SMART Guideline Implementation: ANC DAK

Summary of the Problem

- WHO expert groups want to get best-practice guidelines out into the real world, fast, and update those guidelines as medical knowledge changes. This currently takes years.
- 2 Central Hypotheses:
  - 1) The OpenMRS 3 framework allows content like that in the ANC DAK to be quickly created into a new sample "ANC package", and,
  - 2) Understanding In-Country Content Decision Makers' needs and workflows is mission-critical for successful DAK & O3 package adoption even beyond ANC.
- OpenMRS, Ampath, Mekom, and PIH are being supported by Digital Square's Notice F Award to coordinate design of a DAK-Based OpenMRS 3.x ANC Package that:
  - meets ANC DAK core dictionary, functional, and non-functional requirements
  - has the decision support component of the ANC DAK
  - has program indicators
  - Design: Design related deliverables include published results from user research/assessment and designs for whatever we prioritise.

Links to Know

- Key Contacts: suruchi dhungana (Product Manager) & Paul Adams (UX Designer)
- Communication: Slack channel #anc (most discussion and updates are happening in slack)
- Issue Tracker: Jira Board here (all issues with label "ANCDAK")
- Designs: Pending
- Timeline: June 2022-June 2023

In this page:

- Our 3-Prong Approach
- Open Questions
- 2022 Roadmap
- User Contact Champions
- Actions & Decisions Log
- Reference Resources

The ANC DAK contains the content needed to execute WHO-recommended ANC care guidelines, such as: workflows, medical codes, decision support rules, metrics, and functional requirements.

Our 3-Prong Approach

Staff UX Research & Design
How can alerts/advice be shown effectively to ANC staff?
With so many possible alerts and different types, how best can we show different info to end-users?

Output: A complete UI Pattern toolkit for sharing different types and urgencies of decision support with end users

Decision Makers Research
How are content decisions made in-country?
Who, and how, reconciles: Existing Content, Decisions on what to include/exclude from SMART Guideline set, manage content updates

Output: Summary of findings and recommendations for SMART ecosystem to support reconciliation need; eg Content Decision Maker Persona

1-Rule Prototype
Can the OCL<->O3<->Engine flow work already?
Send 1-2 Decision Support Cases via O3<->CQL Engine (set up Qnrs in O3 & codes in OCL; confirm FHIR-elements supported)

Output: Findings on CQL Engine viability and a reusable set of a few ANC CarePlans in O3

Image source file here.
### Open Questions

- How do we expect the ANC DAK content to be used in the real world?
- How does content decision making happen in countries: In Ministries? In Implementations? (i.e. how people decide what content/care pathways should be applied at their sites)

### 2022 Roadmap

<table>
<thead>
<tr>
<th>August</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>2023...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FHIR IG Deep Dive w/ Bryn Rhodes &amp; FHIR Squad</strong>&lt;br&gt;Explored existing L3 resources and whether automating intake of a FHIR IG might be valuable approach. <em>(Notes) Outcome: Decided not to have a FHIR IG-heavy approach.</em>&lt;br&gt;Status: <strong>DONE</strong></td>
<td>Identify &amp; Prep Users for Interviews: <strong>ANC Staff/Care providers</strong>&lt;br&gt;Target countries to engage for user interviews: Sierra Leone, Zimbabwe, Ethiopia...&lt;br&gt;Status: <strong>IN PROGRESS</strong></td>
<td><strong>UX Results:</strong>&lt;br&gt;Publish results from UX assessments of ANC Staff and Content Decision Makers&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Publish Designs for ANC UX</strong>&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Decision Support Plan</strong>&lt;br&gt;eg leverage opensource Decision Support Engine (depending on business viability indicators of that asset by Jan 2023; will also need confirmation / work to cover any gaps in OMRS FHIR representation of the medical record)&lt;br&gt;Status: <strong>TBD</strong></td>
<td><strong>Not started</strong></td>
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<tr>
<td>Joined WHO SMART Implementers’ call group&lt;br&gt;Raise awareness among the WHO working group of our work on this project, and address early questions about materials available and what user research had already been done. <em>(Notes)</em>&lt;br&gt;Status: <strong>DONE</strong></td>
<td>Identify &amp; Prep Users for Interviews: <strong>Content Decision Makers</strong>&lt;br&gt;Status: <strong>IN PROGRESS</strong></td>
<td>Start Interviews: <strong>ANC Staff</strong>&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td>Start Interviews: <strong>Content Decision Makers</strong>&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Evaluate E2E Test Plan</strong>&lt;br&gt;<strong>Not started</strong></td>
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<td><strong>Gap Analysis of Functional &amp; Non-Functional Requirements</strong>&lt;br&gt;Gap Analysis <a href="#">here</a>&lt;br&gt;Status: <strong>DONE</strong></td>
<td><strong>Test Automation Plan</strong>&lt;br&gt;Likely less about FE E2E tests rather than scaleably useful ones, eg (1) OCL-related tests / concept conflict notifications +/- logs, and (2) O3 test framework/test pipeline improvements.&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Prototype Pkg</strong>&lt;br&gt;O3 ANC MVP Package released (scope: limited concepts, forms, widgets, &amp; clinical view)&lt;br&gt;Status: <strong>TBD</strong></td>
<td><strong>Publish Designs for Content Management Flows</strong>&lt;br&gt;Status: <strong>SCOPE?</strong></td>
<td><strong>Reports</strong>&lt;br&gt;Add Indicator Reports to ANC O3 Package&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>TBD</strong></td>
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<td><strong>Sample Code Set in OCL + Qnr in O3</strong>&lt;br&gt;Need to pick a Qnr. Start by picking a preferred DS rule/care plan.&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Present 1st set of Feedback</strong>&lt;br&gt;Initial feedback shared with WHO DAK team. <em>(Doc here)</em>&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>UAT &amp; Findings Documentation</strong>&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>Plan for Reports</strong>&lt;br&gt;Add to ANC O3 Package&lt;br&gt;Status: <strong>TBD</strong></td>
<td><strong>Data Viz</strong>&lt;br&gt;Demo indicators visualized w/ Superset&lt;br&gt;Status: <strong>NOT STARTED</strong></td>
<td><strong>TBD</strong></td>
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**FELLOWS**

**SONDER**

**RHODES**

**AME**
### User Contact Champions

These contact points are the ones our UX+PM team can reach out to in order to organize user research/interviews etc with ideal users.

**Sierra Leone:** PIH (Maternal Centre of Excellence) - Ellen Ball

**TBD - Haiti or Cambodia:** (Hospital/NGO with ++deliveries) - Dimitri R

**Ethiopia:** Jen to f/u w/ UCSF/ICAP contacts

### Actions & Decisions Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Action or Decision or Request for Information</th>
<th>Notes (Links, Comments, etc)</th>
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<tbody>
<tr>
<td>2022.07.27</td>
<td>2 key findings so far: (1) content not meeting minimum expectations (PIH) eg clear fetal outcome; (2) FHIR IG confusing w/ ++ broken links. Considering focusing on creating tools that would ingest L3 (FHIR IG) content automatically into OMRS. UX Proposal submitted by Sonder here, proposing OOUX approach to research. Reviewed types of Decision Support content: different information types &amp; urgency types. Id'd gaps in existing UI Patterns in O3 to support ANC CarePlan outputs - these red gaps will be a foci for UX research, so output will be a complete toolkit.</td>
<td>Meeting: ANC DAK Product Vision &amp; Roadmap Whiteboarding - All Whiteboard: <a href="https://metroretro.io/board/LBUY4YVOLJML">https://metroretro.io/board/LBUY4YVOLJML</a></td>
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**Review of Key Functional Gaps with Team**

Gap Analysis [here](#)

Status: **DONE**

**1st set of Feedback**

Initial feedback to share with WHO DAK team. ([Doc here](#))

Status: **IN PROGRESS**

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**FELLOW**

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2022.0 8.18  After a ++helpful deep dive w/ Bryn Rhodes on the ANC FHIR IG: Decided we will not pursue a FHIR IG-based approach at this time. 2 main findings:

**Decision Support Engine:** Learned that Bryn’s team has created an opensource Decision Support Engine, now maintaining this, Google Android SDK group is their user at the moment. We could leverage this engine for our Decision Support needs (and OMRS could then bypass need for bespoke data model update for careplan support, b/c you don’t actually need careplan support to make use of the engine).

**Gap in Content Decision Maker Persona/Research:** Seems that ANC DAK has missed a key persona: country-level content decision makers. Eg the massive lift for them to consider all this content and reconcile it with their regional requirements, funder requirements, and current data collected. **Decision:** this will be a critical user for us to involve in user research.

FHIR IG review with Bryn Rhodes - All explored existing L3 resources and whether automating intake of a FHIR IG might be valuable approach.  

(Notes)

2022.0 8.19  Identified 9 names who informed the ANC DAK who could be starters for interviews re. “real world use” of guideline content, developing understanding of market demand/market pain points. Need follow up plan for Sept.

List here - 9 of 70 listed as informants for ANC DAK are from implementer groups

2022.0 8.29  Knowledge base amidst WHO SMART working group on content management processes at Ministry or Implementer is unclear - still a grey-area. We should proceed with plan to understand this as it has huge implications for ANC Guidelines + any other future SMART guidlines.

Joined WHO SMART Implementers’ call group - Suruchi, Grace

Raise awareness among the WHO working group of our work on this project, and address early questions about materials available and what user research had already been done.  

(Notes)

2022.0 9.29  Ellen & Wamz pick 1-2 ANC care plans from DAK as our first ones to prototype in O3 with codes, forms, and widgets (Ideal: both valuable for end users to see in testing, and relatively low effort)

Current top candidates: Danger signs (1), Pre-eclampsia and HTN (17), HIV testing (8)

Need: would be helpful for our ANC grant group to do a small prototype to see the lift required to implement one of these ANC DAK Qnrs + Codes. Could also be a helpful asset for Suruchi & Paul Adams during user interviews.  

https://openmrs.slack.com/archives/C03GWFC9ZKQ/p1662577782775669

**TODO**

Contacted WHO - Nat to confirm no updated spreadsheet w/ more CIEL code mappings

Currently ~40 needed medical codes have mappings to CIEL in "ANC.End"; all others have no reference to CIEL in the spreadsheet resource (Web annex A: Core data dictionary). Andre w Kanter has a version with CIEL maps (not 100% complete)

**TODO**

Assign champion per country to i.d. people to interview/test

**TODO**

Review together the OHRI MCH Mindmap (to understand OHRI MCH goals & needs)

2022.0 9.13  Request to Ellen & Dimitri: Gather list of contacts now  

Jen to f/u re contracting

2022.0 9.23  Grace met in person w/ Jembi, Regenstrief, and CDC-HQ officers in S. Africa - discussed SMART Guidelines ++. Much interest in and alignment with our 3-prong strategy (staff research, content research, engine prototype). Intellisoft Botswana interested in supporting w/ Content Decision Makers for user research followed up.

There is growing interest by PEPFAR in wanting to fund HIV SMART L2 implementation - all very interested in this OMRS grant's work. All folks talked with agreed big need to understand in-country content reconciliation workflows, concern that alert UI to end users needs to not overwhelm esp. when ANC+HIV+NCD etc get combined, and all are +++ interested in technical findings re using the CQL engine.

2022.0 9.23  Suruchi has begun work to implement the O3 Qnrs and Codes in OCL for the Preeclampsia Care Plan.

2022.0 9.27  Shared update on 3-fold plan (staff research, content decision maker research, and CQL engine prototype plan) with the Implementing Smart Guidelines working group with multiple WHO and DPG representatives present.

Learned: Ona seems to be implementing now as well. Google Android SDK increasingly leveraging too. A member Kashya has possibly found a way to bypass needing to “save” a FHIR Qnr - notes and screenshots here.

2022.0 9.27  Emailed Jose & Bryn about contact for support re. trialing the CQL engine.

2022.0 9.27  Design Roadmap discussion - Jen Grace Ciaran Paul.
<table>
<thead>
<tr>
<th>Date</th>
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<tr>
<td>2022.09.28</td>
<td>Team meeting. Picked a Decision Support set for prototyping: High risk &amp; educational: Pre-eclampsia</td>
<td>Followed up on support from Mozy re recent OMRS cmty work on something involving CQL. Later versions of the Hapi FHIR JPA Server (5.3.0+) come with an embedded CQL engine. <a href="https://talk.openmrs.org/t/anc-dak-setting-up-a-prototype-with-the-cql-decision-support-engine/37630/4">Link</a></td>
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<td>Could re-use some parts from the PLIR project that were sending data from OMRS to other server (packaging to send fhir resource from OMRS to a different FHIR server); also triggered a measure written in CQL on that FHIR server.</td>
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<tr>
<td>2022.09.30</td>
<td>Intro interview w/ Dr. Astrid</td>
<td>Bio, Interview Plan, Questions, and Notes</td>
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<tr>
<td>2022.10.07</td>
<td>Discussion w/ Derek Ritz</td>
<td>Design Plan, Process, &amp; Timeline reviewed and agreed on by squad. Analysis of Categories of Decision Support rules by urgency &amp; expected UI-types: findings shared w/ squad (key takeaway: majority of careplans require tasks for providers) Screenshots of Actions &amp; Timelines/Schedules discovery: each output has an action + notes, and often &gt;1 action; DAK also includes timelines (schedules) and not yet clear how we plan to leverage these --&gt; PM to spend time reviewing these in more detail</td>
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<tr>
<td>2022.10.11</td>
<td>Interview w/ Dr Astrid</td>
<td>Bio, Interview Plan, Questions, and Notes</td>
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**Reference Resources**

- Workplan with Timelines & Deliverables
- Full ANC DAK Guideline: “Digital Adaptation Kit for Antenatal Care: Operational requirements for implementing WHO recommendations in digital systems”
- Annex A: Core data dictionary (our copy): Codes/concepts for all rules & indicators. Andy's version where he added CIEL mappings and comments is [here](#).
- Annex B: Decision support logic (our copy): CDS rules in IF/THEN spreadsheet format.
- Annex C: Indicators (our copy): Reporting metrics the WHO hopes will be generated as a result of this structured ANC data collection.
- FHIR IG:
  - GitHub for ANC FHIR IG
  - FHIR IG Documentation: Helpful!! Has all the workflows, personas, scenarios etc. This guide is to be considered in our work.
  - Careplans (PlanDefinitions): e.g. Preeclampsia, Syphilis, HIV, HepC screening, etc...
  - All Questionnaires needed: ANCA Qnr: Registration ANCB4: Confirm pregnancy ANCB5: Quick check (q’s to always ask) ANCB6: Profile & History ANCB7: Symptoms & F/U ANCB8: Physical Exam ANCB9: Labs & Imaging ANCC Qnr: Emergency referral ANCEnd Qnr: Delivery info
- OHRI MCH Mindmap draft
- How Digi Sqr defines “Shelf Ready”
- All ANC WHO SMART Resources: Includes everything from literature review results that formed these guidelines, to links like to FHIR IG.
- WHO SMART Guidelines Vision