SNOMED CT
The case for investment

Executive Summary
About the Report
In 2020, SNOMED International released its 2020-2025 Strategy. The annual work plan to implement the Organization’s Strategy identified the need to revisit the **value proposition for key stakeholder groups** as well as illustrating the **case for investment in SNOMED CT** for Nations, health systems, vendors, etc., globally.

Amid competing priorities and scrutinized budgets, government decision makers are looking for qualitative and quantitative evidence to support their investments, including achieved outcomes and benefits narratives. Following from the value propositions, SNOMED International has developed an innovative yet succinct Case for Investment in both the organization and its products. A thoughtful collection of SNOMED CT case studies also delivers real world examples of SNOMED CT across its varied uses.

Building off the business case work completed in 2014, SNOMED International complements updated stakeholder value propositions with the evidence that SNOMED CT adds measurable value to a broad range of primary and secondary processes that use SNOMED CT encoded data to deliver improved patient outcomes.

As we know, the healthcare industry is ever evolving. The future opportunities for SNOMED CT will be driven by new healthcare data sources and new healthcare technologies. From a health care industry-wide perspective new data sources and technologies such as artificial intelligence, machine learning, personalized and precision medicine, etc., are seen as significant.

SNOMED CT is well positioned as a best-in-class clinical reference terminology to enable the semantic interoperation and knowledge representation of massive and diverse sets of data required by this next evolution in health care delivery.
Executive Summary
SNOMED International
Strategic Directions for 2020 to 2025

Our Vision
By 2025, Clinical Terminologies will be used globally, which will result in better health and improved patient outcomes, supported by one language of health.

Products and Services Goals
01 SNOMED CT Evolution
02 Terminology Integrator
03 SNOMED CT Value Proposition

Adoption Goals
01 SNOMED Adoption & Consumption
02 SNOMED Implementation Support

Innovation Goals
01 Emerging Technologies
SNOMED CT
What is it?

• It is the most comprehensive, multilingual, clinical healthcare terminology in the world.

• It is a resource with scientifically validated clinical content that is released globally, twice per year.

• It enables the consistent representation of clinical content in clinical information systems, health data and analytics platforms, and interoperability solutions.

• It is mapped to other international standards.

• It is adaptable to each country’s requirements.

• It is in use in more than eighty countries.
Viral pneumonia is linked through a set of ‘is a’ relationships, that represent a poly-hierarchy of sub-types. Viral pneumonia ‘is a’ infective pneumonia. Infective pneumonia ‘is a’ infection, and similarly infective pneumonia ‘is a’ respiratory disease. SNOMED CT also links concepts to the applicable part of the body, or a finding site. For example, the viral pneumonia finding site is the lung. Finally SNOMED CT links concepts to a causative agent. For example, the viral pneumonia causative agent is a virus.
SNOMED CT
Is a Core Reference Clinical Terminology

LEGEND
- SNOMED CT Collaboration Partner
- Agreement in progress
- No agreement in place

SNOMED CT 350K+

Terminology Standards content volume

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<th># terminologies / # content</th>
<th>Content Volume</th>
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<tbody>
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<td>&gt;1,000</td>
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<tr>
<td>4</td>
<td>1,001 - 5,000</td>
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<td>1</td>
<td>1,000,001 - 2,000,000</td>
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Note: This diagram is intended to be reflective of SNOMED CT as a core reference terminology. It does not include all the national extensions of SNOMED CT (e.g. Australian Medicines Terminology with 100,000 concepts) that further expand the SNOMED CT hub-and-spoke model.
SNOMED CT
A Core Reference Clinical Terminology – the Australian Example

SNOMED CT-AU
• Australian edition of SNOMED CT
• Includes the Australian Medicines Terminology and >90 reference sets
• Used in all healthcare sectors/settings
• Used for clinician health record documentation
• Released on a monthly basis

EXECUTIVE SUMMARY

Where is **SNOMED CT** used?

**Research**
Conducting clinical research, laboratory research and scientific research.

**Management Analytics**
Conducting trend & comparative analysis and health system value analysis.

**Data Entry and Integration**
The recording and integration of SNOMED CT in clinical information systems and health data & analytics platforms.

**SNOMED CT–embedded Clinical Information Systems, Health Data & Analytics Platforms and/or Interoperability Solutions**

**Clinical Information Sharing**
The electronic exchange of clinical data and documents among Care Providers along the continuum of care, often using interoperability solutions.

**Point-of-Care Analytics**
Creating historical summaries, doing point-of-care reporting and using clinical decision support.

**Population Analytics**
Conducting trend & comparative analysis, pharmacovigilence and clinical audit.
<table>
<thead>
<tr>
<th>Unique Features</th>
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<tbody>
<tr>
<td>Core Reference Terminology</td>
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<tr>
<td>Comprehensive &amp; Granular</td>
</tr>
<tr>
<td>Semantic Network</td>
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<tr>
<td>Broad Use Context</td>
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<tr>
<td>National Mandate</td>
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</table>
The Value of
SNOMED CT for
Stakeholders
SNOMED International has used the Delone and McLean IS Success Framework as the theoretical underpinning for the development of the value propositions. The rationale is that the pathway to realizing the full value of SNOMED CT is when it is embedded in a computer system, typically a clinical information system, a health data & analytics platform, or an interoperability solution. The logic is that SNOMED CT improves the information quality in these systems, and when coupled with other features, increases user adoption and satisfaction.

**Net Benefits**

The extensive use of clinical information systems, health data & analytics platforms and interoperability solutions enables the achievement of key benefits, in this case, **Better Health** and **Improved Patient Outcomes**, as reflected in the SNOMED International Vision.
An End-to-End Perspective
SNOMED CT Value Framework

Collaboration Partners
Provide best-in-class clinical knowledge, classification and interoperability solutions to extend the value of SNOMED CT

Researchers and Knowledge Producers
Use a data/analytics platform to create data, information, evidence and knowledge for point-of-care analytics, population analytics, management analytics and research used by Policy Makers, Care Providers and others

Care Providers
As a team, provide clinical interventions throughout the Patient Journey to achieve Improved Patient Outcomes

Patients/Citizens
Through self-care and working collaboratively with their Care Providers to achieve Better Health

Policy Makers
Provide policy direction and oversee the management of a High-Value Health Care System

Net Benefits
- Better Health
- Improved Patient Service and Patient Health Outcomes
- Increased Health System Value

Members
Holder of the national SNOMED CT license that enables free use of the clinical terminology by all stakeholders within the country

Implementers
With a vision for high quality clinical information, they successfully deploy SNOMED CT, usually as part of vendor clinical information systems, health data & analytics platform and interoperability solutions deployments.

Vendors
Sell and deploy SNOMED CT embedded clinical information systems, data/analytics platforms and interoperability solutions to support Care Providers and Patients/Citizens throughout the Patient journey, as well as Researchers and Knowledge Producers in their analytics and research activities.
SNOMED CT Stakeholder Landscape

**Policy Makers**
SNOMED CT allows Policy Makers to be more informed when making policy and management decisions, accelerating their analytical and decision-making process.

**Members**
SNOMED CT allows Members to ensure that high-quality clinical information is available to all stakeholders in their country, as required.

**Patients/Citizens**
SNOMED CT enables patients/citizens to control their health information and be knowledgeable about their health and their self-care options. SNOMED CT also enables a collaborative relationship with their Care Providers to receive the best care available.

**Care Providers**
SNOMED CT allows Care Providers to improve patient outcomes by being knowledgeable about their patient’s health and their options for care. This allows for a more informed and collaborative relationship with patients when making critical care decisions, and to provide the best care possible, in association with the rest of the care team.

**Collaboration Partners**
Professional Associations who contribute clinical knowledge to ensure that the evolution of SNOMED CT maintains its clinical integrity. Standards Organizations contribute their artefacts so that together with SNOMED CT the ‘one language of health’ can be created.

**Researchers and Knowledge Producers**
SNOMED CT allows Researchers and Knowledge Producers to create ‘the one language of health’ and accelerate data, information, evidence and knowledge creation. Supporting a wide range of analytics and research activities, use of SNOMED CT benefits the decision-making of policymakers, care providers, patients/citizens and other health care stakeholders.

**Vendors**
SNOMED CT allows Vendors to sell their products using a global standard that is deployed in over 80 countries, opening new markets for their software products.

**Implementers**
SNOMED CT is the most comprehensive, scientifically validated, health care terminology available globally, allowing Implementers to collect data once and reuse it for a diverse range of clinical, analytical and research purposes, and enabling them to support the information needs of a variety of stakeholders, including care providers, policymakers, patients/citizens and others.
SNOMED CT Case for Investment

The Case for Investment Identifies why a country would invest resources to implement SNOMED CT

1. What value does a country or healthcare entity desire from a clinical terminology?

2. What potential value does SNOMED CT provide to a specific country or a healthcare entity?

3. What demonstrated value has SNOMED CT provided to a country or a healthcare entity in the past?

4. What are the future opportunities for SNOMED CT?

5. Why would a country or a healthcare entity invest resources to implement SNOMED CT?
SNOMED CT
Case for Investment

“SNOMED CT is the best available core reference terminology for cross-border, national and regional eHealth deployments in Europe”
ASSESS CT 2016
SNOMED CT
Potential Case for Investment

- **Productivity (Model 1)**: Cost savings from improvements in inpatient nursing time, lab tests, drug utilization, length of stay and medical records; plus outpatient transcription use, chart pulls, lab/radiology tests, & drug utilization.

- **Disease Prevention (Model 2)**: Reduced bed days, workdays missed, as well as increased deaths avoided and life years gained from immunizations and cancer screening.

- **Patient Safety (Model 3)**: Reduction in adverse drug events, inpatient bed days, and deaths avoided from CPOE use.

- **BCM & IRR (Model 4)**: The Benefits Cost Multiple and the Internal Rate of Return from investing in clinical information systems and interoperability solutions.

- **Impact on GNI (Model 5)**: The average annual increase to a nation’s GNI as a result of the investments in clinical information systems and interoperability solutions.

The Benefits Cost Multiple and the Internal Rate of Return from investing in clinical information systems and interoperability solutions.
The estimated cost of implementing a SNOMED CT license in the USA for the 15-year study period was USD87M.

Potential mean savings of USD$58.25 billion per year in improved inpatient and outpatient services.

Over 750,000 reduced bed days, approximately 85,000 reduced workdays missed and over 2,200 deaths avoided from immunizations, and over 3700 deaths avoided and 50,000 life-years gained from cancer screening.

A reduction of over 1.1 million adverse drug events and 6.4 million bed days, as well as 8,300 deaths avoided from CPOE use.

A Benefits to Cost Multiple of 1.8 - 4.1 and an Internal Rate of Return for the same investment of 10-41% from investing in clinical information systems and interoperability solutions.

The average annual increase to U.S. GNI as a result of the investments in clinical information systems and interoperability solutions was 0.23% or USD$30.71 billion.
SNOMED CT

A Demonstrated Case for Investment: Real World Use

**Veterans Health Administration**: the cost benefit analysis of the SNOMED CT-embedded VistA system, as well as the benefits derived from the Veterans Health Information Exchange (VHIE).

**Kaiser Permanente**: the benefits derived from a SNOMED CT-embedded HealthConnect clinical information system and patient portal, as well as analytics and research.

**North York General Hospital**: the benefits obtained from a SNOMED CT-embedded eCare clinical decision support system.

**AEHRC and CSIRO (Australia)**: a look into the current and future possibilities for SNOMED CT use in artificial intelligence.

**Barts NHS Trust and the East London Health and Care Partnership**: the benefits derived from a SNOMED CT-embedded Cerner clinical information system and a regional EHR and data & analytics platform.

**Honghu Public Health Surveillance (COVID-19)**: a description of the SNOMED-CT-embedded Honghu Hybrid System that supported policy makers and public health officials with COVID-19 surveillance and control.

**University of Cambridge Hospitals NHS Foundation Trust**: the benefits derived from a SNOMED CT-embedded eHospital clinical information system, patient portal and a health data & analytics platform.

**OHDSI**: the SNOMED CT-embedded OMOP CDM, and the benefits obtained from research projects using the OHDSI research collaborative.

**University of Nebraska Medical Centre**: the benefits obtained from the SNOMED CT-embedded i2B2 data warehouse and its use for clinical and translational research.

**Northern Queensland Primary Health Network and the Mackay Hospital and Health Service**: an economic evaluation of the Mackay SNOMED CT-embedded HealthPathways implementation.
Patient Outcome Benefits across the varied applications of SNOMED CT

**Patient Service Outcome Improvements**

- Patient (Panel) Management
- Health Record Management
- Diagnostic Tests
- Patient Safety
- Infection Control
- Referral Management
- Population Health
- Data Sharing
- Efficiencies and Cost Savings

**Patient Health Outcomes Improvements**

- Patient Safety
- Infection Control
- Population Health
- Analytics and Research
The healthcare industry is ever evolving. The future opportunities for SNOMED CT will be driven by new healthcare data sources and new healthcare technologies. From a health care industry-wide perspective the following new data sources and technologies are seen as significant.

1. **Huge Interoperable Longitudinal Cohorts** - Over the last 20 years, national cohorts (e.g. UK Biobank), have amassed huge populations with genomic, laboratory, and lifestyle assessments as well as longitudinal follow-up on health outcomes. The breadth and depth of data is staggering, as is the opportunities for discovery.

2. **Diversity and Inclusion** - With a growing depth of data, we have an opportunity to replace adjustments for race and ethnicity with more specific measures.

3. **Big Data and AI** - AI approaches in medicine have been limited by the (un)availability of large, commonly structured datasets. Looking forward, biomedical datasets will become increasingly ready for analyses.

4. **Routine Clinical Genomics** – Moving forward, whole genome approaches will become a routine, early step in the understanding, prevention, detection, and treatment of common and rare diseases.

5. **Electronic Health Records** – Many site-based and national research cohorts now use EHRs and other health data to provide up to decades of disease and treatment information that can be repurposed for research. This use will continue to expand.

6. **Phenomics and Environment** – Continued growth of research and clinical uses for different ways to measure clinical phenotypes, exposures, and lifestyles.

7. **Privacy, Trust and Return of Value** - The utility of precision medicine is dependent on broad participation, and broad participation of large populations requires trust, protection of privacy, and a return of value to the participants.
SNOMED CT

Why would a Country Invest in SNOMED CT?

Desired Value
SNOMED CT is a best-in-class, core clinical reference terminology that is well-designed, comprehensive, serves multiple uses, is widely adopted, and enables improved patient outcomes – it clearly passes the bar for the value that a country desires from a clinical terminology and as such makes for a Strong Case for Investment.

Potential Value
Through the modelled deployment in clinical information systems and interoperability solutions SNOMED CT has clearly shown strong potential value and as such makes for a Strong Case for Investment.

Demonstrated Value
The ten Case Studies clearly demonstrate the value that SNOMED CT can bring when used in clinical information systems, health data & analytics platforms and interoperability solutions, and again make for a Strong Case for Investment.

Future Value
Future opportunities, especially in personalized, precision medicine and research, using advanced technologies, are a perfect fit for SNOMED CT, which in turn bolsters its Strong Case for Investment.

The SNOMED CT Case for Investment
Desired Value + Potential Value + Demonstrated Value + Future Value = Strong Case for Investment
EXECUTIVE SUMMARY

1. Desired Value
2. Potential Value
3. Demonstrated Value
4. Future Opportunities

A Strong Case for Investment in SNOMED CT
A Strong Case for Investment in SNOMED CT

There is a demonstrated STRONG CASE FOR INVESTMENT in SNOMED CT
Experience the value of SNOMED CT

Read the full report and visit the value platform at:

snomed.org/value