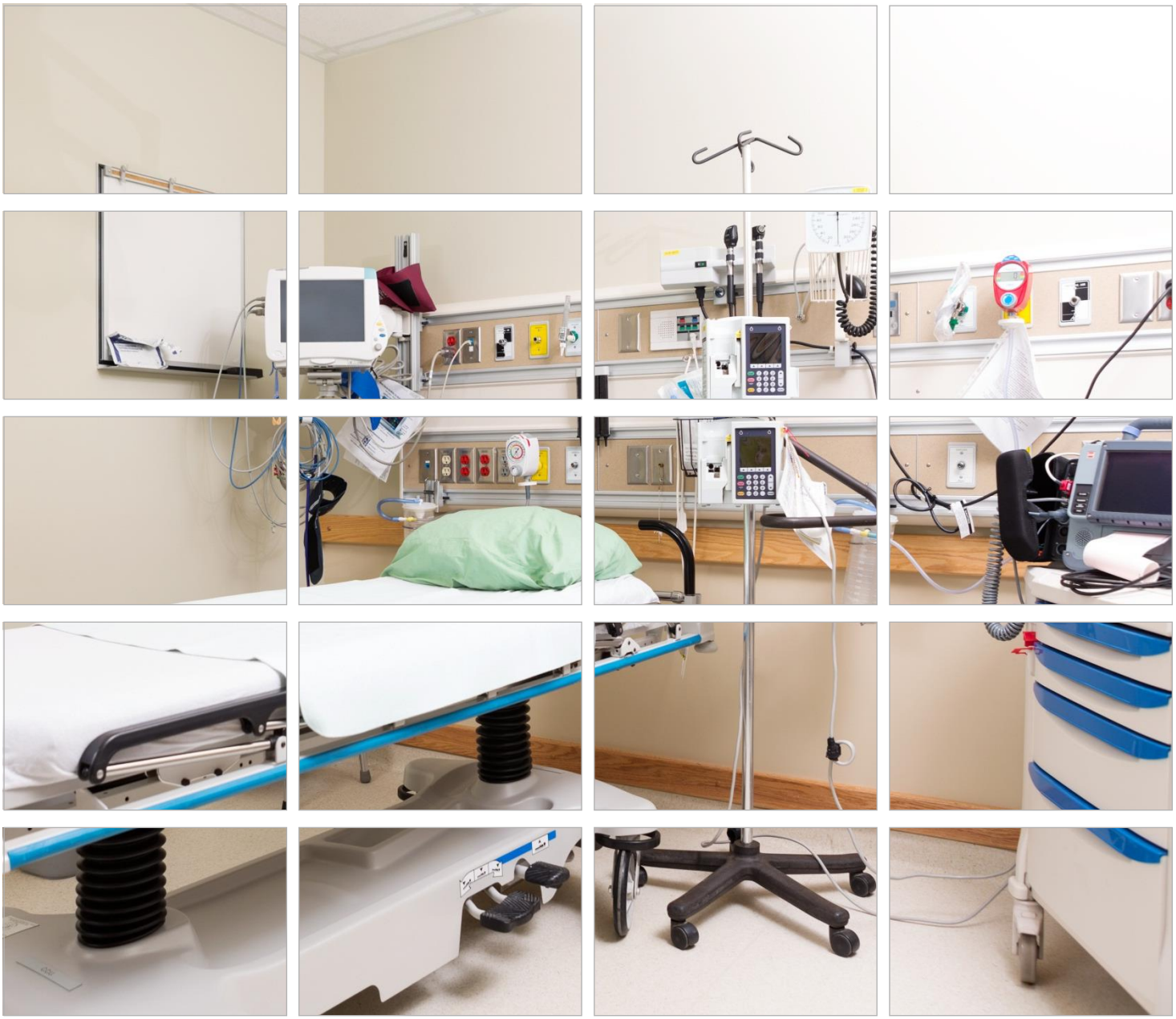

Care Pathways: Guidance on Appraising Sustainability

Emergency Department Visit Module

October 2015

NHS England

Public Health England

Sustainable Development Unit
Working across the NHS, Public Health and Social Care system

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Emergency Department Visit Module

October 2015

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Date: 12 October 2015

1 EMERGENCY DEPARTMENT VISIT

This module provides guidance on how to calculate the performance of a representative patient visit to an emergency department (ED) against the sustainability metrics. It can be used:

- to direct the appraisal of a specific ED visit, through the collection of primary activity data, for a care pathway; or
- as a source of secondary data for an ED visit to inform a screening assessment of a care pathway; or
- as a source of secondary data for an appraisal of a care pathway where an ED visit is known not to be material to the overall care pathway.

1.1 DESCRIPTION

An ED visit is a patient attending an emergency department consultation for a condition or injury deemed as an emergency. The patient is subsequently stabilised, provided with advice, guidance, treatment, referred to other services or discharged.

An ED may also be referred to as Accident and Emergency (A&E). An ED may refer to a consultant-led 24 hour service, single speciality service, doctor- or nurse-led service for minor conditions or a walk-in centre.

In the NHS, five codes for a patient based upon triage in an ED [1] are defined as follows.

- Triage code 1, immediate resuscitation: patients in need of immediate treatment for the preservation of life.
- Triage code 2, very urgent: seriously ill or injured patients whose lives are not in immediate danger.
- Triage code 3, urgent: patients with serious problems, but in an apparently stable condition.
- Triage code 4, standard: standard A&E cases without immediate danger or distress.
- Triage code 5, non-urgent: patients whose conditions are not true accidents or emergencies.

Based upon these definitions of triage categories, three paths through an emergency department are considered.

(1) NHS A&E Initial Assessment Triage Category, http://www.datadictionary.nhs.uk/data_dictionary/attributes/a/a_and_e_initial_assessment_triage_category_de.asp?shownav=1

Patient Needing No Treatment (Scenario 1)

A patient may attend an ED for a condition that they believe is an emergency, but after triage it is determined that no treatment is needed and they are discharged. This scenario is categorised as triage code 5. In practice, discharge without seeing a doctor may not occur or occur seldom, in which case this scenario could be excluded.

Patient with Minor Condition/Injury/Illness (Scenario 2)

A patient may attend an ED with a minor condition that requires advice, guidance or treatment. Typically, a patient will be required to wait for minor condition treatment. Examples of minor conditions include:

- laceration;
- sprain/ligament injury; and
- soft tissue inflammation.

This scenario is categorised as triage code 4.

Patient with Major Condition/Injury/Illness (Scenario 3)

A patient may attend an ED with a major condition (eg their symptoms indicate a life-threatening emergency). Typically, there will be a minimal to zero wait time before stabilisation and/or treatment of the patient. Examples of life-threatening symptoms include:

- loss of consciousness;
- acute confused state and fits that are not stopping;
- persistent, severe chest pain;
- breathing difficulties; or
- severe bleeding that cannot be stopped.

This scenario is categorised as triage code 1, 2 and 3.

1.2 BOUNDARY SETTING

Boundary setting is an important step to ensure consistency with respect to what should and should not be included in the appraisal of a module.

When appraising an ED visit, the first step is to map out all of the activities a patient undertakes when using the module. Following this, the services required to provide these activities shall be determined and finally the resources (eg consumables, energy, etc) identified that are required to provide these services.

To ensure consistency in appraisals, recommended activities, services and resources for an ED visit are presented below.

1.2.1 *Activities Undertaken to Provide an ED Visit*

A patient may go through the following steps to complete an ED visit.
(Note: yellow text refers to activities, orange text refers to separate modules to be included in a care pathway and grey text refers to activities outside the care pathway scope)

- Decision to visit ED: the patient or another actor determines the patient should attend an emergency department.
- Travel: the patient travels to the ED via self or provided travel (included under the patient travel module).
- Registration: the patient is registered at the ED.
- Triage: the patient undergoes initial triage to determine the severity of their condition, to determine the appropriate treatment path and to inform the patient of their wait time.
- Waiting: if a minor condition is determined in triage, the patient may be required to wait for treatment.
- Treatment: patients with minor or major conditions will be treated, which may include advice, guidance, condition treatment or stabilisation.
- Admitted/Referral: the patients may be referred to other services outside the scope of this module, but included in the care pathway. They may also be admitted as an inpatient.
- Travel: if not referred, the patient will travel from the ED after completing triage or treatment (included under patient travel module).

Treatment may include first investigation (eg x-ray) or other diagnostics. Any treatment (including diagnostics) delivered within the ED shall be included. However, if treatment or diagnostics are undertaken in a different department of the hospital or by another service, they shall be excluded from this module and be included separately in the care pathway map.

There may be variations to these activities and regional differences shall be accounted for when mapping out a specific ED visit module.

1.2.2 *Services & Facilities Required to Provide the ED Visit Activities*

To provide these activities, the following services and facilities are required.

- Registration area and staff to check-in the patient.
- Triage area for the patient's condition initially to be assessed.
- Waiting room in the ED.
- Consultation areas (minor and major) for the patient to be treated.
- Administrative services and areas to run the ED within a hospital or other facility.

Any services and facilities associated with a hospital but not required by the ED visit shall be excluded from this module (eg occupational health clinics). Capital goods (eg buildings, car parks) can be excluded from the module unless they are known to be material (1) to the sustainability metrics appraised.

(1) Refer to section 2.6.3 Materiality and Data Screening in the Care Pathways: Guidance on Appraising Sustainability: Main Document

A portion of the hospital shared building and administrative services (eg managing of records, building cleaning) shall be allocated to the ED service provided in the hospital, as described in the Allocation section of this module.

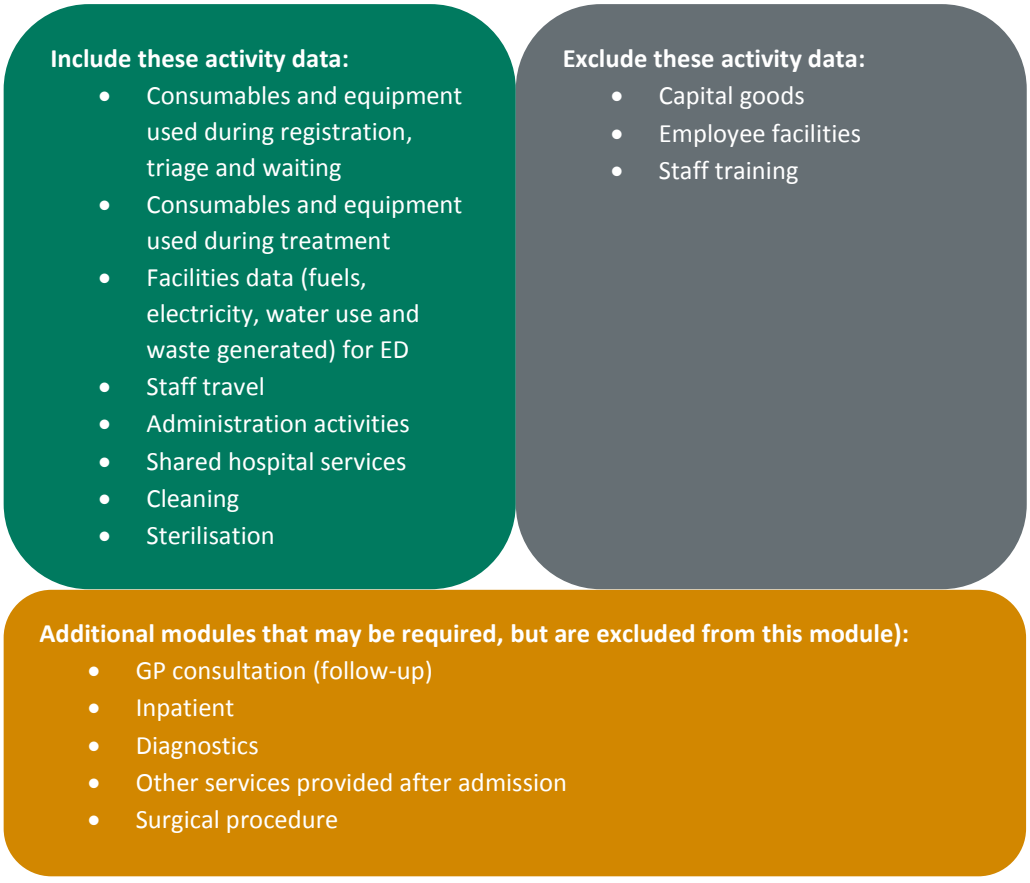
1.2.3 Resources Required to Provide the ED Visit Services

Based on the list of activities, services and facilities identified above, the following categories of activity data shall be included:

(Note: green text refers to data that shall be included in an appraisal of the module)

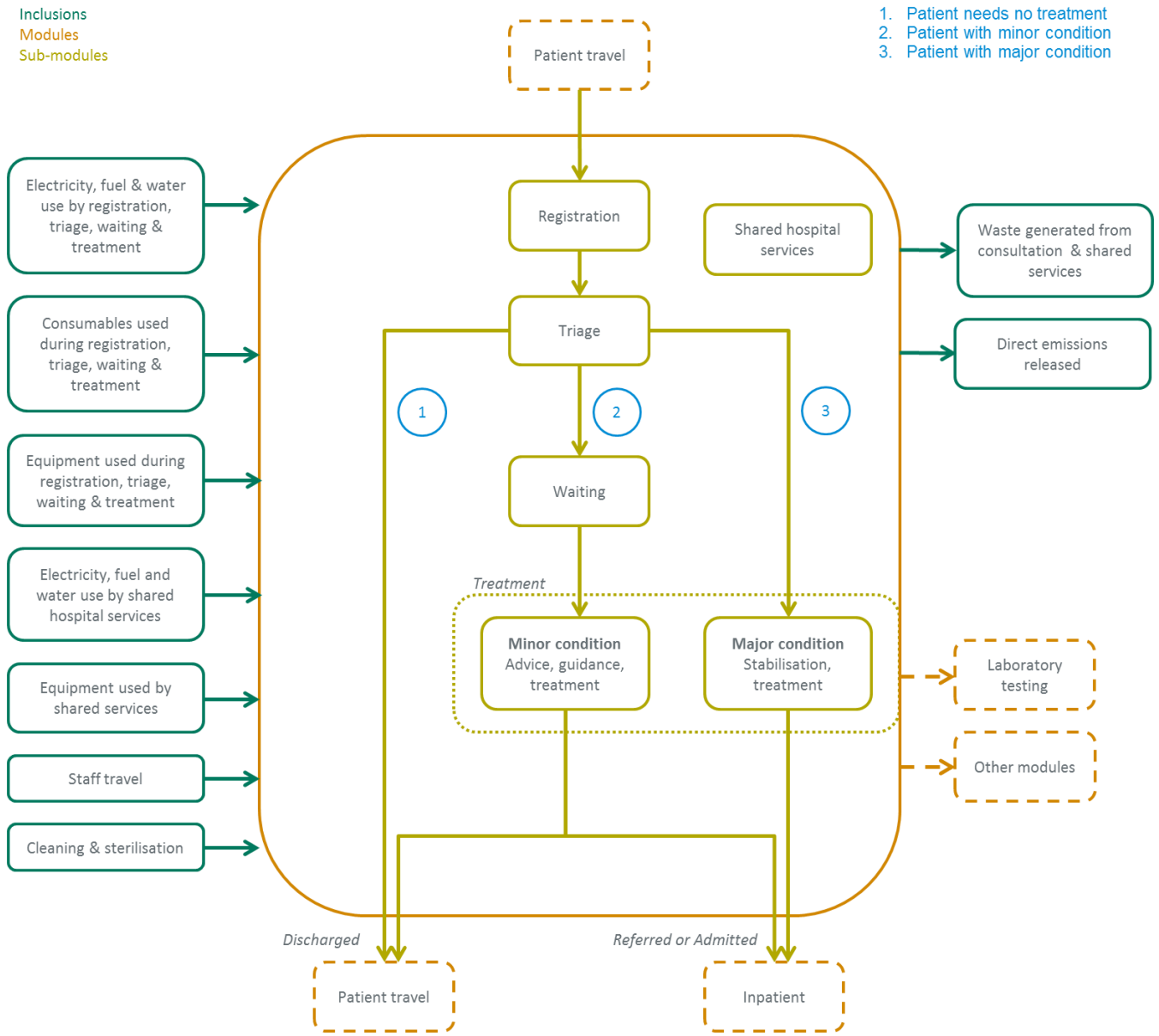
- Facilities, eg energy, water and waste associated with buildings.
- Consumables, eg pharmaceuticals, single use medical devices.
- Medical gases, eg nitrous oxide.
- Equipment, eg reusable medical equipment, hospital beds, furniture.
- Travel, eg staff travel.

A summary of resources and activities that shall be included in this module is provided below. These may be excluded if they can be shown not to be material (1) to the results. Exclusions should be undertaken by applying the materiality rules in the main document, ie no more than 10% of the total impact may be excluded. A list of additional care pathway modules that may be required to connect to this module in order to develop the overall care pathway map is also given. These additional modules are included as examples in order to highlight where this module might fit in to the overall care pathway.



(1) Refer to section 2.6.3 Materiality and Data Screening in the Care Pathways: Guidance on Appraising Sustainability: Main Document

Figure 1.1 Emergency Department Visit Example Process Map



1.3 UNIT OF ANALYSIS

A unit of analysis is identified as a common 'reference flow' or 'basis for comparison' to allow for the module to be included in a care pathway appraisal or to be used to compare different scenarios of the same module (eg ED visits in different regions or the significance of changes made to an existing ED visit).

A patient in a defined age group, with a specific condition or suspected condition, attending a defined type of ED in a geographical area.

- eg an adult patient with a suspected broken arm attending an ED in a hospital in the UK.

Additionally, the triage category could also be included to differentiate units of analysis, if required by the specific appraisal.

1.4 ACTIVITY DATA

Activity data are the quantified measures of activity relevant to the module being appraised.

ED visit module activity data include the following:

- Reference data, such as floor area and throughput of the ED split by services and types of patient.
- Facilities data (eg energy, water and waste) of the ED split by services and patient type where possible.
- Consumables, medical gases and equipment used in each of the sub-modules defined for an ED visit attributed to patient type and condition where possible.
- Consumable and equipment used in shared services of ED administration and the hospital.
- Travel of staff required to provide the ED service and all shared hospital services.

Primary activity data shall be collected to appraise the module if they are found to be material to the care pathway.

To determine if primary activity data are required, the data in *Section 1.7* can be used to inform a screening assessment of a care pathway. If the activity is found not to be material in the screening study, primary data, although preferable, are not required and the case study data can be used to represent the ED visit within the care pathway.

1.4.1 Primary Data

Where required, primary activity data specific to the ED visit being appraised shall be included. These data are likely to be sourced from a representative sample of EDs involved in the appraisal.

If an ED visit for a specific condition is being appraised, data including the following shall be collected to represent a patient attending an ED with that condition.

- Consumables for ED treatment: the type and quantity of all consumables required to provide treatment in an ED for different triage categories, including advice, guidance, stabilisation and treatment. These data should be for the specific condition that is being appraised.
- Equipment for ED treatment: the type, quantity, lifetime and number of uses of equipment required to provide treatment in an ED for different triage categories, including advice, guidance, stabilisation and treatment. These data should be for the specific condition that is being appraised.
- Consumables and equipment used in registration, triage and waiting: the type, quantity, lifetime and number of uses of equipment and type and quantity of consumables required to provide registration, triage and to allow the patient to wait for treatment within the ED.
- Facilities for the ED: quantity of electricity, fuels, water and types of waste generated from the ED visit for the specific condition. If possible, these data should be based upon the equipment required to provide the service, or alternatively allocated on the basis of floor area and sub-metering. Data should be split according to registration, triage, waiting, treatment and other activities.
- Consumables and equipment for administrative services: the type, quantity, lifetime and number of uses of equipment and type and quantity of consumables relevant to the administrative services required to operate the ED and the hospital services allocated to the ED.
- Administrative services facilities: quantity of electricity, fuels, water and types of waste generated relevant to the administrative services required to operate the ED and the hospital services allocated to the ED.
- Staff travel: staff surveys to calculate the modes and distances travelled by staff attributable to operating the ED and hospital services.

These data are the minimum required to conduct an ED visit appraisal. Additional activities, services and resources may be identified when mapping the specific ED visit and these shall be included, noting that they are in addition to the minimum requirements in this guidance.

In some instances, it may not be possible practicably to attribute consumables, equipment or facilities data directly to the ED visit. In these instances, they shall be allocated to the visit using the collected reference data (eg floor area and patient throughput). Allocation is described further in *Section 1.6*.

If the 'bottom up' data described above are not available, then financial data and cost allocation may be used as a proxy in order to quantify consumables, equipment, facilities and travel data associated with an ED visit.

1.4.2 Secondary Data

For activities identified in the process map that are outside the direct control of the organisation, suitable secondary data sources can be used. Secondary data are particularly useful where activities or modules are not deemed material to the study through a screening exercise or materiality assessment. Primary data collection is still preferred and should be used if it is possible reasonably to collect it.

General secondary data sources can be found in *Annex C* of the Main Document and on the GHG protocol website [(1)].

1.5 EMISSION FACTORS

Once primary activity data or secondary activity data have been collected, they shall be combined with the appropriate emission factors to calculate the performance of the module against the sustainability metrics.

A default list of emission factors is available in *Annex C* of the Main Document and should be used where specific emission factors are not available. An example of a specific emission factor is GHG emissions associated with manufacture of a specific type of surgical mask.

If 'bottom up' activity data could not be collected (eg quantities of types of consumables) then financial data may be used and combined with environmental extended input output (EEIO) databases to calculate performance against the sustainability metrics. Use of EEIO is considered to convey greater uncertainty and so using emission factors and primary activity data is preferable.

1.6 MODULE CALCULATION STEPS

Steps to appraise the module include:

1. Map the activities and services associated with the module.
2. Complete a materiality assessment using the module case study to understand significance of activity data and the module to the pathway (if relevant).
3. If significant, identify sources to collect the required activity data. If not significant, use appropriate secondary or case study data and amend to the specific scenario.
4. Collect the required activity data relevant to the module scenario.
5. Identify how activity data can be allocated to the unit of analysis (see Allocation section below).
6. Identify secondary data sources either in *Annex C* of the Main Document or specific to the activity data collected.
7. Perform allocation where necessary and combine the activity data and emission factors.

(1) GHG Protocol Third Party Databases: http://www.ghgprotocol.org/Third-Party-Databases

8. Interpret the findings and follow the guidelines in *Section 3* of the main document for reporting.

1.6.1 Allocation

In the first instance, one should seek to avoid allocation. However, this is often impracticable. Activity data collected for the module may need to be allocated to the particular module and to the unit of analysis. The following describes how this shall be accomplished and is in order of priority.

- Consumables and equipment used during treatment in the ED.
    i. Collect activity data specific to the unit of analysis in the first instance.
    ii. Identify consumables and equipment used during ED treatment specific to the condition and divide by number of patients undergoing treatment for the specific condition.
    iii. If not possible collect activity data on consumables and equipment used in ED treatment and divide by the throughput of all patients attending the ED for the defined time period.

- Consumables and equipment used during registration, triage and waiting in the ED.
    i. Collect activity data specific to the unit of analysis in the first instance.
    ii. Where possible, identify consumables and equipment used throughout registration, triage and waiting in the ED separately that are directly attributable to the visit.
    iii. Identify all consumables and equipment used by services required to provide an ED visit and allocate across all patient throughput of the ED in the defined time period.

- Facilities data for the emergency department.
    i. Where possible, identify the facilities data (eg electricity) directly attributable to the ED visit for a patient with a specific condition (eg by considering equipment use).
    ii. Identify facilities data by activity (eg registration, triage, waiting and treatment) for the ED visit and use a technical expert (or use cost allocation processes) to estimate the percentage to be allocated to the ED. Divide the resulting data by the throughput of patients attending the ED.
    iii. Identify facilities data for the ED. Identify the floor space of the ED rooms in the hospital and allocated based on this, and then divide by the number of patients attending the ED.

- Consumables and equipment used for shared hospital services and ED administrative services.
    i. Where possible, identify consumables and equipment used throughout the shared services that are directly attributable to an ED visit.
    ii. Identify all consumables and equipment used by services required to provide an ED visit and allocate across all patient throughput of the hospital in the defined time period.

- Facilities data for shared hospital services and ED administrative services.
    i. Where possible, attribute shared facilities data directly to the ED visit.
    ii. Identify total facilities data for the hospital and allocate to total patient throughput of the hospital.

1.7 EXAMPLE CALCULATIONS

An example of calculating GHG emissions, fresh water use and waste generated for the module is shown below.

The materiality of data should be considered when collecting and appraising data for the module. Materiality refers to the estimated significance of data to the module being appraised. It is recommended that no more than 10% of data contributing any impact appraised be excluded (eg 10% contribution to GHG emissions of the module). Further guidance on estimating significance can be found in the main document and annexes [(1)]. Users may apply a different cut-off percentage (other than 10%) if justified and this shall be reported along with the results of the appraisal.

For a GHG appraisal, additional effort should be taken when appraising the following categories as these are anticipated to be the most significant contributors:

- Energy used in the ED; and
- Medical gases.

Other hotspots may be identified when conducting an appraisal and all resources and emissions within the boundaries of the module should be considered for significance before excluding any data point.

(1) Refer to section 2.6.3 Materiality and Data Screening in the Care Pathways: Guidance on Appraising Sustainability: Main Document

Module Emergency Department

Unit of analysis An average patient attending an ED consultation for a condition or injury deemed as an emergency. The patient is subsequently stabilised, provided with advice, guidance, treatment, referred to other services or discharged.

Included activities

- ✓ Consumables and equipment used during triage and treatment
- ✓ Facilities data (fuels, electricity, water use and waste generated) for the ED
- ✓ Staff travel
- ✓ Shared hospital services
- ✓ Cleaning (assumed captured in data)
- ✓ Sterilisation (assumed captured in data)

Excluded activities

- × Pharmaceuticals administered during patient treatment (due to lack of data)
- × Capital goods (eg buildings, car parks)
- × Staff training
- × Health authorities, financial services

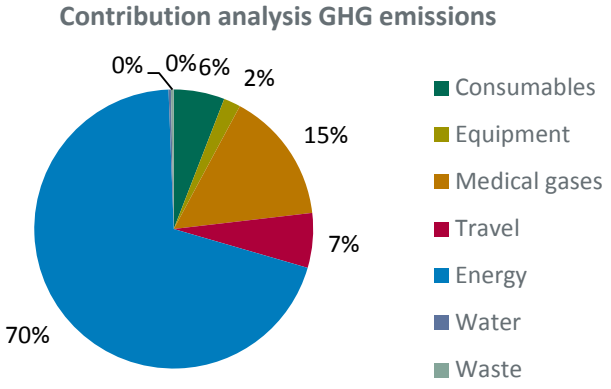
Assumptions Sub metered electricity data was made available by a representative ED. Electricity for shared services and facilities (kitchens, hospital administration etc) was allocated based on staff numbers. Hospital fuel usage was allocated to the module based on staff numbers. Staff travel was estimated using National Travel survey data for commuting.

Data sources

- Dr Frank Swinton, Airedale General Hospital NHS Foundation Trust (AGH), 2014
- Average distance travelled by purpose and main mode: England, 2013, National Travel Survey, Department for Transport statistics
- Estates Return Information Collection (ERIC) database maintained by the Health and Social Care Information Centre http://www.hscic.gov.uk/

Emergency department results (per visit)

per visit	GHG Emissions (kg CO_2e)	Fresh water use - direct (m^3)	Fresh water use - indirect (m^3)	Fresh water use - total (m^3)	Hazardous waste (kg)	Non-hazardous waste (kg)	Total waste (kg)
Consumables	0.84	x	4	4	x	x	x
Equipment	0.28	x	1.5	1.5	x	x	x
Medical gases	2.1	x	0.15	0.15	x	x	x
Travel	0.87	x	1.8	1.8	x	x	x
Energy	9.6	x	13	13	x	x	x
Water	0.038	0.11	0.36	0.47	x	x	x
Waste	0.044	x	0.016	0.016	0.13	0.16	0.29
Total	13.8	0.11	20.8	20.9	0.13	0.16	0.29



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