Proposed Terminology Translation Framework

Integrating AYUSH (traditional Indian medicine) terms with global standards demands a robust, standards-based solution. We propose a **FHIR-based terminology service** that uses HL7's `ConceptMap` (and related Terminology resources) to map NAMASTE/Ayush morbidity codes bi-directionally to ICD-11 (including the new Traditional Medicine chapter). This leverages existing interoperability standards (FHIR, ICD-11, ISO coding) and builds a repeatable, API-driven protocol. The framework would ensure that each AYUSH diagnosis can be reliably translated into an ICD-11 code (and vice versa), preserving meaning and clinical nuance.

Scope and Background

Figure: Timeline of AYUSH terminology standardization leading up to ICD-11 Traditional Medicine (TM) integration. India's NAMASTE portal (launched 2017) consolidated standardized morbidity codes for Ayurveda, Siddha and Unani [1] [2] . Subsequent efforts (2017–2024) refined these terminologies and prepared for global integration [2] [1] . In 2025 WHO officially released the ICD-11 update with a TM chapter, enabling *optional dual coding* of traditional medicine diagnoses [3] . In practice this means a patient encounter can be coded with both a NAMASTE (AYUSH) code and a corresponding ICD-11 code, allowing comprehensive data collection on TM use. WHO explicitly notes that the TM chapter "is used only for optional dual coding in the morbidity data collection (e.g. morbidity reporting, reimbursement, patient safety, research)" [3] . In short, the global environment now supports systematic digitization of AYUSH diagnoses alongside conventional diagnoses, a capability our framework will exploit.

International Standards Alignment

Our protocol builds on **ICD-11's Traditional Medicine chapter** and the broader WHO classification. The WHO FAQ emphasizes that including TM in ICD-11 allows "digitization of Traditional Medicine diagnostic data and easier integration into Electronic Health Record (EHR) systems," as well as "better integration of Traditional Medicine diagnostic data in adverse-event reporting, insurance coverage and reimbursement" [4] . In other words, mapping AYUSH terms into ICD-11 ties Indian TM practice into the international health-data infrastructure. By aligning with ICD-11 and other ISO/HL7 standards, our framework meets regulatory goals (e.g. digital health strategies, Universal Health Coverage) and enables country-to-country comparability of TM data [5] [6] .

Technical Architecture

The core of the solution is an **API-based translation service** using HL7 FHIR Terminology resources. The steps are:

- **CodeSystem definitions:** Publish the AYUSH term set (from NAMASTE) and the ICD-11 code system (including TM chapter codes) as FHIR **CodeSystem** and **ValueSet** resources. These define all valid codes in each system.

- **ConceptMap resources:** Create FHIR **ConceptMap**s that explicitly map AYUSH codes to ICD-11 codes. Each ConceptMap entry links a source concept (e.g. an Ayurveda diagnosis code) to one or more target concepts in ICD-11, with a `relationship` qualifier (e.g. *equivalent*, *narrower*, *broader*) to capture semantic nuance. For example, an Ayurvedic condition might map as "equivalent" to a specific ICD-11 code if meanings align, or "narrower than" if the ICD code is more general [7] [8] . (Mappings that lack a good ICD-11 counterpart could be flagged as *unmapped* or map to a broader category.) The FHIR ConceptMap model supports recording these relationships and any provenance data. As HL7 notes, "a concept map defines a mapping from a set of concepts in a code system... to one or more concepts in other code systems" [7] , with a formal `relationship` to describe each pairing [8] .

- **Terminology Server / APIs:** Host these resources on a FHIR Terminology Service. Conformant FHIR servers provide built-in operations (e.g. `$translate`, `$lookup`) to query code mappings and validate codes. A terminology service "is simply a set of functions built on the definitions provided by a collection of CodeSystem, ValueSet and ConceptMap resources" [9] . Once deployed, any client (EHR, mobile app, public health system) can call a RESTful API (e.g. `/ConceptMap/$translate?source=...&code=...`) to get the mapped code(s). For example, a provider entering a NAMASTE code could automatically retrieve the ICD-11 equivalent. The service would be secured (e.g. OAuth2/ TLS) and offer audit logs for compliance.

Key architecture elements can be summarized:

- **Terminology Repository:** A FHIR server storing CodeSystem and ConceptMap artifacts, ideally under an implementation guide or namespace.
- **APIs:** FHIR REST endpoints for `$translate`, code validation (`ValueSet/$expand`, `CodeSystem/lookup`), etc.
- **Data Flow:** EHR systems submit AYUSH codes or queries; the translation API returns matching ICD-11 codes (and vice versa). The dual coding is recorded in patient records or aggregated reports.

Example: In FHIR, a ConceptMap entry might link `NAMASTE:AYU12345` (an Ayurveda "lower back pain" code) to `ICD-11:ME05.1` with a relationship "equivalent". The terminology service's `$translate` operation would use this ConceptMap to answer queries: e.g. `/ConceptMap/$translate?code=NAMASTE:AYU12345&system=NAMASTE` → returns `{code: ME05.1, display: "Lumbago" (ICD-11)}`.

Ensuring Semantic and Clinical Accuracy

Semantic interoperability requires careful curation. We would engage clinical experts in Ayurveda, Siddha, etc., to vet mappings. Each ConceptMap element can carry `equivalence` (or `relationship`) levels to reflect how close a match is [8] . For instance, if an Indian term has no exact Western analogue, it might map to a broader ICD-11 category (with `broaderMatch`) or even be left unmapped with a note for review. By explicitly encoding these relationships, the framework avoids false equivalences. Moreover, because mappings are context-sensitive, we recommend versioning and contextual qualifiers (e.g. depending on patient age, symptom context). The concept of FHIR ConceptMaps supports *dependent* mappings (multiple targets or condition-based mapping) and provenance (who authored the map). With FHIR's expressive model, we can document these nuances so that implementers (or even machine-learning QA tools) know if a mapping is exact or approximate [8] .

Implementation and Use Cases

This protocol can be implemented in stages, supporting multiple contexts:

- **EHR and Clinical Coding:** Clinicians enter AYUSH diagnoses using NAMASTE codes in the EHR. The system calls the terminology API to retrieve the ICD-11 code for that condition. Both codes are stored in the patient record (dual coding), enabling AYUSH practitioners to document in their own terms while making the data usable for billing and analytics. NAMASTE itself envisions a "futuristic double coding system" using both ASU codes and ICD-10/11 [2] . This ensures clinical accuracy in documentation and meets coding requirements for integrations.
- **Public Health and Reporting:** Aggregated statistics on disease burden can use ICD-11 as the common language. For example, AYUSH clinics reporting monthly morbidity would send ICD-11 codes (translated from NAMASTE codes) into national health databases. This permits consistent epidemiology across conventional and traditional medicine. WHO notes that counting TM encounters and enabling international comparability is a key benefit of the ICD-11 TM chapter [5] . Our service automates that translation, so public-health systems can ingest mixed data and categorize AYUSH cases under ICD codes.
- **Research and Analytics:** Researchers conducting integrative medicine studies can merge AYUSH trial data with global data sets via ICD-11. The translation service provides a systematic "crosswalk" so that outcomes coded in traditional terms become analyzable with conventional health statistics. This fosters evidence-based policy: as one senior AYUSH official notes, dual coding "improves data collection" and "fosters evidence-based policymaking" for traditional medicine [6] .
- **Insurance and Policy:** Indian health policy is already exploring insurance coverage for AYUSH treatments. By mapping to ICD-11, insurers can align AYUSH claims with global diagnostic categories. Indeed, NAMASTE aims to integrate TM into reimbursement systems [10] . For example, an insurer might only recognize ICD codes for claims; our translation allows a clinic to bill under the correct ICD-11 code for an AYUSH treatment, streamlining claims. This respects regulations: ICD-11 coding can be used for non-mortality purposes like reimbursement [3] , and NAMASTE explicitly supports reporting of AYUSH services in standard formats [2] .

Regulatory and Security Considerations

Our framework is designed to comply with Indian and global regulations. In India, the **Ayushman Bharat Digital Mission (ABDM)** mandates use of open standards (FHIR, SNOMED, LOINC, ICD) for all health data exchanges. The ABDM FHIR Implementation Guide explicitly "refers to relevant standards and coding systems… such as EHR Standards for India (2016)" [11] . By using HL7 FHIR and WHO's ICD-11, we align with ABDM and MoHFW directives. The service would require patient consent (as per Indian privacy law) before translating or sharing identifiable health data.

Security measures include OAuth2 authentication for API access, TLS encryption for all data in transit, and audit logging of requests. HL7 guidance notes that even terminology servers should use SSL/TLS, since "observers may be able to infer information about patients by observing the codes… so encryption is still recommended" [12] . We would enforce role-based access (only authorized providers or systems can call the service) and record all translations in an audit trail. Data at rest (e.g. the ConceptMap definitions) would be hosted on a secure server (cloud or on-premises) compliant with healthcare IT regulations (e.g. HIPAA in the US, proposed Digital Health Data Protection laws in India).

Compliance with **clinical standards** is ensured by relying on approved code sets. NAMASTE codes are issued by MoA (along with English definitions), and ICD-11 is maintained by WHO. Any mappings would be reviewed by a joint committee (including clinical experts and informatics specialists) to ensure they meet medical guidelines. The FHIR resources themselves are standard artifacts that can be version-controlled and updated through normal governance (e.g. a new NAMASTE release or ICD-11 update simply leads to updated resources).

Key Components (Summary)

- **HL7 FHIR Terminology Service:** Hosts CodeSystem (NAMASTE, ICD-11), ValueSet, and ConceptMap resources. Supports `$translate` and related operations [13] [9] .
- **ConceptMap Mappings:** AYUSH-to-ICD and ICD-to-AYUSH ConceptMap resources, with explicit `relationship` labels for semantic accuracy [8] . Optionally, a single ConceptMap can include bidirectional groups.
- **FHIR API Layer:** A RESTful interface for applications to query codes. Must support OAuth2 scopes (e.g. `translate:read`) and return JSON.
- **Governance Process:** A workflow for domain experts to propose, vet, and publish mappings. ConceptMap metadata can record author, date, and mapping rationale.
- **Integration Hooks:** Adaptors or FHIR clients in EHRs and health apps to call the translation service when needed (e.g. on code entry, or on data export).

Practical Use Cases

1. **AYUSH Clinic (EHR Integration):** An Ayurvedic physician documents "Amaja shula" (digestive colic) using the NAMASTE code AYU123. The EHR calls our service's ConceptMap `$translate` API, which returns ICD-11 code "DK90 Digestive colic" (for example). The system records both codes. If later the patient is referred to a general hospital, the ICD code ensures other clinicians understand the diagnosis.
2. **Public Health Dashboard:** Monthly HMIS reports from AYUSH units come coded with ICD-11 (via our service). The Ministry of Health can then aggregate AYUSH and allopathic cases seamlessly, meeting WHO's push for integrated data [5] .
3. **Research Study:** A multi-center study on "integrative treatment of arthritis" uses both Ayurveda and Western diagnostics. Investigators use our service to cross-tabulate AYUSH symptoms to ICD-11 rheumatologic categories, enabling combined analysis of efficacy.
4. **Insurance Claim Processing:** An insurance scheme recognizes ICD-11 codes for reimbursement. An Ayurvedic hospital submits claims using ICD-11 codes obtained via the translation service, facilitating payout. This supports NAMASTE's goal of extending insurance to AYUSH treatments [10] .

Security and Privacy

All service endpoints use HTTPS with strong ciphers. User authentication (e.g. via OAuth2 bearer tokens) ensures only authorized actors (clinics, health departments, researchers) may translate codes. Audit logs record the user ID, timestamp, and codes translated. No patient-identifying information needs to be sent to this service (only coded diagnoses), minimizing privacy risk. Nevertheless, encrypting these requests is recommended [12] since inferences could potentially be made (for example, a very rare code might hint at a patient's identity). The system will comply with data protection laws (for India: IT Act and forthcoming Digital Health Act; for other regions: GDPR, HIPAA) by design.

Conclusion

By leveraging HL7 FHIR and WHO ICD-11, we can build a **standardized, bi-directional translation protocol** for AYUSH terminologies. The proposed FHIR Terminology Service (ConceptMaps, CodeSystems) provides a **technical backbone** that is already widely adopted and tested for interoperability [7] [9]. This ensures semantic interoperability: codes from diverse medical paradigms are linked in a computable way. Clinical accuracy is maintained through explicit relationship semantics and expert validation. Regulatory compliance is met by aligning with national digital health guidelines (ABDM/NDHM) and international standards. In practice, this framework will let Indian traditional medicine practitioners participate fully in the digital health ecosystem—entering diagnoses in familiar terms while simultaneously populating standardized health records. Over time, broader adoption can enable richer data analytics and integrative health insights, fulfilling WHO and national goals for inclusive health information.

Sources: We base this design on the NAMASTE initiative and WHO's ICD-11 updates [1] [2] [3] [4], and on HL7 FHIR standards documentation [7] [8] [9]. All mappings and APIs would be version-controlled and open-access to ensure transparency and continual improvement.

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[1] [2] [10] Initiatives: National Ayush Morbidity and Standardized Terminologies Electronic (NAMASTE) Portal - PMC
https://pmc.ncbi.nlm.nih.gov/articles/PMC10410508/

[3] [4] [5] Traditional medicine
https://www.who.int/standards/classifications/frequently-asked-questions/traditional-medicine

[6] WHO's Historic ICD-11 Update: A Landmark for Traditional Medicine Recognition and Global Research
https://ayush.gov.in/resources/pdf/PressRelease/WHO_releases_update_in_ICD.docxR.pdf

[7] [8] [13] ConceptMap - FHIR v6.0.0-ballot3
https://build.fhir.org/conceptmap.html

[9] [12] Terminology-service - FHIR v6.0.0-ballot3
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[11] Home - FHIR Implementation Guide for ABDM v6.5.0
https://www.nrces.in/ndhm/fhir/r4/index.html