**General Practice Extraction Service**

**PD009 GPES Interoperability Standard**

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**Document References**

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| 2 | Message Exchange for Social Care and Health (MESH) | <https://digital.nhs.uk/services/message-exchange-for-social-care-and-health-mesh> | Latest |
| 3 | MESH client File Interface  Specification | https://digital.nhs.uk/binaries/content/assets/legacy/pdf/m/j/mesh\_client\_file\_interface\_specification\_v.1.2.pdf | 1.2 or above |
| 4 | GPES Business Process Catalogue | R2.50 Business Process Catalogue v1.07.doc | 1.07 |
| 5 | SD-013 GPET-Q Interface Code Register | Embedded in this document | 1.2 |
| 6 | Business Rules Supporting Information | Embedded in Appendix C | 1.3 |
| 7 | SNOMED CT  Expression Constraint Language  Specification and Guide | <https://confluence.ihtsdotools.org/display/DOCECL/Expression+Constraint+Language+-+Specification+and+Guide> | Current |

**Forecast Changes**

Where a forecast change results in a change to this document, it appears as ~~strikethrough~~ in the table below and an explanation of the change (and version number of the document in which the change is incorporated, if relevant) provided.

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# Background and Purpose

1. The purpose of this document is to define the GP Extraction Service GPES-I Interoperability Standard, henceforth referred to as the Standard. The Standard defines how GPDC and GPET-E systems communicate with each-other, in sufficient detail to:
   * Allow the relevant suppliers to understand the cost and complexity of developing an interface between GPDC and GPET-E Systems.
   * Provide a full understanding to relevant stakeholders of the capability of GPES to extract data from GP Clinical Systems.
   * Understand the required GPES Primary Care Data Model and approach to defining and executing extractions (section 2).
   * Define the technical design of the communications interfaces between GPDC and GPET-E Systems to sufficient detail to allow suppliers to write and maintain appropriate software (section 3).
2. This version of the Standard replaces version 5.0 revision 5.3. This is to support the changes introduced through the replacement of the GPET-Q component by the GP Data Collector (GPDC). This version of the Standard also incorporates the changes required to the GPET-E functionality to support the detail and requirements contained within Schedule 15 of the GPSOC Framework Agreement.

## Key Components of GPES-I

1. GPES-I consists of 2 key components:
   * A framework for defining and executing an Extraction Definition for standardised data extraction and reporting.
   * A set of system-to-system messages that facilitate data exchange between GPDC and the many GPET-E Systems.
2. The Extraction Definition component is defined in section 2 of this document. This defines the information that can be extracted from GP Systems as well as the processes required to execute extractions.
3. The messaging component is defined in section 3 of this document. This defines the message types, format and content along with the interaction mechanisms. It utilises the NHS’s national technical infrastructure which allows information to be exchanged between GP systems and national systems. This infrastructure is used for GPES to exchange query requests and responses between GPDC and GPET-E Services. The use of the national infrastructure does not imply that data from GP Clinical Systems or GPET-E Services can be shared freely with other national applications. It cannot. Rather, data from GP systems that is collected by GPET-E Services can only be sent to GPDC. The rules for sharing of data collected by GPDC are set per individual Extraction Requirement and approved by the GPES Independent Advisory Group. For the purposes of GPES-I the implications of the use of the national infrastructure are described in Section 3.
4. In addition to the above, a glossary is included in Appendix C – Glossary which contains defined terms used in this document and also GPES documents referred to in this Standard. There is also a section that contains XML schemas and example files plus supplementary documentation to assist implementation of the Standard.

## Document Scope

1. This version of GPES-I *does not* include any potential elements of future versions, or provide details of a developmental roadmap for GPES‑I.
2. This document makes reference to existing national standards and documentation. It is possible that there could be a conflict between these standards. In that case, GPES-I takes precedence over other standards.
   * For data definitions in section 2, GPES-I takes precedence over e-GIF.

## Out of Scope

1. Capacity and other performance related non-functional requirements. These are or will be defined in the design and implementation documents for GPDC and GPET-E systems where relevant.
2. GPES needs to interact with other components of national infrastructure and standards, and GPES-I has to be aligned with these. This document does not contain any specifications for such items. Rather, it provides links to separate documents that contain such specifications.
3. This document does not attempt to provide a full and robust picture of the security and governance approaches adopted by GPES – that is defined in separate GPES documents.

## Note to Readers

1. This document assumes a basic knowledge of the background and purpose of the General Practice Extraction Service. Please refer to the GPES overview documents to obtain a basic knowledge of GPES.

## Historical Reference

1. The GPES-I has been through many revisions since Version 1.0 with some significant changes being introduced. This version no longer records the historical changes, but rather takes Version 5.0 of the Standard and uses it as the starting baseline in this Standard.

# Extraction Requirement Standard

1. This section defines the framework for describing data to be extracted from a GPET-E System and the process used to extract that data. It defines what data items are accessible to GPES and the formats in which each item can be returned from a GPET-E System.

## Extraction Requirement Overview

1. This section describes the generic principle of an Extraction Requirement. It contains sufficient detail to describe how one is to be used in the context of this document. A full product description for an Extraction Requirement is found in Ref [1].
2. An Extraction Requirement is an unambiguous English narrative description of data required to be extracted from a GPET-E System for transmission to GPDC.
3. GPES customer requirements are expressed in Extraction Requirement format such that each GPET-E Extraction Service provider can develop extraction routines to run on their GPET-E systems. The technology and methods used by GPET-E Extraction Service providers to develop such routines are not constrained by this document nor the Extraction Requirement itself, save the compliance to protocols described in this Standard for the supply and return of information between GPDC and GPET-E systems.
4. An Extraction Requirement contains the following components, and is expressed in the following way:
   * Overview of the Customer Request for Information and links to publications associated with it.
   * A structured English narrative which defines and describes; the data attributes used in the Extraction Requirement as specified within the GPES Primary Care Data Model (see paragraph 20 below), data concepts that are to be supported such as aggregated counts and/or patient level attributes, references to placeholders for all Query Set Variables (see paragraph 21 below), processing sequences and instructions for handling Patient Participation Indicators.
   * The planned scheduling information to enable the GPET-E Service Supplier to schedule the GPET-E Executable accordingly, such as; Frequency of Running Customer Query Specification Running Requirements and Query Prioritisation.
5. The format of each Extraction Requirement for each Customer follows that of the Extraction Requirement definition but is specific to the requirement of the Customer.
6. Data attributes within a GPET-E System that are available to an Extraction Requirement are constrained to a definition (the GPES Primary Care Data Model), described in section 2.4 (also see paragraph 29 below). This serves as a reference for each Extraction Requirement, defines the scope of support required by each GPET-E Extraction Service provider and is used to constrain the content of returned data. The Extraction Requirement will also specify the approach to be taken with regard to null values being returned.
7. An Extraction Requirement has placeholders (Query Set Variables) within its definition which are substituted by values provided by GPDC for each Scheduled Query Instance. These placeholders are used to:
   * Provide references to GPES Code String Variants, Patient Cohorts, dates and other values used in or as selection criterion within an Extraction Requirement – known as Selection Criteria type parameters
   * Provide references to system parameters used in the control protocol of the messaging interfaces which includes scheduling data – known as System type parameters
   * Provide references to practice cohort and patient participation information – known as Participation type parameters
8. Data to be substituted in the placeholders within an Extraction Requirement are provided by GPDC in a timely fashion by means of a Run Time Parameters message as described in section 2.2. Clinical code strings will no longer be included in the RTP message for new collections. Suppliers will be provided code strings in the ER Pack and will be required to configure them directly within their systems. Clinical code strings will be phased out of RTP messages for existing collections, including rollovers. The code strings will instead be provided in the ER Pack.
9. The required Regular Extraction Schedule of an Extraction Requirement is defined in the Extraction Requirement itself. The GPET-E System shall execute each Scheduled Query Instance as per this schedule. However, there is a requirement for Extraction Requirements to be executed in addition to this schedule. Where this is required, GPDC will provide a GPET-E system with a Run Time Parameters feed along with scheduling information and a GP practice or patient cohort for which the data is required. Where a GPET-E system has failed to execute a scheduled Query Instance, the GPET-E system must be capable of processing the original RTP retrospectively.

## Run Time Parameters

1. The Extraction Requirement as described in section 2.1 requires one or more placeholders to be substituted with values for each Scheduled Query Instance. This is achieved by provision of a Run Time Parameters message from GPDC to GPET-E for each required Query Instance.
2. Placeholders within an Extraction Requirement will be tagged with a Metadata ID which is unique to that Extraction Requirement (if Metadata ID has to be reused between Extraction Requirements, the Extraction Requirement will be specific about the need). This is known as Extraction Requirement Metadata and is controlled within a GPDC repository.
3. Each Metadata ID will have a corresponding description i.e. “a friendly name”.
4. The Run Time Parameters feed supplies values to be substituted in place of each placeholder by quoting its Metadata ID along with the value or string of values to be used. For a description of the format used to communicate values and strings of values see sections 3.7 and 7.

## Query Results Return Mechanism

1. There are two data formats that can be returned to GPDC from the execution of an Extraction Requirement; aggregated data and Patient Level Data. All data are returned in a Query Results message. Both types of output can be present in the same Query Results message.
2. The Extraction Requirement explicitly states which data items are to be returned and provides reference IDs to be used in communicating the data values to GPDC. This extends to returning values in a Query Results message that are direct copies of values contained within the RTP message (that the QR message is in response to) but is constrained to those element/attributes that occur within the Query-Set-Variables element of the RTP message.
3. Aggregated data is always communicated using reference IDs stated in the Extraction Requirement. Every value to be returned has a unique reference ID.
4. Patient Level Data uses the names of the attributes contained within the 4 tables as defined in section 2.4.2 to label each data value to be returned. The Extraction Requirement states which values are to be returned in the required sequence.
5. An Extraction Requirement that requests Patient Level Data may not know the number of records that could be returned (as this is determined by the selection criteria in the requirement and the number of patient matches). As such multiple data records can be returned.
6. All records within a Query Results message are differentiated using an incremental record identifier.
7. Each record that contains Patient Level Data may contain multiple values from multiple tables as described in section 2.4.2 and is determined by the number of “queries” asked in the Extraction Requirement. Furthermore, each “query” may result in multiple answers. This allows for each record to be made up of multiple sub records. The Extraction Requirement will state IDs to be used to identify each incidence of sub record to be returned. See Appendix A – Query-Results Patient Level Reporting Format for an example of the ID scheme used to achieve this.
8. The order in which data should be returned in a Query Results message is also described in the Extraction Requirement.

### Data Extraction Support

1. QOF and Enhanced Services payments are currently managed by the CQRS system and the data from GP Practices required to calculate these payments in CQRS is supplied by GPES.
2. The GPES-I Standard does not impose the technology and methods for GPET-E Systems to extract data, only the compliance to protocols described in this Standard for the supply and return of information. The current methods of extraction of payment-related data within GP Clinical Systems includes “local reporting[[1]](#footnote-2)” facilities which is not currently mandated by NHS Digital requirements but is accepted by GPES as important to GP Practices and therefore the impact to these “local reporting” facilities is to be minimised.
3. Migration to the supply of data via GPDC is to be achieved by the GPSS adhering to the framework in this standard for the request and supply of data whilst maintaining the existing methods of extraction and local reporting from that extraction, if required.
4. In this approach, a GP Practice may run a local report as and when required without interaction between GPDC and GPET-E. When GPDC requires a Scheduled Query Instance it will exercise the process described in the Standard. Unscheduled data extractions will be achieved by GPDC requesting data by means of an RTP message containing the required scheduling and cohort information. Such requests could be for historic time periods, or to rectify a failed extract, and may contain a GP practice or patient cohort which differs from the original request.
5. The implementation of future QOF and other payment related requirements will be undertaken via the Extraction Requirement development process as described by this Standard, allowing GPSSs to provide their own “local reporting” facilities as they require.

## GPES Primary Care Data Model

1. There are variations between the database structures of the GP Systems developed by different GPSS. This poses a significant problem for the collection of comparable information. The GPES Primary Care Data Model represents a simplified subset of some elements of patient-related information so as to provide a common reference by which Extraction Requirements can be expressed and which GPET-E system suppliers can support.
2. GPET-E System Providers are not required to change their existing record structure to comply with the GPES Primary Care Data Model. Where GPET-E System suppliers identify additional attributes that can be supported these will be assessed for inclusion into updates to the GPES Primary Care Data Model.
3. Figure 1 shows the GPES Primary Care Data Model. Each of the four major categories of information is shown as an entity with relationships to other entities. Each of these entities has a table name (i.e. Patients, Journals, Encounters and Referrals). Subsequent sections provide details of the attributes (fields, columns or data items) in these tables. The Links entity shown is used to represent links between records. Its role is described in section 2.4.2.5.



Figure 1 – GPES Primary Care Data Model

### Mandatory and optional elements

1. All GPES data items that were required by the Requirements for Accreditation (RFA99 v1.2) of GP Computer systems are mandatory. Some items that can be directly derived from data required by RFA are also mandatory.
2. Most GPES data items that are not required by RFA are optional. If the GP System does not permit an optional data item to be recorded, requests for or references to the data item in an Extraction Requirement will result in the return of a null value or a specified default value. All default values will be specified in the relevant Extraction Requirement, if required.
3. However, if a GP system does permit the users to record and store an optional data item in a structured form, then that data should be made accessible using GPES-I.
4. The attributes described in section 2.4.2 are classified as mandatory (M) or optional (O). In the case of the Referrals table (R) is used in place of (M) to indicate the attribute is recommended, as it has been agreed that full support of referrals in its current form is not mandatory in GP systems that do not store referrals data in separate tables.
5. GPES-I queries should only have access to patient data which is on-line and available to GP Practices, including ‘deducted patients’.

### Tables

#### PATIENTS

1. Contains one record for each patient registered. On death or departure from the practice the registration status should be changed and the record should be retained.
2. The data in the PATIENTS table must be supported by all GPET-E Systems. The mandatory data items required to support this table are also required by RFA99 v1.2. The data items are detailed in Table 2 - PATIENTS Table Attributes.

#### JOURNALS

1. Contains any number of records per patient. One record for each dated item of information that is (or could be) represented by a discrete clinical concept. These records may include: signs, symptoms, measurements, results, prescriptions or other forms of treatment.
2. The JOURNALS table must be supported by all GPET-E Systems. The data items are detailed in Table 3 - JOURNALS Table Attributes.

#### REFERRALS

1. Contains one record for each referral of a patient stating the date and type of referral and other relevant details.
2. The data in the REFERRALS table should be supported by GPET-E Systems that hold Referrals data in separate tables or structures.
3. GP Systems that do not support explicit recording of REFERRALS data, must enable this data to be accessed as coded data stored in the same way as JOURNALS table information. In these systems Enquirers will need to map GPES-I requests for referrals data to appropriate queries on the JOURNALS table, see section 2.4.2.5.
4. The data items are detailed in Table 4 - REFERRALS Table Attributes.

#### ENCOUNTERS

1. Contains one record for each encounter with a patient stating the date and type of encounter and if relevant the time (e.g. night visit).
2. The data in the ENCOUNTERS table should be supported by GPET-E Systems. However, if a GP System cannot store this information this does not preclude recognition of the system as GPET-E conformant in all other respects.
3. GP Systems that do not support explicit recording of ENCOUNTERS data may enable this data to be accessed as coded data stored in the same way as JOURNALS table information. In these systems Enquirers will need to map GPES-I requests for encounters data to appropriate queries on the JOURNALS table, see section 2.4.2.5.
4. The data items are detailed in Table 5 - ENCOUNTERS Table Attributes.

#### Links

1. The "Links" entity shown in Figure 1 is not directly addressable as a *table-name*. It is used to represent relationships between different records in the JOURNALS, REFERRALS and ENCOUNTERS tables.
2. Links only exist when a user records an explicit link between two or more records that contain different information about a patient. Some GP Systems do not allow users to structure records in this way. However, systems that do allow links between a disorder and the related treatment and/or outcome should make this information accessible to GPES-I. The relevant Extraction Requirement will specify whether or not specific linking between records held within one or more of the JOURNALS, REFERRALS and ENCOUNTERS tables is required. Linking may be achieved by the use of corresponding values in the LINKS attributes of the records to be linked, or by any other means available to, and chosen by, the GPET-E. The Extraction Requirement will specify the table-attributes to be linked and the rules for that linking; it will not specify the methodology for linking (since that methodology is defined within the LINKS attributes of the GPES Primary Care Data Model).
3. Linkage information is also used to generate the LINKS attribute of the Encounters, Journals and Referrals tables.

### Attributes

1. This section describes the tables and data attributes to be supported by GPET-E implementations.

#### Data types

1. Each attribute has one of the data types described in Table 1 – Attribute Data Types below. NOTE: To clarify how attributes are to be used, examples expressed in logical condition notation are provided – this notation is used for explanation only and does not infer this logical expression is provided in Extraction Requirement descriptions. The data types as described in this table are to be used as the standard unless otherwise expressed in an Extract Requirement.

|  |  |
| --- | --- |
| **TABLE** | A data table. |
| **INTERNAL** | An attribute used as a primary or foreign key to a table. These are NOT explicitly referenced in GPES-I. They are included in the attribute listing for completeness. |
| **DATE** | A date.  Dates must be represented in Extraction Requirements and reported In Query Results using the e-GIF and XML format as "CCYY-MM-DD" (C=century, Y=year, M=month, D=day). This format promotes easier sorting of information in Query Results. Values less than 10 in the day, month or year elements, should be entered with a zero in the first position.  In a Query Results the values "00" for the day (and month) indicate a date that is accurate only to the nearest month (or year). If dates that are only known imprecisely are tested for inclusion or exclusion in a period, they must be treated as equivalent to the first day of the month (or year) in which they fall. It is recognised that this may distort queries that relate to short periods including the first of a month.  Unless otherwise specified in the attribute listing, an unknown date is treated as having the value "0000-00-00" and are reported in Query Results as "0000-00-00".  The date of an event that has not yet occurred (e.g. removal from registration) is treated as having the value "9999-99-99" and is reported in Query Results as "9999-99-99".  The date "0000-00-00" is used in an Extraction Requirement as the start of a range of dates with no finite earliest date and including unknown dates (e.g. DATE\_OF\_BIRTH IN "0000-00-00"-"1996-12-31" specifies all patients who were born before the end of 1996 or whose date of birth is unknown).  The date "9999-99-99" is used in an Extraction Requirement to specify an end of range where there is no finite final date and when an event that has not occurred should be included (e.g. DATE\_OF\_DEATH IN "1996-01-01"-"9999-99-99" specifies all patients who were still alive on 1996-12-31).  If unknown dates or non-existent dates are to be excluded, valid start and end dates must be set. |
| **TIME** | A time.  Times are expressed both in Extraction Requirements and in *Response Files* as "HH:MM:SS" (H=hours, M=minutes, S=seconds) using the twenty four-hour clock. Unknown times should be treated as outside all time range and reported as 99:99:99. Note that where time ranges and date ranges are used these are treated separately (WHERE DATE IN "1996-01-01"-"1996-01-31" AND TIME IN "09:00:00"-18:00:00" means between 9am and 6pm on any day in January 1996 - it does NOT mean encounters between 9am on 1/1/1996 and 6pm on 31/1/1996). If seconds are not recorded against clinical data (as opposed to data recorded for processing RTP messages, for example) then ":00" can be appended to ensure the TIME format is conformant |
| **SEX** | The registered sex of the patient. The values to be used are the e-GIF codes for ‘Person Gender Current’ which are based on the ISO 5218 gender codes as follows:  0 = Not Known  1 = Male  2 = Female  9 = Not Specified  '0' 'Not Known' means that the gender of the person has not been recorded.  '9' 'Not Specified' means indeterminate, i.e. unable to be classified as either male or female. |
| **CV** | A code value from a specified coding scheme. |
| **X(*n*)** | An alphanumeric string of *n* characters. |
| **NUMERIC** | A string of digits, including an optional leading minus sign up to 10 characters that may include a point (full stop) followed by up to four decimal places.  Note that numeric values are represented as strings to clarify the difference between the null value "" (an empty string) and the value zero "0" and indicate they are **not** equivalent. Null should be used where there is no numeric value. Zero should be used only when the numeric value is zero.  When numeric attributes are compared with values, or ranges of values, they are compared as decimal values NOT as alphanumeric strings  E.g.:  A NUMERIC attribute of value "3" is IN ("-10"-"10")  A NUMERIC attribute of value "3" is NOT\_IN ("20"-"40")  An X(n) attribute of value "3" is IN ("-10"-"10")  An X(n) attribute of value "3" is NOT\_IN ("20"-"40")  However, null values are not included in any range and can be included only by specifying the null string "" within the *value-list*.  A NUMERIC attribute of value "0" is IN ("-10"-"10")  A NUMERIC attribute of value "" is NOT\_IN ("-10"-"10") |
| **LINK** | A string containing of zero, one or many link numbers.  Each link number may consist of up to twelve digits.  Link numbers are separated by a ":" (colon) |

Table 1 – Attribute Data Types

#### Code lists

1. Several of the alphanumeric data items are encoded. Wherever possible the specification refers to NHS or other standard code lists. However, where appropriate code lists do not exist, then the GPES Primary Care Data Model includes a list of values. These code lists apply to implementations of this specification. Where it is not possible map an attribute value to a value in the code list the GPET-E System should report the attribute value as stored in the system prefixed by the string "§".[[2]](#footnote-3)

#### Reporting of unsupported attributes

1. With respect to GPET-E systems that do/do not support non-mandatory attributes, each Extraction Requirement will contain definitions, covering each and every attribute as to precisely what data should be returned under what circumstances.

#### PATIENTS Table Attribute List

1. The attributes within the PATIENTS table is defined in Table 2 - PATIENTS Table Attributes.

| **Ref** | **Item - PATIENTS** | **User view** | **Technical notes** | **Code list** | **Data type** | **M/O** |
| --- | --- | --- | --- | --- | --- | --- |
|  | TABLE: PATIENTS | Demographic and registration data about individual patients. | Person / Patient / Patient Registration/Address Association | N/A | TABLE | M |
|  | PID | N/A | Unique person identifier internal to the system. | N/A | INTERNAL | N/A |
| T1A3 | REFERENCE | A reference string uniquely identifying an individual patient.  This unique identifier may be used to associate information extracted from the same practice about the same patient on different occasions.  The value of this attribute will be unique within a practice. | The reference must NOT be decodable outside the practice.  It should be derived by encryption of a unique patient number (e.g. NHS number or practice number) using a key entered by and secret to the practice.  The reference must be decodable within the practice to identify the patient to authorised practice staff. | N/A | X(10) | M |
| T1A4 | DATE\_OF\_BIRTH | Date of birth of patient.  Age is not specified as an attribute of the PATIENTS table. Age can be defined within an Extraction Requirement, if required. | Accept dates specified in Extraction Requirement and Query Results as "CCYY-MM-DD". | N/A | DATE | M |
| T1A5 | SEX | Sex of patient. | Person -– Sex using e-GIF/ISO 5218 codes  Accept as letter M,F,U.0,1,2,9  Report as M/F/U.0/1/2/9 | 0 Not Known  1 Male  2 Female  9 Not specified | SEX | M |
| T1A6 | POSTCODE | Postcode of current address. |  | N/A | X(8) | M |
| T1A7 | POSTCODE\_SECTOR | Postcode sector of patient’s current address. This attribute has been added to allow access to the sector code without the need to define functions in an Extraction Requirement. | The postcode including the first numeric character of the second part of the postcode. i.e. leaving off the last two characters. | N/A | X(6) | M |
| T1A8 | MARITAL\_STATUS | Marital status of the patient. | Treat any values that don't map to the code list as "U" unspecified. | S Single  M Married,  D Divorced  P Separated  C Cohabiting  W Widowed  U Unspecified | X(1) | M |
| T1A9 | GP | Registered doctor. | Patient Registration - GMP number (current). | NHS specified doctor number  G \_ \_ \_ \_ \_ \_ \_ | X(8) | M |
| T1A10 | GP\_USUAL | Doctor usually seen by. | If not available treat as equal to GMP registered as above. | NHS specified doctor number  G. May need alternative codes for locums and registrars, assistants and associates. | X(8) | M |
| T1A11 | ACTIVE | Current registration status with the practice.  If not specified by an Extraction Requirement then only patients who are currently registered with the practice for General Medical Services will be included. | Records for patients who do NOT have ACTIVE ="R" must be excluded from all Results unless the Extraction Requirement refers to a subset or ACTIVE is specified in that clause of the Extraction Requirement. Where the above does not apply then entries in any table that apply to patients who are not of status "R" must be excluded even if the PATIENTS table is not specifically referenced by the Extraction Requirement. | R Currently registered  T Temporary  S Not registered for GMS but is registered for another service category (e.g. contraception or child health)  D Deceased.  L Left practice (no longer registered)  P Private patient | X(1) | M |
| T1A12 | REGISTERED\_DATE | Date of registration. | Accept specification and report as "CCYY-MM-DD". | N/A | DATE | M |
| T1A13 | REMOVED\_DATE | Date of end of registration. |  | N/A | DATE | M |
| T1A14 | DATE\_OF\_DEATH | Date of death of patient. | Accept specification as and report as "CCYY-MM-DD". See notes on DATE\_OF\_BIRTH. | N/A | DATE | M |
| T1A15 | HA | Strategic health authority responsible for care. | Report FHSA if SHA codes not held. | NHS organisation code | X(8) | M |
| T1A16 | PCG | Responsible PCG/PCT. |  | NHS organisation code | X(8) | M |
| T1A17 | PRACTICE | The national practice code used to identify a practice – it consist of one capital letter and 5 numbers – e.g. M12345 |  | NHS organisation code | X(8) | M |
| T1A18 | SURGERY | Indicator of branch surgery at which the patient is usually seen. | If no branch surgeries any value including a null quoted string can be reported. | Practice allocated | X(8) | M |
| T1A19 | MILEAGE | Rural practice mileage (units to surgery from home). |  | N/A | NUMERIC | O |
| T1A20 | DISPENSING | Does practice dispense for this patient? | Always "N" in non-dispensing practices. | Y Yes - dispensing  N Not dispensing | X(1) | M |
| T1A21 | SURNAME | Patient surname or family name. |  | N/A | X(35) | M |
| T1A22 | FORENAME | Forename(s). |  | N/A | X(35) | M |
| T1A23 | TITLE | Patient title or name prefix (e.g. Mr, Mrs, Dr, etc.). | . | N/A | X(10) | M |
| T1A24 | NHS\_NUMBER | The NHS number if known. ‘Null’ field if number not issued. |  | N/A | X(10) | M |
| T1A25 | ADDRESS | Entire address | Strip any commas and double quotes included in address lines to avoid conflict with comma separators. Line-feeds are replaced by the pipe symbol "|”. | N/A | X(180) | M |
| T1A26 | ADDRESS\_1 ADDRESS\_2  ADDRESS\_3  ADDRESS\_4  ADDRESS\_5 | Individual lines of the registered address. | Individual address lines. | N/A | X(35) x 5 | O |
| T1A27 | PRACT\_NUMBER | The number used within the practice to identify the patient. It is the number allocated when registering on the clinical system. e.g. Patient 4396. |  | N/A | X(10) | O |
| T1A28 | ETHNIC | Ethnic origin. | Person - Ethnic Origin | NHS Data Dictionary | X(2) | O |
| T1A29 | FIRST\_LANGUAGE | First language of the patient. | PDS provides the facility to record the primary language for verbal communication. Language is stored on the as a coded value from the ISO 639-1 standard. A language is set only where it is not ‘en’ (English). | PDS extension of ISO 639-1 | X(2) | O |

Table 2 - PATIENTS Table Attributes

#### JOURNALS Table Attribute List

1. The attributes within the JOURNALS table is defined in Table 3 - JOURNALS Table Attributes.

| **Ref** | **Item - JOURNALS** | **User view** | **Technical notes** | | | **Code list** | | **Data type** | **M/O** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | TABLE: JOURNALS | Table containing records of patient characteristics and treatments. | Patient Journal Item/ Patient Characteristic/ Actual Intervention/ Pharmaceutical Intervention. | | | N/A | | TABLE | M |
|  | PID | Patient identifier internal to system. | DO NOT EXPORT | | | N/A | | INTERNAL | N/A |
|  | ID | JOURNALS table record identifier internal to system. | DO NOT EXPORT | | | N/A | | INTERNAL | N/A |
| T2A4 | DATE | Date to which the journal item applies. See note under RECORD\_DATE below.  For medication date of issue (if EPISODE A or I) or authorisation (if EPISODE R). | Accept specification as and report as "CCYY-MM-DD".  A null should be returned where "DATE" has not been recorded. | | | N/A | | DATE | M |
| T2A5 | RECORD\_DATE | Date on which recorded.  For example if an entry is made during a consultation on 3-Jan-1998 noting a past history of appendectomy on 1-Nov-1978:  RECORD\_DATE="1998-01-03" DATE="1978-11-01". | Accept specification as and report as "CCYY-MM-DD".  A null should be returned where "RECORD\_DATE" has not been recorded. | | | N/A | | DATE | M |
| T2A6 | CODE | Code value indicating the nature of the characteristic, event or intervention recorded.  This is a clinical concept except where otherwise indicated. Other coding schemes can be used and coding schemes can be mixed in a single Exception Requirement. See notes in the code list column. | Patient Characteristic Type Code or Intervention Type Code represented using the SNOMED CT or other coding schemes.  See section individual Extraction Requirements for details of hierarchical searches of clinical coding schemes.  Details of the XML serialisation of the code selection criteria will be provided in the XML schema that will is published alongside this specification. | | | | | CV | M |
| T2A7 | HCP | GP or other Healthcare professional responsible. | The person who made an observation or undertook an intervention identified in the record. | | | | NHS specified doctor number  G \_ \_ \_ \_ \_ \_ \_ for GPs.  UKCC number for nursing staff if this is available.  Or a string decodable within the practice. | X(10) | M |
| T2A8 | HCP\_TYPE | Profession of HCP responsible for the action or record.  Should be derived within the *GPET-E System* from the identifier of the person involved. | The code list is based on the attribute POST TYPE IN GMP PRACTICE in the NHS data dictionary 1996 change proposals for Primary Care. Full support for this code list is an objective rather than an immediate requirement for GPET-E implementations.  The four main categories A, B, C and D should be recognised as the first priority.  "D%" includes all staff other than GPs.  The full code list may change to reflect changes in the relevant NHS Data Standard as applied to GP systems. | | | | A Principal GP  B Locum GP  C GP Registrar  D Other Practice staff  D06 Practice Nurse  D07 Dispenser  D08 Physiotherapist  D09 Chiropodist  D10 Interpreter / Link Worker  D11 Counsellor  D12 Osteopath  D13 Chiropractor  D14 Acupuncturist  D15 Homeopath  D16 Health Visitor  D17 District Nurse  D18 Community Psychiatric Nurse  D19 Mental Handicap Nurse | X(3) | M |
| T2A9 | GMS | Whether an action was carried as a GMS service or was undertaken by another agency (relevant to study of activities in practice, items of service etc.). or by the practice acting outside of GMS. |  | | | | Y Yes - done by practice.  N No - done by another agency or by practice outside GMS. | X(1) | M |
| T2A10 | EPISODE  *(In a record with CODE for a diagnosis or problem)* | Whether first or subsequent episode of the coded condition. | If cause of death is recorded on the system it should be accessible as though it were a JOURNALS record with the EPISODE type set as "D". No distinction is made between primary and secondary causes of death. | | | | F First  N New  O Other  Special case  D Cause of Death | X(1) | M |
| T2A11 | EPISODE  *(In a record with CODE for prescribable item)* | Whether a prescription for the coded item is repeat or acute. |  | | | | A Acute  (one-off issue)  I Issue of repeat  R Repeat authorisation | X(1) | M |
| T2A12 | EPISODE  (general note) | Unless selection criteria specifically selects on the EPISODE attribute the GPET-E implementation should act as if the following criteria were present in the Extraction Requirement:  WHERE EPISODE NOT\_IN ("D","R")  This excludes:  a) medication entries that are repeat authorisations ("R") to avoid double counting  b) disease records marked as causes of death ("D")  T2A10 and T2A11 are included in this model as separate attributes, however, for each line of data returned there can only be one of these attributes populated | | | | | |  |  |
| T2A13 | TEXT | Free text associated with patient characteristic or intervention. If medication dosage instructions, etc. | | The first seventy characters of any free text associated with the record. The code rubric should not be included. If no text exists must return a null string. | N/A | | | X(70) | M |
| T2A14 | RUBRIC | Text rubric or meaning associated with the code value of the attribute CODE. | |  | N/A | | | X(60) | O |
| T2A15 | SUMMARY | Whether an item is flagged for inclusion in the patient summary on the Summary Care Record. | | Y = marked for inclusion in the patient summary in the Summary Care Record - regardless as to whether or not the record has, or has not, been uploaded.  N = Not marked for inclusion in the patient summary in the Summary Care Record. | Y N | | | X(1) | O |
| T2A16 | VALUE1  *(In a record with CODE for investigation, measurement or result)* | First numeric value.  For example:  With CODE for weight VALUE1 is the weight in Kg.  With CODE for blood pressure VALUE1 is the systolic pressure in mmHg. | | See Ref [1] for a list of the numeric data that must be supported in this attribute.  Return diastolic and systolic BP as though from one record even if stored in separate records. | N/A | | | NUMERIC | M |
| T2A17 | VALUE2  *(In a record with CODE for blood pressure)* | Diastolic pressure in mmHg. | | Return diastolic and systolic BP as though from one record even if stored in separate records. See Ref [1]. | N/A | | | NUMERIC | M |
| T2A18 | VALUE1  *(In a record with CODE for prescribable item)* | Amount prescribed as number of tablets, capsules, etc. or vol. Of liquid in ml. | | Report as null string "" if this cannot be ascertained from the prescription data.  . | N/A | | | NUMERIC | O |
| T2A19 | VALUE2  *(In a record with CODE for prescribable item)* | Daily dose prescribed as number of tablets, capsules, etc. or vol. Of liquid in ml. | | Report as null string "" if this cannot be ascertained from the prescription data (i.e. prescribed for use as required, etc.). | N/A | | | NUMERIC | O |
|  | VALUE1 & VALUE2  (general note) | T2A16, T2A17, T2A18 and T2A19 are included in this model as separate attributes, however, for each line of data returned there can only be one pair of these attributes populated. I.E. T2A16 & T2A17 or T2A18 & T2A19 | | | | | |  |  |
| T2A20 | END\_DATE | Date when the journal item ceased to apply.  For medication date of end of course (if EPISODE A or I) or date of end of authorisation (if EPISODE R, F or N). | | Accept specification as and report as "CCYY-MM-DD".  If none then "9999-99-99". | N/A | | | DATE | O |
| T2A21 | TIME | Time at which the journal item applied. For example, time of treatment  or time of measurement. | | If none then treat as "99:99:99". | N/A | | | TIME | O |
| T2A22 | CONTEXT | Context of record.  For example, is this a planned intervention, a target or a record of an actual event, characteristic or measurement. | | If CONTEXT:  a) Is NOT supported by a system; or  b) Is NOT specified in an Extraction Requirement,  Only records of actual events, treatments, diagnoses or measurements must be selected and reported.  This attribute may not be used in Extraction Requirements where the coding scheme used in the CODE attribute contains values from SNOMED CT. This is due to differences in the multiple attribute and value model used to represent the context in SNOMED CT and the single axis of this attribute. | A Actual event, treatment, diagnosis or measurement.  P Planned event or treatment (i.e. part of care plan)  T Target measurement or goal.  V Patients view/reason for encounter. | | | X(1) | O |
| T2A23 | CERTAINTY | Degree of certainty. Code value for certainty. This may indicate a positive or negative finding. | | If CERTAINTY is not specified in the Extraction Requirement negative findings are excluded from the response.  This attribute may not be used in Extraction Requirements where the coding scheme used in the CODE attribute contains values from SNOMED CT. This is due to an overlap between the certainty and the finding context in SNOMED CT and the single axis of this attribute. | To be defined using Clinical Terms Version 3 qualifiers. | | | CV | O |
| T2A24 | SEVERITY | Degree of severity. | |  | To be defined using Clinical Terms Version 3 qualifiers. | | | CV | O |
| T2A25 | LINKS | A list of zero, one or many link numbers. A link number is shared by records for the same patient that have been explicitly linked in some way by the use.  For example, problem-linkage, links between disorders and associated treatments and outcomes. | | Each link number may consist of up to six digits.  If a record is linked to more than one group of records several numbers may be reported. The numbers are separated by a ":" (colon).  Link numbers:  May be generated in any way available to the system.  Need not be allocated sequentially.  Are applicable only within a single response.  Are applicable only within records relating to the same patient.  Records that have been explicitly linked by the person recording the data will have one or more common link numbers. | | | | LINK | O |
| T2A26 | REASON | A list of zero, one or many codes for related journal entries that have been linked to this journal entry with a reason relationship.  For example, beta blockers given for hypertension.  To select on a REASON code, the selection criteria should be applied to the code of each reason record. | | If a record is linked to more than one reason record then more than one code may be reported. The codes are separated by a ":" (colon). | | | | CV | O |

Table 3 - JOURNALS Table Attributes

#### REFERRALS Table Attribute List

1. The attributes within the REFERRALS table is defined in Table 4 - REFERRALS Table Attributes.

| **Ref** | **Item - REFERRALS** | **User view** | **Technical notes** | **Code list** | **Data type** | **R/O** |
| --- | --- | --- | --- | --- | --- | --- |
|  | TABLE: REFERRALS | Table containing records of referrals and investigation requests. | External Referral Request/ Attached Specimen | N/A | TABLE | R |
|  | PID | Patient identifier internal to system. |  | N/A | INTERNAL | N/A |
|  | ID | REFERRALS table record identifier internal to system. |  | N/A | INTERNAL | N/A |
| T3A4 | DATE | Date on which the referral was requested. | Accept specification as and report as "CCYY-MM-DD". | N/A | DATE | R |
| T3A5 | HCP | Identity of the healthcare professional responsible for making referral. |  | NHS specified doctor number  G \_ \_ \_ \_ \_ \_ \_ for GPs.  May need to use alternative codes for locums and registrars, assistants and associates.  UKCC number for nursing staff if this is available. | X(10) | R |
| T3A6 | HCP\_TYPE | Profession of the HCP responsible for making referral type.  Should be derived within the *GPET-E System* from the identifier of the person involved. | The code list is based on top level letters for the attribute POST TYPE IN GMP PRACTICE in the NHS data dictionary 1996 change proposals for Primary Care. | A Principal GP  B Locum GP  C GP Registrar  D Other Practice staff | X(3) | R |
| T3A7 | TO\_HCP | Healthcare professional to whom referral is made. |  | GMC or SDS code of person to whom referral is made. | X(10) | R |
| T3A8 | SPECIALITY | Speciality of the professional or department to which referred. |  | Main Specialty and Treatment Function Codes  as defined in the NHS Data Dictionary | X(3) | R |
| T3A9 | UNIT | Provider unit to which referred. |  | NHS Provider Number | X(5) | R |
| T3A10 | TYPE | Type of referral or resource use requested.  e.g. Outpatient appointment, admission, Investigation, etc. |  | O OPD  A Admission  D Day-case  I Investigation  V Domiciliary visit | X(1) | R |
| T3A11 | REASON | A list of zero, one or many codes for the reason for referral.  For example, referrals for hypertension.  To select on a REASON code, the selection criteria should be applied to the code of each reason record. | Depending on the implementation of the referrals table by the GPSS, this attribute may be part of the referrals table or may be the code attribute of related journal entries that have been linked to this referral entry with a reason relationship.  This attribute should not return a free text reason for referral.  Where this attribute is not available when the referral is made though Choose and Book then a null value should be returned.  If a record has or is linked to more than one reason record then more than one codes may be reported. The codes are separated by a ":" (colon). | | CV | O |
| T3A12 | CONTRACTOR | The type of organisation to which the referral is made. | When making a referral through Choose and Book the CONTRACTOR may not be known at the time of the referral and may not be returned to the practice. In these cases a null value should be returned. | A NHS Trust  T NHS Treatment Centre  P Private  O Other | X(1) | O |
| T3A13 | ACTION\_DATE | Date on which the first action requested by the referral was carried out. E.g. Date seen in OPD, date admitted or date of specimen for investigations. | Accept specification as and report as "CCYY-MM-DD". | N/A | DATE | O |
| T3A14 | LINKS | A list of zero, one or many link numbers. A link number is shared by records for the same patient that have been explicitly linked in some way by the user.  For example, problem-linkage, links between disorders and associated treatments and outcomes. | Each link number may consist of up to six digits.  If a record is linked to more than one group of records several numbers may be reported. The numbers are separated by a ":" (colon).  Link numbers:  May be generated in any way available to the system.  Need not be allocated sequentially.  Are applicable only within a single response.  Are applicable only within records relating to the same patient.  Records that have been explicitly linked by the person recording the data will have one or more common link numbers. | | LINK | O |

Table 4 - REFERRALS Table Attributes

#### ENCOUNTERS Table Attribute List

1. The attributes within the ENCOUNTERS table is defined in Table 5 - ENCOUNTERS Table Attributes.

| **Ref** | **Item - ENCOUNTERS** | **User view** | **Technical notes** | **Code list** | **Data type** | **M/O** |
| --- | --- | --- | --- | --- | --- | --- |
|  | TABLE: ENCOUNTER | Table containing records of encounters between the patient and practice healthcare professionals. | Patient Encounter. | N/A | TABLE | M |
|  | PID | Patient identifier internal to system. | DO NOT EXPORT | N/A | INTERNAL | N/A |
|  | ID | ENCOUNTERS table record identifier internal to system. | DO NOT EXPORT | N/A | INTERNAL | N/A |
| T4A4 | DATE | Date of encounter. | Accept specification as and report as "CCYY-MM-DD". | N/A | DATE | M |
| T4A5 | HCP | Identity of the healthcare professional with whom the encounter took place. |  | NHS specified doctor number  G \_ \_ \_ \_ \_ \_ \_ for GPs.  May need to use alternative codes for locums and registrars, assistants and associates.  UKCC number for nursing staff if this is available. | X(10) | M |
| T4A6 | HCP\_TYPE | Profession of HCP with whom the encounter took place.  Should be derived within the *GPET-E System* from the identifier of the person involved. | The code list is based on the attribute POST TYPE IN GMP PRACTICE in the NHS data dictionary 1996 change proposals for Primary Care. Full support for this code list is an objective rather than an immediate requirement for GPET-E implementations.  The four main categories A, B, C and D should be recognised as the first priority.  "D%" includes all staff other than GPs.  The full code list may change to reflect changes in the relevant NHS Data Standard as applied to GP systems. | A Principal GP  B Locum GP  C GP Registrar  D Other Practice staff  D06 Practice Nurse  D07 Dispenser  D08 Physiotherapist  D09 Chiropodist  D10 Interpreter / Link Worker  D11 Counsellor  D12 Osteopath  D13 Chiropractor  D14 Acupuncturist  D15 Homeopath  D16 Health Visitor  D17 District Nurse  D18 Community Psychiatric Nurse  D19 Mental Handicap Nurse | X(3) | M |
| T4A7 | SESSION | Session in which encounter took place. |  | G General consultations  V Visit  N Night Visit  A Ante natal  H Health promotion  C Child health surveillance  3 Three year check  7 75+ check  O Other | X(6) | M |
| T4A8 | LOCATION | Location of encounter. |  | S Surgery  C Clinic  A A+E  H Hospital  O Other | X(6) | M |
| T4A9 | TIME | Time of encounter. | Patient Encounter Start Time.  If not recorded "99:99:99". | N/A | TIME | O |
| T4A10 | DURATION | Length of encounter in minutes. |  | N/A | NUMERIC | O |
| T4A11 | TRAVEL | Travel time in minutes attributable to a home visit. |  | N/A | NUMERIC | O |
| T4A12 | REASON | A list of zero, one or many codes for related journal entries that have been linked to this referral entry with a reason relationship.  For example, encounters for hypertension.  To select on a REASON code, the selection criteria should be applied to the code of each reason record. | If a record is linked to more than one reason record the more than one codes may be reported. The codes are separated by a ":" (colon). | | CV | O |
| T4A13 | LINKS | A list of zero, one or many link numbers. A link number is shared by records for the same patient that have been explicitly linked in some way by the user.  For example, problem-linkage, links between disorders and associated treatments and outcomes. | Each link number may consist of up to six digits.  If a record is linked to more than one group of records several numbers may be reported. The numbers are separated by a ":" (colon).  Link numbers:  May be generated in any way available to the system.  Need not be allocated sequentially.  Are applicable only within a single response.  Are applicable only within records relating to the same patient.  Records that have been explicitly linked by the person recording the data will have one or more common link numbers. | | LINK | O |

Table 5 - ENCOUNTERS Table Attributes

# GPES-I Messaging

1. This section describes the messaging used to achieve the GPES business process for interactions between GPDC and GPET-E systems. It describes the technologies and message formats used along with the rules to control the behaviour of the interactions. The messages themselves are also described to an attribute level, and schema files plus worked examples are included.
2. This section assumes the reader has a working knowledge of the messaging technologies within the NHS along with the GPES business process for interactions between GPDC and GPET-E Systems; see Refs [4] & [6].

## Messaging Technologies

1. MESH is used for all interactions between GPDC and GPET-E systems. As MESH does not have defined message types, this document specifies the MESH payload (.dat) format along with the values that should be used for the MESH control (.ctl) files. For further information see the MESH Specifications – Ref [2] and the MESH client File Interface Specification – Ref [3].
2. Section 3.2 provides an overview of the messages and the messaging technology used for each interaction.
3. All business information communicated between GPDC and GPET-E Systems is either XML or CSV in format. XSD schemas for each interaction are unchanged from those supported by version 5.0 of the Standard. The CSV structure is described in the relevant section for each applicable interaction.

## Message Types

1. A description of the messages utilised within this Standard are described in Table 6. This contains a list of the transport used for each message along with initiating party, a short description of the message and further details on the interaction types used and XML schema definitions used for the transmission of data. Further detail can be found for each message type in the following sections.

| **Txn type** | **Initiated by** | **Target** | **Message Name** | **Transport** | **Message Description** | **Interaction (where applicable)** |
| --- | --- | --- | --- | --- | --- | --- |
| RTP | GPDC | GPET-E | Run-Time-Parameters | MESH | A message containing values to be used in the execution of an Extraction Requirement. This may include patient cohort, selection criteria, participation or terminology data and will contain practice cohort and messaging control data. | GPES-Q-E-RTP  *Request:*  GPES-Q-E-RTP.xsd  MESH Workflow ID:  GPDC\_RTP |
| RTPR | GPET-E | GPDC | Run-Time-Parameters-Response | MESH | A message containing status and message control data in response to Run-Time-Parameters messages. | GPES-E-Q-RTPR  Request:  GPES-E-Q-RTPR.xsd  MESH Workflow ID:  GPDC\_RTPR |
| QR | GPET-E | GPDC | Query-Results | MESH | A message containing Extraction Requirement output for one or more GP Practices for a Scheduled Query Instance along with message control data. | GPES-E-Q-QR  *Request:*  GPES-E-Q-QR.xsd  MESH Workflow ID:  GPDC\_QUERY\_RESULTS |
| QRA | GPDC | GPET-E | Query-Results-Acknowledgement | MESH | A message containing status information from the processing of Query-Results messages in GPDC. | GPES-Q-E-QRA  *Request:*  GPES-Q-E-QRA.xsd  MESH Workflow ID:  GPDC\_QUERY\_RESULTS\_ACK |
| REP | GPET-E | GPDC | Report | MESH | A message containing report information in CSV format. | GPES-E-Q-REP  MESH Workflow ID:  GPDC\_REPORT |

Table 6

## GPET-E Deployment Models

1. There are a number of GPET-E System deployment models currently in existence. They are distributed, centralised and hybrid.
2. Distributed systems are characterised by a single GP Practice clinical system hosted on a server machine usually in the GP Practice.
3. Centralised systems are characterised by a data centre hosted application serving multiple GP Practices.
4. A hybrid exists where a distributed system is implemented for a GP Practice, but data from that GP Practice system is replicated to a central system which is used for reporting generation purposes.
5. GPES-I is required to support all three deployment models. It is also possible that additional deployment models will need to be accommodated as more suppliers enter the market.

### Address Resolution and Routing

1. GPDC will route all Run Time Parameters (RTP) messages to a single MESH address or MESH address pool per GPSS per environment, subject to paragraph 86. The responsibility for onward address resolution and routing lies with the GPSS to account for the supplier-specific deployment model in use. An address pool will be used for load balancing purposes only and the GP practice cohort will be randomly distributed across the address pool.
2. The GPSS MESH address will be treated as a single end-point when applying the messaging rules as described in section 3.5, subject to paragraph 85
3. For distributed systems, GPSS may wish to receive an individual RTP message per practice, such that MESH Control File attributes could be used to automatically route messages from the GPSS central mailbox to the individual practices.
4. Where GPSS with distributed systems are unable to support the model described in paragraphs 83, 84 & 85, the following will apply:
   * GPSS are responsible for ensuring that MESH holds the correct mailbox address for each of their practices
   * GPSS are responsible for ensuring that the GPDC Workflow Group has been added to each practice’s MESH mailbox (this can be done as a centralised MESH process with GPSS oversight to ensure that the correct mailboxes have been updated).
   * GPDC will look up the MESH mailbox address based on the GP practice NACS code and GPDC Workflow Group to retrieve a single valid mailbox for each practice.
   * An individual RTP message will be sent to each practice using the address details retrieved from MESH.
   * Where MESH fails to return a mailbox, GPDC will not attempt to resolve that practice’s address and will not send an RTP. Where MESH returns multiple mailboxes for a practice, GPDC will attempt to resolve the address, for example by looking for the most recently created mailbox or the mailbox with the most recent activity, but this may result in the RTP being sent to the wrong address.
5. GPDC will accept Run Time Parameters Response (RTPR) messages, Query Results (QR) messages and Report messages from any MESH address, subject to the messaging rules in section 3.5.
6. The relationship between GP practice and GP system supplier will be established by querying the Spine Directory Service (SDS). It is the responsibility of the GPSS to ensure that these details are kept up to date when GP practices transfer from one supplier to another.
7. Query Results (QR) messages must be returned to the MESH address specified in the RTP message.

## Message Interactions

The message types as described in section 3.2 are shown in an interaction diagram in Figure 2 - GPES-I Message Interactions. This shows the initiating system for each set of interactions and the resultant reactions. All interactions use the MESH transport.

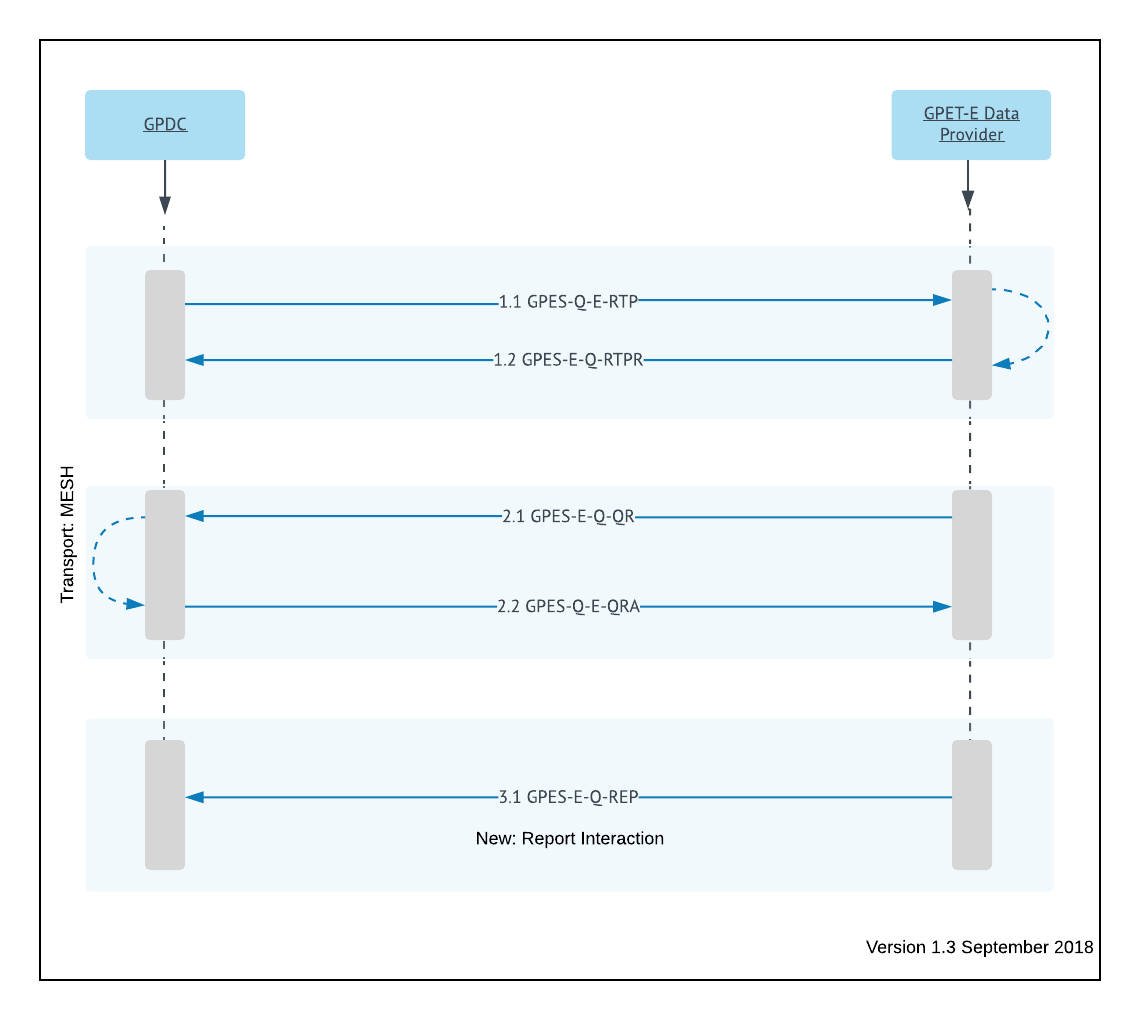


Figure 2 - GPES-I Message Interactions

1. The following section provides an explanation of the interactions.
2. Within the usual GPES business process, GP Practice Participation is derived from CQRS and is used to define the cohort for which data is required per extract. For pilot and other non-standard extracts, the cohort is created manually depending on the practices to be included in the extract.
3. Interactions 1.1 and 1.2 show an asynchronous Run-Time-Parameters and Run-Time Parameter-Response exchange. Individual application acknowledgements are not used for these interactions. Each Run-Time-Parameters interaction has a single corresponding Run-Time Parameter-Response which fulfils the role of an application acknowledgement.
4. Interactions 2.1 and 2.2 show an asynchronous Query-Results and Query-Results-Acknowledgement exchange. Individual application acknowledgements are not used for these interactions. As such, the Query-Results-Acknowledgement interaction serves as an application acknowledgement. Each Query-Results interaction has a single corresponding Query-Results-Acknowledgement. This exchange is in response to a Run-Time-Parameters and Run-Time Parameter-Response exchange. One or more Query-Results exchanges are possible with the number of exchanges dependent on various possible criterion as described in section 3.5.
5. Interaction 3.1 shows a Report transmission.

## Messaging Rules

1. This section details a series of rules that govern the behaviour of message interactions.
2. The architecture for GP Systems allows (but does not require) a single end-point to service many GP Practices, this feature is commonly used by hosted GP Systems. In order to reduce the messaging load on such end-points, GPDC will be able to send a single Run-Time-Parameters message to the GPET-E System, subject to paragraph 97. That message will contain a list of target GP Practices – the “Practice Cohort”. It is required that GPET-E Systems ensure that data are extracted from each target GP Practice contained in the Run-Time-Parameters message.
3. The number of Run-Time-Parameters messages to be sent to a given GPET-E System will be dictated by the MESH address resolution model in force for that GPSS, as described in section 3.3.1, subject to the criteria detailed in paragraph 99.
4. Depending on the size of the practice cohort within a single Run Time Parameters message, the Runtime Parameters message may be split up into 2 or more smaller Run Time Parameters messages by spreading the practice cohort over multiple messages. Where Run Time Parameters for an SQI have to be split over multiple RTP messages, each RTP message will have a unique RTP-UUID.
5. Where a Patient Cohort is included in an Extraction Requirement, a Run-Time-Parameters message will be sent **per GP Practice,** irrespective of the address resolution model in force (see section 3.3.1). In this case, the format of the Run-Time-Parameters message is the same as the general case but only a single practice will be listed in the Practice Cohort. This is to fulfil the Information Governance (IG) requirement that patient identifiers for one GP Practice are not exposed to another GP Practice.
6. Query-Results messages will contain Data Provider Output for a single Scheduled Query Instance. The Scheduled Query Instance to which the Data Provider Output relates will be identified by the Scheduled-Query-Instance-ID in the Run-Time-Parameters message being responded to.
7. For a Scheduled Query Instance, Data Provider Output from multiple GP Practices can be transported to GPDC in a single Query-Results message, subject to any other applicable messaging rules. This includes where an Extraction Requirement results in Patient-Level data being extracted,
8. Where a Run-Time-Parameters message contains a Practice Cohort with more than one GP Practice, Data Provider Output can be returned in a single Query-Results message or multiple Query-Results messages for that Scheduled Query Instance. The number of Query-Results messages is left to the GPET-E System to decide, subject to paragraph 103 and provides flexibility for the GPET-E System e.g. to accommodate batch schedules. Data Provider Output for an individual GP Practice must only be returned once in a Query-Results message, unless an error occurs as described in section 3.10.
9. Where data are to be returned from GPET-E Systems where the volume exceeds the single MESH message size limitation of 100MB for any single Scheduled Query Instance and where the GPSS has not enabled the MESH functionality of chunking large messages, Data Provider Output is to be sent in multiple Query-Results messages as described in section 3.5.1. For MESH functionality, see Ref [2] and Ref [3].
10. All Data Provider Output must be returned in the specified timescales for the Scheduled Query Instance regardless of the number of Query-Results messages used.
11. If a Patient Cohort is included in the Extraction Requirement, returned data can only be from the Patient Cohort or a subset thereof.
12. Acknowledgement messages, where applicable, are always returned to the MESH address that provided the message being acknowledged.
13. If a GPET-E System does not receive a Run-Time-Parameters message for a Scheduled Query Instance the Scheduled Query Instance is not to be executed until the appropriate Run-Time-Parameters message is received.
14. Run-Time-Parameters messages may be re-sent to GPET-E Systems for a Scheduled Query Instance where updated Run Time Parameters are required to be supplied. Where a GPET-E System has not executed the Scheduled Query Instance, these updated Run Time Parameters are to be used for the Scheduled Query Instance.
15. If a GPET-E System does not receive a Query-Results-Acknowledgement message in response to a Query-Results message, the GPET-E System is not to automatically resend the original message, unless any of the conditions in Section 3.14 apply.
16. The retention of data on GPET-E systems relating to this Standard is described in section 3.5.2.
17. Whether a payload should be compressed or not for transmission is described in the following sections which describe each message type in detail.
18. For testing/debugging purposes, the Run-Time-Parameters message contains an attribute (Show-Descriptions) that requests the “friendly name” of Extraction Requirement Metadata to be included in Query-Results messages. Where this attribute is set, GPET-E Systems should return all optional “description” attributes relating to Metadata IDs in Query-Results. This facility is only intended to be used for Extract Requirement development activity and not used for live operation.
19. Each instance of the Report Message will contain a single report. Each report must be submitted as a single report per GPSS. GPSS with distributed systems are responsible for collating the data for all of their GP practice estate into a single report.

### RULE FOR SPLITTING DATA PROVIDER OUTPUT OVER MULTIPLE QUERY-RESULTS MESSAGES

1. For every Scheduled Query Instance, where Data Provider Output exceeds the maximum size limitation of a single MESH message (100MB) the Data Provider Output will be transmitted to GPDC in multiple Query-Results messages, unless the GPSS has implemented the MESH functionality to automatically chunk large messages. The rule for splitting Data Provider Output over multiple Query-Results messages is detailed below:
2. Rule 1. Split Data Provider Output on the boundary between individual GP Practices (relevant if there are multiple GP Practices within the Practice Cohort).
3. Example: An Extract Requirement is executed against a Practice Cohort of 21 GP Practices. Data Provider Output for GP Practices 1 to 17 is contained in Query-Results message no #001. Data Provider Output for GP Practices 18 to 21 is contained in Query-Results message #002.
4. Where an Extraction Requirement is likely to result in a Query-Results message that exceeds the 100MB threshold for a single practice, the GPSS must ensure that the GPET-E system is capable of using the MESH chunking functionality for large messages.

### GPET-E Systems – Data Provider SYSTEM DATA Retention Period

1. Each Extraction Requirement will state how long Data Provider Output is to be retained on GPET-E Systems for audit purposes. This will be recorded in GPDC and measured in a whole number of days with an upper limit of 2192 days (6 years assuming 2 leap years within that period).
2. The data retention period is communicated as an attribute within the Run-Time-Parameters message for every Scheduled Query Instance.
3. Where the data retention period is not zero, it must be retained securely on GPET-E Systems for the specified number of days, starting from the point in time a Query-Results message is transmitted to GPDC.
4. Where the data retention period is zero, it does not have to be retained.
5. The trigger for data deletion or retention is described in section 3.10.

## Message Authentication

1. Due to the inherent security vulnerabilities of the legacy DTS channel, the assurance of a sender’s identity was provided through the TMS transmission channel to ensure the authenticity of Query Results messages subsequently received through the DTS channel. A signature handshake protocol was established using the TMS channel and used in the DTS channel. MESH meets the Spine Core security requirements and uses mutual authentication and enhanced mailbox authentication, therefore the approach used with DTS is no longer required. Furthermore, the use of Spine TMS messaging has been retired from this standard, rendering this legacy authentication process superfluous. However, as this is existing functionality within the GPET-E Systems, the signatures will continue to be exchanged, but will not be used by GPDC to authenticate Query Results messages.
2. A GUID signature is provided in every Run Time Parameters message for every Scheduled Query Instance for every GP Practice. These are assigned by GPDC.
3. For every Run Time Parameters message, a Run Time Parameters Response message returns a GPET-E generated GUID signature in response to every GPDC generated signature[[3]](#footnote-4) (along with status information).
4. As such, on receipt of a Run Time Parameters Response message GPDC contains a GUID signature pair for every Scheduled Query Instance for every GP Practice.
5. The GUID signature pair is communicated in the Query Results message for every Scheduled Query Instance for every practice. GPDC logs the GUID signature pair on receipt, but does not perform any specific validation or processing based on the signatures.
6. This GUID signature pair is referred to as Authentication Signature Pair in this document.

## Run Time Parameters (RTP) Message

1. The Run-Time-Parameters message enables the GPET-E System to;
   * Insert substitute values for the relevant Extraction Requirement’s Query Set Variables,
   * Trigger execution of the query and
   * Initiate the return of a Run-Time-Parameters-Response message.
2. The content of the RTP message is of type GPES-Q-E-RTP.
3. The messaging rules described in section 3.5 must be adhered to.
4. Once the GPET-E System has accepted the message, it will then process the content of the GPES-Q-E-RTP message through the steps described in paragraph 129. On completion of the processing a Run-Time-Parameters-Response message will be returned to GPDC that acknowledges success or failure of the processing and returns the appropriate message control attributes including the Authentication Signature Pair – see section 3.6.
5. Errors and failures at execution time (i.e. after completion of the Run-Time-Parameters and Run-Time-Parameters-Response exchange) are notified to GPDC using the Report messages defined in 3.11 below.

### Message Attributes

1. The Run-Time-Parameters (RTP) message will include the following attributes – *attributes will be required unless otherwise marked as optional as defined by the Runtime Parameters XML schema*:
   * GPES-I-Version – The version of the GPES Interoperability Standard that applies to this message.
   * RTP-Message-Version – The version of the RTP message.
   * Scheduled-Query-Instance-ID – A composite reference number used to uniquely identify the instance of the query being scheduled. It is comprised of the following three elements separated by hyphens “-“. (1: Query Identifier – alpha-numeric 6 characters, 2: Date – numeric 8 digits and Sequence Number – numeric 4 digits, 3: Regular/Ad-hoc query identifier – R or A). For example, A00001-201809180001-R
   * RTP-UUID – An identifier generated by the sender and used to uniquely identify the RTP message itself. (A Universal Unique Identifier (aka GUID). Complies with RFC 4122 and ISO/IEC 11578:1996)
   * Issue-Date-Time – The date/time that this RTP message was issued by GPDC
   * ~~RTP-Reissue – Yes/No flag used to indicate whether this is an original or re-issue of the RTP message.~~ This attribute is deprecated in version 4.1 onwards. Although the attribute still exists in the RTP message it is not used.
   * Query-Name – Optional. The name given to the query that this RTP message relates to.
   * Query-Description – Optional. A description of the query that this RTP message relates to.
   * Query-Domain – The Query Domain to be used for the request (Live/Test),
   * Test-Pack-ID - Optional. An identifier used to uniquely identify a Test Pack against which the query is to be executed.
   * Execution-Date – The earliest date on which the query can be executed.
   * Cutoff-Date - The date by which all results must have been returned (It is unlikely but possible that the Cut-Off and the Execution dates could be the same (a possible scenario might be if GPES was asked to support a pandemic reporting).
     + In the event that an RTP message is sent with a cut-off date in the past, the data must be returned as soon as possible (see paragraph 23)
     + In the event that the supplier has failed to deliver the data by the cut-off date, the supplier should continue to return data, in line with the resolution period and extended resolution period.
   * Interim-Date – The earliest date on which results may be returned. This is provided by GPES to give an indication to the GPET-E Supplier of the aspiration of the Customer to receive data from GPES. Therefore, the term “earliest date on which results may be returned” means from GPES to the Customer and not between GPET-E and GPDC. The earliest date on which GPET-E can return results to GPDC is from the Execution-Date. By providing this information the GPET-E Supplier, they are made aware of the data delivery requirement of the Customer. Any SLA will be specified in the call off of the Extraction Requirement.
   * Query-Priority – A 4-digit number (0000 - 9999) used to notify GPET-E Systems of the priority of the extraction request. (If there are more than one extraction requests with the same execution date and priority (for example previous days extractions did not run) the request with the earliest RTP Issue-Date-Time should be executed first.)
   * QR-Retention-Period – The period, in days, that the query result data is to be retained on GPET-E Systems for audit purposes

***[GP-Practice-Cohort – A list of one or more GP Practice Identifier / GPET-Q Authentication Signature pairs against which results should be returned]***

* + - Practice-ID – A unique GP Practice Identifier in the form of a National Administrative Codes Service (NACS) code. The RTP message supports an unlimited number of GP Practices providing the rules in section 3.5 are adhered to. If the RTP message contains a duplicate Practice-ID code the entire message should be rejected via a failed Application Acknowledgement.
    - GPET-Q-SQI-Authentication-Signature – A unique identifier for use by GPET-E systems to authenticate the message sender as GPDC. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)

***[Patient-Participation – A set of indicators that allow Patient Participation decisions to be made in support of the extraction - Where a check of NCRS patient choices is required as communicated in the Patient-Participation settings within a RTP message, the GPES project does not require a GPET-E supplier to retrieve the most up-to-date NCRS patient choices in response to the receipt of such an RTP message. However, if a GPET-E system already holds a value for an NCRS patient choice on their system, the GPES project does require a GPET-E supplier to take it into account in the extract response, even though it might be out of date. NOTE: The detail contained against the values below take precedence over that included in the QR message schema.]***

* + NCRS-Detailed-Care-Record-Sharing – NCRS Detailed Care Record Sharing patient choice flag. True=Patient record sharing choice MUST be considered, False=Patient record sharing choice should be ignored
  + NCRS-Patient-Sealing - NCRS Sealed/Sealed-Locked flag. True=Patient sealed/sealed-lock choice must be considered, False=Patient sealed/sealed-lock choice should be ignored.
  + NCRS-PDS-S-Flagging - NCRS PDS-S-Flag. True=Patient S-flag choice MUST be considered, False=Patient S-flag choice should be ignored.

***[Exclusion-Code-String –*** This node structure is deprecated in version 4.1 onwards. Although the node structure still exists in the RTP message it is not used. To support excluding patients (where patient identifiable data is being extracted for secondary purposes) two Query-Set-Variables will be provided as opposed to values in the Exclusion-Code-String node and will contain Code Strings, one for ‘dissent’ and one for ‘withdrawn dissent’. The Extraction Requirement will define the logical expression to link the two code strings to determine the settings for individual patients, i.e. is the patient currently dissenting or not.***]***

***[******Query-Set-Variables – A list of values with associated metadata tags used to replace placeholders within Extraction Requirements]***

* + - Substitution-Value - The value(s) to be used in place of each placeholder in an Extraction Requirement and identified by an Attribute Identifier (AID). The syntax used to define Code String Variants is declared in section 7. Multiple values are allowed, delimited with a section character ("§" a non-keyboard character - HTML: § or ASCII code 245). At this release of GPES-I the use of Substitution-Values is restricted to dates, code strings (subject to paragraph 22) and patient cohorts. As such null values will not be utilised and in the error event a null is passed, the GPET-E system should reject the RTP message.
    - Description – A description of the Substitution-Value.
    - AID – The attribute identifier
  + Show-Descriptions – Used for debugging purposes. If “Y” then all optional friendly name attributes of Description-Type are to be populated.
  + DTS-Return-Address – The MESH Address to which the Run Time Parameters Response message and Query Results file(s) produced in response to this RTP is/are to be returned. Must be a valid MESH address as defined in Ref [2] and Ref [3].

### Payload Definition

1. The XML Schema for the Run Time Parameters content is defined as GPES-Q-E-RTP.xsd and can be found in Section 4.

#### MESH Control File Configuration

1. For each transmission, the following values should be used within the MESH control file for the following attributes:
2. <To\_DTS> Populate with the MESH address required to route the RTP message as per the address resolution process described in Section 3.3.1.
3. <WorkflowID> Populate with the text “GPDC\_RTP”.
4. <Subject> Populate with the first Practice-ID value from within the GP-Practice-Cohort node of the RTP payload, followed by “:”, followed by “TEST:” or “LIVE:” which matches that in the Query-Domain element within the RTP payload (note, capitalised here), followed by the Scheduled-Query-Instance-ID value within the RTP payload, e.g.
5. “A98765:LIVE:A00118-000000000002-R”
6. <LocalId> Populate with the RTP-UUID value from within the RTP payload.
7. <DataChecksum> Populate with the MD5 checksum of the payload.
8. NOTE: These attributes are those specific to the transmission of GPES files using the MESH service and are not the complete complement of attributes required in a control file – see the file interface definition Ref [3].

### Exception and Error Processing

1. See section 3.14.

## Run Time Parameters Response (RTPR) Message

1. The Run-Time-Parameters-Response message contains the necessary attributes for a GPET-E System to acknowledge processing of a Run-Time-Parameters message and provide the necessary status responses to GPDC for every GP Practice that was contained in the Run-Time-Parameters message.
2. If the GPET-E System is unable to schedule all requests in a Run-Time-Parameters message, either due to a message error, incorrect GP Practice Cohort (e.g. a GP Practice is included which is not/no longer supported by that GPET-E system) or similar error, for one or more GP Practices, it will return status responses to GPDC indicating the relevant failure code, by GP Practice ID, for those GP Practices that fail – see section 3.8.3 for error processing. The GPET-E System should continue to service requests for GP Practices that do not error. This is to allow the GPDC System to record the status for every GP Practice in every Scheduled Query Instance for GPES Business Unit operational use and for the provision of Management Information reports.
3. The Run-Time-Parameters-Response message also allows a GPET-E System to respond to GPDC and complete the Authentication Signature Pair exchange for every GP Practice in a Scheduled Query Instance – see paragraph 132.
4. The content of the RTPR message is of type GPES-E-Q-RTPR.
5. The messaging rules described in section 3.5 must be adhered to.
6. The GPDC System will process the content of the GPES-E-Q-RTPR message.
7. Errors and failures at execution time (i.e. after completion of the Run-Time-Parameters and Run-Time-Parameters-Response exchange) are notified to GPDC using the Report messages defined in 3.11 below.

### Message Attributes

1. The Run-Time-Parameters-Response (RTPR) message will include the following attributes – *attributes will be required unless otherwise marked as optional as defined by the Runtime Parameters Response XML schema*:
   * GPES-I-Version – The version of the GPES Interoperability Standard that applies to this message.
   * RTPR-Message-Version – The version of the RTPR message.
   * RTPR-UUID - An identifier used to uniquely identify the RTPR message itself. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)
   * RTP-UUID – The identifier that uniquely identifies the RTP message being responded to. (sourced from the RTP message)
   * Issue-Date-Time – The date/time that the message was issued by GPET-E
   * Query-Name – Optional. The name given to the query that this RTPR message relates to. (sourced from the RTP message)
   * Query-Description – Optional. A description of the query that this RTPR message relates to. (sourced from the RTP message)
   * Scheduled-Query-Instance-ID (SQI) – A composite reference number used to uniquely identify the instance of the query being scheduled. It is comprised of the following three elements separated by hyphens “-“. 1: Query Identifier – alpha-numeric 6 characters, 2: Date – numeric 8 digits and Sequence Number – numeric 4 digits, 3: Regular/Ad-hoc query identifier – R or A). For example, A00001-201809180001-R (sourced from the RTP message).

***[GP-Practice-Cohort – A list of one or more GP Practice Identifier / GPET-Q Authentication Signature / GPET-E Authentication Signature / Response ID values against which results are to be returned.]*** This list is sourced from the RTP message and MUST contain every practice for which data has been requested in the RTP message.

* + - Practice-ID – A unique GP Practice Identifier in the form of a National Administrative Codes Service (NACS) code. (sourced from the RTP message)
    - GPET-Q-SQI-Authentication-Signature – A unique GPDC identifier for practice level authentication of GPDC. (sourced from the RTP message)
    - GPET-E-SQI-Authentication-Signature – Optional. A unique practice level identifier for use by GPDC to authenticate the GP Practice system. This value will be populated if the RTP-Response-ID indicates that results will be returned. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)
    - RTP-Response-ID – A 5-digit Hexadecimal value used to indicate to GPDC whether results will be returned for this GP Practice.

### Payload Definition

1. The XML Schema for the Run Time Parameters Response content is defined as GPES-Q-E-RTPR.xsd and can be found in Section 4.

#### MESH Control File Configuration

1. For each transmission, the following values should be used within the MESH control file for the following attributes:
2. <To\_DTS> Populate with the DTS-Return-Address as provided in the Run-Time-Parameters message provided for the Scheduled Query Instance. This is to enable GPDC to load balance traffic through different GPDC hosted MESH clients if required. NOTE: This value may vary across different Extraction Requirements and even different Scheduled Query Instances of the same Extraction Requirement and must not be hard coded.
3. <WorkflowID> Populate with the text “GPDC\_RTPR”.
4. <Subject> Populate with the GPSS NACS code, followed by “:”, followed by “TEST:” or “LIVE:” which matches that in the Query-Domain element within the RTP message being responded to (note, capitalised here), followed by the Scheduled-Query-Instance-ID value within the RTPR payload, e.g.
5. “YGK01:LIVE:A00118-201809180001-R”
6. <LocalId> Populate with the RTP-UUID value from within the RTPR payload.
7. <DataChecksum> Populate with the MD5 checksum of the payload.
8. NOTE: These attributes are those specific to the transmission of GPES files using the MESH service and are not the complete complement of attributes required in a control file – see the file interface definition Ref [3].

### Exception and Error Processing

1. See section 3.14.

## Query Results (QR) Message

1. The Query-Results message contains the necessary attributes for a GPET-E System to communicate Data Provider Output to GPDC for each Scheduled Query Instance of an Extraction Requirement.
2. Along with messaging control attributes it contains a format to allow Data Provider Output to be communicated as described in section 2.3. This format is part of the overall message schema and is generic for all Extraction Requirements that adhere to this Standard.
3. The Query-Results message is transferred via MESH.
4. The content of the Query-Results message is XML in format of type GPES-Q-E-QR as described in section 4.
5. The Query-Results message may be GZip compressed[[4]](#footnote-5) by the GPET-E application to maximise the volume of data that can be transported. The status of the payload being compressed or uncompressed is communicated via the MESH control channel, see paragraph 180.
6. This compression-by-the-application approach is irrespective of any compression capability native to the MESH client software and its mode of operation. Where a Query-Results message has been GZip compressed by the GPET-E application, the “IsCompressed” flag in the MESH control file must be set to “Y” to avoid MESH attempting to compress the message.
7. The messaging rules described in section 3.5 must be adhered to, specifically the criteria governing the handling of Data Provider Output being split across multiple Query-Results messages.
8. GPET-E Systems should send Query Results back to GPDC as soon as practically possible after the results are available but no later than 4 hours following generation.
9. Query-Results must only be sent to GPDC on or after the Execution Date and should arrive before or on the Cut-off Date as defined in the Run-Time-Parameters message. For clarity, there is no process for GPDC to request a cancellation of a previously successfully Scheduled Query Instance of an Extraction Requirement (via an RTP – RTPR exchange). Running an Extraction Requirement after the cut-off date may have SLA implications for the GPET-E and may impact the capacity available within the GPET-E to run valid instances, but the late submission will nevertheless be accepted by GPDC.
10. In the event of an error whilst processing the Query-Results message within GPDC a resend of the Query-Results message may be requested, however this is an off-system process and will not be requested in the Query-Results-Acknowledgement message (see paragraph 196.
11. A Checksum of the Query-Results message is to be generated by the GPET-E System once the message generation is complete and, where applicable, after the message has been compressed by the GPET-E application (as opposed to the MESH client). This is transferred via a MESH control file attribute – see section 3.9.2.1 for details on how MESH control file attributes are used.

### Message Attributes

1. The Query Results (QR) message will include the following attributes – *attributes will be required unless otherwise marked as optional as defined by the Query Results XML schema*:

* GPES-I-Version – The version of the GPES Interoperability Standard that applies to this message.
* QR-Message-Version - The version of the QR message.
  + QR-UUID - An identifier used to uniquely identify the QR message itself. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)
  + Scheduled-Query-Instance-ID – A composite reference number used to uniquely identify the instance of the query that the results relate to. It is comprised of the following three elements separated by hyphens “-“. 1: Query Identifier – alpha-numeric 6 characters, 2: Date – numeric 8 digits and Sequence Number – numeric 4 digits, 3: Regular/Ad-hoc query identifier – R or A). For example, A00001-201809180001-R (sourced from the RTP message).
  + RTP-UUID – The identifier that uniquely identifies the RTP message being responded to. (sourced from the RTP message)
  + Practice-ID – A unique GP Practice Identifier in the form of a National Administrative Codes Service (NACS) code. (sourced from the RTP message)
  + GPET-Q-SQI-Authentication-Signature – A unique GPDC identifier for practice level authentication of GPDC. (sourced from the RTP message)
  + GPET-E-SQI-Authentication-Signature – A unique practice level identifier for use by GPDC to authenticate the results. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)
  + Issue-Date-Time – The date/time that the message was issued by GPET-E
  + Query-Name – Optional. The name given to the query that this QR message relates to. (sourced from the RTP message)
  + Query-Description – Optional. A description of the query that this QR message relates to. (sourced from the RTP message)

***[Query-Results-Manifest – GP system Identifier and statistics details]***

* + - GPET-E-Executable-Version - Used for GPET-E system to communicate the version of the GPET-E Executable software used to extract the Query Result data. Format of this attribute is for GPET-E supplier to decide and manage. This is distinct to the GP System Identifier in this message
    - GP-System-Identifier – The computer system used by the GP Practice, made up of a product and version identifier conforming to the standard defined in the 04002 code within Ref [7].

***[Terminology-Identifiers]*** – A list of one or more of the clinical coding standards used by the GP Practice system (the terminology stated is the terminology supported by the GPET-E for the Practice at the point of generating the message).

* + - * CodeSchemeID – ISO Object Identifier for the coding scheme
      * Terminology-Name – The terminology name within the coding scheme.
      * Terminology-Release – This element is deprecated in version 4.1 onwards. Although the element still exists in the QR message it is not used and must be included in all QR messages with a null value.
    - RTP-Translation-Start-Date-Time - Date/time of the start point for a GPET-E system to populate the GPET-E Executable with the RTP values
    - RTP-Translation-End-Date-Time – Date/time of the stop point for a GPET-E system to populate the RTP values.
    - Query-Execution-Start-Date-Time – Date/time of the start point for a GPET-E system to run a GPET-E executable
    - Query-Execution-End-Date-Time - Date/time of the stop point for a GPET-E system to run a GPET-E executable

***[Query-Results – One or more Query-Results-Records for Patient, Aggregate and Freeform results]***

* + - RID – A sequential record identifier for each Patient-Level-Record within the Query-Results-Records. Note that all RID values are contiguous within the QR message.

***[Patients-Table-Attributes]***

NB: All of the patients table attributes in the QR message (except for QID and LID) are sourced from the patients table but unlike the patients table all attributes are optional and populated according the query. See section 2.4.3.4 for a description of the patients table attributes below. The QID and LID attributes are “system” attributes and do not form part of the patient data.

* + - QID – The query identifier related to the patient for this RID.
    - LID – The line identifier related to this QID.
* *REFERENCE*
* *DATE-OF-BIRTH*
* *SEX*
* *POSTCODE*
* *POSTCODE-SECTOR*
* *MARITAL-STATUS*
* *GP*
* *GP-USUAL*
* *ACTIVE*
* *REGISTERED-DATE*
* *REMOVED-DATE*
* *DATE-OF-DEATH*
* *HA*
* *PCG*
* *PRACTICE*
* *SURGERY*
* *MILEAGE*
* *DISPENSING*
* *SURNAME*
* *FORENAME*
* *TITLE*
* *NHS-NUMBER*
* *ADDRESS*
* *ADDRESS-1*
* *ADDRESS-2*
* *ADDRESS-3*
* *ADDRESS-4*
* *ADDRESS-5*
* *PRACT-NUMBER*
* *ETHNIC*
* *FIRST-LANGUAGE*

***[Journals-Table-Attributes]***

NB: All of the journals table attributes in the QR message (except for QID and LID) are sourced from the journals table but unlike the journals table all attributes are optional and populated according the query. See section 2.4.3.5 for a description of each of the attributes below. The QID and LID attributes are “system” attributes and do not form part of the patient data.

* + - QID – The query identifier related to the patient for this RID.
    - LID – The line identifier related to this QID.
    - DATE
    - RECORD-DATE
    - CODE
    - HCP
    - HCP-TYPE
    - GMS
    - EPISODE-CONDITION (source = Journals Table T2A10)
    - EPISODE-PRESCRIPTION (source = Journals Table T2A11)
    - TEXT
    - RUBRIC
    - SUMMARY
    - VALUE1-CONDITION (source = Journals Table T2A16)
    - VALUE2-CONDITION (source = Journals Table T2A17)
    - VALUE1-PRESCRIPTION (source = Journals Table T2A18)
    - VALUE2-PRESCRIPTION (source = Journals Table T2A19)
    - END-DATE
    - TIME
    - CONTEXT
    - CERTAINTY
    - SEVERITY
    - LINKS
    - REASON

***[Referrals-Table-Attributes]***

NB: All of the referrals table attributes in the QR message (except for QID and :LID) are sourced from the referrals table but unlike the referrals table all attributes are optional and populated according to the query. See section 2.4.3.6 for a description of each of the attributes below. The QID and LID attributes are “system” attributes and do not form part of the patient data.

* + - QID – The query identifier related to the patient for this

RID.

* + - LID – The line identifier related to this QID.
      * DATE
      * HCP
      * HCP\_TYPE
      * TO\_HCP
      * SPECIALITY
      * UNIT
      * TYPE
      * REASON
      * CONTRACTOR
      * ACTION\_DATE
      * LINKS

***[Encounters-Table-Attributes]***

NB: All of the encounters table attributes in the QR message (except for QID and :LID) are sourced from the encounters table but unlike the encounters table all attributes are optional and populated according to the query. See section 2.4.3.7 for a description of each of the attributes below. The QID and LID attributes are “system” attributes and do not for part of the patient data.

* + - QID – Optional. The query identifier related to the patient for this RID.
    - LID – Optional. The line identifier related to this QID.
      * DATE
      * HCP
      * HCP\_TYPE-ENC
      * SESSION
      * LOCATION
      * TIME
      * DURATION
      * TRAVEL
      * REASON
      * LINKS

***[Aggregate Record – Zero or more aggregate records]***

* + - Aggregate-Record - Aggregation value.
    - RID – A sequential record identifier for each Aggregate-Record within the Query-Results-Records. Note that all RID values are contiguous within the QR message.
    - AID – The unique aggregation identifier for this Aggregate-Record.
    - Description – The text description for this Aggregate-Record.

***[Freeform Record – Zero or more freeform records]***

* + - RID – A sequential record identifier for each Aggregate-Record within the Query-Results-Records. Note that all RID values are contiguous within the QR message.

***[Freeform Attribute – One or more freeform attribute records]***

* + - * Freeform-Attribute – Freeform value.
      * QID - The query identifier related to the patient for this RID.
      * LID – The line identifier related to this QID.
      * AttributeName – The name of the attribute populated in Freeform-Attribute

In the above specification, for the use of RID, QID and LID values, each Extraction Requirement will specify exactly how the RIDs, QIDs and LIDs should be used for that Requirement. The Extraction Requirement will state in which order the record types are to be used, and for each of these record types the values to be used for QIDs and LIDs. It is likely the QIDs will all be unique. The QID values will start at 1 and increment by 1 for each SQI. The LID values will start at 1 and increment by 1 for every QID.

### Payload Definition

1. The XML Schema for the Query-Results content is defined as GPES-Q-E-QR.xsd and can be found in section 4.
2. The filename format is not relevant for this message as the MESH service assigns a system wide unique filename for transmission over the service and the local filename is not preserved. It is advised that a unique filename format is implemented by suppliers for local debugging purposes.

#### MESH Control File Configuration

1. For each transmission, the following values should be used within the MESH control file for the following attributes:
2. <To\_DTS> Populate with the Return-DTS-Address as provided in the Run-Time-Parameters message provided for the Scheduled Query Instance. This is to enable GPDC to load balance traffic through different GPDC hosted MESH clients if required. NOTE: This value may vary across different Extraction Requirements and even different Scheduled Query Instances of the same Extraction Requirement and must not be hard coded.
3. <WorkflowID> Populate with the text “GPDC\_QUERY\_RESULTS”
4. <Subject> Populate with the text “GPES-E-Q-QR:” followed by “C:” or “U:” to denote Compressed or Uncompressed, followed by “TEST:” or “LIVE:” which matches that in the Query-Domain element within the corresponding RTP file (note, capitalised here), followed by the QR-UUID value within the payload (where there are multiple SQIs in a QR message, utilise the first QR-UUID in the payload, i.e. the first QR-UUID after the default declaration) followed by “:” and terminating with the MD5 checksum of the payload, e.g.
5. “GPES-E-Q-QR:C:TEST:5CFB1991-A903-4414-8464-620D4C3E23BD:977B865EA3F3E0D4CCB4D7947D21C006”
6. <LocalId> Populate with the RTP-UUID value from within the QR payload
7. NOTE: These attributes are those specific to the transmission of GPES files using the MESH service and are not the complete complement of attributes required in a control file – see the file interface definition Ref [3].

### Exception and Error Processing

1. See section 3.14.

## Query Results Acknowledgement (QRA) Message

1. The Query-Results-Acknowledgement message contains the necessary attributes for GPDC to acknowledge receipt of a Query-Results message from a GPET-E System.
2. The Query-Results-Acknowledgement message is transferred via MESH and will be returned to the same MESH address from which the originating QR was sent.
3. The content of the Query-Results-Acknowledgement message is XML in format of type GPES-Q-E-QRA as described in section 4.
4. The Query-Results-Acknowledgement message will **not** be GZip compressed by the GPDC application[[5]](#footnote-6).
5. The messaging rules described in section 3.5 must be adhered to.
6. GPDC Systems will send Query-Results-Acknowledgement messages back to GPET-E Systems as soon as practically possible after Query-Results have been processed but no later than 4 hours following processing.
7. Processing of a Query-Results message includes integrity checking of the physical file via a MD5 checksum to ensure all bits (as in 8 bits = 1 byte) of the file were transferred successfully. Where an MD5 checksum error is detected, GPDC will respond with the relevant acknowledgement error code – Ref [5] – and quote the QR-UUID as provided in the Subject attribute of the MESH control file that was used to transmit the QR-UUID. In this instance, as the content of the Query-Results message cannot be inspected, the QRA will quote a Scheduled-Query-Instance-ID of "000000-000000000000-A" and a Practice-ID of "V81998"; these two data values being superfluous. GPET-E Systems can use the QR-UUID to identify the submission that has failed.
8. Each GPET-E System must retain the Query-Results message until GPDC sends back an acknowledgement that it has received and validated the message sent via a Query-Results-Acknowledgement message.
9. If the Query-Results-Acknowledgement states the Query-Results message was successfully processed the GPET-E System is free to delete the Query-Results message, subject to the retention rules described in section 3.5, or to retain for local processing if appropriate (e.g. for value added processing).
10. If GPDC fails to acknowledge receipt of a Query-Results message, the GPET-E System may delete the Query-Results message after a set period not less than three days, subject to the retention rules described in section 3.5.
11. If GPDC determines that a Query-Results message is incorrect, incomplete or corrupt it will respond with the relevant acknowledgement error code – Ref [5], providing there is enough detail available in the Query-Results message to act upon.
12. Where an incorrect Query-Results message has been submitted (see paragraph 195), then the GPET-E System may assume that the local data copy is of no further use and delete it. Any requests for the data to be resubmitted will follow a Service Management process. In such cases, the GPET-E system must be capable of submitting a corrected Query-Results message against the original Run-Time-Parameters message.

### Message Attributes

1. The Query Results Acknowledgement (QRA) message will include the following attributes – *attributes will be required unless otherwise marked as optional as defined by the Query Results Acknowledgement XML schema*:

* GPES-I-Version – The version of the GPES Interoperability Standard that applies to this message.
* QRA-Message-Version - The version of the QRA message.
  + QRA-UUID - An identifier used to uniquely identify the QRA message itself. (A Universal Unique Identifier (aka GUID) generated by the sender. Complies with RFC 4122 and ISO/IEC 11578:1996)
  + Issue-Date-Time – The date/time that the message was issued by GPDC

***[Acknowledgement Record – One or more acknowledgement records, one per QR]***

* + Scheduled-Query-Instance-ID – A composite reference number used to uniquely identify the instance of the query that results relate to. It is comprised of the following three elements separated by hyphens “-“. 1: Query Identifier, 2: Sequence Number, 3: Regular/Ad-hoc query identifier. (sourced from the QR message).
  + Practice-ID – Single GP Practice NACS Code
  + Query-Name – Optional. The name given to the query that this QRA message relates to.
  + Query-Description – Optional. A description of the query that this QRA message relates to.

### Payload Definition

1. The XML Schema for the Query-Results content is defined as GPES-Q-E-QRA.xsd and can be found in section 4.
2. The filename format is not relevant for this message as the MESH service assigns a system wide unique filename for transmission over the service and the local filename is not preserved. It is advised that a unique filename format is implemented by suppliers for local debugging purposes.

#### MESH Control File Configuration

1. For each transmission, the following values should be used within the MESH control file for the following attributes:
2. <To\_DTS> Populate with the MESH Address from which the Query-Results message originated.
3. <WorkflowID> Populate with the text “GPDC\_QUERY\_RESULTS\_ACK”
4. <Subject> Populate with the text “GPES-Q-E-QRA:” followed by the QRA-UUID value within the payload e.g.
5. “GPES-Q-E-QRA:E4DD52CD-4525-4CC9-A6E8-375AC5252CF3”
6. <LocalId> Populate with the RTP-UUID value from within the QR payload.
7. NOTE: These attributes are those specific to the transmission of GPES files using the MESH service and are not the complete complement of attributes required in a control file – see the file interface definition Ref [5].

### Exception and Error Processing

1. See section 3.14.

## Report (REP) Message

1. The Report message is a MESH wrapper for a number of different reports from GPET-E Systems to GPDC.
2. The content of the REP message is of comma separated values (CSV) format.
3. The messaging rules described in section 3.5 must be adhered to, specifically paragraph 113.
4. The GPDC System will process the content of the GPES-E-Q-REP message.

### Message Attributes

1. There are two agreed reports which can be transmitted using the GPES-E-Q-REP interaction, the Extract Success Report and the Extract Deployment Status Report. The Report (REP) message will include the following attributes – *attributes will be required unless otherwise marked as optional as defined by the Report CSV File Definitions*:
2. Attributes common to both reports:
   * Report Name – The full name of the report, e.g. “GPES Rep-02 - Extract Deployment Status Report”. [Text]
   * Reporting Date – The date on which the report was run. [Date “ccyymmdd” - field length = 8]
   * GP System Supplier Name – Organisation name derived from the GPSS NACS code. [Text]
   * Service ID – The six-character Query Identifier, e.g. A00028. [Alphanumeric - field length = 6]
   * Service Name – The name of the data extract, e.g. MenACWY. [Text]
   * NACS Code – The NACS code of the GP Practice. To include all target GP practices by Extraction Requirement. [Alphanumeric - field length = 6]
3. Attributes specific to Rep-01 - Extract Success Report:
   * SQ Instance ID – A composite reference number used to uniquely identify the instance of the query being scheduled. It is comprised of the following three elements separated by hyphens “-“. 1: Query Identifier – alpha-numeric 6 characters, 2: Date – numeric 8 digits and Sequence Number – numeric 4 digits, 3: Regular/Ad-hoc query identifier – R or A). For example, A00001-201809180001-R (sourced from the RTP message).
   * DDW Start Date – The Data Delivery Window Start Date (sourced from the Extraction Requirement). [Date “ccyymmdd” - field length = 8]
   * DDW End Date – The Data Delivery Window End Date (sourced from the Extraction Requirement). [Date “ccyymmdd” - field length = 8]
   * RP End Date – The Resolution Period End Date (sourced from the Extraction Requirement). [Date “ccyymmdd” - field length = 8]
   * RTP Start Date – Execution-Date (sourced from the RTP message). [Date “ccyymmdd” - field length = 8]
   * RTP Cut-Off Date – Cutoff-Date (sourced from the RTP message). [Date “ccyymmdd” - field length = 8]
   * Data Published to Data Viewer – The Timestamp of when the data was made available to the Data Viewer (sourced from GPET-E System audit logs). [DateTime ccyymmdd hh:mm:ss - field length = 17]
   * Data Sent to GPDC – Timestamp of when the QR was successfully uploaded to the MESH server [DateTime ccyymmdd hh:mm:ss - field length = 17]
   * Ack Received from GPDC – Timestamp of when the acknowledgement from GPDC was available to be retrieved from the MESH server (sourced from the MESH logs) [DateTime ccyymmdd hh:mm:ss - field length = 17]
   * Delivered – A “YES” or “NO” value indicating whether the QR was successfully delivered to GPDC (YES if a QRA message has been received, irrespective of the status code, NO if a QRA message has not been received)
   * Delivery Status Code – The Acknowledgement Status Code from the QRA, e.g. 3000.
4. Attributes specific to Rep-0 2 - Extract Deployment Status Report:
   * Business Rule Version – The version of the Business Rules used for the extract (sourced from the Extraction Requirement). [Text]
   * Deployment Status – The status of the capability of the GPET-E System to extract data for a given Extract Requirement for each GP practice. Possible values are “Deployed” or “Not Deployed”.
   * Deployment Date – The date the extraction capability was deployed for each GP practice. [Date “ccyymmdd” - field length = 8]

### Payload Definition

1. The sample CSV file structures can be found in Section 4.

#### MESH Control File Configuration

1. For each transmission, the following values should be used within the MESH control file for the following attributes:
2. <To\_DTS> Populate with the value “X26HC033”. This attribute must be stored as a configurable item within the GPET-E System and must not be hard coded.
3. <WorkflowID> Populate with the text “GPDC\_REPORT”.
4. <Subject> Populate with the GPSS NACS code, followed by “:”, followed by the Report Name being sent, e.g.
5. “YGK01:Rep-0 2 - Extract Deployment Status Report”
6. <LocalId> REP-UUID - An identifier generated by the sender and used to uniquely identify the REP message itself. (A Universal Unique Identifier (aka GUID). Complies with RFC 4122 and ISO/IEC 11578:1996)
7. <DataChecksum> Populate with the MD5 checksum of the payload.
8. NOTE: These attributes are those specific to the transmission of GPES files using the MESH service and are not the complete complement of attributes required in a control file – see the file interface definition Ref [3].

### Exception and Error Processing

1. GPDC will not perform any message or business validation of the Report Message. Errors will be reported and resolved through an off-system process.
2. Where an incorrect, incomplete or corrupt Report message has been submitted, then the GPET-E System may assume that the local data copy is of no further use and delete it. Any requests for the data to be resubmitted will follow a Service Management process. In such cases, the GPET-E system must be capable of submitting a corrected Report message.

## Report Acknowledgement

1. GPDC will not send anacknowledgementfor the Report Message. GPSS are responsible for ensuring that the report has been successfully sent.

## Message Control Attributes - Worked Example

1. To illustrate the correct use of the Run-Time-Parameter, Run-Time-Parameter-Response, Query-Results and Query-Results-Acknowledgement schemas Figure 3 is included[[6]](#footnote-7). It shows the relationship between key attributes in the four different schemas.
2. This example is for a Query (ABC) that is to be scheduled at a GP Practice (A12345). The query executes successfully and the results returned in a single Query Results message which is acknowledged.
3. Particular attention is drawn to the values used in the attributes to show where they propagate through the example to uniquely identify each message and uniquely reference the parent message.



Figure 3 - Worked Example 1

## Exception and Error Handling

1. GPDC and GPET-E systems must implement error handling and reporting in the event of exceptions encountered while processing MESH messages. The message interactions for MESH messages are described in section 3.4.
2. Ref [5] contains the source of interface codes used to describe error conditions and events as communicated within GPES-I interactions.
3. The following paragraphs describe exception and error handling for those interactions.
4. In the following circumstances the system must report an error to support staff who will raise an incident;
   * Where an attempt to send a message fails or times out and the error cannot be resolved by attempting to resend that message e.g. where the error is not due to the MESH system being temporarily unavailable.
   * Where an attempt to re-send a message times out or fails more than a pre-configured number of times.
   * Where validation such as schema validation of a received message fails. In this circumstance any required Acknowledgement or Response message must also be sent and indicate the error.
   * Where a received Acknowledgement or Response message indicates a failure that cannot be resolved by the system software e.g. by merely re-sending the original message.

## GPES-I / Message Version Control Mechanism

1. The versioning of messages within GPES-I is managed via a compatibility matrix which describes which version of messages are in use in which version of GPES-I, see Table 7. Message interactions are grouped into the two transport technologies; TMS in BLUE and MESH in YELLOW.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Transport: TMS** | | | | **Transport: MESH** | | | | |
|  | **Message Interaction** | GPES-Q-E-RTP | GPES-E-Q-RTPR | GPES-Q-E-NT | GPES-E-Q-NT | GPES-Q-E-RTP | GPES-E-Q-RTPR | GPES-E-Q-QR | GPES-Q-E-QRA | GPES-E-Q-REP |
| **TMS Message ID** | COMT\_IN000001GB01 | COMT\_IN000002GB01 | COMT\_IN000003GB01 | COMT\_IN000004GB01 | N/A | N/A | N/A | N/A | N/A |
| **GPES-I Version** | **DMS Version ID** | **Message Version** | | | | **Message Version** | | | | |
| 3.0 | 3GPSDMS1.0 | 0.1 | 0.1 | 0.1 | 0.1 | N/A | N/A | 0.1 | 0.1 | N/A |
| 3.1 | V3GPS\_DMSv1.0:RC1 | 0.2 | 0.2 | 0.2 | 0.2 | N/A | N/A | 0.2 | 0.2 | N/A |
| 4.0 | v3GPS\_DMSv1.0:RC1 | 0.2 | 0.2 | 0.2 | 0.2 | N/A | N/A | 0.2 | 0.2 | N/A |
| 5.0 | v3GPS\_DMSv1.0:RC1 | 0.2 | 0.2 | 0.2 | 0.2 | N/A | N/A | 0.2 | 0.2 | N/A |
| 5.2 | v3GPS\_DMSv1.0:RC1 | 0.2 | 0.2 | 0.2 | 0.2 | N/A | N/A | 0.2 | 0.2 | N/A |
| 5.3 | v3GPS\_DMSv1.0:RC1 | 0.2 | 0.2 | 0.2 | 0.2 | N/A | N/A | 0.2 | 0.2 | N/A |
| 6.0 | N/A | N/A | N/A | N/A | N/A | 0.2 | 0.2 | 0.2 | 0.2 | 1.2 |

Table 7

1. Each version of GPES-I implements specific versions of each of the six different message interactions. Each message interaction has its version ID fixed within its schema. This approach is to facilitate version control of each message independently so as to remove the need to uplift all schemas each time a change is required to GPES-I.
2. All messages contain a GPES-I Version attribute which is not a fixed value (as in it is not hardcoded within the schema) but is populated by the sender depending on the version of GPES-I in use between the sender and the receiver. Thus, as a new version of GPES-I is introduced the value in the GPES-I Version attribute is incremented as per Table 7 as and when the software is deployed.
3. The GPES-I Version attribute uniquely defines which version of messaging is to be used in the MESH channel for the version of GPES-I in use.

## Support for Production Test Environments

1. Production Test Environments (PTEs) are supported by GPES-I using the following configuration.
2. New synthetic GP Practices cannot be requested or configured within SDS for use as PTE practices. Therefore the Practice ID to GPSS lookup which GPDC uses for addressing will not function in the same way for PTEs as it will for live practices, as Practice IDs cannot be assigned to PTEs.
3. However, all GPES messages require Practice IDs to be included in the business element of the messages and Practice-ID is the “primary-key” linking all messages. Additionally, there is a requirement to be capable of hosting multiple “dummy practices” on a PTE. Therefore, a solution is required for PTEs such that GPES messages are populated with Practice IDs that are allowed within the messaging solution but allow the “primary-key” function of Practice-ID to continue.
4. GPDC cannot simply generate a GP Practice ID to use as there is a risk of choosing an ID that in the future becomes live. Therefore, the value used for Practice ID in messages destined for PTEs is static as ID “V81998” [As defined in the NHS data dictionary as “GP Practice Code not applicable”, see http://www.datadictionary.nhs.uk/web\_site\_content/supporting\_information/organisation\_data\_service\_default\_codes.asp ]
5. When operation of GPDC requires interaction to PTEs the <Query-Domain> element within the RTP message is set to “Test” (as opposed to “Live” for normal production use). The Test-Pack-ID, an attribute of the <Query-Domain> element is used to differentiate between “dummy practices” within PTEs. The Test-Pack-ID attribute is used in the following way:
6. The format is <PTE Org ID >-<Dummy Practice ID>-<SQI ID>
7. Where <PTE Org ID > is that as provided by the GPSS for the PTE (will be agreed with each GPET-E) and is a maximum of 10 digit alphanumeric
8. <Dummy Practice ID> is a single identifier (where necessary from a range of identifiers agreed with each GPET-E) to be used by the GPET-E to target the Extraction and is a maximum of 10 digit alphanumeric
9. <SQI ID> is a replay of the Scheduled-Query-Instance-ID for which the RTP message is,
10. E.G. YYY-PTE50003- A00001-201805030001-R
11. Thus, every RTP message has a valid Practice ID within the GP Practice estate and can be targeted at specific instances of “dummy practice” in the PTE. The value in the Test-Pack-ID does not represent the ID of live practice and therefore there is no systematic link between IDs used in PTE and live domains.
12. The allocation of Dummy-Practice-IDs and their association with the appropriate test data pack will be managed through operational procedures between GPES and the GPET-Es on an Extraction Requirement by Extraction Requirement basis.

### Rules

1. All PTE MESH mailboxes must be in the Spine Integration environment.
2. An RTP message generated for a PTE will only ever have a single Practice-ID (static at V81998) included in it, acknowledging further detail for the PTE will be included in the Test-Pack-ID.
3. When GPET-Es respond to the RTP with a QR message (after having completed a successful RTPR exchange), the content of that QR message must only include a response to the single Practice contained in the RTP message.
4. GPSS must be able to generate a valid QR for testing purposes without receiving an RTP from GPDC. Values required for the testing of each extraction will be included in the Extraction Requirement. If a GPET-E solution requires an RTP in order to generate a QR, then the GPET-E must complete the RTP and RTPR exchange locally without any input from GPDC.
5. For testing and certification purposes, and where the RTP has been sent by GPDC, GPET-Es must be able to submit more than one QR in response to a single RTP.

### Relationship between messages

1. The mechanism to ensure the relationship between RTP messages and all other messages returned/sent to and from GPDC is detailed below.
2. RTP – As described above. An RTP message will only ever have a single Practice-ID in the GP-Practice-Cohort node
3. RTPR – The Practice ID – SQI-ID – RTP-UUID – RTPR-UUID combination of attributes supplied in a RTPR message, as normal, is used to link a RTPR to the originating RTP. In this instance all RTPRs are from the same Practice ID and a Test-Pack-ID – RTP-UUID lookup can be used to resolve the RTPR to the PTE source.
4. QR – The Practice ID – SQI-ID – RTP-UUID – QR-UUID combination of attributes supplied in a QR message, as normal, is used to link a QR to the originating RTP. In this instance all QRs are from same Practice ID and a Test-Pack-ID – RTP-UUID lookup can be used to resolve the PTE source.
5. QRA – The Practice ID – SQI-ID – QR-UUID combination of attributes supplied in a QR message along with the MESH address that the QR message arrived from, as normal, is used to link a QRA to the originating QR and send a QRA to the PTE. In this instance all QRAs are to the same Practice ID. The Practice ID – SQI-ID – QR-UUID – QRA-UUID combination of attributes supplied in a QRA message can identify which QR the QRA is relevant to and a QR-UUID – RTP-UUID – Test-Pack-ID lookup at the GPET-E will identify which “Practice” the RTP was initiated to.

# MESH Message Schemas

1. The XML schema and example files described in the Run Time Parameters, Run Time Parameters Response, Query Results and Query Results Acknowledgement sections above are included here in a single zipped collection. Note: Common data types are held within a separate schema, these are used by the parent schemas and are included in the package below.



1. The CSV example for the Report messages are included here.



1. The updated Interface Code Register (Ref [5]) is included here.



1. Version 5.0 of GPES-I included fixes for the GPES-E-Q-QR schema. The GPES-E-Q-QR schema itself remains unchanged but requires version 0.3 of the GPES-QR-Patient-Level-Data-Structure.xsd and version 0.3 of the GPES-Data-Types.xsd.
2. All other schemas will function using the GPES-Data-Types.xsd as provided in GPES-I version 4, although for completeness the GPES-Data-Types.xsd as provided in GPES-I version 5 should be used for all interaction schemas and are fully backward compatible.

# Acknowledgement Status Codes

1. The following section defines the valid acknowledgement status codes to be used for interactions between GPDC and GPET-E Systems.
2. A number of codes have been reused from previous versions of the GPES-I Standard; however, the meaning of some of these codes has changed. None of the acknowledgement status codes shall request, nor imply, that a message is to be resent automatically by the GPET-E System. In all cases where an acknowledgement code indicates anything other than total success, the GPSS must ensure that the GPET-E Systems are configured to follow the processes described in Section 3.5 and 3.14.
3. Whilst the error states are self-explanatory, the exact scenarios expected to trigger each of the error codes will be defined prior to testing.

## Run time Parameters Response (RTPR) Status Codes

|  |  |
| --- | --- |
| **Status Code** | **Description** |
| 02000 | Run time parameter message processed successfully |
| 02001 | Unexpected RTP message schema version for GPES-I version stated |
| 02002 | GPES-I version not supported |
| 02003 | Practice not registered at this GPET-E |
| 02004 | Extraction requirement not supported |
| 02005 | Domain not supported (data included in the Test-Pack-ID cannot be processed successfully) |
| 02009 | Exclusion-Code-String not supported |
| 0200A | Missing or invalid substitution value |
| 0200B | Invalid Execution\Interim\Cutoff date or combination thereof, e.g. cut off date is earlier than the execution date |

## Query Results Acknowledgement Status Codes

|  |  |
| --- | --- |
| **Status Code** | **Description** |
| 03000 | Query results message processed successfully |
| 03005 | Invalid scheduled query instance ID |
| 0300A | Query results message not expected |
| 0300B | Duplicate QR - QR already received |
| 0300C | Checksum validation failure |
| 0300E | Unable to persist file (e.g. Invalid or missing query results data, junk data, unrecognisable format) |
| 03010 | Unable to parse file against the expected schema as stated in control file |

# Appendix A – Query-Results Patient Level Reporting Format

1. Where an Extraction Requirement specifies that Patient Level Data is to be returned in a Query Results message, this section describes the format to be used.
2. The format is closely coupled to the GPES Primary Care Data Model in that the Extraction Requirement can only request data from that model and therefore the resultant output is also reported using attribute names from that model.
3. Whilst the format is constrained to reporting specific attributes it is extensible and flexible to satisfy the varying requirements of each Extraction Requirement.
4. Each record that contains Patient Level Data may contain multiple values from multiple tables as described in section 2.4.2 and is determined by the number of “queries” asked in the Extraction Requirement.
5. Furthermore, each “query” may result in multiple answers. This allows for each record to be made up of multiple sub records. The Extraction Requirement will state IDs to be used to identify each incidence of a sub record to be returned.
6. Three identifiers are used in the reporting format, as described below:
7. Each record has an identifier; a “RID”.
8. Each record contains data for a single patient and is the result of asking one or more queries[[7]](#footnote-8).
9. Each query has an identifier; a “QID”.
10. Each query only requests data from a single table and details which values are to be required, by attribute name.
11. Each query may result in one or more lines of data being returned.
12. Each line of data has an identifier; a “LID”.
13. Each line of data may contain one or more data values, unless there is no data to return in which case null values will be supplied in the format QID = n, LID =1 and no attribute value pairs will be supplied in the element.
14. To illustrate by example[[8]](#footnote-9), part of an Extraction Requirement requires the following:
15. Selection Criteria: All patients currently registered and aged 50 or over on 01/01/2011
16. Provide the following data:
17. Query 1: The patent’s DOB and SEX
18. Query 2: All blood pressure readings taken on or after 01/01/2000 including the date the recording was taken
19. Query 3: The most recent diagnosis of Diabetes recorded on or after 01/01/2000 including the date of diagnosis and the Clinical Code indicating the type of Diabetes diagnosed
20. If the selection criteria that governs the population of patients that are included in a query results in 3000 patients, there will be 3000 records returned in the Query Results message. Each record will have
21. One answer for Query 1
22. None, one or more than one answers for Query 2
23. None or one answer for Query 3
24. An example record is shown in Figure 4.



Figure 4

# Appendix B - Syntax for GPES Code String Variants

1. This Standard only supports SNOMED\_CT syntax, as READ2 and CTV3 terminologies are in the process of being retired from Extract Requirements. However, the syntax for the legacy terminologies is retained in this Standard for historical purposes.
2. Table 8 identifies the different concepts needed to support Code String Variant definitions as used within Substitution Values in Run Time Parameters. This approach has been modelled on analysing the Code Clusters within the QOF Business Rules and designed to ensure that the nuances of those Code Clusters remain supported in the syntax.
3. The use of the ‘<>’ parenthesis here is for clarity inside this table only. The <> parenthesis will NOT appear in the Code String Variant definitions themselves. The use of the ‘@’ symbol is to represent a space. Spaces are used to make the Code String Variant more human readable.
4. With the introduction of SNOMED-CT Terminology into GPET-Q, special handling was required to deal with the addition of special characters in the code string QSVs for the XML based RTP. The approach adopted for GPET-Q is that all Code String Variants will have “<![CDATA[ “ as a prefix and “]]>” as a post fix added to the original contents of the field, e.g. <![CDATA[868631000000102]]>. GPDC does not propose to implement this approach, as it will correctly escape the XML data so as not to cause any parsing issues, e.g. &lt;&lt;314463006 OR &lt;&lt;198091000000104 OR &lt;&lt;198081000000101 etc.

| **Id** | **Concept** | **Syntax Form** | **Description** | **Example** |
| --- | --- | --- | --- | --- |
| 1 | Single Code | <xxxxx>  <xxxx.>  <xxx..>  <xx…>  <x….> | This represents a concept of a single code concept within a given NHS Terminology.  As Read2 and CTV3 are fixed length structures (i.e. 5 characters) ,for these NHS Terminologies, any code will be padded out to 5 characters (where necessary) by the suffixing with the appropriate number of full-stops.  For DM+D & SNOMED\_CT there is no intention to pad out these codes. | C10E1  C10E.  C10..  C1…  C…. |
| 2 | Delimiter | @,@ | The use of a “,” character represents a delimiter between any of concepts defined within this table.  NOTE: A delimiter cannot be directly followed by another delimiter. | C1000 , C1001 |
| 3 | Multiple Codes | <xxxxx> , <xxxxx> | This represents a concept of a list of codes within a given NHS Terminology. This is effectively is a repetition of a ‘single code’ concept followed by a ‘delimiter’, until the final code is listed. | C1000 , C1001 , C1002 |
| 4 | Wildcard | % | The use of a “%” character represents a ‘wildcard’, to mean “this code and all its descendants”. The “%” character must follow on immediately from a given code, i.e. no intervening spaces.  This concept can be used in any NHS Terminology used in GPES that allows codes to be grouped in a hierarchical parent-child type structure. | C10..% |
| 5 | Range | - | The use of a “-“ character represents a ‘range’, to mean  “all codes that fall within this alphanumeric range of codes, inclusive of the code defining the range”. The “-“ character must be placed directly between to two codes, i.e. no intervening spaces.  The use of a “-“ character has an implied ‘wildcard’, i.e. for a given range of codes, also include all their descendants.  Note: That this is only permissible for READ2. | C1000-C100z |
| 6 | Exclusion | @(excluding@<code>) | The use of an ‘exclusion’ concept i.e. “(excluding@<code>)“ means that the codes specified within the () parenthesis should be excluded from the preceding specified ‘wildcard’ or ‘range’ concept.  An ‘exclusion’ concept can only follow on from a ‘wildcard’ or a ‘range’ concept.  The codes specified within the () parenthesis(for an ‘exclusion’ concept’ can include   1. A single code <code> 2. A list of codes <code> , <code> 3. A ‘wildcard’ code <code>% 4. A code range <code>-<code> 5. A combination of a) to d) | C10..% (excluding C1001)  C10..% (excluding C1001, c100z)  C10..% (excluding C100%)  C10..% (excluding C1000-C100z)  C10..% (excluding C1001, C1011, C1011y, C102.%, C1030-C103y) |
| 7 | Inclusion | @(including@<code>) | The use of and ‘inclusion’ concept i.e. “(including@<code>)“  means that the codes specified within the () parenthesis should not be excluded from the codes specified in an associated ‘exclusion’ concept.  An ‘inclusion’ concept can only follow on from a ‘wildcard’ code or ‘range of codes’ within an ‘exclusion’ concept and must be nested within the ‘exclusion’ concept.  The codes specified within the () parenthesis can include   1. A single code <code> 2. A list of codes <code> , <code> 3. A ‘wildcard’ code <code>% 4. A code range <code>-<code> 5. A combination of a) to d) | C10..% (excluding C100% (including C1001))  C10..% (excluding C1000-C100z (including C1001))  C10..% (excluding C1001, C1011, C1011y, C102.% (including C1020), C1030-C103y (including C1031), C107.% (including C1070-C1071,C107y)) |

Table 8

## SNOMED\_CT Syntax

SNOMED CT codes may be up to 18 numbers long. In the cluster strings the following syntax is used to define which codes are included or excluded:

|  |  |  |
| --- | --- | --- |
| Syntax | Example | Description |
| No syntax | 000000001 | Include the single code 000000001 |
| << | <<000000002 | Include code 000000002 and all of its children |
| < | <0000000003 | Include all children of code 000000003 but do not include code 000000003 itself |
| OR | 000000004 OR 000000005 | The separator between codes (OR replaces the commas that used to separate the codes in the Read V2 and CTV3 code strings). Include codes 000000004 and 000000005. |
| MINUS | <<44054006 MINUS (237599002 OR 703138006) | Do not include the code(s) following the word MINUS |
| ( ) | As above | Used to separate exclusions from inclusions and vice versa |
| ^ | ^999000841000001106 | Member of (used for reference sets for drugs) |

The syntax above may be combined within one rubric, for example:

(<<1000000000001 OR <1000000000002 OR 10000000003 OR ^9990000000004) MINUS (30000000001 OR <<3000000002)

In English this rubric would read as:

*Include code 1000000000001 and all of its children, include all children under code 1000000000002 (but not code 1000000000002 itself), include code 10000000003 and include all codes within the refset 9990000000004 but exclude code 30000000001 and exclude code 3000000002 and all of its children.*

For further information, see Ref [6] and Ref [7].



# Appendix C – Glossary

1. 

Attachment 1: GPES-I Glossary

------------------------------------------END OF DOCUMENT-----------------------------------------

1. A value-added reporting service provided by GPSS to GP Clinical Systems, not specified or tested by CFH or NHS IC [↑](#footnote-ref-2)
2. This is the “section” character, chosen as it is not a keyboard character [↑](#footnote-ref-3)
3. For successful Run Time Parameter exchanges only, failures do not have a returned signature [↑](#footnote-ref-4)
4. See [IETF RFC1952](http://tools.ietf.org/html/rfc1952) for details. [↑](#footnote-ref-5)
5. It is acknowledged the MESH client may be configured to compress files by its native capability [↑](#footnote-ref-6)
6. NOTE: The diagram is constructed in MS Visio 2003 and can be double clicked to expand for ease of viewing in MS Visio. [↑](#footnote-ref-7)
7. Although a record has a RID and a record contains data for a single patient, this does not exclude a patient crossing multiple RIDs [↑](#footnote-ref-8)
8. This example is fictitious, unrealistic and is provided for the purpose of describing the format used to structure GPET-E Output [↑](#footnote-ref-9)