

Medication Resources for drug terminologies

Australia have had the [NCTS](#) operating for some time now, which provides a national server exposing a FHIR terminology endpoint and the software used to host that endpoint ([Ontoserver](#)) for implementers to run locally and syndicate national content updates into whenever it suits them.

Until now the service has been focussed on providing these services and software to help with implementation of SNOMED CT-AU, including AMT, although in the near future this will expand to other national code systems. This provides services to implement SNOMED CT-AU and AMT based around CodeSystem, and implicit ValueSet and ConceptMap as defined at [Using SNOMED CT with FHIR](#) in the FHIR specification.

However this doesn't provide a particularly rich experience for drug terminologies like AMT, where a greater density of information exists and is typically desired when looking up a code. CodeSystem lookup typically provides parents, children, descriptions (of different types, definition status, and module, but this isn't the detail usually desired when dealing with medications. This differs from most of the rest of SNOMED CT content where the modelling and properties of the concepts are not usually looked up and examined as closely.

The [FHIR Medication resource](#) provides a much more comfortable, common structure to represent these concepts, and the [FHIR search REST API](#) and [Medication resource specific search parameters](#) provide an easy to use API to search drug terminologies.

For example see a [CodeSystem lookup](#)

CodeSystem lookup

```
{
  "resourceType": "Parameters",
  "parameter": [
    {
      "name": "name",
      "valueString": "SNOMED Clinical Terms Australian extension"
    },
    {
      "name": "version",
      "valueString": "http://snomed.info/sct/32506021000036107/version/20171031"
    },
    {
      "name": "display",
      "valueString": "Panadeine Extra uncoated tablet"
    },
    {
      "name": "designation",
      "part": [
        {
          "name": "language",
          "valueCode": "en"
        },
        {
          "name": "use",
          "valueCoding": {
            "system": "http://snomed.info/sct",
            "code": "9000000000000003001",
            "display": "Fully specified name"
          }
        },
        {
          "name": "value",
          "valueString": "Panadeine Extra (codeine phosphate hemihydrate 15 mg + paracetamol 500 mg) uncoated tablet (trade product unit of use)"
        }
      ]
    },
    {
      "name": "designation",
      "part": [
        {
          "name": "language",
          "valueCode": "en"
        },
        {
          "name": "use",
          "valueCoding": {
            "system": "http://snomed.info/sct",
```

```

        "code": "900000000000013009",
        "display": "Synonym"
    }
},
{
    "name": "value",
    "valueString": "Panadeine Extra uncoated tablet"
}
]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueCode": "parent"
        },
        {
            "name": "value",
            "valueCode": "30425011000036101"
        }
    ]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueCode": "parent"
        },
        {
            "name": "value",
            "valueCode": "52803011000036102"
        }
    ]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueCode": "parent"
        },
        {
            "name": "value",
            "valueCode": "9851000168109"
        }
    ]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueCode": "sufficientlyDefined"
        },
        {
            "name": "valueBoolean",
            "valueBoolean": true
        }
    ]
},
{
    "name": "property",
    "part": [
        {
            "name": "code",
            "valueCode": "effectiveTime"
        }
    ],

```

```

        {
          "name": "valueString",
          "valueString": "20090630"
        }
      ],
    },
    {
      "name": "property",
      "part": [
        {
          "name": "code",
          "valueCode": "moduleId"
        },
        {
          "name": "value",
          "valueCode": "900062011000036108"
        }
      ]
    }
  ]
}

```

versus a [Medication resource rendering](#) of an AMT concept 52397011000036105 | Panadeine Extra uncoated tablet |

Medication resource

```

{
  "resourceType": "Medication",
  "id": "52397011000036105",
  "meta": {
    "profile": [
      "http://medserve.online/fhir/Profile/ExtendedMedication"
    ]
  },
  "text": {
    "status": "generated",
    "div": "<div xmlns=\"http://www.w3.org/1999/xhtml\"><p>Panadeine Extra uncoated tablet</p></div>"
  },
  "extension": [
    {
      "url": "http://medserve.online/fhir/StructureDefinition/parentMedicationResources",
      "extension": [
        {
          "url": "http://medserve.online/fhir/StructureDefinition/parentMedication",
          "valueReference": {
            "reference": "Medication/52803011000036102",
            "display": "paracetamol 500 mg + codeine phosphate hemihydrate 15 mg tablet"
          }
        }
      ],
    },
    {
      "url": "http://medserve.online/fhir/StructureDefinition/medicationResourceType",
      "valueCoding": {
        "system": "http://hl7.org/fhir/medication_type",
        "code": "UPDSF",
        "display": "Unbranded product with strengths and form"
      }
    },
    {
      "url": "http://medserve.online/fhir/StructureDefinition/parentMedicationResources",
      "extension": [
        {
          "url": "http://medserve.online/fhir/StructureDefinition/parentMedication",
          "valueReference": {
            "reference": "Medication/23628011000036109",
            "display": "paracetamol 500 mg tablet"
          }
        }
      ],
    }
  ],
}

```

```

        {
            "url": "http://medserve.online/fhir/StructureDefinition/medicationResourceType",
            "valueCoding": {
                "system": "http://hl7.org/fhir/medication_type",
                "code": "UPDSF",
                "display": "Unbranded product with strengths and form"
            }
        },
        {
            "url": "http://medserve.online/fhir/StructureDefinition
/parentMedicationResources",
            "extension": [
                {
                    "url": "http://medserve.online/fhir/StructureDefinition
/parentMedication",
                    "valueReference": {
                        "reference": "Medication/21433011000036107",
                        "display": "paracetamol"
                    }
                },
                {
                    "url": "http://medserve.online/fhir/StructureDefinition
/medicationResourceType",
                    "valueCoding": {
                        "system": "http://hl7.org/fhir/medication_type",
                        "code": "UPD",
                        "display": "Unbranded product with no strengths or form"
                    }
                }
            ]
        }
    ],
    {
        "url": "http://medserve.online/fhir/StructureDefinition/parentMedicationResources",
        "extension": [
            {
                "url": "http://medserve.online/fhir/StructureDefinition/parentMedication",
                "valueReference": {
                    "reference": "Medication/21286011000036106",
                    "display": "paracetamol + codeine"
                }
            },
            {
                "url": "http://medserve.online/fhir/StructureDefinition/medicationResourceType",
                "valueCoding": {
                    "system": "http://hl7.org/fhir/medication_type",
                    "code": "UPD",
                    "display": "Unbranded product with no strengths or form"
                }
            },
            {
                "url": "http://medserve.online/fhir/StructureDefinition
/parentMedicationResources",
                "extension": [
                    {
                        "url": "http://medserve.online/fhir/StructureDefinition
/parentMedication",
                        "valueReference": {
                            "reference": "Medication/21821011000036104",
                            "display": "codeine"
                        }
                    },
                    {
                        "url": "http://medserve.online/fhir/StructureDefinition
/medicationResourceType",
                        "valueCoding": {
                            "system": "http://hl7.org/fhir/medication_type",
                            "code": "UPD",

```

```

        "display": "Unbranded product with no strengths or form"
      }
    ]
  },
  {
    "url": "http://medserve.online/fhir/StructureDefinition/medicationResourceType",
    "valueCoding": {
      "system": "http://hl7.org/fhir/medication_type",
      "code": "BPSF",
      "display": "Branded product with strengths and form"
    }
  },
  {
    "url": "http://medserve.online/fhir/StructureDefinition/brand",
    "valueCodeableConcept": {
      "coding": [
        {
          "system": "http://snomed.info/sct",
          "code": "9851000168109",
          "display": "Panadeine Extra"
        }
      ]
    }
  },
  {
    "url": "http://medserve.online/fhir/StructureDefinition/sourceCodeSystem",
    "extension": [
      {
        "url": "http://medserve.online/fhir/StructureDefinition/sourceCodeSystemUri",
        "valueUri": "http://snomed.info/sct"
      },
      {
        "url": "http://medserve.online/fhir/StructureDefinition/sourceCodeSystemVersion",
        "valueString": "http://snomed.info/sct?version=http%3A%2F%2Fsnomed.info%2Fsct%
2F32506021000036107%2Fversion%2F20171031"
      }
    ]
  },
  {
    "code": {
      "coding": [
        {
          "system": "http://snomed.info/sct",
          "code": "52397011000036105",
          "display": "Panadeine Extra uncoated tablet"
        }
      ]
    },
    "status": "active",
    "isBrand": true,
    "form": {
      "coding": [
        {
          "system": "http://snomed.info/sct",
          "code": "265011000036104",
          "display": "uncoated tablet"
        }
      ]
    },
    "ingredient": [
      {
        "modifierExtension": [
          {
            "url": "http://medserve.online/fhir/StructureDefinition/basisOfStrengthSubstance",

```

```

        "valueCoding": {
          "system": "http://snomed.info/sct",
          "code": "51924011000036104",
          "display": "codeine phosphate hemihydrate"
        }
      },
      "itemReference": {
        "reference": "Substance/1978011000036103",
        "display": "codeine"
      },
      "amount": {
        "numerator": {
          "value": 15000,
          "unit": "microgram",
          "system": "http://snomed.info/sct",
          "code": "90011000036103"
        },
        "denominator": {
          "value": 1,
          "unit": "each",
          "system": "http://snomed.info/sct",
          "code": "700001301000036101"
        }
      }
    },
    {
      "itemReference": {
        "reference": "Substance/2442011000036104",
        "display": "paracetamol"
      },
      "amount": {
        "numerator": {
          "value": 500,
          "unit": "mg",
          "system": "http://snomed.info/sct",
          "code": "99011000036109"
        },
        "denominator": {
          "value": 1,
          "unit": "each",
          "system": "http://snomed.info/sct",
          "code": "700001301000036101"
        }
      }
    }
  ]
}

```

Additionally other sources of data can be blended in to augment the drug terminology following the 80/20 rule to provide useful information that saves looking up other code systems in other formats. For example in Australia, regularly used details of the PBS subsidy or regulatory information from the TGA can be blended into the resource. This saves developers from having to look up maps to other coding systems (e.g. PBS and TGA) and then find the source data for those code systems and parse it to find the properties they need.

This potentially also creates a common implementation API (search API and Medication resource as the common format) for multiple drug terminologies. AMT, dm+d, RxNorm...etc could all be exposed in this way.

To provide this richer implementation experience and avenue for blending other information, work has gone into the concept of exposing AMT as a FHIR endpoint (running nationally or runnable locally similar to the NCTS). Other drug terminology owners are known to be considering similar approaches, or are looking for implementation APIs and services like this to make drug terminologies easier and faster to implement.

An example of this idea can be found at <http://medserve.online> - you'll find there's a Medication resource for each AMT concept at each of AMT's 7 levels of abstraction and they reference each other to link together. There are also a series of extensions used in this example to represent parts that can't be represented in Medication resources (e.g. basis of strength substance) and others that are present to provide useful additional information (e.g. parents).

The aim of this discussion page is to

1. raise awareness of this topic and activity, and invite feedback, thoughts and comments

2. facilitate and make visible collaboration should there be concurrent efforts to approach this for different drug terminologies so approaches may converge where possible

Please feel free to comment or ask questions!