

# Machine readable data export of Kranus Edera

## Technical Specification

Version 1.0

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# 1. Introduction

## 1.1 Scope and Definition

This document outlines the interoperable data export capabilities of the application Kranus Edera. The export is based on the FHIR® R4 v4.0.1<sup>1</sup> standard published by HL7. The FHIR data export format is JSON (JavaScript Object Notation)<sup>2</sup> encoded in UTF-8 (ISO 10646)<sup>3</sup>.

It should be noted that this is a *machine* readable format. Patients also have the option to download a *human* readable format as PDF (ISO 32000-1:2008)<sup>4</sup>, which patients can read and also share with their doctor.

## 1.2 Audience

This document is for stakeholders in the public health sector including but not limited to manufacturers, physicians, patients and regulators.

## 1.3 Purpose

Providing patients' data in an interoperable and internationally recognized standard to stakeholders in the public health sector is of paramount importance, which will empower all stakeholders involved. This added value for patients and other stakeholders is also reflected by the upcoming integration of Kranus Edera into the national e-health infrastructure (e.g. ePA).

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<sup>1</sup> <https://www.hl7.org/fhir/history.html#v4.0.1>

<sup>2</sup> <https://www.json.org/json-en.html>

<sup>3</sup> <https://www.iso.org/standard/69119.html>

<sup>4</sup> <https://www.iso.org/standard/51502.html>

## 2. Data Export

### 2.1 Specification

In the Kranus Edera App under “Profil” and then “Ihre Gesundheitsdaten”, patients have the option to export their data as “L7 FHIR” (see 1.1) as seen in 2.2 below.

The data consists of the following resources:

FHIR Resource	Type	Cardinality	Description
Bundle	collection	1..1	This is an abstract resource that is used to store a collection or list of other FHIR resources. In this case Patient and Observation.
Patient	patient	1..1	This resource is used to store patient information like name, phone and birth date.
Observation	survey	0..*	Entries of patient reported outcomes collected by Kranus Edera by asking the patient.

As already stated above the `Bundle` is used to aggregate the rest of the FHIR resources. The first entry in the bundle is the `Patient` data.

The `Patient` resource is used to identify the user via name, phone and birth date and a unique identifier UUID4 (RFC 4122)<sup>5</sup>, which is used by the Kranus Edera system to identify users.

Data entered by the user throughout the therapy is exported through `Observation` resources as a part of the `Bundle`. The entries of type “survey” and are based on FHIR’s category code. The codes are based on LOINC<sup>6</sup> codes where each code is corresponding to an entry in the LOINC database (e.g. height as 8302-2, neurological diseases as 46023-8 etc.).

<sup>5</sup> <https://datatracker.ietf.org/doc/html/rfc4122>

<sup>6</sup> <https://loinc.org/>

## 2.2 Example

Here is an example of a sample test user to showcase what the FHIR JSON export looks like. The Specification (see 2.1) explains the structure.

```
{
  "type": "collection",
  "resourceType": "Bundle",
  "identifier":
  {
    "period":
    {
      "end": "2022-08-16T10:53:48.917898",
      "start": "2021-08-16T10:53:48.917898"
    },
    "use": "official",
    "value": "72a700f7-f776-4326-8451-ed68d623a57b"
  },
  "timestamp": "2021-08-16T10:53:48.917898",
  "entry":
  [
    {
      "resource":
      {
        "id": "36354be7-fb22-4a6a-b135-fe5bde78ec5d",
        "birthDate": "1981-08-26",
        "name":
        [
          {
            "text": "Max Mustermann"
          }
        ],
        "telecom":
        [
          {
            "system": "phone",
            "value": "+49170111111"
          }
        ],
        "resourceType": "Patient"
      }
    },
    {
      "resource":
      {
        "id": "1",
        "category":
        [
          {
            "coding":
            [
              {

```

```

        "code": "survey",
        "system":
"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
    }
    ]
  },
  "code":
  {
    "coding":
    [
      {
        "code": "62812-3",
        "system": "http://loinc.org"
      }
    ],
    "text": "Sind Sie in der Lage körperlich aktiv zu
sein (z.B. schnelles Spazieren gehen, Treppen steigen)?"
  },
  "status": "final",
  "subject":
  {
    "reference":
"Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
  },
  "valueBoolean": true,
  "resourceType": "Observation"
},
{
  "resource":
  {
    "id": "6",
    "category":
    [
      {
        "coding":
        [
          {
            "code": "survey",
            "system":
"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
          }
        ]
      }
    ],
    "code":
    {
      "coding":
      [
        {
          "code": "78941-2",
          "system": "http://loinc.org"
        }
      ]
    }
  }
}

```

```

        }
      ],
      "text": "Leiden oder litten Sie in der Vergangenheit
an folgenden Erkrankungen?\nHerzleiden:"
    },
    "status": "final",
    "subject":
    {
      "reference":
"Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
    },
    "valueString": "Nein, ich leide an keiner der folgenden
Erkrankungen",
    "resourceType": "Observation"
  }
},
{
  "resource":
  {
    "id": "7",
    "category":
    [
      {
        "coding":
        [
          {
            "code": "survey",
            "system":
"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
          }
        ]
      }
    ],
    "code":
    {
      "coding":
      [
        {
          "code": "46023-8",
          "system": "http://loinc.org"
        }
      ]
    },
    "text": "Leiden oder litten Sie in der Vergangenheit
an folgenden Erkrankungen?\nNeurologische Erkrankungen:"
  },
  "status": "final",
  "subject":
  {
    "reference":
"Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
  },
  "valueString": "Nein, ich leide an keine der folgenden
Erkrankungen",

```

```

        "resourceType": "Observation"
    },
    {
        "resource": {
            "id": "19",
            "category": [
                {
                    "coding": [
                        {
                            "code": "survey",
                            "system": "https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
                        }
                    ]
                }
            ],
            "code": {
                "coding": [
                    {
                        "code": "8302-2",
                        "system": "http://loinc.org"
                    }
                ],
                "text": "Wie groß sind Sie?"
            },
            "status": "final",
            "subject": {
                "reference": "Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
            },
            "valueInteger": 180,
            "resourceType": "Observation"
        }
    },
    {
        "resource": {
            "id": "20",
            "category": [
                {
                    "coding": [
                        {
                            "code": "survey",
                            "system":

```



```

"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
    }
  ]
},
"code":
{
  "coding":
  [
    {
      "code": "LG34372-9",
      "system": "http://loinc.org"
    }
  ],
  "text": "Wie viel wiegen Sie?"
},
"status": "final",
"subject":
{
  "reference":
  "Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
  },
  "valueInteger": 80,
  "resourceType": "Observation"
},
{
  "resource":
  {
    "id": "21",
    "category":
    [
      {
        "coding":
        [
          {
            "code": "survey",
            "system":
"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
          }
        ]
      }
    ]
  },
  "code":
  {
    "coding":
    [
      {
        "code": "21112-8",
        "system": "http://loinc.org"
      }
    ],
    "text": "Wie ist ihr Geburtsdatum?"
  }
}

```

```

    },
    "status": "final",
    "subject":
    {
        "reference":
        "Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
    },
    "valueDateTime": "1981-08-26T00:00:00",
    "resourceType": "Observation"
}
},
{
    "resource":
    {
        "id": "22",
        "category":
        [
            {
                "coding":
                [
                    {
                        "code": "survey",
                        "system":
                        "https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
                    }
                ]
            }
        ],
        "code":
        {
            "coding":
            [
                {
                    "code": "8677-7",
                    "system": "http://loinc.org"
                }
            ],
            "text": "Nehmen Sie einen der folgenden
Wirkstoffe/Medikamente regelmäßig ein?"
        },
        "status": "final",
        "subject":
        {
            "reference":
            "Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
        },
        "valueString": "Nein, ich nehme keine der folgenden
Medikamente ein",
        "resourceType": "Observation"
    }
},
{
    "resource":

```

```

    {
      "id": "26",
      "category":
      [
        {
          "coding":
          [
            {
              "code": "survey",
              "system":
"https://terminology.hl7.org/2.1.0/CodeSystem-observation-category.html"
            }
          ]
        }
      ],
      "code":
      {
        "coding":
        [
          {
            "code": "LG41761-4",
            "system": "http://loinc.org"
          }
        ],
        "text": "Wie oft sind Sie wöchentlich körperlich
aktiv (Joggen, schnelles Gehen, Fahrradfahren)?"
      },
      "status": "final",
      "subject":
      {
        "reference":
"Patient/36354be7-fb22-4a6a-b135-fe5bde78ec5d"
      },
      "valueInteger": 5,
      "resourceType": "Observation"
    }
  ]
}

```