



HealthGorilla REST API Requisition Guide

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Resources:

- FHIR <http://hl7.org/fhir/>
- SMART on FHIR <http://docs.smarthealthit.org/>
- HealthGorilla FHIR Profiles v1.0
- HealthGorilla FHIR Extensions v1.0
- HealthGorilla FHIR ValueSet v1.0

Health Gorilla provides RESTful API that can be used to submit laboratory/radiology orders. This API is built upon FHIR DSTU3 and uses common FHIR resources and operations.

The following FHIR resources are involved in the requisitioning process:

- RequestGroup
- ProcedureRequest
- Account
- Coverage
- Organization
- Location
- Practitioner
- Patient
- RelatedPerson
- Specimen

RequestGroup

HealthGorilla uses `RequestGroup` resource to describe an order. `RequestGroup` refers to nested `ProcedureRequest` resources via `RequestGroup.action.resource` attribute. Each `ProcedureRequest` is a single test ordered within the parent order. Multiple tests can be ordered in the scope of an order.

`RequestGroup` must implement the HealthGorilla Order profile.

```
https://healthgorilla.com/fhir/StructureDefinition/hg-order
```

RequestGroup and nested resources may contain references. These references should refer to resources hosted on the same HealthGorilla FHIR server or internal resources (“contained”). Do not include references to external resources into the request. See <https://www.hl7.org/fhir/references.html> for details.

Below you can find a list of attributes that are used to submit a new order.

RequestGroup.status

This attribute must have the following value:

System: <http://hl7.org/fhir/request-status>

Code	Display	Definition
active	Active	The request is ready to be acted upon

RequestGroup.intent

This attribute must have the following value:

System: <http://hl7.org/fhir/request-intent>

Code	Display	Definition
order	Order	The request represents a request/demand and authorization for action

RequestGroup.priority

This is an optional attribute. You can use the following values to indicate the certain order has a high priority:

System: <http://hl7.org/fhir/request-priority>

Code	Display	Definition
urgent	urgent	The request should be actioned promptly - higher priority than routine
asap	ASAP	The request should be actioned as soon as possible - higher priority than urgent

stat	STAT	The request should be actioned immediately - highest possible priority. E.g. an emergency
------	------	---

RequestGroup.subject

Patient the tests are ordered for. This must be a reference to an existing [Patient](#) resource.

RequestGroup.author

The practitioner that authored the order - author, creator. This must be a reference to an existing [Practitioner](#) resource.

RequestGroup - authorizedBy

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-authorizedBy
```

The healthcare organization or department that authored the order. This must be a reference to an existing [Organization](#) resource. If known, this should be a certain healthcare organization location (Practice Location).

The target [Organization](#) must have one of the following types:

System: <https://www.healthgorilla.com/fhir/organization-type>

Code	Display	Definition
PR	Practice	Practice
PRL	Practice Location	Practice Location

RequestGroup.action

This is a list of tests ordered within the given order.

Each `action` element should contain `resource` attribute, that should be a link to an internal [ProcedureRequest](#) resource.

RequestGroup - account

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-account
```

This is billing preferences for the order. This must be an internal reference to [Account](#) resource. Required to be specified.

RequestGroup - patientLocation

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-location
```

Patient's physical location - Room/Bed. This should be an internal reference to [Location](#) resource. This attribute may be mandatory for some laboratories. If present then `Location.physicalType` is mandatory and must contain one of the following values:

System: <http://hl7.org/fhir/location-physical-type>

Code	Display	Definition
ro	Room	A space that is allocated as a room, it may have walls/roof etc., but does not require these.
bd	Bed	A space that is allocated for sleeping/laying on. This is not the physical bed/trolley that may be moved about, but the space it may occupy.

Example

```
{
  "resourceType": "RequestGroup",
  "contained": [
    {
      "resourceType": "Location",
      "id": "room",
      "name": "1A / 28",
      "mode": "instance",
      "physicalType": {
```

```

    "coding": [
      {
        "system": "http://hl7.org/fhir/location-physical-type",
        "code": "bd",
        "display": "Bed"
      }
    ],
    "text": "Room/Bed"
  }
},
...
],
...
"extension": [
  {
    "url":
https://www.healthgorilla.com/fhir/StructureDefinition/patient-location,
    "valueReference": {
      "reference": "#room"
    }
  },
  ...
]
}

```

RequestGroup - performer

Extension:

```

https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-performer

```

The desired performer for doing the diagnostic testing - laboratory, radiology imaging center, etc.

This must be a reference to an existing [Organization](#) resource. This is not a physical location, but an abstract Organization.

The target [Organization](#) must have one of the following types:

System: <https://www.healthgorilla.com/fhir/organization-type>

Code	Display	Definition
------	---------	------------

F	Facility	Facility
---	----------	----------

RequestGroup - performerLocation

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/performer-location
```

The service provider location where the requested diagnostic procedure should be performed. This must be a reference to an existing Location resource. Referenced location must be linked to the specified performer via `Location.managingOrganization` attribute.

Examples

Electronic order to LabCorp (no location)

```
{
  {
    "resourceType": "RequestGroup",
    ...
    "extension": [
      {
performer",
        "valueReference": {
          "reference": "Organization/f-d8da43521fe28b2afddb465",
          "display": "LabCorp"
        }
      },
      ...
    ]
  }
}
```

Radiology order to RADNet PSC (location chosen)

```

    "url":
    "https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
performer",
    "valueReference": {
      "reference": "Organization/f-d8da4352bfba8331b622682c",
      "display": "RADNet"
    }
  },
  {
    "url":
    "https://www.healthgorilla.com/fhir/StructureDefinition/performer-loc
ation",
    "valueReference": {
      "reference": "Location/fl-ade96d557573db6d2eabcc72",
      "display": "RADNet"
    }
  },
  ...
]
}

```

RequestGroup - requester

Extension:

```

https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
requester

```

The physician who requests diagnostic procedures for the patient and responsible for the order. This extension has two attributes - `agent` and `onBehalfOf`.

`requester.agent` is the individual who sent the order.

There are two options to go:

1. If performer does not require Account Number to be passed for physician, then it should be a reference to an existing `Practitioner` resource.
2. If Account Number is required to be included into request, then it must be an internal reference to `Practitioner` resource. An embedded resource must contain two identifiers:
 - HealthGorilla identifier that can be used to obtain an existing HealthGorilla practitioner
 - Account Number

`requester.onBehalfOf` is the practice the physician was acting on behalf of. This attribute is required to be set, if Account Number for practice is mandatory. In this case, it must be an

internal reference to Organization resource. An embedded resource must contain Account Number.

Examples:

Laboratory does not require any Account Number to be passed.

```
{
  "resourceType": "RequestGroup",
  "meta": {
    "profile": [
      "https://healthgorilla.com/fhir/StructureDefinition/hg-order"
    ]
  },
  ...
  "extension": [
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
requester",
      "extension": [
        {
          "url": "agent",
          "valueReference": {
            "reference": "Practitioner/fc076a524383b188ffc10051",
            "display": "Robert Kelso, M.D."
          }
        },
        {
          "url": "onBehalfOf",
          "valueReference": {
            "reference": "Organization/t-d5da4352af2201ace56ca725",
            "display": "Dr. Doe Practice"
          }
        }
      ]
    }
  ],
  ...
}
```

Both physician and practice Account Number are required.

```
{
  "resourceType": "RequestGroup",
  "meta": {
    "profile": [
      "https://healthgorilla.com/fhir/StructureDefinition/hg-order"
    ]
  },
  "contained": [
    {
      "resourceType": "Practitioner",
      "id": "1",
      "identifier": [
        {
          "type": {
            "coding": [
              {
                "system": "http://hl7.org/fhir/v2/0203",
                "code": "PRN",
                "display": "Passport number"
              }
            ]
          },
          "system": "http://hl7.org/fhir/sid/us-npi",
          "value": "1234567893"
        },
        {
          "type": {
            "coding": [
              {
                "system": "http://hl7.org/fhir/v2/0203",
                "code": "AN",
                "display": "Account number"
              }
            ],
            "text": "Account Number"
          },
          "value": "04843980"
        }
      ],
      "active": true,

```

```

    "name": [
      {
        "family": "Doe",
        "given": [
          "John"
        ],
        "suffix": [
          "M.D."
        ]
      }
    ],
  },
  {
    "resourceType": "Organization",
    "id": "2",
    "identifier": [
      {
        "type": {
          "coding": [
            {
              "system": "http://hl7.org/fhir/v2/0203",
              "code": "AN",
              "display": "Account number"
            }
          ],
          "text": "Account Number"
        },
        "value": "1A45HT6"
      }
    ],
    "name": "Dr. Doe Practice - 1825 Somestreet st, Sacramento, CA"
  },
  ...
],
"extension": [
  {
    "url":
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-requester,
    "extension": [
      {
        "url": "agent",

```

```
    "valueReference": {
      "reference": "#1"
    },
    {
      "url": "onBehalfOf",
      "valueReference": {
        "reference": "#2"
      }
    }
  ]
},
...
],
...
}
```

RequestGroup - reasonCode

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-reasoncode
```

An explanation or justification for why this diagnostic investigation is being requested in coded or textual form.

RequestGroup - specimen

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-specimen
```

One or more specimens that the laboratory procedure will use.
Currently only collection date is used in this attribute.

Example:

```
{
  "resourceType": "RequestGroup",
  "contained": [
```

```

{
  "resourceType": "Specimen",
  "id": "specimen",
  "subject": {
    "reference": "Patient/03db43522cc01432572e0a53",
    "display": "Bart Simpson"
  },
  "collection": {
    "collectedDateTime": "2018-09-27T11:41:30+03:00"
  }
},
...
],
...
"extension": [
  {
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-specimen",
    "valueReference": {
      "reference": "#specimen"
    }
  },
  ...
]
}

```

RequestGroup - deliveryOptions

Extension:

```

https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-deliveryOptions

```

The delivery options for the given order.

There are three possible ways to send an order:

1. Send electronically
2. Send by fax
3. Print requisition form

If the specified performer does not support the selected mode, then the order will be rejected.

Examples:

Send electronically

```
{
  {
    "resourceType": "RequestGroup",
    ...
    "extension": [
      {
        "url":
        "https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
        deliveryOptions",
        "extension": [
          {
            "url": "location",
            "valueReference": {
              "reference": "Location/f1-03db43522cc01432572e0a53"
            }
          }
        ],
      },
    ],
  },
  ...
}
```

Fax Requisition Form to the Service Provider

```

    {
      "url": "method",
      "valueContactPoint": {
        "system": "fax",
        "value": "000 000 0000"
      }
    }
  ],
  ...
],
...
}

```

Print requisition form

```

{
  "resourceType": "RequestGroup",
  ...
  "extension": [
    {
      "url":
      "https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
      deliveryOptions",
      "extension": [
        {
          "url": "electronic",
          "valueBoolean": false
        }
      ]
    },
    ...
  ],
  ...
}

```

RequestGroup.note

An order note - any comments that should be included in the requisition.

Account

Account resource defines billing preferences for the given order.

Account must implement the HealthGorilla Order Billing Account profile.

```
https://healthgorilla.com/fhir/StructureDefinition/hg-order-account
```

Below you can find attributes that **Account** resource may contain.

Account.type

Which individual or organization will pay for the given order. Also known as 'bill to' option.

Always required and must contain code from the following ValueSet:

```
https://www.healthgorilla.com/fhir/ValueSet/order-billto
```

Account.coverage

A list of insurances that can be used to pay the order. Up to three insurances supported. If there are more than one insurance in the list, then `priority` attribute should be set.

Mandatory if `account.type` is 'thirdParty', ignored otherwise.

Account.guarantor

A person who will pay for the given order.

Mandatory if `account.type` is 'guarantor', ignored otherwise.

Account - workerCompensation

Extension:

```
https://www.healthgorilla.com/fhir/StructureDefinition/account-wc
```

Set to True in case of worker compensation.

This extensions is used if `account.type` is 'thirdParty', ignored otherwise.

Examples

BillTo Self

```
{
  "resourceType": "RequestGroup",
  "contained": [
    {
      "resourceType": "Account",
      "id": "1",
      "meta": {
        "profile": [
          "https://healthgorilla.com/fhir/StructureDefinition/hg-order-account"
        ]
      },
      "type": {
        "coding": [
          {
            "system": "https://www.healthgorilla.com/order-billto",
            "code": "self",
            "display": "Client (Our Account)"
          }
        ],
        "text": "Client (Our Account)"
      }
    },
    ...
  ],
  "extension": [
    {
      "url":
        "https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-account",
      "valueReference": {
        "reference": "#1"
      }
    },
    ...
  ],
  ...
}
```

```
}
```

BillTo Patient

```
{
  "resourceType": "RequestGroup",
  "contained": [
    {
      "resourceType": "Account",
      "id": "1",
      "meta": {
        "profile": [
          "https://healthgorilla.com/fhir/StructureDefinition/hg-order-account"
        ]
      },
      "type": {
        "coding": [
          {
            "system": "https://www.healthgorilla.com/order-billto",
            "code": "patient",
            "display": "Patient"
          }
        ],
        "text": "Patient"
      },
      "guarantor": [
        {
          "party": {
            "reference": "Patient/03db43522cc01432572e0a53",
            "display": "Bart Simpson"
          }
        }
      ]
    },
    ...
  ],
  "extension": [
    {
      "url":
        "https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-account",

```

```

    "valueReference": {
      "reference": "#1"
    }
  },
  ...
],
...
}

```

BillTo Guarantor

```

{
  "resourceType": "RequestGroup",
  "contained": [
    {
      "resourceType": "Account",
      "id": "1",
      "meta": {
        "profile": [
          "https://healthgorilla.com/fhir/StructureDefinition/hg-order-account"
        ]
      },
      "type": {
        "coding": [
          {
            "system": "https://www.healthgorilla.com/order-billto",
            "code": "guarantor",
            "display": "Guarantor"
          }
        ],
        "text": "Guarantor"
      },
      "guarantor": {
        "reference": "#guarantor"
      }
    },
    {
      "resourceType": "RelatedPerson",
      "id": "guarantor",
      "extension": [

```

```
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/relatedperson
-employer",
    "valueString": "Springfield Nuclear Plant"
  }
],
"patient": {
  "reference": "Patient/03db43522cc01432572e0a53",
  "display": "Bart Simpson"
},
"relationship": {
  "coding": [
    {
      "system": "http://hl7.org/fhir/policyholder-relationship",
      "code": "parent",
      "display": "Parent"
    }
  ],
  "text": "Parent"
},
"name": [
  {
    "family": "Simpson",
    "given": [
      "Homer"
    ]
  }
],
"telecom": [
  {
    "system": "phone",
    "value": "000 000 0000",
    "use": "home"
  }
],
"gender": "male",
"birthDate": "1960-02-20",
"address": [
  {
    "text": "742 Evergreen Terrace, Springfield, USA, CT 11111",
    "line": [
      "742 Evergreen Terrace"
    ]
  }
]
```

```

    ],
    "city": "Springfield",
    "state": "CT",
    "postalCode": "11111",
    "country": "USA"
  }
]
},
...
],
"extension": [
  {
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
account",
    "valueReference": {
      "reference": "#1"
    }
  },
  ...
],
...
}

```

BillTo ThirdParty

```

{
  "resourceType": "RequestGroup",
  "contained": [
    {
      "resourceType": "Account",
      "id": "1",
      "meta": {
        "profile": [
"https://healthgorilla.com/fhir/StructureDefinition/hg-order-account"
        ]
      },
      "extension": [
        {
          "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/account-wc",

```

```
    "valueBoolean": true
  }
],
"type": {
  "coding": [
    {
      "system": "https://www.healthgorilla.com/order-billto",
      "code": "thirdParty",
      "display": "Third Party"
    }
  ],
  "text": "Third Party"
},
"coverage": [
  {
    "coverage": {
      "reference": "#2"
    },
    "priority": 1
  }
]
},
{
  "resourceType": "Coverage",
  "id": "2",
  "identifier": [
    {
      "value": "619A988989"
    }
  ],
  "status": "active",
  "subscriber": {
    "reference": "#3"
  },
  "beneficiary": {
    "reference": "Patient/03db43522cc01432572e0a53",
    "display": "Bart Simpson"
  },
  "relationship": {
    "coding": [
      {
        "system": "http://hl7.org/fhir/policyholder-relationship",
```

```

        "code": "parent",
        "display": "Parent"
    }
  ],
  "text": "Parent"
},
"payor": [
  {
    "reference": "Organization/ip-5",
    "display": "ANTHEM BLUE CROSS OF CALIFORNI"
  }
],
"grouping": {
  "group": "GOOGLEPLEX"
}
},
{
  "resourceType": "RelatedPerson",
  "id": "3",
  "extension": [
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/relatedperson-employer",
      "valueString": "Springfield Nuclear Plant"
    }
  ],
  "patient": {
    "reference": "Patient/03db43522cc01432572e0a53",
    "display": "Bart Simpson"
  },
  "relationship": {
    "coding": [
      {
        "system": "http://hl7.org/fhir/policyholder-relationship",
        "code": "parent",
        "display": "Parent"
      }
    ]
  },
  "text": "Parent"
},
"name": [

```

```
    {
      "family": "Simpson",
      "given": [
        "Homer"
      ]
    }
  ],
  "telecom": [
    {
      "system": "phone",
      "value": "000 000 0000",
      "use": "home"
    }
  ],
  "gender": "male",
  "birthDate": "1960-02-20",
  "address": [
    {
      "text": "742 Evergreen Terrace, Springfield, USA, CT 11111",
      "line": [
        "742 Evergreen Terrace"
      ],
      "city": "Springfield",
      "state": "CT",
      "postalCode": "11111",
      "country": "USA"
    }
  ]
},
...
],
"extension": [
  {
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
account",
    "valueReference": {
      "reference": "#1"
    }
  }
],
...
],
```

```
...
}
```

ProcedureRequest

`ProcedureRequest` describes the diagnostic procedure requested within the order. It should be an internal resource referenced in `RequestGroup.action.resource`. Each laboratory supports the certain set of tests that can be ordered. HealthGorilla provides API that should be used to obtain available tests for the given facility.

Here you can find attributes that are expected to be specified.

ProcedureRequest.category

This attribute must have the following value:

```
...
"category": [
  {
    "coding": [
      {
        "system": "http://snomed.info/sct",
        "code": "103693007",
        "display": "Diagnostic procedure"
      }
    ]
  }
]
...
```

ProcedureRequest.status

This attribute must have the following value:

System: <http://hl7.org/fhir/request-status>

Code	Display	Definition
active	Active	The request is ready to be acted upon

ProcedureRequest.intent

This attribute must have the following value:

System: <http://hl7.org/fhir/request-intent>

Code	Display	Definition
order	Order	The request represents a request/demand and authorization for action

ProcedureRequest.priority

This attribute allows to set priority for the given test within the order. This is an optional attribute. You can use the following values, if the certain test should be submitted with high priority:

System: <http://hl7.org/fhir/request-priority>

Code	Display	Definition
urgent	urgent	The request should be actioned promptly - higher priority than routine
asap	ASAP	The request should be actioned as soon as possible - higher priority than urgent
stat	STAT	The request should be actioned immediately - highest possible priority. E.g. an emergency

You can use the following values, if it should be indicated, that the certain test has 'unscheduled' priority:

System: <http://hl7.org/fhir/request-priority>

Code	Display	Definition
routine	Routine	The request has normal priority

ProcedureRequest.code

This is the code, that identifies the particular test ordered. Mandatory.

Example

```
{
  "code": {
    "coding": [
      {
        "code": "074666",
        "display": "074666 9 Drug-Scr"
      }
    ],
    "text": "074666 9 Drug-Scr"
  }
}
```

ProcedureRequest.supportingInfo

This is a reference to an internal `QuestionnaireResponse` resource that contains list of 'order entry questions' (AOEs) answers related to the given diagnostic procedure.

AOE can be required to be answered, or may be optional. If AOE is required for the specified configuration (performer, test, specimen), but missed in the request, then the whole order will be rejected. Only answered AOE should be included into request.

If different tests refer to the same order-level AOE, then the answer should be the same for all tests.

There are different types of AOE answers supported:

- Date
- String
- Boolean
- Coding

Examples

```
{
  "resourceType": "RequestGroup",
  "meta": {
    "profile": [
      "https://healthgorilla.com/fhir/StructureDefinition/hg-order"
    ]
  },
}
```

```
"contained": [
  {
    "resourceType": "QuestionnaireResponse",
    "id": "aoes",
    "status": "completed",
    "item": [
      {
        "linkId": "ZBL-1",
        "answer": [
          {
            "valueCoding": {
              "code": "1",
              "display": "White/Caucasian"
            }
          }
        ]
      },
      {
        "linkId": "ZBL-2",
        "answer": [
          {
            "valueCoding": {
              "code": "1",
              "display": "Yes"
            }
          }
        ]
      },
      {
        "linkId": "ZBL-3",
        "answer": [
          {
            "valueCoding": {
              "code": "V",
              "display": "Venous (blood)"
            }
          }
        ]
      },
      {
        "linkId": "ZBL-4",
        "answer": [
```

```

        {
            "valueCoding": {
                "code": "R",
                "display": "Repeat"
            }
        }
    ]
}
],
{
    "resourceType": "ProcedureRequest",
    "id": "test",
    "status": "active",
    "intent": "order",
    "priority": "stat",
    "category": [
        {
            "coding": [
                {
                    "system": "http://snomed.info/sct",
                    "code": "103693007",
                    "display": "Diagnostic procedure"
                }
            ]
        }
    ],
    "code": {
        "coding": [
            {
                "code": "007625",
                "display": "Lead, Blood (Adult)"
            }
        ],
        "text": "Lead, Blood (Adult)"
    },
    "supportingInfo": [
        {
            "reference": "#aoes"
        }
    ]
},

```

```
    ...
  ],
  ...
  "action": [
    {
      "resource": {
        "reference": "#test",
        "display": "074666 9 Drug-Scr"
      }
    }
  ],
  ...
}
```

Answer of type String

```
{
  {
    "linkId": "AOE-002",
    "test": "Topography",
    "answer": [
      {
        "valueBoolean": true
      }
    ]
  }
}
```

Answer of type Boolean

Answer of type Coding

```
{
  "linkId": "AOE-003",
```

```
"answer": [
  {
    "valueCoding": {
      "code": "1",
      "display": "Yes"
    }
  }
]
```

Answer of type Date

```
{
  "linkId": "AOE-004",
  "answer": [
    {
      "valueDate": "2016-01-15"
    }
  ]
}
```

ProcedureRequest.note

Any notes and comments related to the given test.

Endpoint

The FHIR Create interaction (<https://www.hl7.org/fhir/http.html#create>) should be used to submit an order:

```
https://api.healthgorilla.com/fhir/RequestGroup
```

Endpoint accepts HTTP POST request, and expects **RequestGroup** resource passed (json or xml). Once order submitted, then HTTP 201 will be returned and newly created resource location included into the response header.

```
Location →
http://api.healthgorilla.com/fhir/RequestGroup/0fb0ac5b2a203b8a3f078400
```

Splitting Orders

If there are too many tests ordered within the order, or selected tests cannot be included into a single order, then server rejects the request and suggests the way of grouping.

In this case, HTTP 200 OK is returned, `OperationOutcome` included and contains

'`order-splitting-required`' issue and

'`https://www.healthgorilla.com/fhir/StructureDefinition/operationoutcome-order-splitting`' extension with suggested grouping.

```
009001|488162;500199
```

Example:

The LabCorp order submitted and the following test are ordered:

- 009001 Fine-Needle Aspiration
- 488162 Prostate Biopsies
- 500199 Human Papillomavirus, Biopsy

Server returns HTTP 200 response:

```
{
  "resourceType": "OperationOutcome",
  "extension": [
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/operationou
tcome-order-splitting",
      "valueString": "009001|488162;500199"
    }
  ],
  "issue": [
    {
      "severity": "fatal",
      "code": "processing",
      "details": {
        "coding": [
          {
            "code": "order-splitting-required"
          }
        ],
        "text": "Splitting required"
      }
    }
  ]
}
```

```
}
```

This means that the client should split the initial order into two and include test in the way below:

- RequestGroup (009001)
- RequestGroup (488162 and 500199)

HTTP 201 and Warning

Sometimes server may return a warning. It means that the order has been submitted, but something went wrong and end-user should be notified.

```
{
  "resourceType": "OperationOutcome",
  "issue": [
    {
      "severity": "error",
      "code": "informational",
      "details": {
        "coding": [
          {
            "code": "order-warning"
          }
        ],
        "text": "Your order has been submitted, but we were not able
to fax it due to an unexpected error."
      }
    }
  ]
}
```

Errors

When the order is submitted, then two phase validation is performed on the server side. Firstly server checks that the data structure is correct and all required attributes are in place. Server checks that all links are valid. If any errors occurred then common-FHIR error returned to the client.

Secondly server processes the request and checks, that the given order matches all business rules depending on the specified performer, requester and ordered tested.

Resource Validation Errors

Common FHIR-related errors

HTTP Status	Details
400 Bad Request	resource could not be parsed or failed basic FHIR validation rules - Content
404 Not Found	resource type not supported, or not a FHIR end-point
422 Unprocessable Entity	the proposed resource violated applicable FHIR profiles or server business rules. This should be accompanied by an OperationOutcome resource providing additional detail

Examples:

Performer missed in the request - HTTP 422

{
{
"resourceType": "OperationOutcome",
"issue": [
{
"severity": "error",
"code": "processing",
"diagnostics": "Supplied Patient is unknown."
}
]
}

Patient cannot be recognized by server - HTTP 422

```
}  
]  
}
```

Unknown test ordered - HTTP 422

```
{  
  "resourceType": "OperationOutcome",  
  "issue": [  
    {  
      "severity": "error",  
      "code": "processing",  
      "diagnostics": "Ordered tests cannot be found."  
    }  
  ]  
}
```

Processing Errors

If the verification of business rules failed or an error occurred then HTTP 200 OK with OperationOutcome resource returned.

The following error codes are supported:

Code	Details
order-validity-unknown	Validation failed, reason is unknown.
order-error	Unexpected error occurred during submitting.
order-practice-an-required	Practice Account Number required to be set.
order-invalid	Validation failed, order cannot be submitted.
order-aoes-notanswered	Required AOE's are not answered.
order-el-notpossible	Electronic ordering is not possible for the given laboratory and physician.
order-el-connectionfailed	Order cannot be submitted electronically due to a communication error.
order-el-error	An error occurred

Examples:

Doctor Account Number required, but missed - HTTP 200

```
{
  "resourceType": "OperationOutcome",
  "issue": [
    {
      "severity": "error",
      "code": "invalid",
      "details": {
        "coding": [
          {
            "code": "order-invalid"
          }
        ],
        "text": "Account/Client Number must be 8 digits long number"
      }
    }
  ]
}
```

Examples

Submit LabCorp order

```
{
  "resourceType": "RequestGroup",
  "meta": {
    "profile": [
      "https://healthgorilla.com/fhir/StructureDefinition/hg-order"
    ]
  },
  "contained": [
    {
      "resourceType": "QuestionnaireResponse",
      "id": "aoes",
      "status": "completed",
      "item": [
        {

```

```
"linkId": "ZBL-1",
"answer": [
  {
    "valueCoding": {
      "code": "1",
      "display": "White/Caucasian"
    }
  }
],
{
  "linkId": "ZBL-2",
  "answer": [
    {
      "valueCoding": {
        "code": "1",
        "display": "Yes"
      }
    }
  ],
{
  "linkId": "ZBL-3",
  "answer": [
    {
      "valueCoding": {
        "code": "V",
        "display": "Venous (blood)"
      }
    }
  ],
{
  "linkId": "ZBL-4",
  "answer": [
    {
      "valueCoding": {
        "code": "R",
        "display": "Repeat"
      }
    }
  ]
}
```

```

    }
  ]
},
{
  "resourceType": "ProcedureRequest",
  "id": "test",
  "status": "active",
  "intent": "order",
  "priority": "stat",
  "category": [
    {
      "coding": [
        {
          "system": "http://snomed.info/sct",
          "code": "103693007",
          "display": "Diagnostic procedure"
        }
      ]
    }
  ],
  "code": {
    "coding": [
      {
        "code": "007625",
        "display": "Lead, Blood (Adult)"
      }
    ],
    "text": "Lead, Blood (Adult)"
  },
  "supportingInfo": [
    {
      "reference": "#aoes"
    }
  ]
},
{
  "resourceType": "Account",
  "id": "1",
  "meta": {
    "profile": [

```

["https://healthgorilla.com/fhir/StructureDefinition/hg-order-account"](https://healthgorilla.com/fhir/StructureDefinition/hg-order-account)

```
]
},
"type": {
  "coding": [
    {
      "system": "https://www.healthgorilla.com/order-billto",
      "code": "patient",
      "display": "Patient"
    }
  ],
  "text": "Patient"
}
},
{
  "resourceType": "Practitioner",
  "id": "4",
  "identifier": [
    {
      "type": {
        "coding": [
          {
            "system": "http://hl7.org/fhir/v2/0203",
            "code": "PRN",
            "display": "Passport number"
          }
        ]
      },
      "system": "http://hl7.org/fhir/sid/us-npi",
      "value": "1234567893"
    },
    {
      "type": {
        "coding": [
          {
            "system": "http://hl7.org/fhir/v2/0203",
            "code": "AN",
            "display": "Account number"
          }
        ]
      },
      "text": "Account Number"
    },
    {
      "value": "04843980"
    }
  ]
}
```

```
    }
  ],
  "active": true,
  "name": [
    {
      "family": "Doe",
      "given": [
        "John"
      ],
      "suffix": [
        "M.D."
      ]
    }
  ]
},
{
  "resourceType": "Organization",
  "id": "5",
  "identifier": [
    {
      "type": {
        "coding": [
          {
            "system": "http://hl7.org/fhir/v2/0203",
            "code": "AN",
            "display": "Account number"
          }
        ],
        "text": "Account Number"
      },
      "value": "1A45HT6"
    }
  ],
  "name": "Dr. Doe Practice - 1825 Somestreet st, Sacramento, CA"
},
{
  "resourceType": "Specimen",
  "id": "6",
  "collection": {
    "collectedDateTime": "2018-09-20T12:21:26+03:00"
  }
}
}
```

```
],
  "extension": [
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
authorizedBy",
      "valueReference": {
        "reference":
"Organization/t1-d5da4352af2201ace56ca725-01db4352f2deaeb1173e0444",
        "display": "Dr. Doe Practice"
      }
    },
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
account",
      "valueReference": {
        "reference": "#1"
      }
    },
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
performer",
      "valueReference": {
        "reference": "Organization/f-d5da4352df37dd00cfb1e115",
        "display": "LabCorp"
      }
    },
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
requester",
      "extension": [
        {
          "url": "agent",
          "valueReference": {
            "reference": "#4"
          }
        },
        {
          "url": "onBehalfOf",
```

```

        "valueReference": {
          "reference": "#5"
        }
      }
    ]
  },
  {
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-reasoncode",
    "valueCodeableConcept": {
      "coding": [
        {
          "system": "http://hl7.org/fhir/sid/icd-10",
          "code": "Z79.4",
          "display": "Long term (current) use of insulin"
        }
      ],
      "text": "Long term (current) use of insulin"
    }
  },
  {
    "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-reasoncode",
    "valueCodeableConcept": {
      "coding": [
        {
          "system": "http://hl7.org/fhir/sid/icd-10",
          "code": "E09.51",
          "display": "Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy without gangrene"
        },
        {
          "system": "http://snomed.info/sct",
          "code": "8801005",
          "display": "Secondary diabetes mellitus"
        }
      ],
      "text": "Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy without gangrene"
    }
  }
}

```

```
    },
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
specimen",
      "valueReference": {
        "reference": "#6"
      }
    },
    {
      "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/requestgroup-
deliveryOptions",
      "extension": [
        {
          "url": "electronic",
          "valueBoolean": true
        }
      ]
    }
  ],
  "status": "active",
  "intent": "order",
  "subject": {
    "reference": "Patient/03db43522cc01432572e0a53",
    "display": "Bart Simpson"
  },
  "author": {
    "reference": "Practitioner/fc076a524383b188ffc10051",
    "display": "Robert Kelso, M.D."
  },
  "note": [
    {
      "text": "Patient claims that his skin is yellow."
    }
  ],
  "action": [
    {
      "resource": {
        "reference": "#test",
        "display": "074666 9 Drug-Scr"
      }
    }
  ]
}
```

```
}  
]  
}
```

Compendium

Health Gorilla provides API that can be used to obtain tests supported by the given diagnostic provider.

The following FHIR resources are involved:

- **Organization and Location**
Contains link to compendium items that can be ordered (reference to **ValueSet**).
- **CodeSystem**
The whole compendium supported by the given healthcare provider.
- **ValueSet**
List of compendium items from the source **CodeSystem**, that are available for ordering in the certain diagnostic provider location or healthcare service (e-ordering).
- **Questionnaire**
AOE questions for the given test.

Organization and Location

If **Organization** or **Location** supports ordering, then it has reference to related compendium. This is a link to **ValueSet** resource, that contains compendium items available for ordering in the certain **Organization** or **Location**.

Organization - compendium

Extension:

```
https://healthgorilla.com/fhir/StructureDefinition/provider-compendium
```

Example:

```
{  
  "resourceType": "Organization",  
  "id": "f-d5da4352df37dd00cfb1e115",  
  ...  
  "extension": [  
    {
```

```

        "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/provider-co
mpendium",
        "valueReference": {
            "reference": "ValueSet/f-d5da4352df37dd00cfb1e115"
        }
    },
    "name": "LabCorp",
    ...
}

```

The example above contains link to tests that can be ordered in LabCorp:

```

https://api.healthgorilla.com/fhir/ValueSet/f-d5da4352df37dd00cfb1e
115

```

ValueSet

ValueSet endpoint implements the common FHIR *expand* operation, that should be used to lookup for a specific test. See <https://www.hl7.org/fhir/valueset-operations.html#expand>.

The following attributes are supported:

filter	A text filter that is applied to restrict the codes that are returned.
offset	Paging support - where to start if a subset is desired.
count	Paging support - how many codes should be provided in a partial page view.

Example:

Find first five tests that match the query 'Immunoglobulin'.

Request: HTTP GET

```

https://api.healthgorilla.com/fhir/ValueSet/f-d5da4352df37dd00cfb1e
115/$expand?filter=Immunoglobulin&count=5

```

Response:

```
{
  "resourceType": "ValueSet",
  "status": "active",
  "expansion": {
    "identifier": "c377b75b3d16a7de376f2f77",
    "timestamp": "2018-10-05T17:40:03+03:00",
    "total": 14,
    "parameter": [
      {
        "name": "query",
        "valueString": "Immunoglobulin"
      }
    ],
    "contains": [
      {
        "system": "urn:uuid:d5da4352df37dd00cfb1e115",
        "code": "001784",
        "display": "Immunoglobulin A, Qn, Serum"
      },
      {
        "system": "urn:uuid:d5da4352df37dd00cfb1e115",
        "code": "100115",
        "display": "Immunoglobulin A, Quant, CSF"
      },
      {
        "system": "urn:uuid:d5da4352df37dd00cfb1e115",
        "code": "002162",
        "display": "Immunoglobulin D, Quant, Serum"
      },
      {
        "system": "urn:uuid:d5da4352df37dd00cfb1e115",
        "code": "002170",
        "display": "Immunoglobulin E, Total"
      },
      {
        "system": "urn:uuid:d5da4352df37dd00cfb1e115",
        "code": "002238",
        "display": "Immunoglobulin G Index"
      }
    ]
  }
}
```

CodeSystem

`CodeSystem` endpoint implements the common FHIR *lookup* operation, that should be used to get details for the given test. See <https://www.hl7.org/fhir/codesystem-operations.html#lookup>.

Available properties:

Property	Control	Type	Description
display	1..1	String	Display string
definition	0..1	String	Detailed description
property.aoe	0..1	Boolean	AOEs required
property.specimen-type	0..1	String	Specimen Type
property.specimen-container	0..1	String	Specimen Container
property.specimen-collection	0..1	String	Specimen Collection
property.specimen-storage	0..1	String	Specimen Storage
property.linked-compendium-required	0..*	Coding	Test that must be included to the same order.
property.linked-compendium-recommended	0..*	Coding	Test that should be included to the same order.
property.cpt	0..*	Coding	Related CPT codes
property.group	0..1	Coding	Radiology Group

If 'aoe' property is 'True' then there are AOE questions related to this test, and answers should be included into request.

Example:

Request: HTTP GET

```
https://api.healthgorilla.com/fhir/CodeSystem/$lookup?system=urn:uuid:d5da4352df37dd00cfb1e115&code=085928
```

Response:

```
{  
  "resourceType": "Parameters",
```

```

"parameter": [
  {
    "name": "name",
    "valueString": "LabCorp Compendium Items"
  },
  {
    "name": "display",
    "valueString": "Immunoglobulin G,Syn Rate,CSF"
  },
  {
    "name": "property",
    "part": [
      {
        "name": "code",
        "valueString": "specimen-type"
      },
      {
        "name": "value",
        "valueString": "Serum AND cerebrospinal fluid
(CSF) "
      }
    ]
  },
  {
    "name": "property",
    "part": [
      {
        "name": "code",
        "valueString": "specimen-container"
      },
      {
        "name": "value",
        "valueString": "Red-top tube or gel-barrier
tube AND sterile (CSF) container"
      }
    ]
  },
  {
    "name": "property",
    "part": [
      {
        "name": "code",

```

```
        "valueString": "specimen-storage"
    },
    {
        "name": "value",
        "valueString": "Refrigerate"
    }
]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueString": "cpt"
        },
        {
            "name": "value",
            "valueCoding": {
                "system": "http://www.ama-assn.org/go/cpt",
                "code": "82040 001"
            }
        }
    ]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueString": "cpt"
        },
        {
            "name": "value",
            "valueCoding": {
                "system": "http://www.ama-assn.org/go/cpt",
                "code": "82042 001"
            }
        }
    ]
},
{
    "name": "property",
```

```

    "part": [
      {
        "name": "code",
        "valueString": "cpt"
      },
      {
        "name": "value",
        "valueCoding": {
          "system": "http://www.ama-assn.org/go/cpt",
          "code": "82784 002"
        }
      }
    ]
  }
]
}

```

Questionnaire

Questionnaire resource is used to describe AOE questions.

Supported item types:

System: <http://hl7.org/fhir/item-type>

Code	Display	Definition
date	Date	Question with a date answer (valueDate)
string	String	Question with a short (few words to short sentence) free-text entry answer (valueString)
choice	Choice	Question with a Coding drawn from a list of options (specified in either the option property, or via the valueset referenced in the options property) as an answer (valueCoding)
open-choice	Open Choice	Answer is a Coding drawn from a list of options (as with the choice type) or a free-text

		entry in a string (valueCoding or valueString)
--	--	--

FHIR search `Questionnaire` by code operation should be used to retrieve AOE questions related to the test.

Request: HTTP GET

```
https://api.healthgorilla.com/fhir/Questionnaire?code=urn:uuid:d5da4352df37dd00cfb1e115|198330
```

Both of *system* and *code* are required to be included.

Example:

This is a simple response:

```
{
  "resourceType": "Questionnaire",
  "id": "e2da43522638191129bd11ca",
  "name": "PapIG, CtNgTvHSV, rfxHPVall AOE questions",
  "status": "active",
  "code": [
    {
      "system": "urn:uuid:d5da4352df37dd00cfb1e115",
      "code": "198330"
    }
  ],
  "subjectType": [
    "Patient"
  ],
  "item": [
    {
      "id": "ZCY-1",
      "extension": [
        {
          "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/questionnaire-requiredwhenspecimen",
          "valueBoolean": true
        }
      ],
    }
  ]
}
```

```

        "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/questionnai
re-constraints",
        "valueString": "Use: Gynecological source"
    },
    {
        "url":
"http://hl7.org/fhir/StructureDefinition/questionnaire-itemControl"
,
        "valueCodeableConcept": {
            "coding": [
                {
                    "code": "textBox"
                }
            ]
        }
    },
    "code": [
        {
            "code": "ZCY-1"
        }
    ],
    "text": "Cervical",
    "type": "string"
},
...
{
    "id": "ZCY-12",
    "extension": [
        {
            "url":
"https://www.healthgorilla.com/fhir/StructureDefinition/questionnai
re-requiredwhenspecimen",
            "valueBoolean": true
        },
        {
            "url":
"http://www.healthgorilla.com/fhir/StructureDefinition/questionnai
re-constraints",
            "valueString": "Use: Date of patient's last menstrual
period or menopausal date."

```

```

    },
    {
      "url":
"http://hl7.org/fhir/StructureDefinition/questionnaire-itemControl"
,
      "valueCodeableConcept": {
        "coding": [
          {
            "code": "localDate"
          }
        ]
      }
    },
    {
      "code": [
        {
          "code": "ZCY-12"
        }
      ],
      "text": "LMP-Meno Date",
      "type": "date"
    },
    ...
    {
      "id": "DEV_AOE",
      "extension": [
        {
          "url":
"http://hl7.org/fhir/StructureDefinition/questionnaire-itemControl"
,
          "valueCodeableConcept": {
            "coding": [
              {
                "code": "multiselect"
              }
            ]
          }
        }
      ],
      "code": [
        {
          "code": "DEV-AOE"
        }
      ]
    }
  ]
}

```

```

    }
  ],
  "text": "Question",
  "type": "choice",
  "repeat": true,
  "option": [
    {
      "valueCoding": {
        "code": "1",
        "display": "Adenoids"
      }
    },
    ...
    {
      "valueCoding": {
        "code": "9",
        "display": "Nasopharynx"
      }
    }
  ],
  ...
],
  "initialString": "Bone"
},
...
]
}

```

Extensions

There are several extensions that can be applied.

AOE answer required when a specimen is collected.

<https://www.healthgorilla.com/fhir/StructureDefinition/questionnaire>

<https://www.healthgorilla.com/fhir/StructureDefinition/questionnaire-constraints>

Constraints.

UI control.

```
http://hl7.org/fhir/StructureDefinition/questionnaire-itemControl
```

Diagnostic Providers

HealthGorilla provides API that can be used to lookup diagnostic provider by name, type and location.

Organization

Organization resource describes an abstract HealthCare provider. Some **Organizations** support electronic ordering and can be assigned as diagnostic procedure performer.

The following parameters can be used in search request:

Name	Type	Description
type	token	A code for the type of organization.
name	string	A portion of the organization's name or alias.
ordering-enabled	token	A ordering-enabled property. Use to get only organizations that support ordering.
_count	number	A positive integer. If passed, then server will not return more then specified.

Examples:

```
https://www.healthgorilla.com/fhir/Organization?type=https://www.healthgorilla.com/facility-type|RadiologyImaging&name=Rad&ordering-enabled=true
```

Location

Location resource describes the certain HealthCare provider location. This can be a PSC or Laboratory.

Available location types:

System: <http://hl7.org/fhir/v3/RoleCode>

Code	Display	Definition
HUSCS	specimen collection site	Description: A location that plays the role of delivering services which may include collecting specimens and/or samples from patients for laboratory testing purposes, but does not perform any tests or analysis functions.
OUTLAB	outpatient laboratory	Description: A location that plays the role of delivering services which may include tests are done on clinical specimens to get health information about a patient pertaining to the diagnosis, treatment, and prevention of disease for same day visits.
HRAD	radiology unit	Description: A location that plays the role of delivering services which may include the branch of medicine that uses ionizing and non-ionizing radiation to diagnose and treat diseases. The radiology unit may be further divided into subspecialties such as Imaging, Cardiovascular, Thoracic, and Ultrasound.

The following parameters can be used in search request:

Name	Type	Description
-------------	-------------	--------------------

type	token	A code for the type of location.
name	string	A portion of the location's name or alias.
address-state	string	A state specified in an address.
address-city	string	A city specified in an address.
address-postalcode	string	A postal code specified in an address.
ordering-enabled	token	A ordering-enabled property. Use to get only locations that support ordering.
near	token	The coordinates expressed as [latitude]:[longitude] (using the WGS84 datum, see notes) to find locations near to (servers may search using a square rather than a circle for efficiency) Requires the near-distance parameter to be provided also.
near-distance	quantity	A distance quantity to limit the near search to locations within a specific distance Requires the near parameter to also be included.
test-code	token	A order codes that the requested locations should support.
organization	reference	Searches for locations that are managed by the provided organization
_count	number	A positive integer. If passed, then the server will not return more than specified.

Examples:

Find RadNet locations in Sunnyvale that can perform CT Scan: Head/Brain

```
https://www.healthgorilla.com/fhir/Location?organization=f-d8da4352
```

```
https://www.healthgorilla.com/fhir/Location?name=LabCorp&type=OUTLAB&near=37.3910024:-122.0765676&near-distance=10&_count=5
```

Find first five LabCorp laboratories near GEO point.