

SNOMED CT

The case for investment

SNOMED CT

The global
language of
healthcare





POLICYMAKERS



MEMBERS



**COLLABORATION
PARTNERS**



**RESEARCH & KNOWLEDGE
PRODUCERS**



VENDORS



CARE PROVIDERS



IMPLEMENTORS



PATIENTS/CITIZENS

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SNOMED CT

The global language of healthcare



About the Report

SNOMED CT
The global language of healthcare



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 interoperability and knowledge representation of massive and diverse sets of data required by this next evolution in health care delivery.

Executive Summary

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SNOMED International

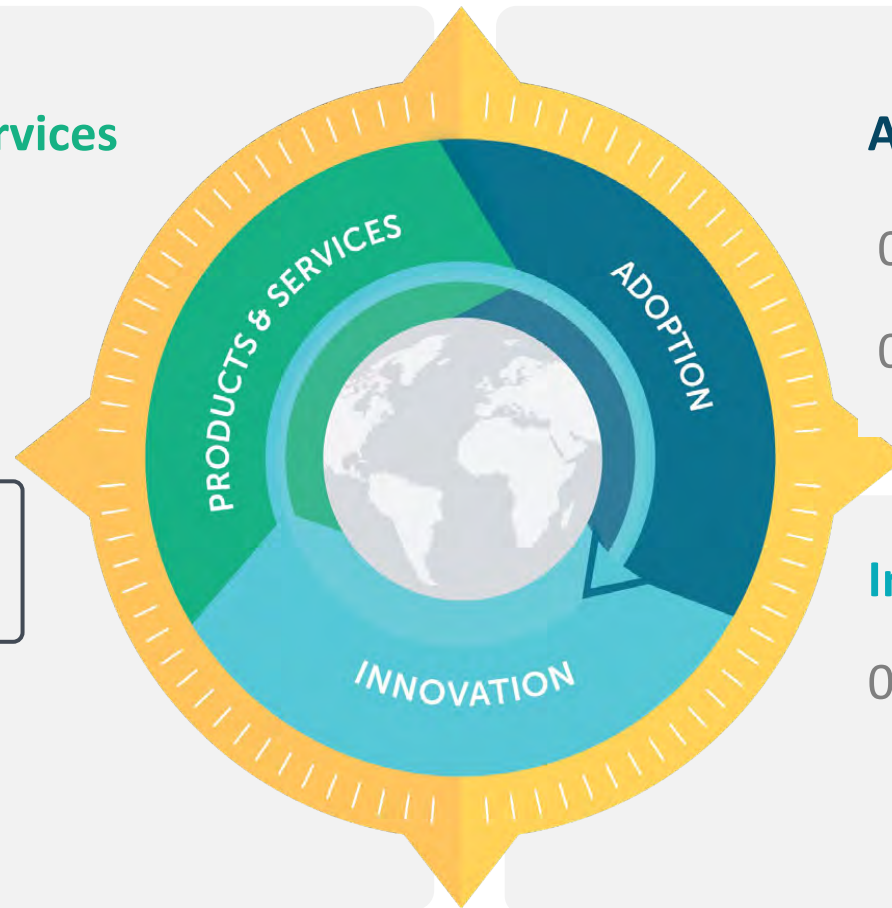
Strategic Directions for 2020 to 2025

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

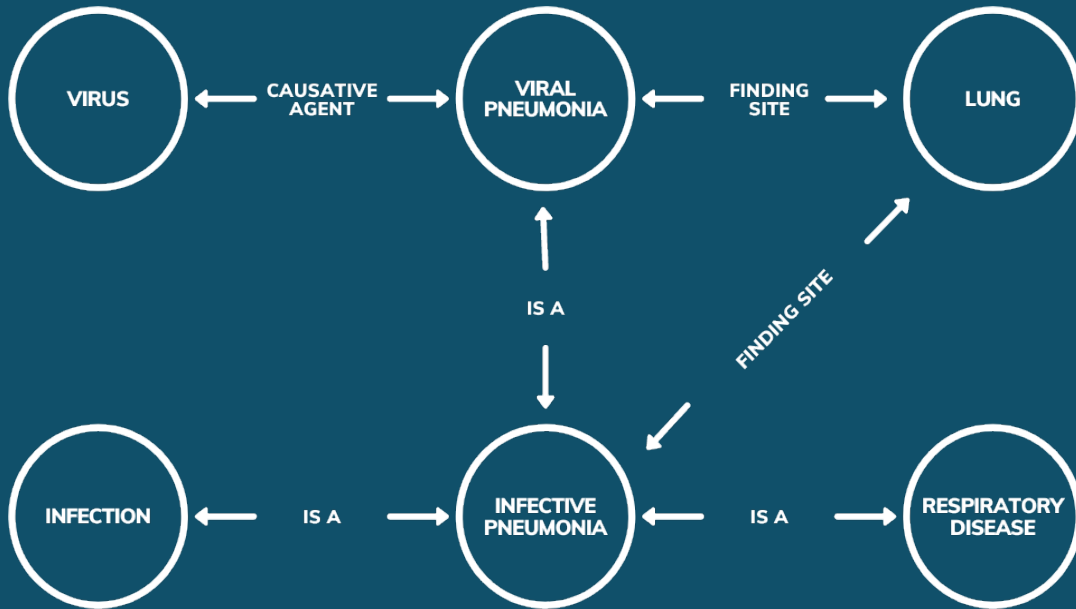
SNOMED CT

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.



The SNOMED CT Viral Pneumonia Example



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

What is it?



Concepts

Represent clinical thoughts.
Every concept has a unique
numeric identifier.

Enable meaning-based queries



Descriptions

Link human readable terms to
concepts.

*Assist searching for concepts
and provides multi-lingual
support*



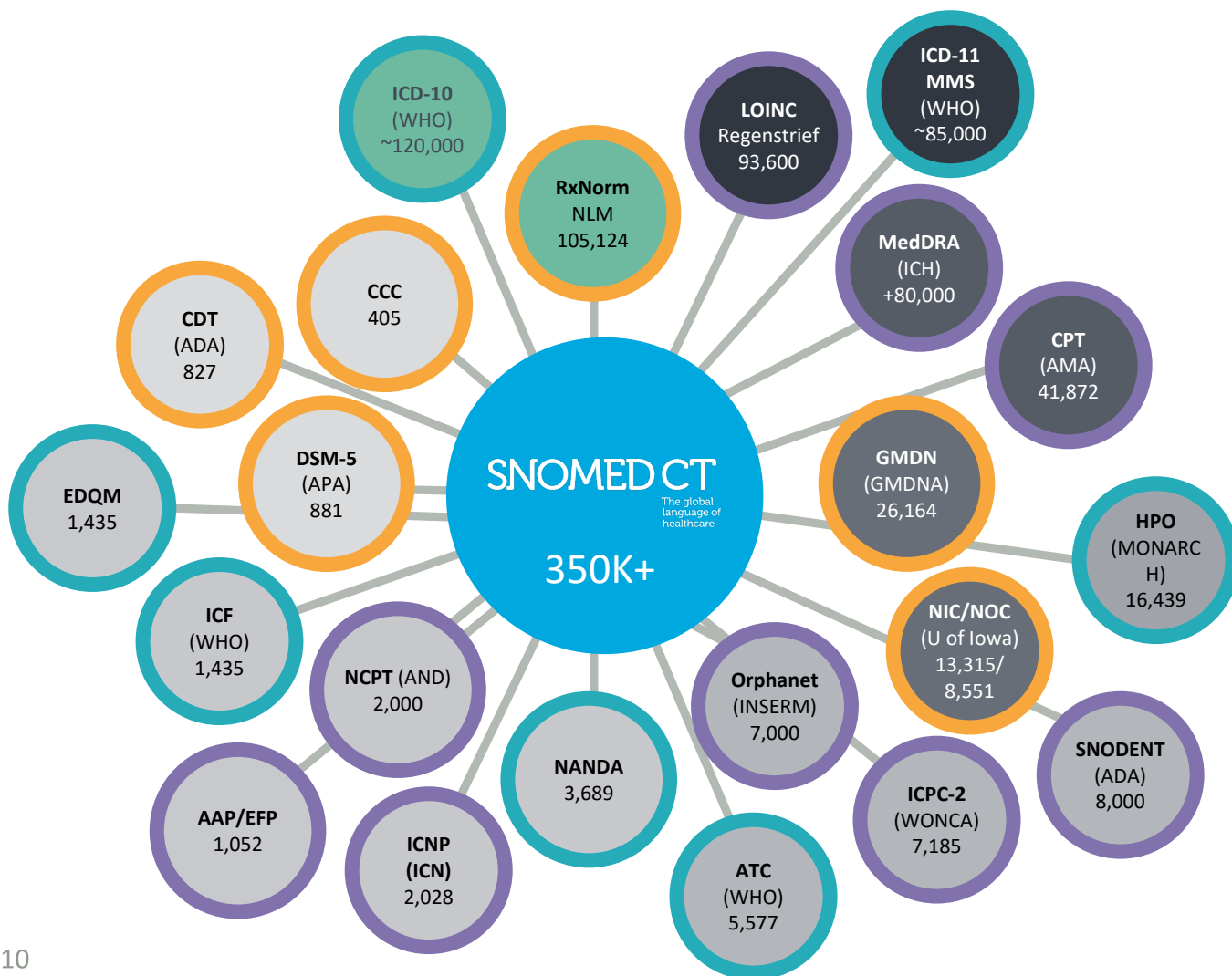
Relationships

Link concepts to other concepts
whose meaning is related in some
way.

Support aggregation and queries

SNOMED CT

Is a Core Reference Clinical Terminology



Terminology Standards content volume

terminologies / # content

3	>1,000
4	1,001 - 5,000
4	5,001 - 10,000
1	10,001 - 20,000
2	20,001 - 40,000
2	40,001 - 60,000
1	60,001 - 80,000
1	80,001 - 100,000
1	100,001 - 200,000
2	200,000+
1	300,000+

LEGEND

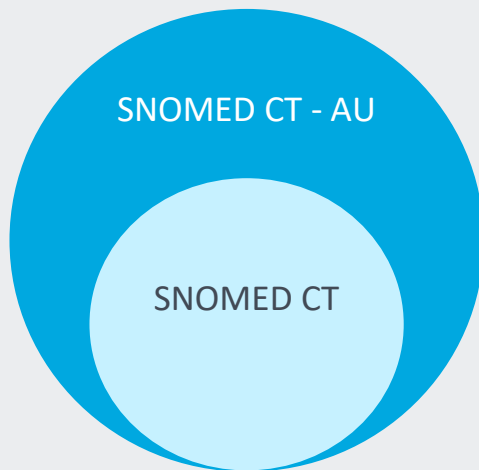


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Note: This diagram is intended to be reflective of SNOMED CT as a core reference terminology. It does not include all the national extensions of SNOMED CT (e.g. Australian Medicines Terminology with 100,000 concepts) that further expand the SNOMED CT hub-and-spoke model.

SNOMED CT

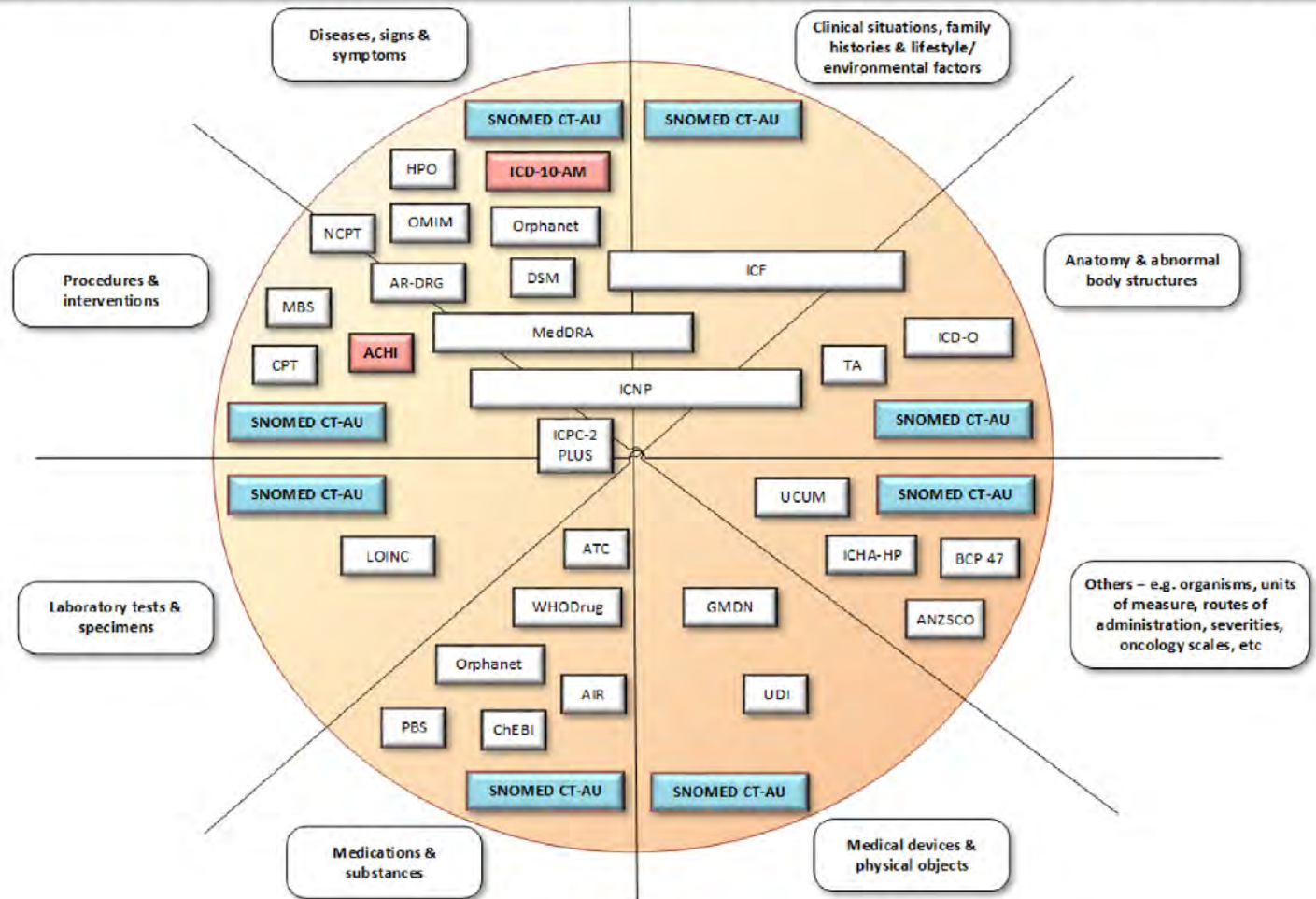
A Core Reference Clinical Terminology – the Australian Example



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

ICD-10-AM, SNOMED CT-AU and common clinical classifications, ontologies & code sets used in health



4. Australian Digital Health Agency et al., "Terminologies and classifications: SNOMED CT AU and ICD 10 AM use in Australia" PowerPoint presentation, August 2020. See https://www.healthterminologies.gov.au/library/DH_3288_2020__TerminologyAndClassificationPresentation_v2.1.pdf

Where is SNOMED CT used?

Research

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



Data Entry and Integration

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



Clinical Information Sharing

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



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

Management Analytics

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



Population Analytics

Conducting **trend & comparative analysis**, **pharmacovigilance** and **clinical audit**.



Point-of-Care Analytics

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



SNOMED CT

What is unique about it?

SNOMED CT



Core Reference Terminology

Comprehensive & Granular

Semantic Network

Broad Use Context

National Mandate



Unique
Features

The Value of SNOMED CT for Stakeholders

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The Theoretical Underpinning

SNOMED CT Value Framework

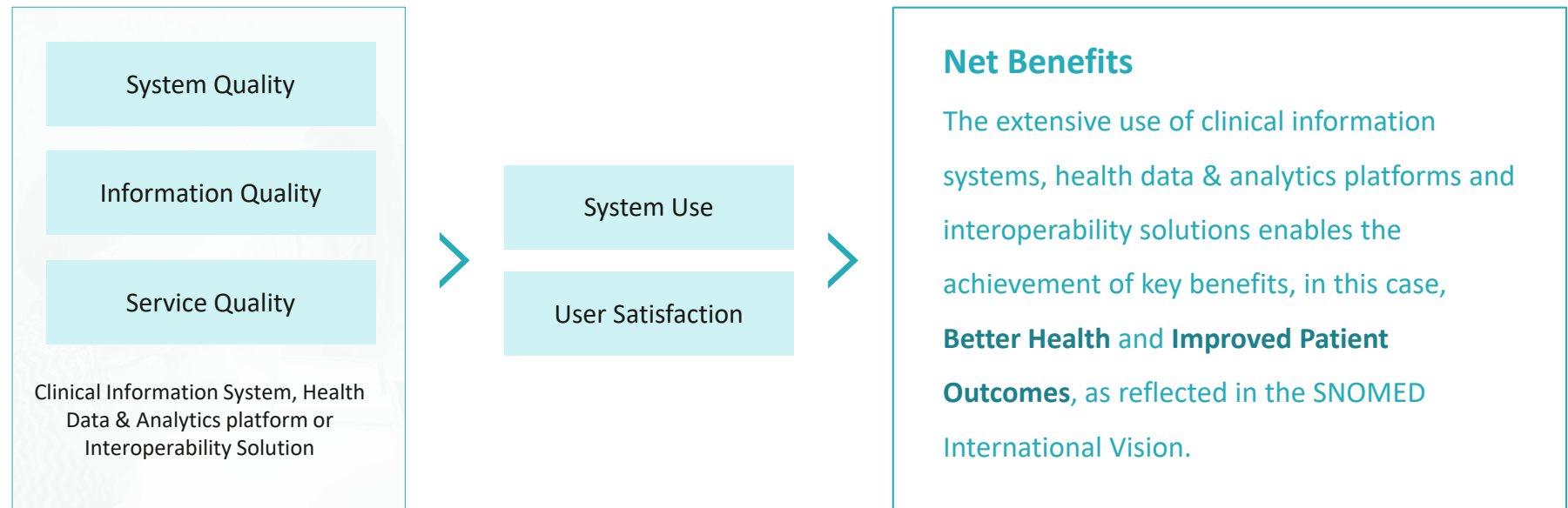
SNOMED International has used the Delone and McLean IS Success Framework as the theoretical underpinning for the development of the value propositions.

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.

SNOMED CT >

Adapted from the Delone and McLean IS Success Framework



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**



Integrated with SNOMED CT

Health Data & Analytics Platforms
Clinical Information Systems
Interoperability Solutions



The Patient Journey

Net Benefits

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

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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 system, 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.



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.

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 Producer 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.

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

Cimino

- ✓ SNOMED CT is “fit for purpose” as a clinical terminology using the Cimino criteria

AHIMA

- ✓ SNOMED CT meets all the AHIMA data quality requirements

ASSESS CT

- ✓ SNOMED CT meets the clinical terminology suitability requirements of the E.U. community
- ✓ SNOMED CT is professionally managed and maintained

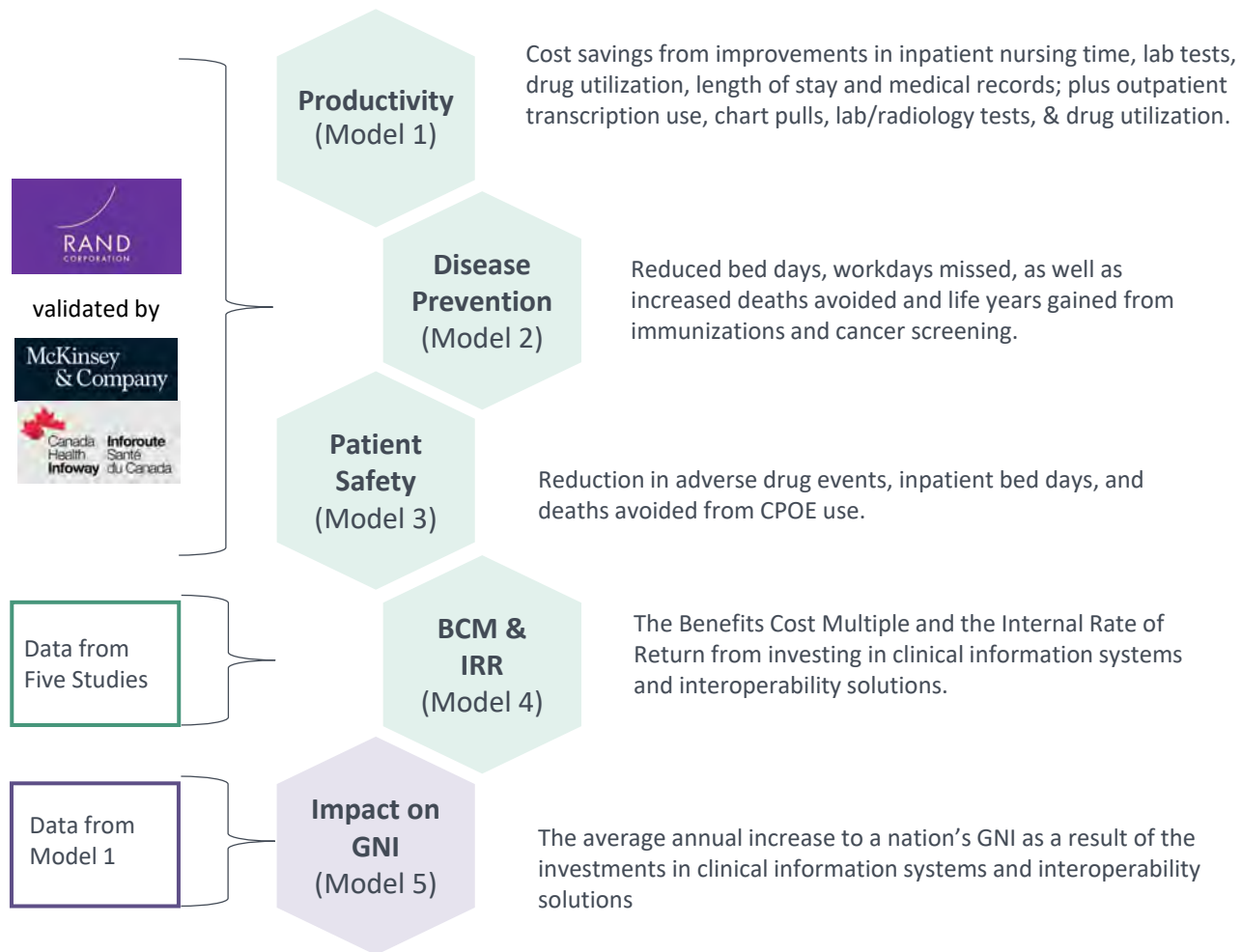
“SNOMED CT is the best available core reference terminology for cross-border, national and regional eHealth deployments in Europe”

ASSESS CT 2016

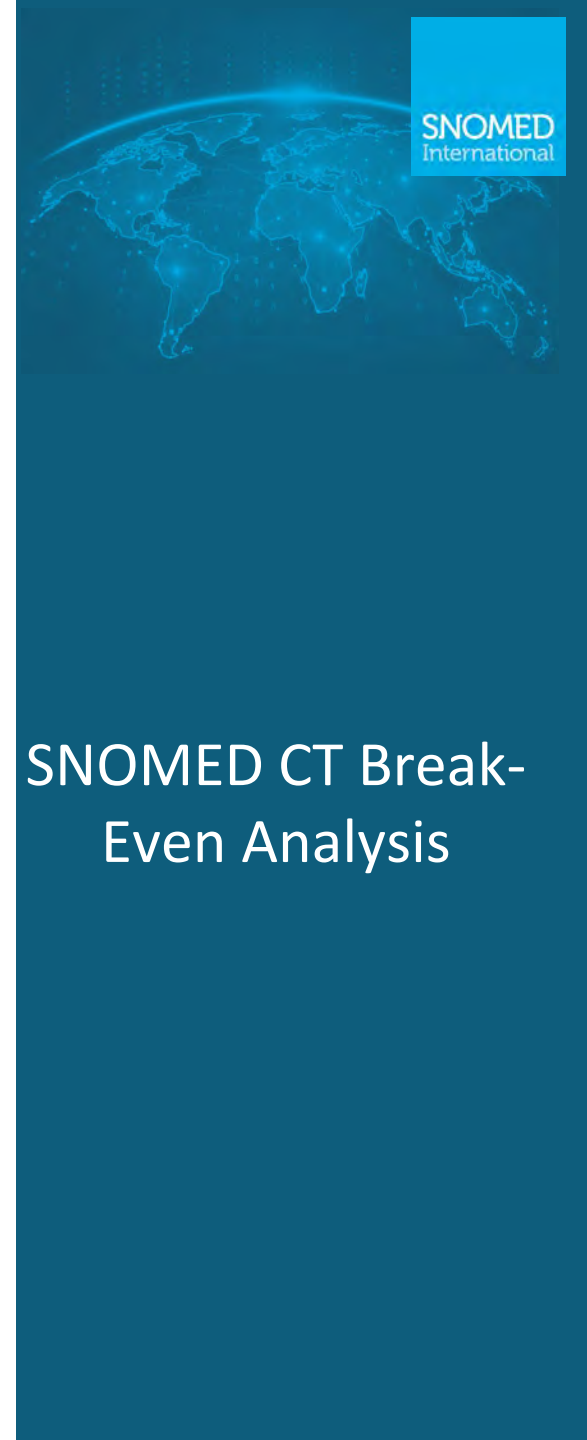


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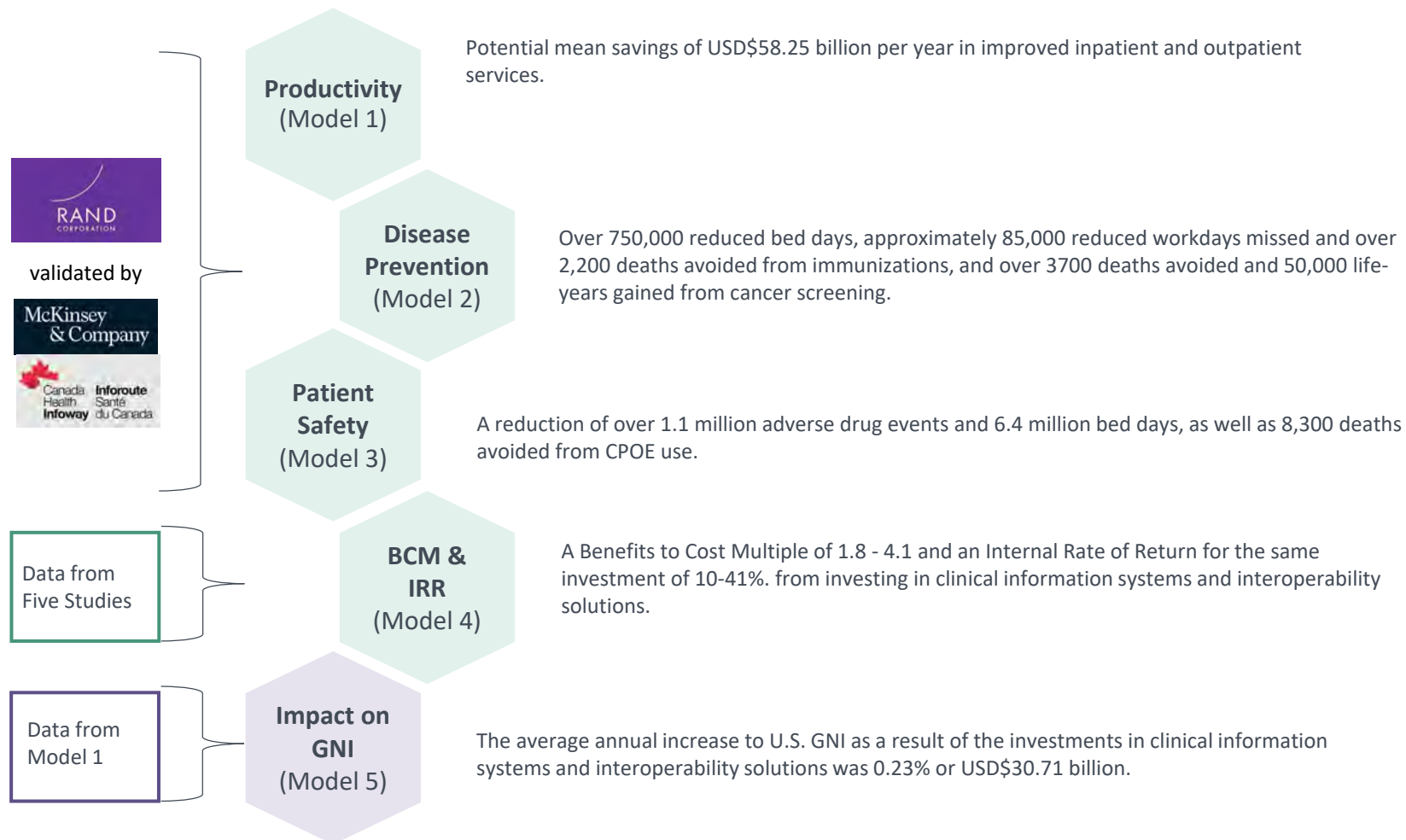
Potential Case for Investment



SNOMED CT Break-Even Analysis



The estimated cost of implementing a SNOMED CT license in the USA for the 15-year study period was USD87M.



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Using only the Model 1 cumulative benefits of USD\$875B the breakeven percentage is 0.01%.



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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).

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

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.

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.

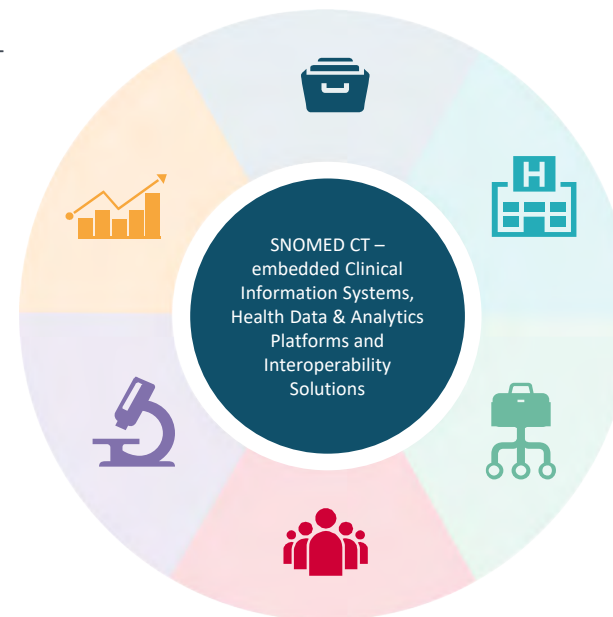
Kaiser Permanente: the benefits derived from a SNOMED CT-embedded HealthConnect clinical information system and patient portal, as well as analytics and research

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

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.

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.

Northern Queensland Primary Health Network and the Mackay Hospital and Health Service: an economic evaluation of the Mackay SNOMED CT-embedded HealthPathways implementation.



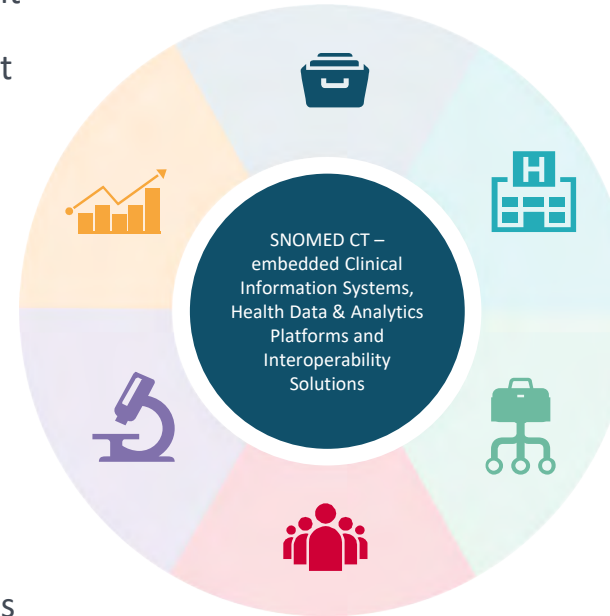
Patient Outcome Benefits across the varied applications of SNOMED CT

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



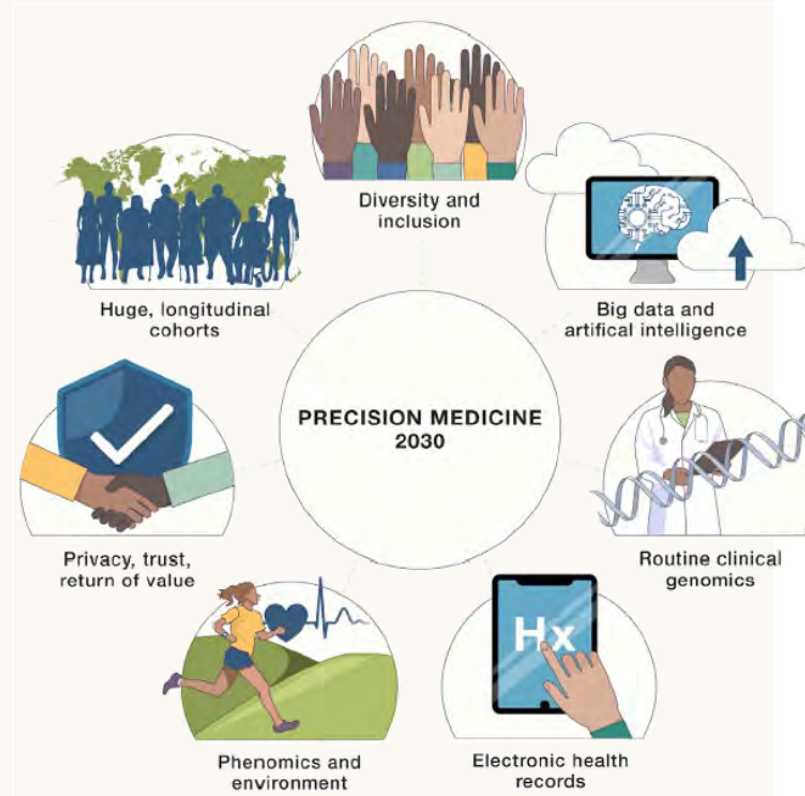
The healthcare industry is ever evolving. The future opportunities for SNOMED CT will be driven by new healthcare data sources and new healthcare technologies.

From a health care industry-wide perspective the following new data sources and technologies are seen as significant.

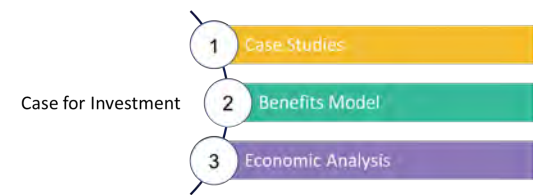
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Future Opportunities

Personalized, Precision Medicine 2030



- 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.
- Diversity and Inclusion** - With a growing depth of data, we have an opportunity to replace adjustments for race and ethnicity with more specific measures.
- 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.
- 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.
- 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.
- Phenomics and Environment** – Continued growth of research and clinical uses for different ways to measure clinical phenotypes, exposures, and lifestyles.
- 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.⁸



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

1 Desired Value



2 Potential Value



3 Demonstrated Value



4 Future Opportunities





There is a demonstrated
**STRONG CASE FOR
INVESTMENT**
in SNOMED CT

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



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