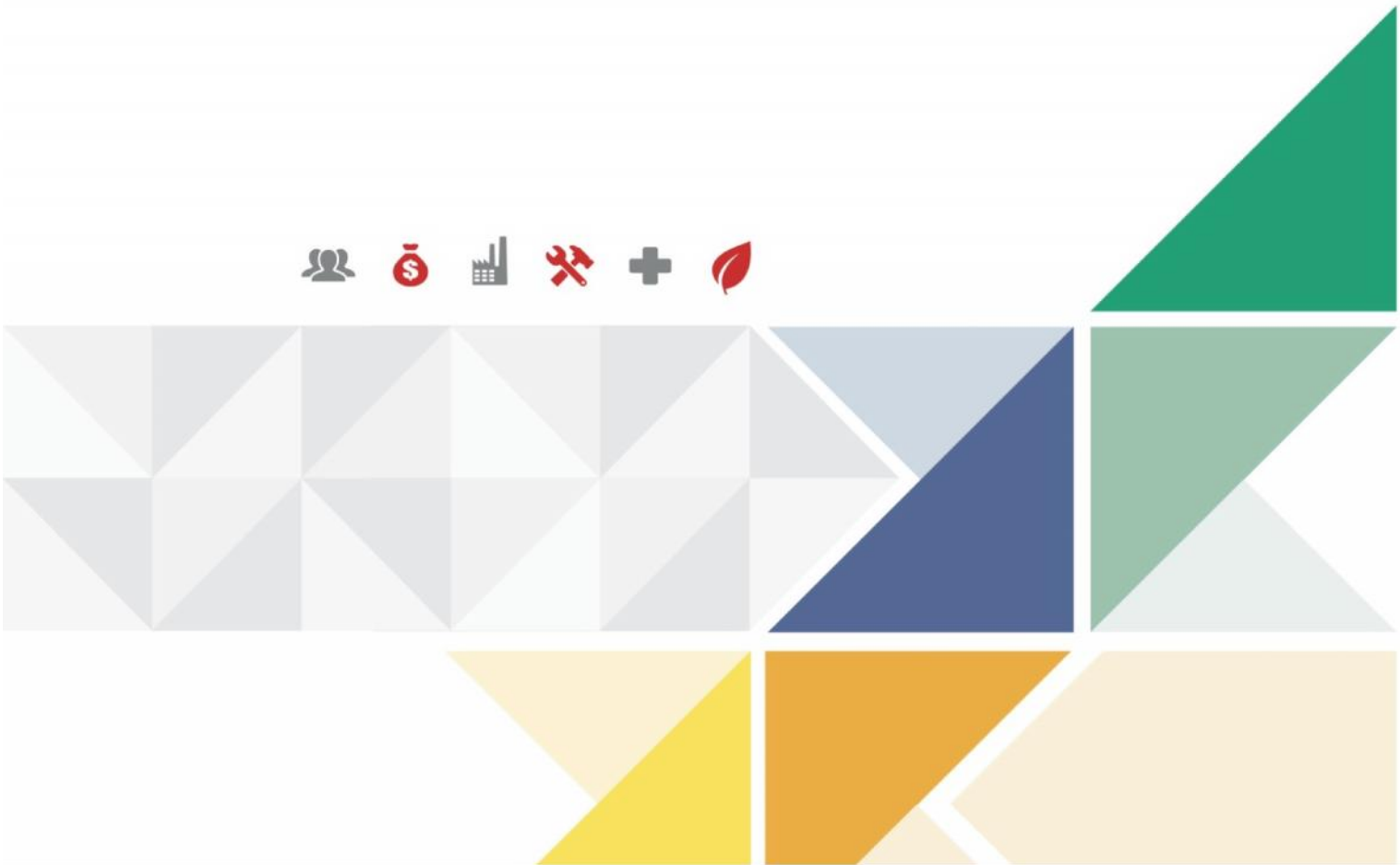
ABS DATA QUALITY MANUAL

Part B – Quality Gates in the Statistical Process



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Data is useful. High-quality, well-understood, auditable data is priceless (Ted Friedman, Gartner)

INTRODUCTION

About the ABS Data Quality Manual

The ABS Data Quality Manual has been developed to provide guidance and support for all statistical staff in managing quality for their statistical collections. It has been divided in to three parts:

- *Part A – Understanding and Applying the ABS Data Quality Framework,*
- *Part B – Quality Gates in the Statistical Process, and;*
- *Part C – Quality Incident Management and Reporting*.

Part B – Quality Gates in the Statistical Process

Part B – Quality Gates in the Statistical Process, will assist readers to systematically identify and treat risk in their statistical process using the process described in the existing product 1540.0 Quality Management of Statistical Processes Using Quality Gates .

STATISTICAL PROCESS RISK MANAGEMENT

Major errors can have significant impact on our reputation and the ability of our stakeholders to make informed decisions. Most errors are detected in-house before publication; however this has at times resulted in last-minute work to correct the problems leading to delays in the release of data. Other errors have only been discovered after release, resulting in re-issue of statistical output.

Testing for risks in a statistical process

Data, methodology and process errors can be detected early in the statistical process. To ensure errors are detected as early as possible, statistical releases in the ABS use a common quality assessment process known as “Quality Gates”.
Quality Gates are a major risk management tool for statistical areas, allowing them to treat risks already identified using the process outlined in the ABS Risk Management Framework. Accountability, timing, actions, tests and results are all pre-agreed, allowing a systemic and effective way of identifying process quality issues.

QUALITY GATES

Quality gates are an organisational risk mitigation strategy the ABS has adapted to improve the early detection of errors or flaws in any part of statistical processes, be it collecting, processing, analysing or disseminating statistics. Quality gates are a powerful tool for improving a statistical organisation's ability to manage statistical risk by:

- providing explicit evidence relating to the statistical process at strategic places in the cycle to determine fitness for purpose of the process (and data) at that point in time; and
- improving knowledge management and information sharing of data relating to specific stages of a statistical process.

Definition

A quality gate is a set of acceptance criteria that tests the overall quality of a process for identified risks at a predetermined point in a process.

At a gate, an area measures the current point-in-time process against pre-defined thresholds. There are at least two possible results:

- **The results are inside thresholds**. In this case, an independent party (the gatekeeper) can sign off and process continues as normal.
- **The results fall outside the thresholds**. If this occurs, pre-agreed actions are triggered. Depending on the parameters, processes may continue with further safeguards or other more formal mitigation processes can be triggered.

Some gates may contain three or more levels of results, triggering different actions.

Features of quality gates

A quality gate has six features. These are defined through the use of a Quality Gates Template, which should be used when setting up gates. The template can be found at Attachment A. The six features are:

Placement – the points in statistical processes at which a quality gate should be implemented based on the risk associated with that given point

Quality measures - indicators which provide information about potential problems to allow for their early detection in a statistical process, e.g. response rates or data availability

Roles - roles involve assigning tasks and accountability to areas or people connected to quality gates, including an operational person, stakeholders and a sign-off person

Tolerance - tolerance or threshold refers to an acceptable level of quality for each quality measure, agreed in advance

Actions - a set of predetermined responses if a tolerance level or threshold is met or not met which allow faster responses to arising problems

Execution/evaluation - an examination of where improvements may be made to the quality gates in future cycles based on problems identified throughout the overall process.

QUALITY GATES AND THE ABS DATA QUALITY FRAMEWORK

Quality gates link back to the ABS Data Quality Framework dimensions of Institutional Environment, Relevance, Timeliness, Accuracy, Coherence, Interpretability and Accessibility to ensure that all dimensions of quality have been considered and maintained in the production of the statistical outputs.

Each gate includes tests and thresholds for indicators for most (if not all) quality dimensions. For further information, please refer to the Quality Assistant.

SETTING UP QUALITY GATES

Setting up quality gates is a staged process, requiring a number of steps as outlined throughout this manual. It is advised that staff complete the following steps prior to setting up their quality gates:

Broad map of statistical process

Complete a broad overview of their statistical process cycle using a standard ABS statistical process methodology.

List of identified risks

Compile a list of identified statistical risks, including likelihood and impact using the **standard ABS risk management model**.

Completion of required eLearning and pre-reading

Complete the *Ready for Risk and Quality* online learning from CapabilityPlus:

- Introduction to Statistical Quality
- Design and prepare quality declarations
- Recognise and manage statistical risk
- Understand statistical process risk and quality gates

Quality gates workshops

SRQA are available to facilitate workshops for staff to assist in this process if needed. Before a workshop can be organised, participants will be required to complete the steps above.

STEPS IN SUMMARY

There a number of steps to set up a quality gate, shown below. Each step is explained in detail in the next section of this manual.

STEP 1: SET PLACEMENT

Definition

"Placement" is the first component of a quality gate. It refers to the placement of quality gates throughout a statistical process (also known as a business process cycle, or statistical process cycle).

More about placement

Placement of a quality gate is determined by the level of risk associated with given points in the production process. We ask what can go wrong, where it can occur and what impact can it have. This helps us place a gate at times to detect problems at the earliest possible place - minimising downstream impacts on the process and statistical outputs that would occur if the detected risk was realised later.

In order to ask these questions there are two essential components that must be in place before gates are designed:

- A completed Statistical Risk Management Plan, showing key risks that can be tested for in the quality gates. This helps ask what can go wrong, and what impact it can have.
- A broad map of the statistical process (usually at the 2nd level of the Statistical Process Activity Model). This helps us answer where problems can occur. After these steps are completed, areas can organise a workshop with Statistical Risk and Quality Assurance (SRQA).

Required steps

Identify your risk

- Risks will often be unique to a collection.
- The placement of a quality gate may be different for each production process.
- Areas **must** complete a statistical risk management plan identifying the key statistical risks, as gates are designed to test for these risks.

Identify when problems can occur

- Quality gates should be situated where risks are most likely to be detected.
- Gates should be limited to around 4 to 5 per process. Any more generally increases burden.
- Placement is usually discussed in a quality gates workshop.

Map your process

- Areas must complete broad process maps, as gates are point in time assessments.
- For further Information on how to complete this step, please consult the Quality Assistant.

STEP 2: DECIDE ON MEASURES

Definition

Quality measures are a set of indicators that provide information about potential problems at a given point in the process. A quality gate will have multiple quality measures.

More about measures

Each gate tests for different risks, which will need to be assessed with different measures. We choose the quality measures that are going to reveal if there is a problem with the process - both in terms of immediate needs and longer terms outcomes.

Quality gates don't replace normally quality checks. But they do contain a set of good indicators (quality measures) of the targeted risks. The selection is based on the identified risks, and what information would be required in order to make an assessment about fitness for purpose at that point in time.

Not every detailed check that is undertaken in a process will constitute an individual quality measure, however they may be utilised by quality measures. An example of this is a check list of the different ways a data set is validated (e.g. internal consistency checks, non-zero values, number of records in is equal to number of records out), which may not in itself be a quality measure but combined with other detailed checks it may form a part of a quality measure.

Indicators are sourced from the Methodology Indicator Library, available from SRQA.

Required steps

Look at indicators of identified risks

- Once the risks and timing are known, collections choose measures that could test for those risks.
- Methodology & SRQA have a library of measures to help inform this process.

Decide on key indicators

- Areas then choose the best suited measures to test quality at that point in time.
- Consultation with Methodology & SRQA is essential to maximise effect and minimise duplication.

Agree and record measures

- Once selected, collections should seek agreement with areas that own measures outside the collection's control.
- All measures are recorded on quality gates template (see Appendix).

STEP 3: AGREE ON ROLES

Definition

Roles identify areas or people who are directly connected to the quality gate and its operation, along with people or areas who are affected by issues with the process.

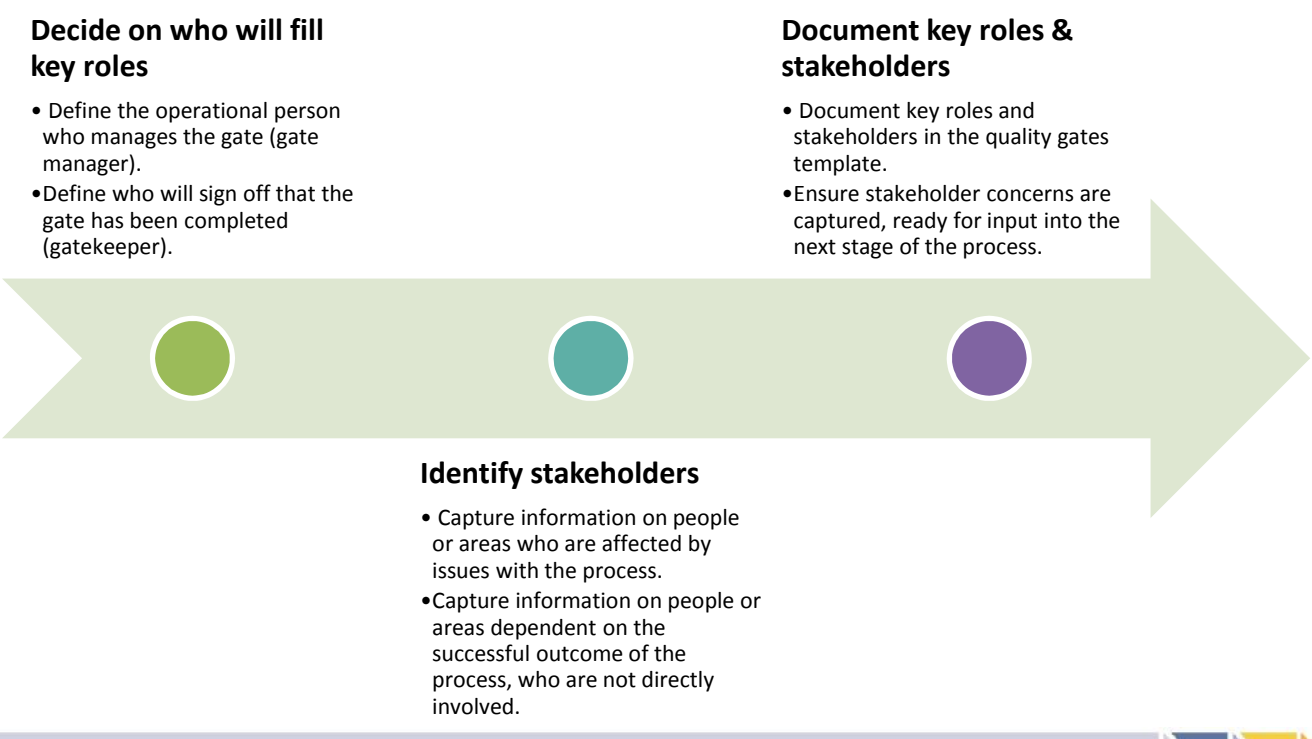
More about roles

Roles are assigned in the quality gates process at this stage. Much of the value in the structured quality gate process involves identifying responsibilities for actions as well as those areas or people connected to a quality process. It is important to make sure that people or areas dependent on the successful outcome of the process, who are not directly involved, are included in roles as stakeholders.

This allows clear accountability and facilitates proper consultation and input into the design process. It usually involves capturing:

- Areas or people who are directly connected to the quality gate and its operation (an operational person who manages the gate [**gate manager**] and a sign off person [**gatekeeper**],
- Other stakeholders:
    - people or areas who are affected by issues with the process
    - people or areas dependent on the successful outcome of the process, who are not directly involved

Required steps and outputs



STEP 4: DECIDE TOLERANCES

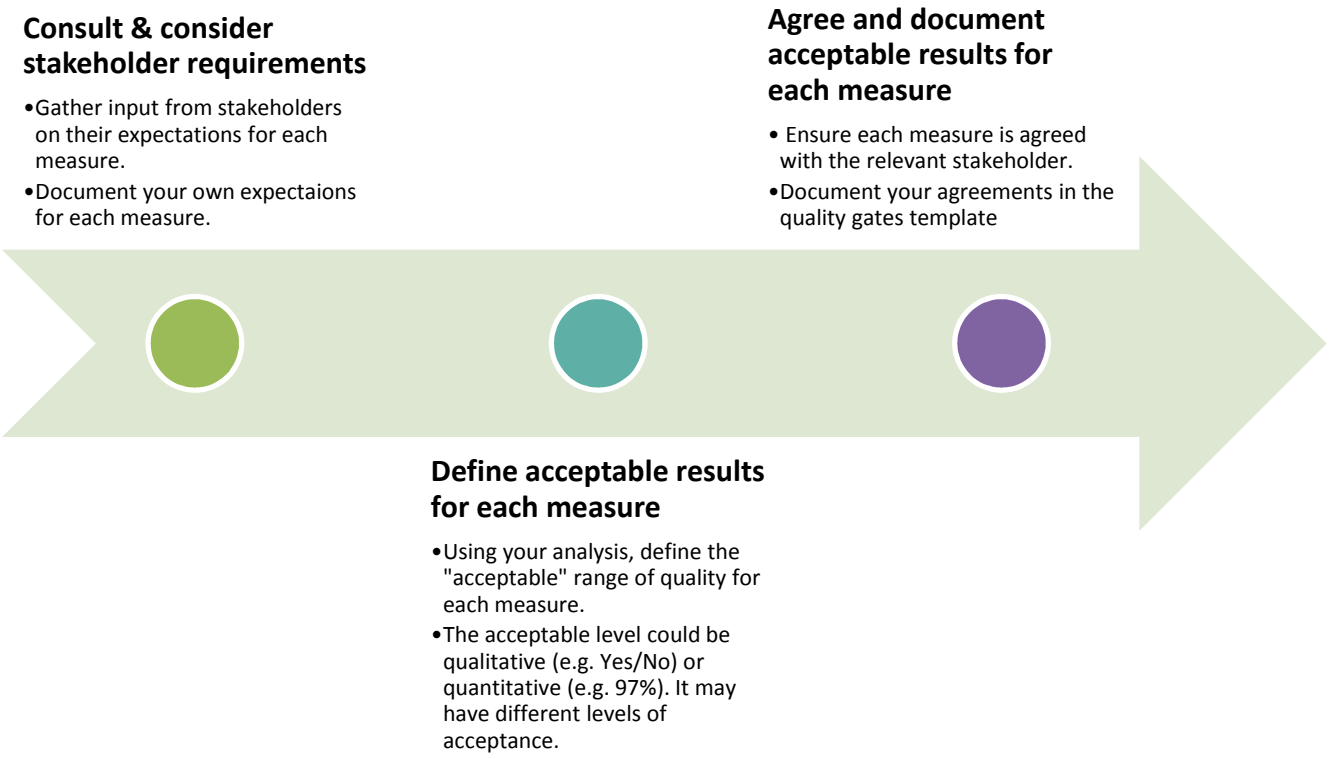
Definition

Tolerance refers to an acceptable level of quality. The acceptable level could be qualitative (e.g. Yes/No) or quantitative (e.g. 97%).

More about tolerances

Once the placement, risks, roles and measures have been defined, the next step is to identify the tolerance for each measure in the gate. Tolerance levels or thresholds are generally set by expectations of what should be observed at that point in the process for a given quality measure. The thresholds provide a range of what is acceptable quality and may have different levels of acceptance. Many thresholds may be outside the subject matter area's direct control, so working with stakeholders to determine required thresholds in crucial. Areas should work with their Methodology Support team and other stakeholders through the Quality Gates design process to select ideal tolerances for each gate.

Required steps



STEP 5: AGREE ON ACTIONS

Definition

Actions are predetermined responses to various outcomes for a quality gate. They define what will be done if overall threshold or tolerance levels are met or not met with regards to each quality measure.

More about actions

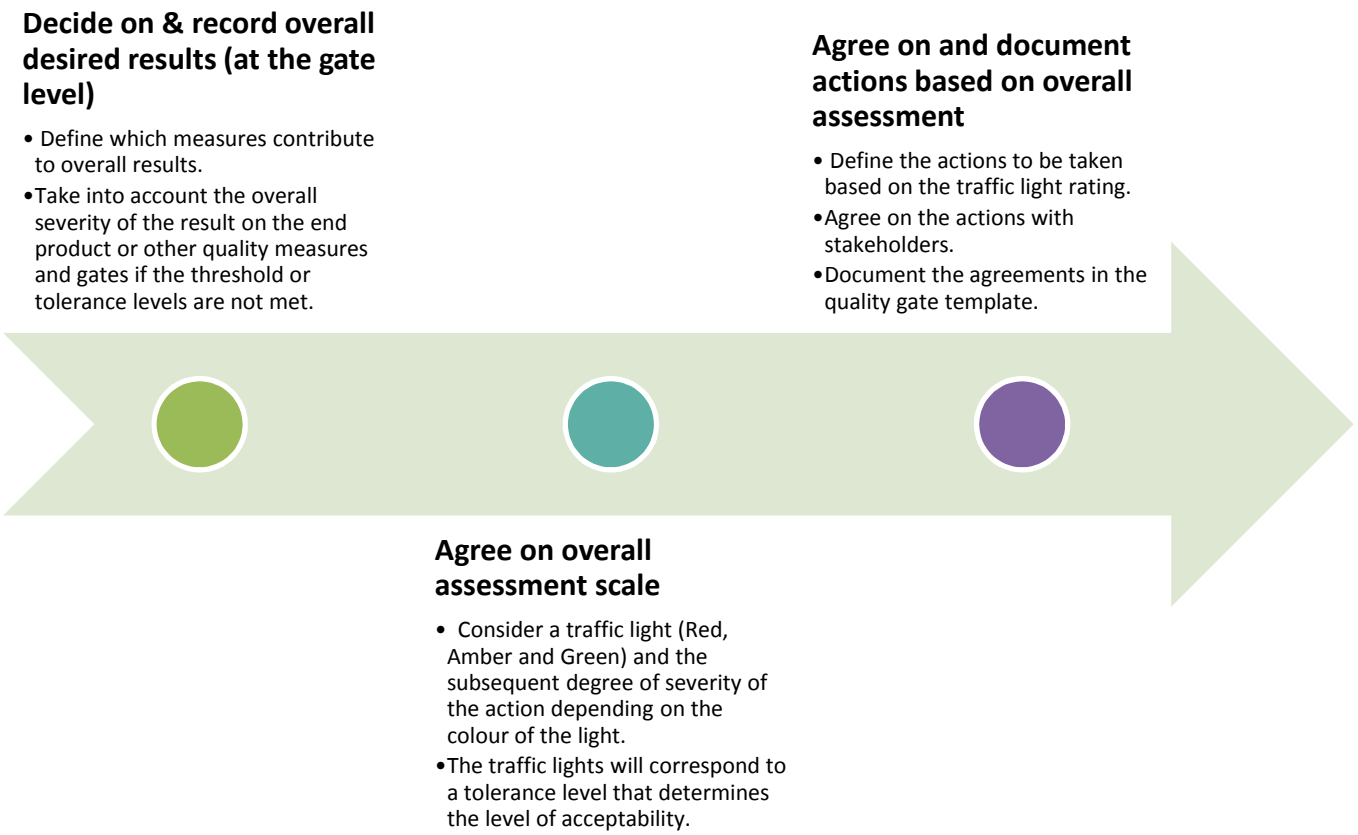
Actions associated with quality measures need to take into account the severity of the result on the end product or other quality measures and gates, in particular, if the threshold or tolerance levels are not met. Questions which may help clarify the actions to take for a quality measure depending on the tolerance levels are:

- What needs to be done if there is a problem?
- Who needs to be informed?

The preferred process to design actions is to:

- decide on, and record, overall desired results,
- decide on a rating scale to assess what level of response is required, and then
- agree on and document actions based on overall assessment.

Required steps



STEP 6: PERFORM EXECUTION AND EVALUATION

Definition

The final component of a quality gate is Evaluation. As with any process that is undertaken, an evaluation or review should occur to examine where improvements can be made for future use.

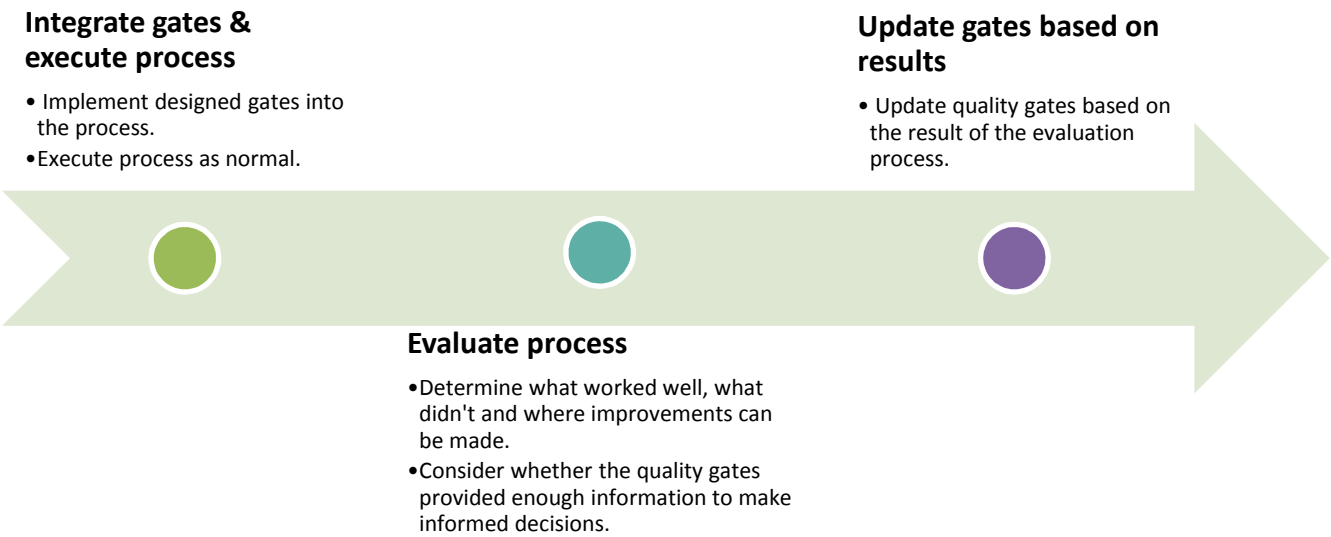
More about execution and evaluation

At the end of each statistical process cycle it is recommended that the quality gates should be evaluated to determine what worked well, what didn't and where improvements can be made. It is useful to consider whether the information provided by the quality gates contributed enough information to make informed decisions.

The gates are then updated based on the results.

Evaluation of quality gates consolidates the final reporting on the quality of the statistical process cycle.

Required steps



Attachment A: Quality Gates Template

The full, editable version of this template can be found here.

QUALITY GATES

DOCUMENT REVIEW/MODIFICATION HISTORY

1. GATE PLACEMENT

1.1 DETAILS

Section	
Data Source	
Process Name	

1.2 PLACEMENT

Gate Name	
Gate Number	
Gate Keeper	
Gate Placement	
Gate Purpose	•
Gate Reference & Frequency	
Stakeholders	**I.**

2. GATE CLEARANCE

2.1 CLEARANCE REQUIREMENTS

Clearance Document	
Gate Sign-Off	
Clearance Time Frame	
Clearance Actions	

GREEN LIGHT

Gate Cleared:	All quality measures meet the green light requirements

ORANGE LIGHT

Gate Conditionally Cleared:	I. What re the circumstances/conditions which are acceptable for the process to pass through the gate without being fully cleared? II. What actions need to be taken? III. What at the possible impacts resulting from: the investigation which need to undertaken, impacts if something is wrong?

RED LIGHT

Gate FAILED:	I. What are the circumstances/conditions which the process fails to clear the gate, resulting in the process being stopped II. What actions need to be taken III. What at the possible impacts resulting from the stopping the process (E.g. Flow on effects)

3. QUALITY MEASURES

QUALITY MEASURE DETAIL:	
QM Name:	
QM Person/Team:	
QM Sign-Off:	
Purpose:	
Definitions	
QUALITY MEASURE / THRESHOLDS / ACTIONS:	
File being validated:	**File Name:** **File Location:**
File being validated against:	**File Name:** **File Location:** **File Name:** **File Location:**
Method:	**NA**
Threshold/Tolerance:	Green Light = Orange Light = Red Light =
Presentation of measure:	**Presentation:** **File Location:**

Action:

GREEN LIGHT

Process Status:	Continue process

ORANGE LIGHT

Process Status:	Continue with caution and investigate
Notification:	The following persons/stakeholders need be advised:

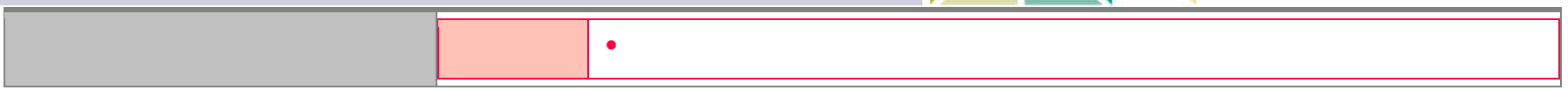
Line Management	Contact (Yes/No)	Stakeholders	Contact (Yes/No)	Clients/Other	Contact (Yes/No)

Problem Resolution:	**Investigation/Resolution Task #1** **Assigned to:** **Task:** • **Outcomes:** < Insert outcome action > < Insert outcome action >
Problem Escalation:	**Action:** • Contact < Section Owner of the Data > for further instruction. • Contact relevant stakeholders and clients **Stakeholders to be :** • << Stakeholder name >> **Clients:** • << Stakeholder name >>

RED LIGHT	
Process Status:	Stop process
Notification:	The following persons/stakeholders need be advised:

Line Management	Contact (Yes/No)	Stakeholders	Contact (Yes/No)	Clients/Other	Contact (Yes/No)

Problem Resolution:	**Resolution Task #1:** **Assigned to:** **Task:** **Outcomes:** < Insert outcome action > < Insert outcome action > **Resolution Task #2:** **Assigned to:** **Task:** **Outcomes:** < Insert outcome action > < Insert outcome action >
Problem Escalation:	**Action:**



FURTHER INFORMATION

Further information is available from:

- The ABS Data Quality Framework
- The ABS Quality Gates Framework
- The Quality Assistant
- Local methodology support teams
- Statistical Risk and Quality Assurance section (the authors of this manual).

DOCUMENT CONTROL

Version: 2.0 – Jessica O'Rourke (01 April 2016)

Approved by: Phillip Wise, Statistical Risk and Quality Assurance