NHS

Approved Costing Guidance – Standards

Ambulance information requirements and costing processes

	Mandatory (Ambulance)
Publication status	Final
Publication date	31 January 2020
Relates to financial year data	2020/21
Collection year	2021

NHS England and NHS Improvement

Contents

IR1: Collecting information for costing

Purpose: To set out the minimum information requirements for incident-level and patient-level costing.

Objectives

1. To ensure all providers collect the same information for costing, comparison with peers and cost collection purposes.

2. To help allocate the correct quantum of cost to the correct activity using the prescribed cost allocation method.

3. To support accurate matching of costed activities to the correct incident and patient.

4. To support local reporting of cost information by activity in the organisation's dashboards and business intelligence.

Scope

5. This standard specifies the minimum requirement for the information feeds for the costing process prescribed in the *Approved Costing Guidance – ambulance*.

6. The information requirements specified in this standard apply to all activity going through 999 control centres.

7. Where the identity of the patient is not known, activity information is required to cost **a** patient, not **the** patient.

Ambulance information requirements

8. Data on clinical interventions falls outside the scope of this standard because there are more appropriate drivers for ambulance service costs, such as journey time.

What you need to implement this standard

- Costing principle 5: Good costing should focus on materiality[1]
- Information gap analysis template (IGAT) or corresponding template in the costing assessment tool (CAT)
- Technical document:
  - Spreadsheet IR1.1: Information feeds required for costing
  - Spreadsheet IR1.2: Field requirements for the information feeds
  - Spreadsheet IR1.3: Examples of feed data for different scenarios
  - Spreadsheet IR1.4: Diagram: different levels of information recorded for ambulance responses and their relationships

Overview

9. The standards describe three main information sources for costing:

- activity information feeds
- supplementary information feeds
- relative weight values.

10. Any costs not covered in the prescribed information feeds need relative weight values or a local information source to allocate the costs.

11. One way to store relative weight values in the costing system is to use statistic allocation tables.

12. You may be using additional sources of information for costing. If so, continue to use these and document them in integrated costing assurance log (ICAL) worksheet 2: Additional information source.

13. The information feeds provide the following information:

- activities that have occurred, eg the incident feed contains information on providing telephone clinical advice, which tells the costing system whether

---

[1] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/

to include this activity in the costing process; providing telephone clinical advice does not happen in all incidents

- the cost driver to use to allocate costs, eg duration of time on scene
- information for more accurate identification of resources, eg the fleet information feed contains information that can be used to identify the cost of repair and maintenance for an individual vehicle.

14. Spreadsheet IR1.1 lists the information feeds required for costing.

15. The standards prescribe two types of information feed:

- **activity feeds** – these contain information about the patient-facing activities, eg the incident information feed
- **supplementary feeds** – these contain information to more accurately calculate costs for resources, eg fleet information feed.

16. Activity feeds can be grouped into two types to support the matching process:

- **master feeds** – the core patient-level activity feeds that the other feeds are matched to, eg the incident information feed
- **auxiliary feeds** – the information feeds that are matched to the master feeds, eg the response feeds.

17. Table IR1.1 lists the five information feeds we specify for ambulance costing.

Table IR1.1: Information feeds

Feed number	Feed name	Feed scope	Type of feed
20[2]	Incident information	All incidents your organisation responded to within the costing period. Call stage activity information is covered by this feed.	Master
21	Response information	All physical responses, ie staffed vehicles or on foot responders, that your organisation dispatched to respond to an incident within the costing period.	Auxiliary

---

[2] The feed numbers are set across all sectors, which explains why those for ambulance costing do not start at 1.

Ambulance information requirements

22	Patient information	All patients who were involved in the incidents within the costing period. It is used to take incident level costs to the patient level.	Auxiliary
23	Staff information	All staff shifts and working hours within the costing period.	Supplementary
24	Fleet information	All episodes of vehicle maintenance and repair for all vehicles involved in responding to incidents within the costing period.	Supplementary

18.   Spreadsheet IR1.2 lists the data fields required for each feed.

19.   You are not required to collect an activity feed if your organisation does not provide that activity.

20.   You are not required to collect duplicate information across information feeds unless this is needed for matching. The reasons for including each field in the information feeds are given in columns J to M in Spreadsheet IR1.2.

21.   Your informatics department is best placed to obtain the data required from the most appropriate source. But to help you identify the information already being collected by your organisation, use Spreadsheet IR1.2.

22.   This standard prescribes the information to be collected, but not how it is collected. If you collect several of the specified feeds from one dataset, you should continue to do so, provided the required information is captured.

23.   If you have activity in your information feeds where the costs are reported in another provider's accounts, you need to report this activity under 'cost and activity reconciliation items' as described in Table CP5.1 in Ambulance standard CP5: Reconciliation. This is so your own patient costs are not allocated to this activity, deflating the cost of your own patients.

24.   Note that the information feeds specified in this standard are neither reports that you need to produce nor a collection template. They specify the information you will need for costing.

Ambulance information requirements

Approach

25. This section describes each information feed, explaining the:

    - relevant costing standard
    - data collection source
    - feed scope.

26. The diagram in Spreadsheet IR1.4 explains the different levels of information we refer to, particularly call level, response level, incident level and patient level, in relation to the information feeds.

27. You should read the following sections describing these feeds in conjunction with Spreadsheet IR1.2.

Feed 20: Incident information

Relevant costing standard

- Ambulance standard CM31: Allocating costs across job cycle elements
- Spreadsheet IR1.2: Field requirements for the information feeds
- Spreadsheet IR1.3: Examples of feed data for different scenarios[3]

Collection source

28. Activity data is collected from the call or another trigger (eg an ambulance passing a roadside incident or a transfer from NHS 111 service) and any subsequent responses recorded in your organisation's computer-aided dispatch (CAD) system.

29. This data should come from your CAD system.

Feed scope

30. All the incidents your organisation responded to within the costing period, covering every stage of an emergency response (ie job cycle) – from receiving

---

[3] See scenario examples in Spreadsheet IR1.3 for how the incident feed (feed 20), response feed (feed 21) and patient feed (feed 22) link together and what specific data fields need to be populated for costing in each scenario.

Ambulance information requirements

a call to treating and conveying the patient(s) to a treatment location, handing over care and preparing to respond again.[4]

31. This feed includes information on:

    - call stage activities, eg source of call, start and end time of the call
    - incident-level physical response stage activities, eg number of responses dispatched for the incident, number of responses arriving on scene, number of responses arriving at treatment locations
    - general information about the incident, eg provider organisation, commissioning organisation, incident location and whether the location is cross-border.

32. Although data on call handling activities[5] is usually collected at the call level, which is lower than incident level – that is, one incident may be associated with more than one call, this version of the standards only requires information on the main call associated with the incident.[6] This is because duplicate calls associated with the same incident cannot be linked to the main call and the incident.[7]

33. Data on telephone clinical advice activities[8] is usually collected at the incident level.

34. Data on giving telephone clinical advice to the crew at the scene is not required for this version of the standards.

35. Data on the physical response stage activities is usually collected at the response level. However, providers are required to collect an incident-level activity feed to bring together activity data from multiple responses for use in cost allocation, eg the number of responses allocated for the incident is used to allocate the cost of dispatchers.

---

[4] See Ambulance standard CM31: Allocating costs across job cycle elements for details of job cycle stages.

[5] See Ambulance standard CM31: Allocating costs across job cycle elements for details of call stage activities.

[6] The main call is the call linked to the incident in your CAD system.

[7] This is based on feedback from the National Ambulance Information Group.

[8] See Ambulance standard CM31: Allocating costs across job cycle elements, for details of call stage activities.

Ambulance information requirements

36. This feed is a master activity feed that the auxiliary feeds match to.

Feed 21: Response information

Relevant costing standard

- Ambulance standard CM31: Allocating costs across job cycle elements
- Ambulance standard CM33: Non-responding time
- Spreadsheet IR1.2: Field requirements for the information feeds
- Spreadsheet IR1.3: Examples of feed data for different scenarios[9]

Collection source

37. This data should come from your CAD system.

Feed scope

38. All responses – that is, staffed vehicles or on-foot responders – that your organisation dispatches to an incident within the costing period, covering all stages of a physical response from the time a response is dispatched, including travelling to the scene, treating patients at the scene and conveying the patient(s) to a treatment location, handing over care and preparing to respond again.

39. This feed includes information on:
- time stamps and duration of the job cycles, eg at scene date and time; left scene date and time
- the response unit, eg vehicle ID, vehicle type, staff ID
- patient handover, eg handover organisation and department.

40. This auxillary feed matches a response to an incident: it is matched to the incident feed (feed 20) using the activity ID (incident ID) recorded in it.

---

[9] See scenario examples in Spreadsheet IR1.3 for how the incident feed (feed 20), response feed (feed 21) and patient feed (feed 22) link together and what specific data fields need to be populated in each scenario.

Ambulance information requirements

Feed 22: Patient information

Relevant costing standard

- Ambulance standard CP4: Matching costed activities to incidents and patients
- Spreadsheet IR1.2: Field requirements for the information feeds
- Spreadsheet IR1.3: Examples of feed data for different scenarios[10]

Collection source

41. This data may come from either your CAD system or your electronic patient record (EPR) system.

Feed scope

42. All patients who were involved in the incidents that your organisation responded to within the costing period.

43. This feed is used to take incident-level costs to the patient level.

44. This feed includes patient information collected during the emergency call and response:

- patient identifying information, eg NHS number or other patient ID
- demographic information, eg age, gender
- information relating to the emergency call, eg reasons for the call (also known as chief complaint)
- type of treatment the patient received:
  – hear and treat/refer
  – see and treat/refer
  – see, treat and convey.

45. We acknowledge that for some patients not all these details will be available. We expect available data to be recorded and an attempt made to find the NHS

---

[10] See scenario examples in Spreadsheet IR1.3 for how the incident feed (feed 20), response feed (feed 21) and patient feed (feed 22) link together and what specific data fields need to be populated in each scenario.

Ambulance information requirements

number using the batch-tracing service,[11] NHS Spine[12] or other services. In the technical document we provide the codes to use when data is not available.

46. Note that for the patient-identifiable information, information governance issues should be covered by your organisation's own procedures, not these standards.

47. For multiple-patient incidents, the number of conveying vehicles arriving at a treatment location should be used as a proxy for the number of patients involved in the incident.[13] A patient record should be generated for each patient conveyed, even if the patient's details are not available – that is, a proxy patient record needs to be generated.

48. This feed is linked[14] to the incident feed (feed 20) using activity ID (incident ID) recorded in this feed, matching a patient to an incident.

49. It is also linked to the response feed (feed 21) using conveying response ID, which matches a patient to the response unit that conveys them.

Feed 23: Staff information

Relevant costing standard

- Ambulance standard CM31: Allocating costs across job cycle elements
- Ambulance standard CM33: Non-responding time

Collection source

50. This data may come from the rota (scheduling) system and electronic staff record (ESR) system.

---

[11] See https://digital.nhs.uk/media/31515/DBSB-NHS-Number-Batch-Tracing/doc/DBSB_-_NHS_Number_Batch_Tracing for details on batch tracing.
[12] See https://digital.nhs.uk/spine for details on Spine.
[13] See Ambulance standard CM31: Allocating costs across job cycle elements for details of how to allocate costs to multiple patients involved in an incident.
[14] It is linked rather than matched because matching only refers to matching of patient-facing activities.

Ambulance information requirements

Feed scope

51.   All staff shifts, working hours and downtime within shifts within the costing period.

52.   The staff information feed is a supplementary feed, not an activity feed – that is, it contains no information about patient-facing activities. It is an information source to:

- help allocate staff costs at the level of each individual staff member
- calculate non-responding time for frontline staff.

53.   Best practice is to use information from actual rotas and staff pay. This data can directly link staff costs to the activities the staff delivered and accurately distribute non-responding time across jobs.

54.   This feed includes information on:

- shift start and end date and time
- staff identifier
- staff working hours
- start and end date and time of downtime
- vehicle identifier.

55.   This feed is linked[15] to the incident feed (feed 20) using staff ID for call-taking staff and clinicians who provide telephone clinical advice.

56.   It is also linked to the response feed (feed 21) using staff ID for frontline staff.

Feed 24: Fleet information

Relevant costing standard

- Ambulance standard CM32: Fleet costs
- Ambulance standard CM33: Non-responding time

---

[15] It is linked rather than matched because matching only refers to matching of patient-facing activities.

Ambulance information requirements

Collection source

57. This data may come from your fleet management system. Where fleet management information is not available from a single system, gather information from the available source.[16] Please follow the guidance in Ambulance standard IR2: Managing information for costing to make the information available for costing.

Feed scope

58. All episodes of vehicle maintenance and repair for all vehicles involved in responding to incidents within the costing period.[17]

59. The fleet information feed is a supplementary feed, not an activity feed – that is, it contains no information about patient-facing activities. It is an information source to:

- help allocate fleet costs at the level of each vehicle
- calculate non-responding time for vehicles.

60. This feed includes information on the maintenance and running of vehicles in the fleet:

- vehicle identifier
- parts used in repairs and their costs
- technician time
- time vehicle spent off road (in hours).

61. Deep-cleaning dates and costs should be collected at the individual vehicle level, using a fleet number or other unique identifier.

62. This feed is linked to the response feed (feed 21) using vehicle ID.

---

[16] Feedback from the National Ambulance Information Group is that fleet management information is not available consistently across all ambulance service providers.

[17] See Ambulance standard CM32: Fleet costs for definitions of patient-facing vehicles and support vehicles.

Ambulance information requirements

Additional activity feeds and fields

63. If you already collect activity feeds additional to the five information feeds specified above, you are encouraged to continue to do so. Record these additional feeds in ICAL worksheet 2: Additional information source.

64. If you use fields additional to those specified for local reporting or more detailed costing, continue to use these and log them in ICAL worksheet 2: Additional information source.

65. If your organisation has a well-developed EPR system, you may be able to capture more data on the care given to patients than the standards currently require. You should collect this additional data as it will increase local understanding of the costs associated with different activities, and future versions of the standards may require it for costing.

66. The groups of information listed above are the minimum the standards require for costing, but they do not cover all patient activities in ambulance services. You need to decide whether specific local costing needs require additional activity feeds. Examples of such feeds are:

   - patient transport service (PTS)
   - NHS 111 service
   - GP out-of-hours services
   - commercial activities, such as first-aid training and events cover.

67. Use these three criteria to prioritise obtaining additional information feeds:

   - value of service
   - volume of service
   - priority of the service within the provider and the healthcare economy.

Identifying hidden activity

68. Take care to identify any 'hidden' activity within your organisation. This is activity that is not recorded on any of your organisation's main systems such as CAD.

Ambulance information requirements

69. Capturing 'hidden' activity is important to ensure that:

   - any costs incurred for it are not incorrectly allocated to the recorded activity, thus inflating its reported cost

   - costs incurred are allocated over all activity, not just activity reported on the provider's main system such as CAD.

Other data considerations

70. Information from specific fields of the information feeds is required to enable cost to be allocated (see Spreadsheet CP3.3). These fields are flagged with a 'Y' in column J in Spreadsheet IR1.2.

71. The information feeds do not contain any income information. Your organisation may decide to include the income for the feeds at incident level.[18]

72. The feed specifications in Spreadsheets IR1.1 and IR1.2 do not include description fields for the codes used, eg organisation name for organisation code. You may ask for description fields to be included in the feeds; otherwise you need to maintain code and description look-up tables for each feed to understand the costing data supplied. There should be a process for mapping and a rolling programme for revalidating the codes and descriptions with each service.

---

[18] See Ambulance standard CM34: The income ledger for further information.

IR2: Managing information for costing

Purpose: To assess, manage and improve the availability and quality of the information specified in Ambulance standard IR1: Collecting information for costing.

Objectives

1. To explain how to support your organisation improve the quality of the data it uses for costing.

2. To explain how to manage data quality issues in information used for costing in the short term.

3. To explain what to do when information is not available for costing.

Scope

4. All information required for the costing process.

What you need to implement this standard

- Costing principle 1: Good costing should focus on materiality
- Costing principle 4: Good costing should be based on high quality data that supports confidence in the results[19]
- Information gap analysis template (IGAT)[20]
- Costing assessment tool (CAT)

---

[19] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/
[20] See our tools and templates to help implement the standards, https://improvement.nhs.uk/resources/approved-costing-guidance-2019

Ambulance information requirements

- Integrated costing assurance log (ICAL) template – where you can record and monitor your feed set up, progress and regular feeds for information management and governance

Overview

5. As a costing practitioner, you are not responsible for the quality and coverage of information in your organisation. However, you are ideally placed to raise data quality issues.

6. This standard provides guidance on how you can minimise the impact of poor-quality activity information when producing cost information. These are short-term measures that allow you to produce cost information in line with the costing principles while your organisation continues to work on the quality and coverage of its information as a whole.

7. Most of the required information[21] should be held on your information systems, but its availability will vary due to different information management practices and the capacity of your information technology.

8. Use our information gap analysis template (IGAT)[22] to assess data availability for costing with your informatics colleagues and relevant services.

9. Agree with informatics colleagues the format of information, frequency of information feeds and any specific data quality checks for costing purposes. Use this information to populate the information feeds log in your integrated costing assurance log (ICAL). An example of a completed patient-level feeds log is given in ICAL worksheet 1: Patient-level activity feeds.

10. Access locally-held information for allocating overheads (type 1 support costs), such as headcount information for allocating HR costs.

11. Work with your informatics colleagues and relevant services to streamline the process for extracting the information required for costing.

---

[21] As specified in Ambulance standard IR1: Collecting information for costing.
[22] See the information gap analysis template, https://improvement.nhs.uk/resources/approved-costing-guidance-2019/

<u>Ambulance information requirements</u>

12. This standard does not provide guidance on complying with information governance, including confidentiality, data protection and data security. You should consult your organisation on information governance teams, policies and procedures.

Approach

Assessing the availability of information for costing

13. Here we provide guidance on assessing data availability. You should work with your informatics department and the relevant services to assess the availability of data against Ambulance standard IR1: Collecting information for costing, and to streamline processes for extracting what is required.

14. The quality of information varies between organisations. The specific data fields in each feed are given in Spreadsheet IR1.2. Their availability can be grouped as:

- **Available from computer-aided dispatch (CAD) systems (most fields in feeds 20 to 22):** activity and patient data are recorded based on semi-automated job cycle stage triggers – for example, arriving at the scene, leaving the scene, arriving at the treatment location – from response vehicles and dispatchers, and callers' answers to questions they are asked over the telephone by the call handler.

- **Available from your local information systems (feeds 23 and 24):** this information is collected from local information systems other than CAD. The availability of the information varies depending on how advanced the local systems at your organisation are – for example, some providers do not collect all the fleet and staff information required.

- **Available but not necessarily in a usable format (certain fields in feed 22):** activity and patient information from patient report forms (PRFs) completed for each patient by frontline staff. This is often captured and stored on paper, making it difficult to incorporate with other data sources on any scale. Providers with integrated electronic patient record (EPR) systems should use this data source where possible and appropriate, either instead of information from the CAD system or as a supplement to it.

- **Not currently available (certain fields in feeds 20 to 22):** for example, number of patients treated at the scene.

Ambulance information requirements

15. Use our IGAT and work with your informatics colleagues and relevant services to assess data availability for costing.

16. If you are not collecting the required information, you must work with the relevant departments in your organisation to begin collecting it and to make it available for costing. Figure IR2.1 shows you how to access data for costing.

Figure IR2.1: Making data available for costing
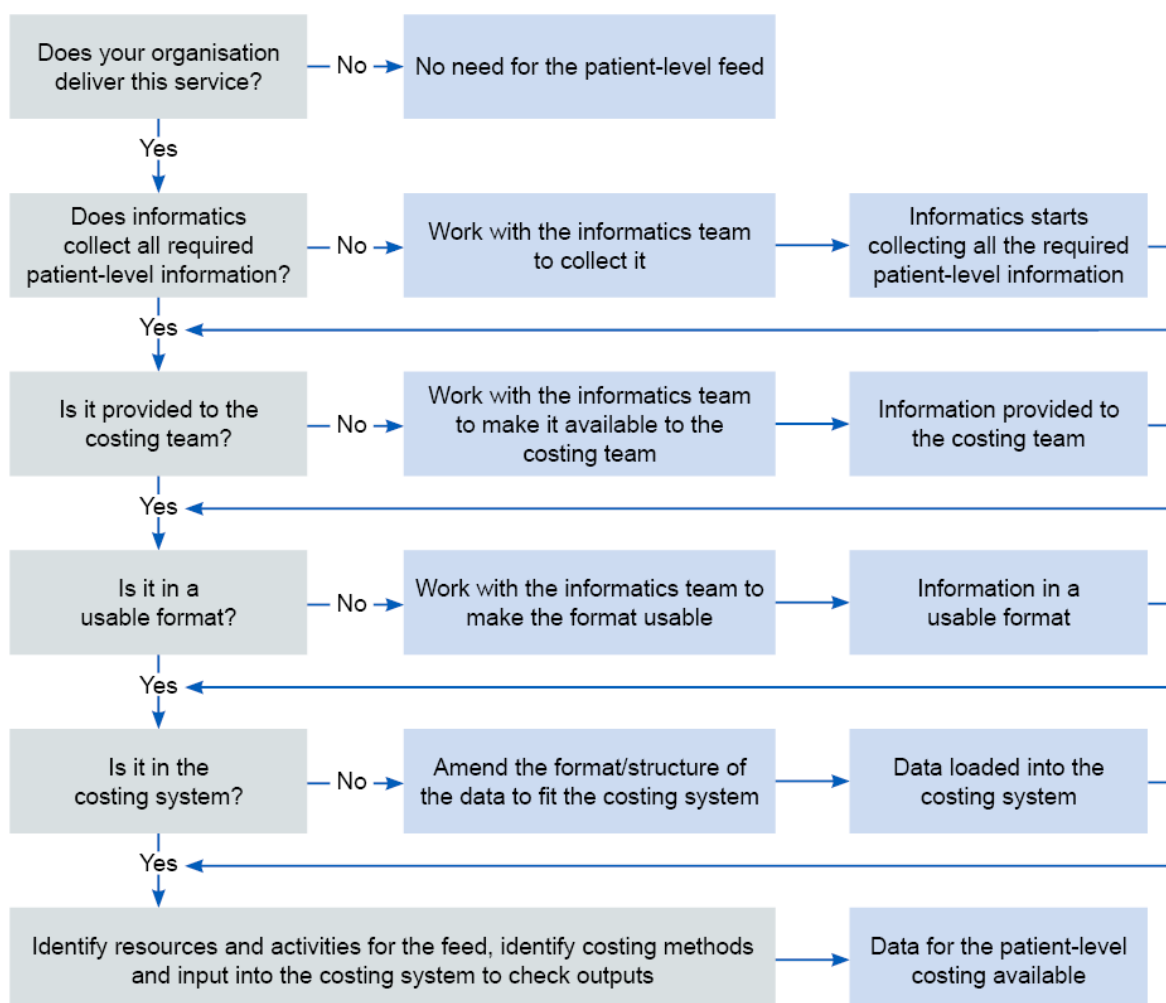
17. If you cannot achieve all the information requirements initially, you should prioritise accessing:

- fleet information
- staff information
- data fields to:
  - flag whether an incident involves one or more patients

– provide a proxy count of patients based on the number of vehicles arriving at a treatment location.

Data available from systems other than CAD

18. Payroll data should be available from an internal system such as the electronic staff record (ESR), and rota data should be available from an internal system such as the global rota system, to provide the information required for the staff information feed (feed 23).

19. If you do not currently collect shift data, you should work with your informatics department and relevant operational or scheduling departments to collect it.

20. You should use staff payroll data to allocate staff costs to the activities these staff deliver. Your CAD system should record which staff respond to which incidents. However, if it does not, continue to use your current method and work towards obtaining the required information. Record the information you collect and the approach you use in ICAL worksheets 2: Additional information source and 14: Local costing methods.

21. Note that you must ensure that relevant information governance requirements are complied with when accessing individual payroll data.

22. Depending on the development of your fleet management system, the fleet information feed (feed 24) may or may not be available at your organisation.

23. If your organisation does not collect the required fleet information, continue to use your current method and work towards obtaining the required information. Record the information you collect and the approach you use in ICAL worksheets 2: Additional information source and 14: Local costing methods.

Available data that may not be suitable for costing

24. Providers complete a paper PRF for each patient they treat or convey. In some cases, multiple forms may be completed for the same patient – for example, when care switches between different frontline staff, or when a patient is observed over a long time.

25. The adoption of EPR systems varies widely, with many providers still using paper forms; EPR systems vary in their ability to link to hospital systems.

Ambulance information requirements

26. EPR data is not currently used in costing. Any plans to incorporate EPR data into costing will have to ensure the data is available in a useable format and is of high enough quality (see Figure IR2.2).

Figure IR2.2: Establishing data quality improvement measures
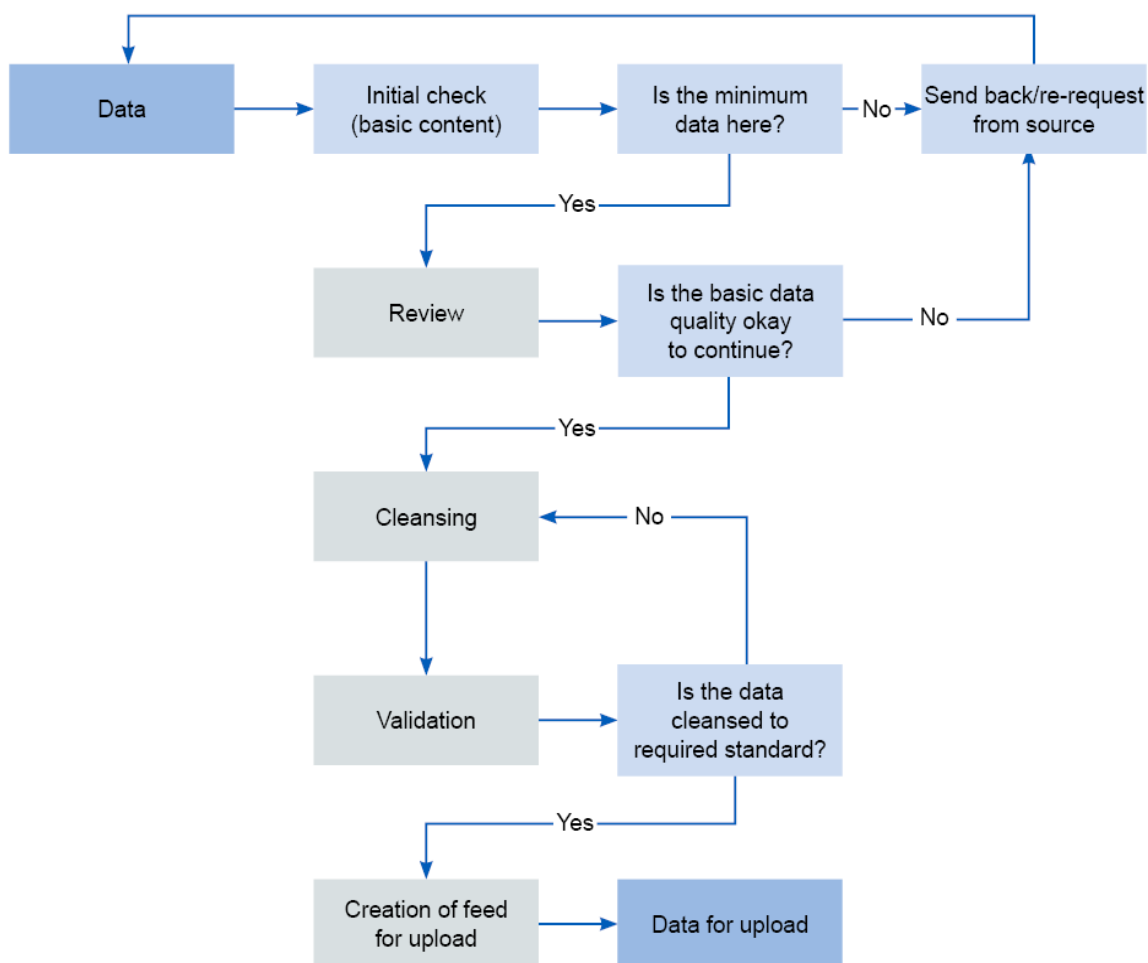
27. In future, quality EPR data could provide a rich and accurate source of data for costing at the patient level. Costing systems should be set up in anticipation of this data source becoming available.

Unavailable data and future requirements for data collection

Linking duplicate calls

28. All call handling activities are recorded in your CAD system. However, when more than one call is made about an incident, only the main call is linked to the incident; all duplicate calls are recorded separately.

Ambulance information requirements

29. To accurately allocate call handling resources it is important to link activity data about all calls, including duplicates, to an incident. This enables you to allocate costs based on the duration of all relevant calls, not just the main call. Developing a way to obtain this information is a goal for the future development of the standards.

Telephone clinical advice

30. There are two issues with the activity data on giving telephone clinical advice:
    - some providers do not record the duration of giving clinical advice to patients by telephone (ie hear and treat) separately from answering the call and triage, ie, no time stamp is recorded to separate the two activities
    - time clinical advisors spend talking to ambulance crews is not recorded.

31. Separating call handling activities from telephone clinical advice activities is important as different resources need to be allocated to the two types of activity. Developing a way to obtain this information is a goal for future development of the standards.

32. In this version of the standards we include a yes/no option for providers that can be used to record when telephone clinical advice is given to ambulance crews (see Spreadsheet IR1.2).

Number of patients

33. In the absence of EPR data, the number of patients treated at the scene cannot currently be recorded. Developing a way to obtain this information is a goal for the future development of the standards.

34. The number of patients conveyed to hospital is not currently recorded by any ambulance provider. Developing a way to collect this data without increasing the workload for call takers or ambulance crews is a goal for the future development of the standards.

Other patient information

35. Some patient information, such as NHS number, age, gender and clinical data beyond chief complaint, is either unavailable or of poor quality. The full

Ambulance information requirements

adoption of EPR systems will significantly improve the quality of this information, which is important for meaningful analysis of cost information.

36. All the issues above are summarised in Table IR2.1 below.

Table IR2.1: Variably available information for costing

Unavailable items or items with varying availability	Issue
Linking duplicate calls	CAD systems only allow one major call to be linked to an incident. Duplicate calls about the same incident cannot be linked.
Separate time stamps for call handling and providing telephone advice to patients	Some providers do not distinguish between hear and treat and call handling time.
Time stamps for when clinicians provide telephone advice to ambulance crews	Some providers do not distinguish between hear and treat and providing telephone advice to ambulance crews; others have separate resources for each.
Number of patients at the scene	Field exists in some CAD systems based on a question asked during emergency calls, but the data quality of the field is known to be poor. Providers using EPR can count the forms completed for unique patients.
Number of patients conveyed to hospital	Field exists in some CAD systems but is reported not to be widely used. When it is, the data is not collected systematically.
Patient information (NHS number, age, gender, etc)	Missing values for a significant number of patients.
Clinical data beyond chief complaint	Main source is PRF, which is often available in paper form only and data cannot currently be integrated into the costing system.

Using information in costing

37. Costing is a continuous process, not a one-off exercise for a national collection.

38. If your organisation has its own quarterly or monthly cost data for local reporting and business intelligence, you may only need to run the patient-level costing once a year for the national collections.

Ambulance information requirements

39. If your organisation has no other form of cost data, run the process quarterly as a minimum, although we consider monthly to be best practice.[23]

40. The benefits of frequent calculation of costs are:

    • effects of changes in practice or demand are seen, and you can respond to them while they are still relevant

    • internal reporting remains up to date

    • mistakes can be identified and rectified early.

41. It is important that the costing system is configured to recognise whether a load is in-month or year-to-date, or it may not load some of the activity.

42. To ensure the costing system is loading everything it should, follow the guidance in Ambulance standard CP5: Reconciliation, and use the patient event activity reconciliation report (see Spreadsheet CP5.1).

43. Bespoke databases, such as fleet management, use the descriptions and codes provided when they were set up. Over time these codes and descriptions may change, become obsolete or be added to. You should map all the descriptions and codes used in the auxiliary and supplement feeds to those used in the master feeds to ensure the costing allocation methods (particularly matching) are applied correctly. These should be reviewed in a rolling programme.

Refreshing the information feeds

44. Note the difference between a refresh and a year-to-date feed. A **year-to-date feed** is an accumulation of in-month reports (unless the informatics team has specified otherwise). A **refresh** is a rerun of queries or reports by the providing department to pick up any late inputs. The refreshed dataset includes all the original data records plus late entries.

45. Services will continue to record activity on systems after the official closing date and this activity needs to be costed. Therefore you need to pick up entries made after the period closes – and they may be numerous – by refreshing the data.

---

[23] The benefits of real-time data can be found at: www.gov.uk/government/publications/nhs-e-procurement-strategy

Ambulance information requirements

46. Get a refresh of all the information feeds:

   - six-monthly – for the previous six months (April to September)[24]
   - annually – for the previous financial year (April to March).

47. A challenge for costing practitioners is that changes as a result of the refreshes can alter the figures in service-line reports. With the help of the relevant services' management accountant leads, you need to explain significant changes to users of the service-line reports, highlighting the impact of late inputs to the department providing the information feed.

Using information in the costing system

48. If the costing system needs to calculate durations – for example, time on scene in seconds, it needs to know which columns to use in the calculation. If the durations have already been calculated and included in the feed, the costing system needs to know which column to use in allocating costs. For the prescribed information feeds, the derived duration fields are included in column D in Spreadsheet IR1.2.

49. Once you decide the method of calculation, use this information to populate the log showing how the costing system uses information feeds in ICAL worksheet 1: Patient-level activity feeds.

Managing information feeds

50. For each entry you should keep a log of data feeds in ICAL worksheets 1 to 7 including:

   - the feed's source system, data table name, department, named person and a deputy responsible for providing the data source to you
   - whether it is an in-month or year-to-date feed
   - period covered by the feed – for example, all activities undertaken in the calendar month
   - format of information to be loaded into the costing system: SQL script, Excel spreadsheet or text file (eg CSV)
   - the working day on which the costing practitioner will receive the feed
   - any known quality issue with the data source and solutions

[24] You should do a six-monthly refresh in November to refresh data feeds from April to September.

Ambulance information requirements

- number of records on the feed.

Supporting your organisation to improve data quality for costing and managing data quality issues in the short term

Data quality issues

51. The quality of time stamp data for job cycle elements varies. Some providers may have many missing values for job cycle element start and end time. This information is vital in cost allocation, as duration of job cycle elements is used as a weighting in many of the allocation methods prescribed (see Spreadsheet CP3.3). You need to talk to your informatics colleagues to look for ways to improve data quality. Methods to treat gaps caused by missing time stamps in job cycles should be developed locally and recorded in ICAL worksheets 6: Activity data quality checks and 7: Activity data cleansing.

52. You need to be aware that the chief complaint or initial diagnosis recorded for a patient does not always accurately reflect their medical problem. This is because it is based on symptoms reported according to triage system coding, not a medical diagnosis by a clinician who has assessed the patient in person.

53. For providers that have fleet management systems, their use and the quality of data available from them vary. You should be aware of this and perform quality checks on fleet data (see Figure IR2.2) before incorporating it into your costing system.

Data quality checks

54. Follow a three-step quality checking process for costing data:

- **Step 1 – Review the source data:** identify any deficiencies in the feed, including file format, incomplete data, missing values, incorrect values, insufficient detail, inconsistent values, outliers and duplicates.

- **Step 2 – Cleanse the source data:** remedy/fix the identified deficiencies. Follow consistent rules and log your alterations, creating a 'before' and 'after' copy of the data feed. Applying duration caps is part of this step. Always report data quality issues to the department supplying the source data so they can be addressed for future processes. Keep data

amendments to the minimum, only making them when fully justified and documenting them clearly.

- **Step 3 – Validate the source data:** you need a system that checks that the cleansed and correct data is suitable for loading into the costing system. This may be part of the costing system itself. Check that the cleansing measures have resolved or minimised the data quality issues identified in Step 1; if they have not, either repeat Step 2 or request higher quality data from the informatics team.

55. Consider automating the quality check to reduce human errors and varied formats. Automatic validation, via either an ETL (extract, transform, load) function of the costing software or a self-built process, can save time. But take care that the process tolerates differences in input data and if not, that this data is consistent. Otherwise you risk spending disproportionate time fixing the automation.

56. Your organisation should continuously improve data quality for audit purposes. Request changes to the information feeds from the source department or informatics team, then review the revised data for areas to improve. Set up a formal process to guide these data quality improvement measures and ensure those most useful to costing are prioritised.

Use of duration caps

57. Moderate outlier values by rounding them up or down to bring them within accepted parameters. Review the feeds to decide where to apply duration caps and build them into the costing system.

58. You can apply a cap to reduce outliers – for example, a call that is not properly closed and appears to last over six hours could be reduced to six hours. Applying duration caps removes the distraction of unreasonable unit costs when sharing costing information.

59. Capped data needs to be reported as part of the data quality check. The caps need to be clinically appropriate and signed off by the relevant service.

60. An example duration cap is given in Table IR2.2. Such caps should be used as the default in the absence of better local assumptions.

Ambulance information requirements

61. While caps moderate or even remove outlier values, studying these outliers (ie unexpected deviations) is informative from a quality assurance point of view. You should record the caps used and work with the informatics department and the department responsible for the data feed to improve the data quality and reduce the need for duration caps over time.

62. Record any duration caps you use in ICAL worksheet 1: Patient-level activity feeds, showing how the costing system uses patient-level activity feeds.

Table IR2.2: Example of duration caps

Feed no	Feed name	Field name	Duration (seconds)	Replace with
1	Incident information	Call duration	≥3,601	3,600

When information is not available for costing

63. Information for costing may be unavailable because data is not:

   - collected at an individual patient level
   - given to the costing practitioner
   - in a usable format for costing
   - loaded into the costing system and included in costing processes.

64. If you are missing any of the required data fields in Spreadsheet IR1.2, follow the steps shown in Figure IR2.2 above to make the data available for costing.

65. Until the data becomes available, you need to:

   - continue to use your current methods
   - document these in your costing assurance log
   - start discussions with the department on how to obtain the information for costing.

CP1: Ensuring the correct cost quantum

Purpose: To set out how the general ledger is used for costing, and to highlight the areas that require review to support accurate costing.

Objective

1. To ensure the correct quantum of cost is available for costing.

Scope

2. This standard should be applied to all lines of the general ledger.

What you need to implement this standard

- Costing principle 2: Good costing should include all costs for an organisation and produce reliable and comparable results[25]

Overview

3. You need the income and expenditure for costing. We refer to this as the 'general ledger output'. This output needs to be at cost centre and expense code level and is a snapshot of the general ledger at a point in time.

4. You do not require balance sheet items for costing.

5. You can bring your general ledger into your costing system either by bringing in:

    - the trial balance: for audit purposes this should balance to zero, or

---

[25] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/

<u>Ambulance costing processes</u>

- only the cost and income: this should reconcile to your statement of comprehensive income.

6. The general ledger is closed at the end of the period, after which it cannot be revised.[26] For example, if in March you discover an error in the previous January's ledger that needs to be corrected, you can only make the correction in March's ledger. Doing so will correct the year-to-date position, even though the January and March figures do not represent the true cost at those times, as one will be overstated and the other understated. Check with the finance team to ensure that only finally closed periods that contain any such changes are brought into the costing system as a matter of routine.

7. The timing of when some costs are reported in the general ledger may pose a challenge for costing. For example, overtime pay for a particular month may be posted in the general ledger in the month it was paid, not the month the overtime was worked. This highlights a limitation in the time-reporting and expense payment system. We recognise this limitation but are not currently proposing a work-around for it.

8. Discuss the general ledger's layout and structure with the finance team so that you understand it. This will help you understand the composition of the costing output.

9. Keep a record of the input of cost into your costing system for each costing period. There may be multiple loads and we recommended that each load is noted. You should record each load in integrated costing assurance log (ICAL) worksheet 12: GL load record.

Approach

Obtaining the general ledger output

10. The finance team should tell you when the general ledger has been closed for the period and give you details of any off-ledger adjustments for the period. You need to put these adjustments into your cost ledger, especially if they are included in your organisation's report of its financial position, as you will need to reconcile to this.

---

[26] Some systems may allow you to back-post payroll journals.

Ambulance costing processes

11. Keep a record of all these adjustments in ICAL worksheet 11: Adjustments to the general ledger at each load,[27] to reconcile back to the general ledger output. Take care to ensure that any manual adjustments are mapped to the correct line of the cost ledger.

12. Table CP1.1 below shows what the extract of the general ledger output must include.

     Table CP1.1: General ledger output required fields

	Field name
1	Period (MM-YYYY)
2	Cost centre
3	Expense code
4	Monthly income or expenditure value (for use if you do in-month costing rather than year-to-date average costing)
5	Year-to-date income or expenditure value

13. You may choose either field 4 or 5 depending on the type of costing (monthly or year-to-date) your organisation undertakes.

14. Ensure the process for extracting the general ledger output is documented in ICAL worksheet 8: Extracting GL output. You should extract this only after the finance team tells you it has closed the general ledger for the period.

15. The finance team should tell you when it has set up new cost centres and subjective codes in the general ledger, and when there are material movements in costs or income between subjective codes or cost centres. Cross-team approval increases the different teams' understanding of how any changes affect them.

16. **Finance teams should not rename, merge or use existing cost centres for something else** without informing you as not knowing when this has been done will cause problems for costing. Finance teams should close a cost centre

---

[27] If the number of adjustments is significant, you can maintain a log of adjustments elsewhere and record the location of the file(s) in the costing assurance log.

and set up a new one rather than renaming it. If this is not possible, they should tell you about any changes.

17. The new general ledger cost centres and expense codes need to be mapped to the cost ledger. You then need to reflect these changes in the costing system.

18. 'Error suspense'[28] ledger codes need to be addressed so that all costs can be assigned accurately to incidents and patients. Work with your finance colleagues to determine what these codes contain so that they are mapped to the correct lines of the cost ledger.

19. You should have a rolling programme to regularly meet your finance colleagues to review the general ledger and its role in costing. This can identify problems and enhances their engagement with the use of the data.

---

[28] Organisations may use a different name for dump ledger codes, eg error suspense codes and holding ledger codes.

CP2: Clearly identifying costs

Purpose: To ensure costs are in the correct starting position for costing.

This standard is under review and will be published on 28 February 2020.

CP3: Allocating costs to activities

> Purpose: To ensure that the correct quantum of costs is allocated to the correct activity using the most appropriate cost allocation method.

Objectives

1. To ensure each resource is allocated to each relevant activity using a single appropriate method, ensuring consistency and comparability in collecting and reporting cost information, and minimising subjectivity.

2. To ensure resources are allocated to activities in a way that reflects how care is delivered to the patient.

3. To ensure costs are allocated to activities using an appropriate information source.

4. To ensure relative weight values reflect how costs are incurred.

Scope

5. This standard should be applied to all costs reported in the cost ledger and all activities undertaken by the organisation.

6. This standard covers relative weight values.

What you need to implement this standard

- Costing principle 2: Good costing should include all costs for an organisation and produce reliable and comparable results
- Costing principle 5: Good costing should focus on materiality

<u>Ambulance costing processes</u>

- Costing principle 6: Good costing should be consistent across services, enabling cost comparison within and across organisations[29]
- Technical document:
  - Spreadsheet CP3.1: Resources for patient-facing and type 2 support costs
  - Spreadsheet CP3.2: Activities
  - Spreadsheet CP3.3: Allocation methods to allocate patient-facing and type 2 support resources, first to activities then to incidents and finally to patients

Overview

7. The standardised costing process using resources and activities aims to capture cost information by reflecting how those costs are incurred.

8. The costing process allocates resources to incidents and patients in three steps:

- allocate resources to activities (this standard)
- match costed activities to the correct incident (Ambulance standard CP4: Matching costed activities to incidents and patients)
- link the costed incidents to patients (Ambulance standard CP4: Matching costed activities to incidents and patients).

9. The allocation methods prescribed in the standards in most cases do not include a relative weight value for acuity or intensity. If you are using a relative weight value for acuity or intensity on top of the prescribed allocation method, continue to do this and record it in integrated costing assurance log (ICAL) worksheet 15: Superior costing methods.

Approach

Resources

10. Resources are the components used to deliver the activities, such as staff, equipment and consumable items. The costs of providing these resources are

---

[29] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/

<u>Ambulance costing processes</u>

recorded in your general ledger, and the resource code prescribed by the standards groups these costs into themes.

11. This standard prescribes a list of resources to be used for the costing process. Resources are categorised as either patient-facing or support type 2 (see Spreadsheet CP3.1).

12. In the standardised cost ledger (see Spreadsheet CP2.1) all patient-facing and type 2 support cost lines are mapped to the prescribed resources for you. Once you have mapped your general ledger to the standardised cost ledger, you will get a list of the resources (see Spreadsheet CP3.1) used by your organisation.

13. The costs within a resource may have different information sources and cost drivers. For example, the patient-facing frontline staff resource could include the costs of frontline staff salaries and overheads (type 1 support costs) such as operational manager costs, station non-pay costs, HR and finance costs.

14. The transparency of these costs within each resource – what they are and where they come from in the general ledger – should be maintained throughout the costing process.

15. Once these separated costs have been calculated they can be aggregated to whatever level the resources have been set at, and you can be confident the resource unit cost is accurate because it is underpinned by this costing process.

Activities

16. Activities are the work undertaken by all resources to deliver the services required by patients to achieve desired outcomes: for example, answering a call or treating patients at the scene.

17. Together, resources and activities form a two-dimensional view of what costs were incurred to deliver what activities. This can be displayed in a matrix such as that shown in Table CP3.1 below.

Ambulance costing processes

**Table CP3.1: Example of a resource–activity combination in matrix form**

Resource	Activity: treating patients at the scene
CAD system	XX
Fleet maintenance and repairs – internal	XX
Fleet preparation/cleaning	XX
Frontline staff – Band 5	XX
Frontline staff – Band 6	XX
Fuel	XX
Medical and surgical consumables	XX
Vehicle depreciation	XX
Vehicle insurance	XX

18. This standard prescribes a list of activities for ambulance services (see Spreadsheet CP3.2). Activities are categorised either as patient-facing or type 2 support activities.

19. You need to identify all the activities your organisation performs from the prescribed list of patient-facing and type 2 support activities in Spreadsheet CP3.2.

20. Some activities are informed by activity feeds: for example, the activity mobile to scene (activity ID: AMA183) uses information from the response feed (feed 21) for costing.

21. Column F in Spreadsheet CP3.2 describes whether the information source is one of the prescribed information feeds or another information source.

Ambulance costing processes

Allocate resources to activities

Figure CP3.1: Extract from the spreadsheet costing diagram in the technical document showing allocation of resources to activities
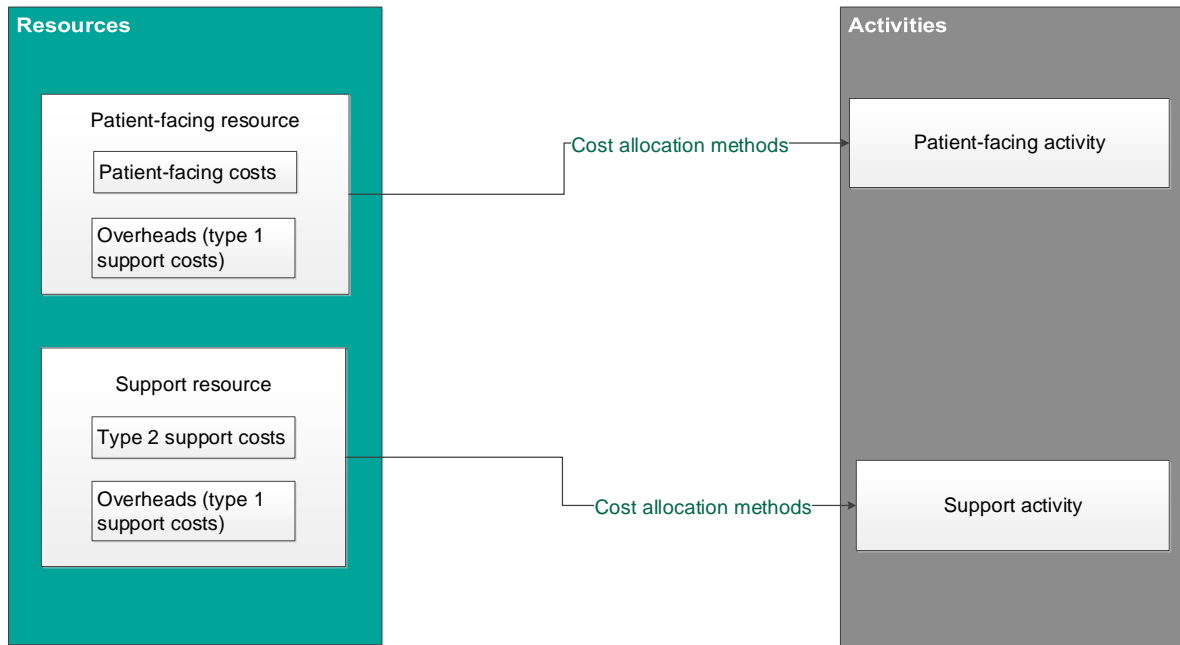
22. Only costs that have an activity-based cost allocation method are assigned a resource and activity from the prescribed lists (see Spreadsheet CP3.3).

23. You need to use these prescribed resource and activity combinations in your costing system.

24. The resource and activity combinations used in the costing process for your organisation are identified by:

    - obtaining the list of resources for your organisation from mapping your general ledger to the cost ledger (see Ambulance standard CP2: Clearly identifying costs)

    - identifying the list of activities performed by your organisation from the prescribed list.

25. You should ignore activities and their related resources in the technical document if your organisation does not provide them.

26. You must allocate resources to the activities using the methods prescribed in column F of Spreadsheet CP3.3.

Ambulance costing processes

27. Resources need to be allocated to activities in the correct proportion. There are three ways to do this:

    - based on actual time, items or costs[30] from the relevant information feed prescribed
    - using relative weight values[31] created in partnership with the relevant departments
    - using a local information source.

28. Where one resource needs to be apportioned to several activities, you need to determine the percentage of the cost to apportion to each activity after discussions with clinicians and managers, supported by documented evidence where available (eg paramedic rota plans). These splits and their basis should be recorded in ICAL worksheet 13: % allocation bases. Note that this is a different process from disaggregating costs in your general ledger to map them to the cost ledger.

29. One way to do this is to disaggregate the expense codes in the cost ledger further to resource/activity level. Figure CP3.2 below shows how this could look in the resource/activity matrix for a division of frontline staffing costs.

30. Note that frontline staffing resources do **not** need to be apportioned to each job cycle activity[32] as this is done when allocating resources to activities – that is, apportioning and allocating resources happens in one step (see Ambulance standard CM31: Allocating costs across job cycle elements).

31. Do not apportion resources equally to all activities without clear evidence that they are used in this way, and do not apportion costs indiscriminately to activities.

32. Use a relative weight value unless there is a local reason for applying a fixed cost.

---

[30] The costs should be used as a weighting rather than a fixed cost.
[31] Relative weight values are statistics to allocate costs in proportion to the total cost incurred. They are an agreed weighting of an item used to allocate costs for a patient event.
[32] Includes the following activities: allocation to mobile, mobile to scene, time on scene, convey patients to treatment location, patient handover and handover to clear.

Ambulance costing processes

Figure CP3.2: Identifying the correct quantum of cost to be apportioned to activities
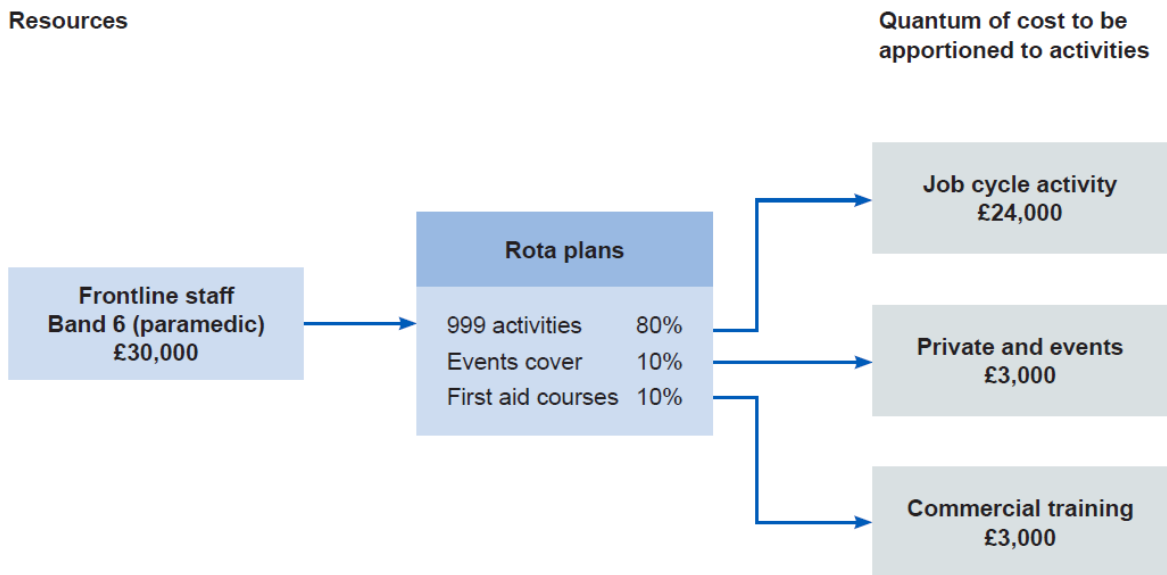
33. Where the same cost driver is used for several calculations in the costing system, and providing the costs can be disaggregated after calculation, you can aggregate the resources in your costing system to reduce calculation time. For example, if several resources for treating patients at the scene use the driver 'duration of the activity', you can add them together for the cost calculation.

34. If you have a more sophisticated cost allocation method for allocating patient-facing or type 2 support resources to activities:

   - keep using it
   - document it in ICAL worksheet 15: Superior costing methods
   - tell us about it.

35. We do not accept some cost allocation methods as superior to the prescribed methods. These include using income or national averages to weigh costs.

36. The activity feeds will inform the cost allocation methods providing key cost drivers, such as duration of each job cycle element. The information feeds will also provide information about the relative weight values to be used in the costing process, such as fleet repairs and maintenance costs in the fleet information feed (feed 24).

Ambulance costing processes

37. Investigate any costs not driven to an activity or any activities undertaken by your organisation that have not received a cost and correct these.

Relative weight values

38. Relative weight values are values or statistics used to allocate costs to a patient event in proportion to the total cost incurred.

39. One way to store the relative weight values for use in your costing system is to compile statistic allocation tables.

40. Income values and national cost averages should **not** be used as relative weight values.

41. Relative weight values are used to allocate costs when information on other drivers is not available. They must be developed and agreed with the relevant service managers and clinicians to ascertain all aspects of the costs involved and ensure these are as accurate as possible.

42. Different costs will require different approaches to derive appropriate relative weight values to support their allocation.

43. You should allocate all costs to patients based on actual usage or consumption. Where you cannot do this, you should use a relative weight value to allocate costs to a patient.

44. Relative weight values should be reviewed on a rolling programme or when a significant change occurs in the relevant department.

Relative weight values for overheads (type 1 support costs)

45. To allocate overheads (type 1 support costs) in the correct proportion, relative weight values may need to be identified by obtaining the relevant information from the departments.

46. An example of a statistic allocation table for the relative weight value of staff budgeted headcount is given in Table CP3.2; this could be further weighted to derive a relative weight value.

Ambulance costing processes

47. You may add additional information to further weight a relative value. For example, you can add cleaning rotas or location weighting to floor area for cleaning so that fleet workshops get a greater proportion of cleaning costs than station corridors. If you do this, continue to do it and document it in your costing model.

Table CP3.2: Budgeted headcount statistic allocation table

Department	Budgeted headcount
Emergency operations control centre	40
Stations (relevant subset)	30
Headquarters reception	5
Human resources	15
Finance office	10
Total	100

CP4: Matching costed activities to incidents and patients

Purpose: To achieve consistency across organisations in assigning costed activities to the correct incident and patient(s).

Objectives

1. To provide methods to consistently assign costed activities to the correct incident.

2. To link costed incidents to patients to produce patient unit costs.

3. To highlight and report source data quality issues that hinder accurate matching, and investigate unmatched activity.

Scope

4. This standard should be applied to all costed activities.

What you need to implement this standard

- Ambulance standard IR1: Collecting information for costing
- Ambulance standard IR2: Managing information for costing
- Ambulance standard CM31: Allocating costs across job cycle elements
- Technical document:
  - Spreadsheet CP3.3: Allocation methods to allocate resources, first to activities then to incidents and finally to patients

Ambulance costing processes

Overview

5.   Matching is integral to accurate patient-level costing. For an accurate final patient unit cost, the costed activities need to be matched first to the incident and then linked to the patient(s).

6.   The matching process for costed activities involves two steps:

  • matching activities to incidents

  • linking costed incidents to patients.

7.   This two-step matching process is used because more than one patient can be treated in any one incident (which is widely used as the unit of activity for ambulance emergency responses). To derive the patient unit cost, you need to first match costed activities to the incident and then link these activities to the patient.

8.   Matching costed activities to incidents can be done using either of two approaches:

  • for activities informed by an information feed, use the matching fields in the information feeds (see column H in Spreadsheet IR1.1)

  • for all other activities, use the prescribed cost allocation methods to match the costed activities to incidents.

9.   Matching physical response stage activities[33] and some call-stage activities[34] to incidents takes place before the costing process – it is done in your computer aided dispatch (CAD) system (see Ambulance standard IR1: Collecting information for costing). Therefore, you do not need to repeat this step to match these activities in the costing process.

10.   Linking costed incidents to patient(s) can be done using either of the two approaches below. Which one you use depends on whether the incident involves one patient or more than one patient:

  • for single-patient incidents, link the costed activities matched to the incident to the patient recorded for the incident

---

[33] Including activities: allocation to mobile, mobile to scene, time on scene, convey patients to treatment locations, patient handover and handover to clear.
[34] Including call taking and telephone clinical advice.

Ambulance costing processes

- for multiple-patient incidents:
  - first use the prescribed cost allocation rules to produce patient-level cost for each activity matched to the incident
  - then link the costed activities (at patient level) to the patients recorded for the incident.

11. Limitations of the data on number of patients, patient identifiers and other patient information (see Ambulance standard IR2: Managing information for costing for details) mean that exact matching of costed activities to each patient involved in one incident is not currently possible. The standards prescribe cost allocation rules, and you are required to create proxy patient records to generate patient unit costs (that is, a patient-level cost).

12. We will update this standard with rules to match costed activities to individual patients once information is available to enable this; we anticipate this will be possible once the electronic patient record (EPR) system has been more widely adopted by the ambulance sector.

Approach

Matching costed activities to the incident

13. Figure CP4.1 below, adapted from the costing diagram in the technical document, shows the two-step matching process:

    - matching activities to incidents
    - linking costed incident to patients.

    Please refer to Spreadsheet CP3.3 for details of the matching and allocation rules.

14. The prescribed matching fields ensure the relevant auxiliary data feeds can be attached to the correct incident.

15. The incident, call or response ID always generates the best match.

16. If you obtain your auxiliary information feeds from the CAD system and you can include the incident ID in the feeds, use this ID to match the auxiliary feed (eg response information feed) to the master feed (incident information feed).

Ambulance costing processes

Figure CP4.1: Extract from the spreadsheet costing diagram in the technical document showing matching of costed activities to incidents and patients
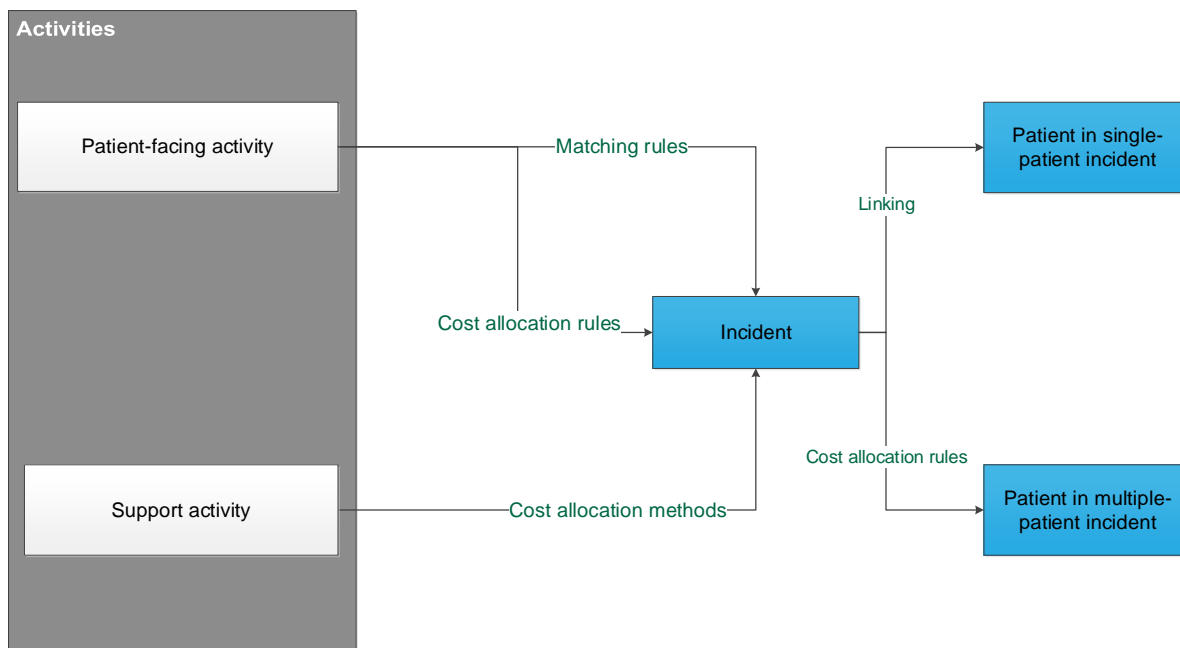
17. Matching physical response stage activities and some of the call stage activities to incidents is done in your organisation's CAD system (see column G in Spreadsheet 3.3 for details).

18. However, there are problems matching activities to incidents when:

    - duplicate calls are taken
    - clinical advice is provided to an ambulance crew at the scene.

    These problems are discussed in Ambulance standard IR1: Collecting information for costing.

19. For these activities, as well as type 2 support activities, you should follow the cost allocation rules and methods prescribed in column G (Step 2) in Spreadsheet CP3.3 to allocate the costs to an incident.

20. Once costed activities are matched to the incident, the next step is to link the costs to patients and create patient unit costs.

Linking incident-level costs to patients

21. The linking process to patient(s) differs depending on whether an incident involves one patient or more than one patient.

Ambulance costing processes

22. Use **number of vehicles arriving at the treatment location** in the incident feed (feed 20) as a proxy for the number of patients involved in each incident. Use this number to determine whether an incident is a single-patient incident or a multiple-patient incident. See Ambulance standard CM31: Allocating costs across job cycle elements and Ambulance standard IR2: Managing information for costing, for an explanation of why the proxy is used.

Linking incident-level costs to patients in single-patient incidents

23. The vast majority of incidents are single-patient incidents.[35] After matching the costed activities to these single-patient incidents, you should have the patient unit cost.

24. Where possible, you should then link the costed incident to the patients recorded for the incidents to create patient-level costs using recorded incident identifiers (activity ID) and patient identifiers (patient ID) in your patient information feed (feed 22).

25. We know that patient identifiers are not always collected. In these cases, a proxy patient record (with a proxy patient ID) needs to be generated to create costs at **a patient level**.

26. You will now have patient-level costs for all incidents that involve single patients.

Linking incident-level costs to patients in multiple-patient incidents

27. A small proportion of incidents involve more than one patient. Creating patient-level costs from incident-level costs for these incidents involves two steps:

   • first use the prescribed cost allocation rules to produce patient-level cost for each activity matched to the incident
   • then link the costed activities (at patient level) to the patients recorded for the incident.

---

[35] Feedback from the ambulance costing technical focus group was that more than 90% of the incidents ambulance trusts respond to involve only one patient.

Ambulance costing processes

Producing patient-level costs

28. Use **number of vehicles arriving at the treatment location** as a proxy for the number of patients conveyed, and then split the costs of each activity matched to the incident between this number of patients.

29. Use the cost allocation rules prescribed in column H (Step 3) Spreadsheet CP3.3 to allocate the incident-level activity costs to all the patients involved in an incident to derive the patient unit cost.

Linking to patients

30. Where possible, you should then link the costed incident to the patients recorded for the incident to create patient-level costs using recorded incident identifiers (activity ID) and patient identifiers (patient ID) in your patient information feed (feed 22).

31. Limitations of the information collected on patients mean it is not currently possible to match every patient involved in a multiple-patient incident (see Ambulance standard IR2: Managing information for costing and Ambulance standard CM31: Allocating costs across job cycle elements).

32. We know that patient identifiers are not always collected. For multiple-patient incidents where the total number of patients recorded in your patient information feed (feed 22) is smaller than the number of vehicles arriving at the treatment location, proxy patient records (with proxy patient IDs) need to be created in your patient information feed (feed 22). This is to ensure that all the costs at the patient level have a patient record to link to, and you are therefore costing '**a**' patient not '**the**' patient.

33. You will now have patient-level costs for all incidents that involve multiple patients.

Other considerations

34. The accuracy with which costed activities are matched depends on the quality of both the master feeds and the auxiliary feeds. Follow the guidance in Ambulance standard IR2: Managing information for costing, to help your organisation improve its data quality.

Ambulance costing processes

35. If your matching rules are more sophisticated than the prescribed matching fields and improve the accuracy of your matching, continue to use them and record them in ICAL worksheet 15: Superior costing methods.

36. Your costing system should produce a report of the matching criteria used in the system, as described in Table CP5.1 in Ambulance standard CP5: Reconciliation, and you should have a rolling programme to review this.

Reporting unmatched activity for local business intelligence

37. Organisations have traditionally treated the cost of the unmatched activity in different ways. Most commonly, it has been absorbed by matched activity, a practice which can have a material impact on the cost of matched activity, particularly when reviewing the cost at an individual patient level for benchmarking and tariff calculation.

38. For local reporting purposes, we recommend you do not assign unmatched activity to other incidents or patients but report them as reconciliation items.

39. If reported unmatched activity forms a material proportion of an organisation's expenditure, this is likely to be due to poor source data. As this issue will deflate the patient unit cost, it needs to be identified and steps taken to improve the quality of the source data, rather than artificially inflating the patient unit cost by allocating unmatched activity. Please follow the guidance in Ambulance standard IR2: Managing information for costing, to support your organisation in improving its data quality.

CP5: Reconciliation

Purpose: To set out process for reconciling costs and income to the organisation's accounts, and to reconcile the activity counts reported by the organisation.

Objectives

1. To ensure the cost and income outputs from the costing system reconcile to the organisation's accounts.

2. To ensure the activity outputs from the costing system reconcile to what the organisation is reporting.

Scope

3. This standard covers all costs, income and activity included in the costing process.

What you need to implement this standard

- Costing principle 2: Good costing should include all costs for an organisation and produce reliable and comparable results
- Costing principle 4: Good costing should involve transparent processes that allow detailed analysis[36]
- Technical document:
  - Spreadsheet CP5.1: Cost, income and activity reconciliation reports

Overview

4. All the costing process outputs must reconcile to the information reported to the board, and in the final audited accounts. This ensures a clear link between

---

[36] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/

these outputs and the costs and activity information captured in the source data.

Approach

Reconciliation of costs and income

5. The costs and income outputs must reconcile to the main sources of this information, the general ledger output and the organisation's reported financial position.[37]

6. To demonstrate that the outputs of the costing process reconcile to the main sources of information, the reports detailed in Spreadsheet CP5.1 must be available from your costing system.

Table CP5.1: Cost, income and activity reconciliation reports

Report number	Report name	Report purpose
CP5.1.1	Input accounting reconciliation	Enables the totals for the cost ledger and income ledger to be reconciled to the monthly statement of comprehensive income (SOCI) reported by the board for the period reported on, as well as to the final audited accounts at year-end.
CP5.1.2	Internal reporting reconciliation	Shows the costs from the monthly, quarterly or annual report reconciled to the costs reported in the costing system. Clear records must be kept of any adjustments leading to differences between them, both for internal purposes and to provide a clear audit trail.
CP5.1.3	Locality or service level reports	Detailed reports of income and costs at provider level, service-line level, localities (eg clinical commissioning groups (CCGs) or locally-defined operational areas), down to the level of each incident and patient. This should encourage operational engagement, as details of the resources and activities involved in each individual pathway will be available.

---

[37] See Ambulance standard CP2: Clearly identifying costs, for guidance on where adjustments may be made between the general ledger output and the cost ledger, to be included in your reconciliation.

Ambulance costing processes

Report number	Report name	Report purpose
CP5.1.4	Output accounting reconciliation	Checks that the final costing outputs reconcile to those in the board reports and the audited annual accounts, with the option in the costing system to amend values for any post-closure adjustments, thereby ensuring that the final costing outputs reconcile to these earlier reports.
CP5.1.5	Adjustments and exclusions report	Documents all the adjustments and exclusions to the total quantum. This must also reconcile annually to the final audited accounts to provide assurance when submitting data for mandatory cost collections.
CP5.1.7	Cost centre and categorisation reports	Assures users of cost information that all appropriate costs are accounted for as part of the costing process. These reports must be available at the levels of the cost centre, expense code, pay/non-pay/income and patient-facing/support costs.
CP5.1.8	Matching criteria	To show the matching criteria (matching fields) being used in the system to identify how many records are matched.
CP5.1.9	Unmatched activity	Costed activities that could be matched to an area but not to an incident within that area and costed activities that could not be matched to an area or an incident.
CP5.1.10	Cost group reconciliation	When the costing process is complete, enables the costs within the five cost groups to be reconciled to the cost ledger, with the total cost within these cost groups equalling the total in the cost ledger.
CP5.2.1	Core activity reconciliation	Shows the core ambulance activity used in the costing model reconciled to the original source data – for example, number of calls, number of physical responses, number of incidents, number of patients – with all exclusions and amendments clearly recorded and explained.
CP5.2.2	Patient event activity reconciliation	To show patient event activity used in the costing model – eg on-scene time – reconciled to the initial data feeds, with all exclusions and amendments clearly recorded and explained.
CP5.2.3	Board report reconciliation	Enables reconciliation of incidents used in the costing model to the board report based on geographical areas – for example, locally defined operational areas or CCGs. This activity must also be reconciled to the outputs of the costing system to ensure that all activity has been processed.

Ambulance costing processes

Report number	Report name	Report purpose
CP5.2.4	Full cost reconciliation	Shows the full costs for all the activities loaded into the costing system as part of the outputs of the costing model.
CP5.2.5	Timing differences reconciliation	If differences in the timing arise between capturing the activity in the costing system and the activity reported by the provider, a clear record must be kept so these differences can be explained. To avoid these timing differences, it is good practice to use a dataset for provider reporting produced on the same day as that to be used in the costing system.
CP5.2.6	Output activity reconciliation	Reconciliation should be performed by costing practitioners to demonstrate that the activity from the source datasets matches the outputs of the costing system, with the exception of any legitimate – and documented – adjustments or exclusions. This reconciliation report should encompass activity feeds received from the informatics team, data warehouse or equivalent, as well as any activity data captured and reported manually.
CP5.2.7	Non-NHS patient report	All activity that does not relate to NHS patients should be clearly identifiable and reportable to enable the use of the costing system to complete a reference costs return.

7. To support reconciliation and reporting, once the costing model is fully processed, the costs associated with incidents, patients and other cost groups should be classified into the five cost groups listed in Table CP5.2.

Table CP5.2: Cost and activity groups

Cost group	Description
Patient care	Includes the costs relating to the organisation's: • 999 service • patient transport service • NHS 111 service • GP out-of-hour service • other services

Ambulance costing processes

Cost group	Description
Education and training (E&T)	Costs relating to E&T in the organisation
Research and development (R&D)	Costs relating to R&D in the organisation
Other activities	Includes the costs related to the organisation's commercial activities
Cost and activity reconcilaiton items	Includes: • costs for which there is no corresponding activity, such as a frontline staff member who is employed by a provider to perform air ambulance service activity and the provider is unable to include this in its costing system • activity for which there are no corresponding costs, such as help from another provider to cover a major incident

8. Cost and activity reconciliation items have the following benefits:

   • patient unit costs reflect the true cost of treatment, undistorted by provider-incurred costs that are not patient-related

   • the true cost is more appropriate for benchmarking between providers as non patient-related costs can significantly affect cost reporting by different providers.

Reconciliation of activity

9. The activity outputs must reconcile to what your organisation reports. For example, if your organisation reports XX incidents in a costing period, your activity outputs should reconcile to this number. To avoid any reconciliation differences due to timing, information feeds used in the costing process and those reported by the organisation should be created at the same time.

10. Some activity datasets should be reconciled to external sources such as the national ambulance quality indicators return. Organisations should also reconcile activity to their contracting reports and other national submissions relevant to each service line, to ensure all data produced and submitted by an organisation is consistent and accurate.

Ambulance costing processes

11. To demonstrate that the costing system's outputs reconcile to the main sources of activity information, the activity reconciliation reports detailed in Spreadsheet CP5.1 must be available from your costing system.

12. You should also reconcile the activity outputs to the activity in the source datasets to ensure all the activity you entered into your costing system has been costed and then included in the costing output.

13. In your costing process, do **not** include activity that is recorded in your information feeds but the costs of which are incurred by another organisation. Report this activity in 'cost and activity reconciliation items'.

14. To reconcile the activity used in the system to that actually carried out by the department/service, the activity count must be correct in the information feeds. Use the information feed log in ICAL worksheet 1: Patient-level activity feeds.

CP6: Assurance of cost data

Purpose: To ensure providers develop and maintain high quality assurance for costing and collection purposes.

Objective

1.   To provide assurance that:

- providers have implemented the standards and collections guidance properly
- the costing principles have been applied in the costing process and outputs
- providers are maintaining a clear audit trail of the costing and collection process
- processes are adequate to validate the accuracy of submitted data in line with the Approved Costing Guidance
- patient pathways and cost data have been clinically reviewed.

Scope

2.   This standard relates to all costing processes and outputs produced by the provider.

What you need to implement this standard

- Costing principle 4: Good costing should involve transparent processes that allow detailed analysis
- Costing principle 7: Good costing should engage clinical and non-clinical stakeholders and encourage use of costing information[38]

---

[38] See *The costing principles*, https://improvement.nhs.uk/resources/approved-costing-guidance/

<u>Ambulance costing processes</u>

- Integrated costing assurance log (ICAL)
- Standards gap analysis template (SGAT)
- Information gap analysis template (IGAT)
- Costing assessment tool (CAT)
- Data validation tool (DVT)
- Data quality reports
- Access to the national PLICS portal

Overview

3. There are several ways to provide assurance on the costing and collection process, including:

   - formal audit of process and submission by the provider's internal and external auditors
   - evidence demonstrating:
     – compliance with the standards and associated guidance
     – users' review of cost data
     – use of the cost information to support decision-making (eg cost improvement plans, returns to regulators, local prices)
     – minutes of regular user/working group meetings.

4. The assurance process should be integral to producing cost information. Producing an audit trail, covering assumptions, decisions and reviews should be part of the process. This will enable the organisation to show it has adequate processes for ensuring the accuracy of cost information, both to internal and external users.

5. Many stakeholders require assurance:

   - the executive team in its strategic decision-making
   - clinicians and their operational managers in analysing activities and clinical procedures
   - external stakeholders, who may make varied use of the information.

6. The level of evidence should be sufficient to support the reason for making the change. It will also allow updates and changes to the costing processes and can be linked to the costing assurance log, showing why processes have been

changed. This will support the assurance process for the board when submitting the costing submission. It can also help identify areas where costing needs to be improved, based on recommendations from findings that could not be completed in time for the submission.

7.   We provide several tools to help you develop and maintain an assurance process that will promote continued improvement of costing in your organisation. Figure CP6.1 below shows examples of these.

# Approach

Documenting costing processes

8.   You should use our tools to document your organisation's costing processes.[39] In particular:

*   The **ICAL** helps document compliance with the standards. You can use it to record where you have made local adjustments and the reasons for them. It will also ensure the organisation retains costing knowledge and expertise when costing practitioners change.

*   The **SGAT** summarises the costing process standards (CPs) and the costing methods (CMs) to help your organisation plan and prioritise implementation of the standards.

*   The **IGAT** helps assess the gaps between the information collected and what the information requirements standards (IRs) require. This will help discussions between information teams and costing practitioners on assessing and closing the gaps identified.

*   The **CAT** helps providers understand and record their progress in implementing the standards. It will help you focus your attention on areas to develop and improve based on their materiality.

*   **Spreadsheet: Transition path** describes a three-year plan for implementing the standards.

*   At the end of this standard is an example **checklist** to help you develop an assurance process.

---

[39] See Tools and templates to help implement the standards, https://improvement.nhs.uk/resources/approved-costing-guidance-2019

Ambulance costing processes

- The **Model Ambulance**[40] has useful information for reviewing the cost data.

Figure CP6.1: Assurance tools
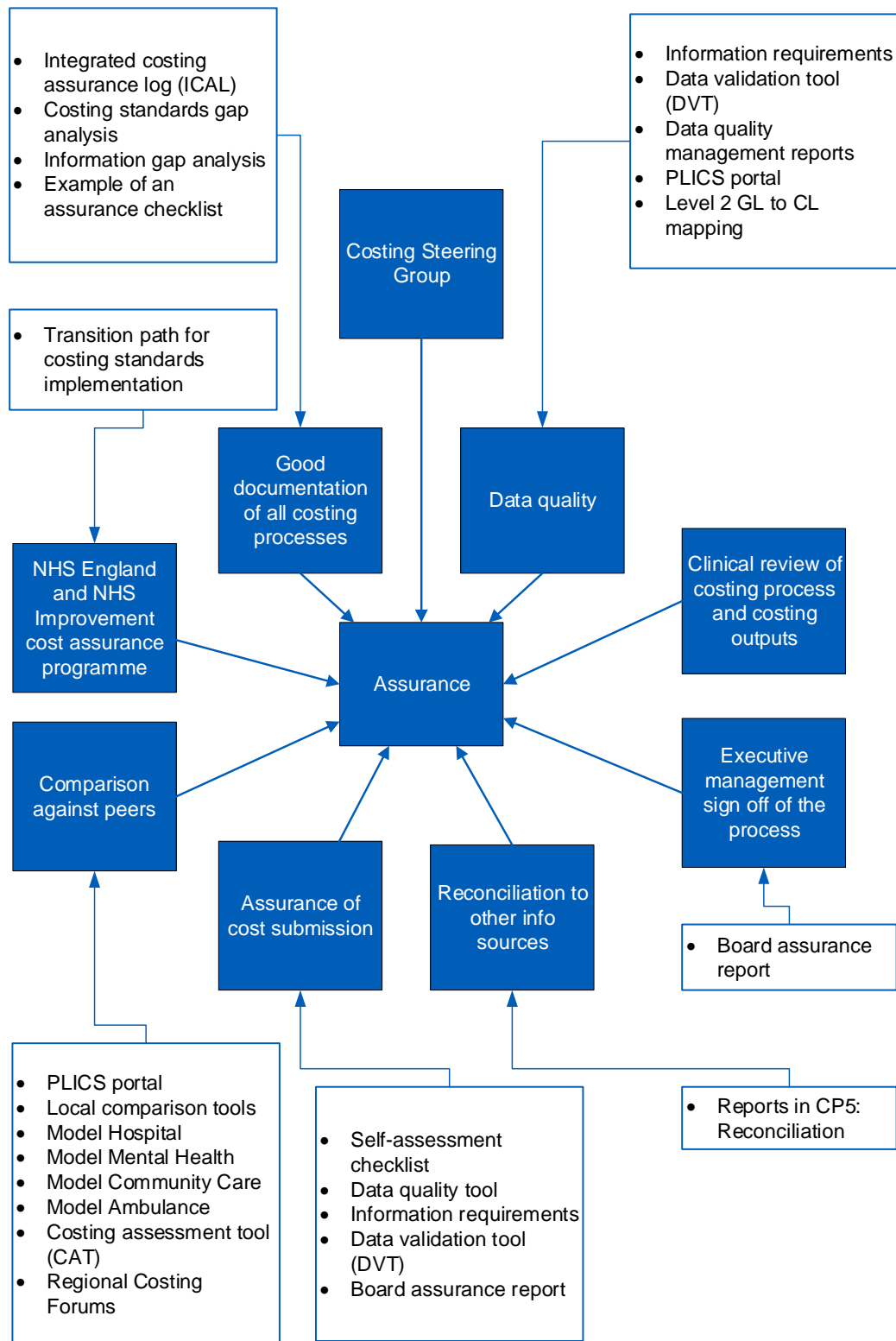
Ambulance costing processes

9. Documenting all costing processes effectively brings benefits that include:

    - being able to show the assumptions and source data to end users, which will improve the outputs' credibility and increase confidence in their usefulness

    - a clear audit trail – an integral part of good documentation – will facilitate reconciliation and assurance, as well as provide evidence for the management of the overall process; it will also provide a template for improving future calculation of costs

    - understandable assumptions that can more easily be challenged, leading to improvements in the costing process.

Assurance on the quality of costing processes and outputs

10. Costing is a material and significant system in provider organisations as it supports national and local pricing processes and generates the underlying data for business and investment decisions. Therefore, we expect providers to ensure costing is included in internal and external audits. This will provide assurance on the accuracy of cost data for its internal and external users.

11. National reviews of the data quality within submissions will be scheduled periodically – this is known as the costing assurance programme.

12. It is important to remember that understanding the costs of delivering services is fundamental to providers managing their financial position and to their business planning. This is why it is recognised that unless cost information is linked to the organisation's ongoing management, it will not accurately reflect the services being delivered.

13. The more services use cost information, the more they will understand the cost data and how it has been calculated. This in turn will build their confidence in the cost information produced for their service. This is why it is vital to offer an opportunity for services to review and give feedback on their cost data.

14. Cost information should be owned by senior managers and clinicians. Staff from across the organisation must engage with the finance department if it is to provide meaningful support.

Ambulance costing processes

Costing steering group

15. An example of best practice in engaging stakeholders is to form a 'costing steering group' with executive and clinical membership. Ideally the chair would be a clinician.

16. Such a group's overall purpose is to improve the quality of cost information and oversee, provide ideas for, encourage and evaluate the use and understanding of costing information in the organisation.

17. It can achieve this by:
    * reviewing cost information and the cost submission
    * reviewing the quality and coverage of underlying data
    * reviewing existing costing processes
    * agreeing priorities for reviewing and developing the system.

18. To help with this, the group should be supported by members from:
    * IT
    * informatics
    * clinical coding
    * finance
    * service managers
    * other care providers including senior nursing
    * education and training lead
    * a clinical champion (any discipline).

19. This type of review should be part of a rolling programme rather than one-off as part of a national mandated collection.

Regular assurance processes

20. You should have a rolling programme of reviewing the costing processes and outputs to provide assurance that costing information is sufficiently accurate for its intended use. The effort applied to this type of validation should be proportionate to the significance of the costs being measured, and to the costing purpose in line with the principle of materiality.

<u>Ambulance costing processes</u>

21. It is important for you to work with clinicians, other healthcare providers and service managers so you can:

    - understand all the resources and activities involved in delivering patient care
    - understand the information sources available to support costing
    - identify the expected costs associated with that care
    - ensure these are reflected in the costing processes within your costing system.

22. Effective board engagement with costing is a requirement for improving and making better use of patient-level cost information. Boards have an important role in securing greater engagement between clinical and costing staff.

23. Effective executive support will also lead to more and better governance, including documenting and defining policies and procedures.

24. The director of finance signs off the cost submission as part of the self-assessment checklist. This is on the provider's behalf and confirms the trust has completed all required actions to ensure the submission's accuracy.

Assurance on the reconciliation to other information sources

25. Reconciliation to financial and activity sources is an important part of providing assurance on the costing output's quality. It is important to provide assurance that a single source of data is used for all decision-making. Follow the guidance in Ambulance standard CP5: Reconciliation, to ensure you are reconciling to the appropriate information sources in Spreadsheet CP5.1.

Assurance on the quality of the cost submission[41]

26. We provide tools to help you with the quality of your cost submission. These include:

    - **The self-assessment checklist** (Table CP6.1) ensures providers are reviewing their data quality. It includes executive review and sign-off and the minimum expected quality checks.
    - **The PLICS data quality tool** (Tableau) is accessed via NHS Improvement's [single sign-in website](). It reviews the submitted cost data, quickly identifying

---

[41] Information on these tools and where to find them is given in the cost collections guidance, https://improvement.nhs.uk/resources/approved-costing-guidance-2019

Ambulance costing processes

quality issues, and informs providers if resubmission is required. Providers will receive a quality/index report to help inform their costing and data investigation. It also enables providers to review their costs with peers.

- **The data validation tool** comprises mandatory validations that indicate whether the submission will fail based on the field, and values formatting requirements for uploading the data. The tool also includes checks where analysing the data reveals warnings about expected outputs. These warnings are non-mandatory and should lead your investigation, validation and assurance of the cost data uploaded.

Comparison with peers

27. The national PLICS portal is accessed via NHS Improvement's single sign-in website. The PLICS portal enables providers to review their submitted data and anonymously compare their outputs to their peers. In this way a provider can identify its outlying areas and focus on reviewing the activity and costing for these. The PLICS portal provides reports on where providers can improve the costing and assurance of their data. It also identifies potential productivity opportunities and other metrics such as the weighted average unit.

28. The data validation tool provides a summary of data quality warnings that give assurance that all providers' submitted data is comparable and subject to the same validations as their peers' data. The work that follows the warnings generated by the data validation tool will give additional assurance that providers have investigated and corrected their data to best fit the expected costs of the submission and those of their peers.

29. The CAT tool provides a dashboard that allows you to compare CAT scores for your organisation against those of your peer providers.

30. You should have a rolling programme of local exercises to regularly compare your organisation's costs with those of your peers.

Ambulance costing processes

Costing assurance programme[42]

31. The aim of the assurance process is to provide evidence of the work undertaken and the reasoning behind the decisions made. As such, the audit trail, evidence of meetings, discussions with clinicians, etc should be maintained but not be an end in themselves.

32. Providing evidence for an external assurance audit should not be the main purpose of collecting this information.

33. The evidence provided should also be in harmony with the costing principles.[43]

Example: An assurance checklist

As part of the ongoing assurance process you should use a checklist. Table CP6.1 below is an example of a costing assurance checklist.

This example is for the standards published in January 2020 for 2020/21 data to be collected in the summer of 2021.

It shows an 18-month assurance cycle, so the next year's assurance cycle would start before the current year's cycle is completed. This means two years' assurance cycles would run concurrently for approximately four months.

Table CP6.1: Example of a costing assurance checklist

Month	Process stage	Checklist	Completed
1 (March 2020)	Implementation of the standards	Standards and associated guidance read by costing team	
1	Implementation of the standards	Relevant standards shared and discussed with relevant departments, eg: • Ambulance standards IR1: Collecting information for costing, and IR2: Managing information for costing – with informatics	

---

[42] See *The Approved Costing Guidance 2020 – what you need to know and what you need to do* for details of the costing assurance programme, https://improvement.nhs.uk/resources/approved-costing-guidance/
[43] See *The costing principles,* https://improvement.nhs.uk/resources/approved-costing-guidance/

Ambulance costing processes

Month	Process stage	Checklist	Completed
		• Ambulance standard CP1: Role of the general ledger in costing –with finance colleagues • Ambulance standard CP5: Reconciliation – with your software supplier to ensure system can produce their reports • Costing methods standards – reviewed with relevant departments	
2 (April 2020)	Implementation of the standards	Complete the information gap analysis template	
2	Implementation of the standards	Complete the standards gap analysis template	
2	Implementation of the standards	Set up costing assurance log	
3 (May 2020)	Implementation of the standards	Identify areas to work on to improve the quality of costing for this cycle (implementation of standards through to collection)	
3	Implementation of the standards	Sense check identified areas against the costing principles	
3	Implementation of the standards	Meet clinicians and other healthcare providers and service managers to acquire the understanding and information needed to inform the costing process	
3	Implementation of the standards	Inform and agree with executive managers the costing development approach you are taking for this cycle, eg: • following the transition path in the technical guidance • focusing on areas of local importance	
3 to 6 (May to Aug 2020)	Implementation of the standards	Implement developments in the costing system	
6 (Aug 2020)	Implementation of the standards	Document processes, assumptions made, etc	

Ambulance costing processes

Month	Process stage	Checklist	Completed
6	Implementation of the standards	Revisit and refine assumptions with clinicians and other care providers and service managers to ensure understanding is correct and will provide meaningful results	
6	Implementation of the standards	Sense check refinements against the costing principles	
6 to 9 (Aug to Nov 2020)	Implementation of the standards	Implement developments in the costing system	
9 (Nov 2020)	Implementation of the standards	Sense check first results from implementation developments with clinicians and other healthcare providers and service managers	
9	Implementation of the standards	Update executive management on first results	
10 to 14 (Dec 2020 to March 2021)	Implementation of the standards	Update costing system on refinements from sense check	
15 (April 2021)	Preparing for the collection	Prepare for collection – review collection guidance again	
16 (May 2021)	Preparing for the collection	Prepare submission using: • self-assessment checklist • data validation tool	
16	Preparing for the collection	Run the reconciliation reports in Ambulance standard CP5: Reconciliation, to ensure financial and activity values reconcile	
16	Preparing for the collection	Sense check costing outputs and reconciliation reports in line with the costing principles	
17 (June 2021)	Preparing for the collection	Obtain executive management sign-off of the submission	
17	Preparing for the collection	Complete the CAT	
18 (July 2021)	Post-submission	Review: • the PLICS portal and share with stakeholders • data quality report	

Ambulance costing processes

Month	Process stage	Checklist	Completed
18	Post-submission	Update the costing assurance log	
Post month 18	Post-submission	Do peer comparison to identify outliers and to feed into the next cycle of costing development	

Contact us:

costing@improvement.nhs.uk

NHS England and NHS Improvement

Wellington House

133-155 Waterloo Road

London

SE1 8UG

This publication can be made available in a number of other formats on request.