

DATA LOCALIZATION IN MEDICAL INFORMATICS

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Dr.TV Gopal

Adjunct Professor, Department of Computer Science and Engineering &
Artificial Intelligence, Mahindra University, Hyderabad, India

For the Records

Professor [Retired]

Department of Computer Science and Engineering & Director [Retired],
Centre for Applied Research in Indic Technologies [CARIT]

College of Engineering, Guindy Campus

Anna University Chennai – 600 025

e-mail : gopal@annauniv.edu;

gopal.tadepalli@mahindrauniversity.edu.in

Home Page : <https://vidwan.inflibnet.ac.in/profile/57545>

WHY ?

REGULATORY REASONS

- Medical data should be localized to comply with strict national privacy laws [like the Digital Personal Data Protection Act; DPDP Act] and to safeguard highly sensitive patient records.
- Keeping data geographically grounded ensures regulatory compliance, data sovereignty, and gives governments direct legal jurisdiction over how health information is protected and accessed.
- My related work is through the Indian Computer Emergency Response Team [CERT-in], Data Security Council of India [DSCI], ITIM and International Open Forum on Data Society [IOFDS]

WHY?

CLINICAL SETTINGS

- **Cultural and Linguistic Relevance:** Translating software and devices with accurate terminology prevents life-threatening miscommunications and builds patient trust.
- **System Alignment:** Regional variations use different diagnostic coding [e.g., ICD-10 variants] and metric systems [e.g., mmol/L vs. mg/dL for glucose], which must match the local standard.
- **Legal and Ethical Standards:** Privacy frameworks [like HIPAA or GDPR] require specific localized consent flows and data handling rules.
- Early experience with DIMAT Standard & Medical Transcription

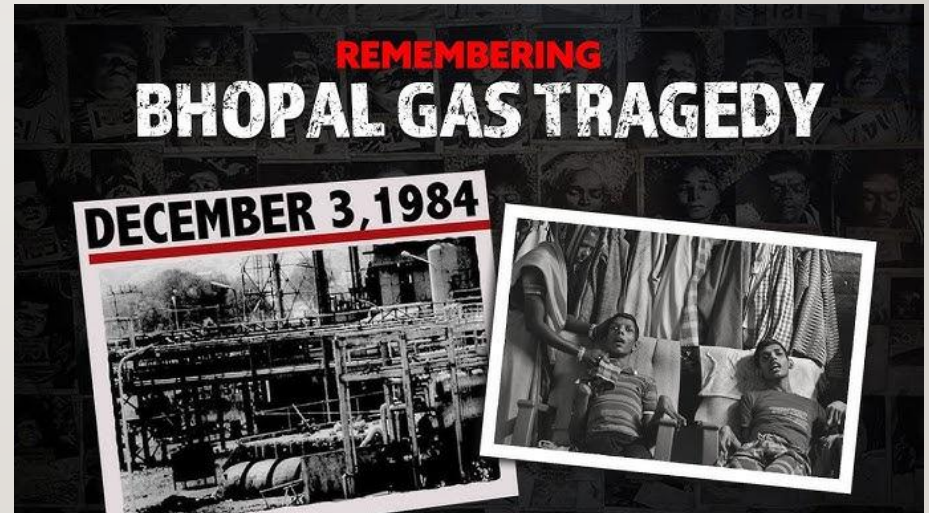
A DIFFERENT WHY?

REASONS FOR NON-LOCALIZATION AND / OR GLOBAL

- Transitioning medical data from localized, isolated silos to a global, interoperable network is vital for accelerating biomedical research, eliminating demographic biases in AI, and improving rapid-response public health.
- It enables life-saving insights through real-world data sharing.
- **Eliminating Algorithmic Bias:** Global pooling creates diverse datasets that ensure AI safety and equity across all populations
- **Advancing Rare Disease Research**
- **Accelerating Clinical Trials**
- **Rapid Global Pandemic / Disaster Response**

MY PRAYERS

- The Seveso disaster [Italy] on July 10, 1976 - where an explosion released a toxic cloud of TCDD dioxin - serves as a pivotal baseline for global chemical safety regulations.
- Half a century later, research reveals increased rates of gastrointestinal cancers, cardiovascular diseases, and endocrine disruptions among exposed populations, though the contaminated zones were successfully remediated.



MY PRAYERS

- **The Vietnam War (Agent Orange):** From 1961 to 1971, the U.S. military heavily sprayed the defoliant Agent Orange, which was heavily contaminated with dioxins, devastating large areas of land and leaving lasting health impacts on the population.
- **Times Beach, Missouri (USA):** In the early 1970s, toxic waste laced with dioxin was sprayed on dirt roads to control dust. The environmental crisis escalated, leading to the complete evacuation and buy-out of the town by the EPA in December 1982.
- **The Belgian Dioxin Affair:** In 1999, a major food contamination crisis occurred when animal feed became contaminated with PCBs and highly toxic dioxins, which spread into the poultry and dairy supply chains.

TRADITIONAL HEALING - I

- Yes, traditional healing fundamentally demands localization. Because it views health as a holistic balance between the mind, body, spirit, and immediate environment, the efficacy and practices are deeply rooted in specific geographic, cultural, and community contexts.
- Sourcing of Remedies: Traditional pharmacopeias depend directly on local biodiversity. The specific plant, mineral, or animal remedies utilized are often geographically isolated and cannot be synthetically replicated or globally scaled without losing their holistic integrity.



TRADITIONAL HEALING - 2

- **Cultural Frameworks & Beliefs:** Healing practices are intertwined with native languages, spiritual beliefs, and social customs. A practice separated from its originating cultural narrative often loses its intended psychological and spiritual efficacy.
- **Community Trust:** Traditional healers [*Vaidyas, Bhopas*, or spiritual elders] act as trusted intermediaries who understand the exact socio-cultural reality and lineage of the patient
- **Accessibility:** Traditional medicine thrives where Western biomedical infrastructure is geographically or financially inaccessible, meaning the services adapt to the socio-economic realities of the specific region.
- **Note:** Now Outmoded Local Medical Practitioner [LMP] & Rural Medical Practitioner [RMP]; Mandatory Rural Posting of Government Doctors

Towards standards for management and transmission of medical data in web technology

Francesco Sicurello

President of @ITIM, Italian Association on Telemedicine and Medical Informatics;

National Research Council-Institute of Biomedical Technologies,
Milan;

Health Directorate, Lombardia Region;

Towards E-cooperation and E-inclusion Between Countries by Health Networks and Telemedicine

Francesco Sicurello

@ITIM / IITM – Italian Association of Telemedicine and Medical Informatics / International Institute of Tele-
Medicine, Universities of Milano Bicocca and Insubria, University Technological Centre of Desio, Italy

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CORE CONCEPTS - TECHNICAL

- **Residency vs. Localization:** Data residency defines the physical location of data storage. Localization adds strict rules on who can access and process it outside those borders.
- **Absolute vs. Partial:** Absolute localization forbids data from ever leaving the jurisdiction. Partial localization applies only to specific sensitive categories [e.g., financial records, medical data], allowing less critical information to remain in global clouds.
- **Drivers:** Governments implement these laws to ensure user privacy, enhance local security, and keep personal data under local legal jurisdiction

BEST PRACTICES - TECHNICAL

- Data Classification: Categorize your data by sensitivity and regulatory requirements.
- Infrastructure Selection: Deploy workloads using geo-fencing and localized cloud architectures rather than relying on centralized global servers.
- Backup Management: Ensure that replicas, backups, and disaster failover sites strictly adhere to the same jurisdictional boundaries as your production data.

TELECOMMUNICATIONS POLICY

The International Journal of Digital Economy, Data Sciences and New Media

Telecommunications Policy is concerned with the roles of information and communication technologies (ICT) in the economy and society. The journal is multidisciplinary and international, encompassing conceptual, theoretical and empirical studies, quantitative as well as qualitative. Its scope includes ICT markets; policy, regulation, and governance; management, entrepreneurship, innovation and use. Contributions may explore these topics at national, regional and international levels, including issues confronting both developed and developing countries.

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Email: sppkmv@nus.edu.sg

Data localization is the practice of storing and processing data within specific geographic boundaries.

THREE CLOSELY RELATED IDEAS

- **Data Residency:** refers to the physical location where data is stored. It refers to the actual location of the servers and other infrastructure that are used to store and process data. Data residency can be important for compliance with laws and regulations that require certain types of data to be stored within a specific country or region.
- **Data Sovereignty:** refers to the legal authority of a government or other entity to exercise control over data within its borders. It involves the ability of a government or other entity to regulate the collection, storage, use, and transfer of data within its jurisdiction.
- **Data Localization:** refers to the practice of storing and processing data within a specific geographic location. It can be motivated by various factors, such as national laws or regulations, security and privacy concerns, or the desire to keep data closer to users.

Data Localization

Importance



01.

Enhanced
data security
and privacy

02.

Improved
customer trust

03.

Reduced legal
risks and
penalties

04.

Enhanced
operational
efficiency

05.

Compliance with
industry-specific
regulations

DATA SPACES

[MAKING DATA LOCALIZATION SEAMLESS]

- **Data spaces** are federated, decentralized frameworks governed by standardized rules that allow trusted, cross-border data sharing without creating centralized data monopolies.
- **Data Localization** refers to strict legal requirements demanding that specific types of data be physically stored and processed within the borders of the collection country.
- **These two concepts often intersect.** Organizations must build localized, compliant data centers while simultaneously utilizing data space architectures to share that localized data securely with international partners.

FOCUS:TRADITIONAL MEDICINE

- Traditional healing encompasses indigenous, plant-based, or spiritual practices passed down through generational apprenticeships rather than written texts.
- Because this knowledge is experiential, it often lacks formal clinical documentation.
- To preserve these invaluable community traditions, researchers frequently use ethnographic methods [like handwritten notes instead of strict recordings] to honor sacred practices.
- Because these traditions do not interface with conventional healthcare systems or track patient outcomes in digital formats, they present unique challenges and opportunities.

THE DATA SPACE

- **Oral Transmission:** Wisdom is passed down directly from mentor to apprentice rather than through institutionalized academic training or published textbooks
- **Decentralized Spaces:** Healing occurs within cultural contexts, utilizing local flora, spiritual rituals, and ceremonies deeply tied to the community's ancestral landscape
- **Integration Challenges:** The absence of quantified, standardized records creates skepticism within the modern biomedical field, making collaboration difficult.
- **Cultural Relevance:** These systems remain deeply trusted in rural and indigenous populations because they address the mind, body, and spirit holistically, offering affordable and accessible care.
- **Biomedical Contributions:** Despite the lack of formal data, the empirical observation of plants and remedies in traditional healing has historically contributed significantly to modern medicine [e.g., Aspirin and Artemisinin]

The author of **IN THE REALM OF HUNGRY GHOSTS**

GABOR MATÉ, MD
with **DANIEL MATÉ**

NEW YORK
TIMES
BESTSELLER

the Myth of Normal

**TRAUMA, ILLNESS & HEALING
IN A TOXIC CULTURE**

- **The saying “poison is the cure for poison” is often true in modern medicine!**
- **“Vishaniki Virugudu Vishame” – In Telugu ; My Mother Tongue**
- This concept, famously described by toxicologist Paracelsus as "the dose makes the poison," is the basis for antidotes and venom immunotherapies.

For example, antivenom is made by injecting small, safe amounts of animal venom into horses or sheep, allowing their bodies to create antibodies that are then harvested to save snakebite victims.

TO BE STUDIED

"NATURAL EQUALS SAFE"

- However, the assumption that "natural equals safe" is increasingly being challenged as evidence mounts regarding the potential health risks associated with these classical remedies.
- The convergence of ethnopharmacology and modern medicine underscores the necessity for a thorough scientific evaluation to ensure the safety and efficacy of traditional treatments.
- Notably, metals such as mercury, sulfur, and arsenic, commonly used in traditional medicine, can undergo biotransformation, leading to adverse effects like bioaccumulation, oxidative stress, inflammation, genomic damage, and microbiota alterations.



THE FACT

- Practitioners and indigenous healers operate out of localized "data spaces," meaning their knowledge is embedded within shared cultural narratives, spiritual frameworks, and immediate natural environments rather than empirical databases.

Original Article

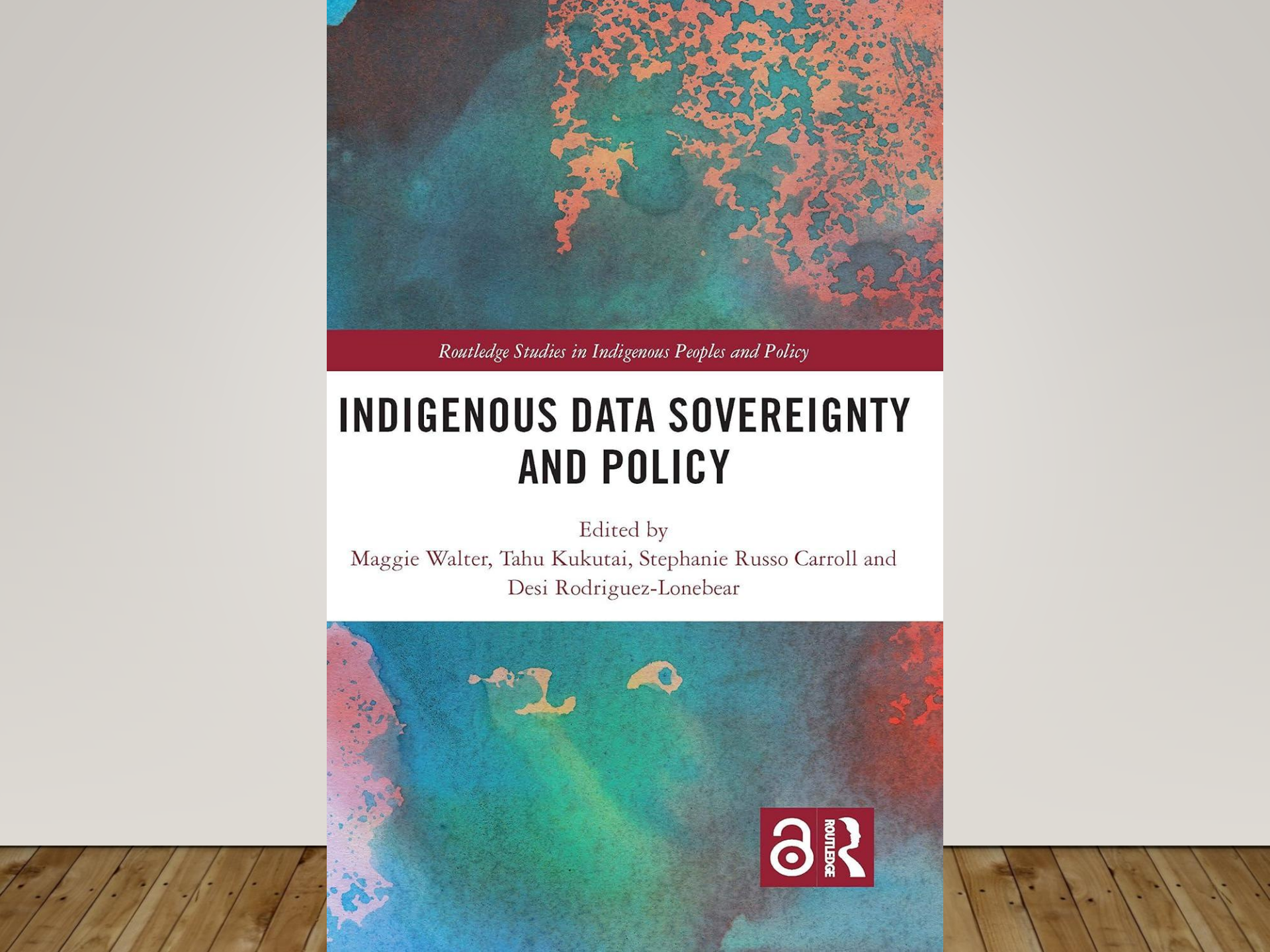
Documentation of Traditional Healing Practices Used by Tribal Healers of Dindori District, Madhya Pradesh

Umesh Shukla, Nitin Ujjaliya, Anjali Jain, Riddhi Sudhir Bhatt

Indigenous Peoples have the right to Indigenous data sovereignty and Indigenous data governance



Photo: Worawut Prasiuan | Getty Images



Routledge Studies in Indigenous Peoples and Policy

INDIGENOUS DATA SOVEREIGNTY AND POLICY

Edited by

Maggie Walter, Tahu Kukutai, Stephanie Russo Carroll and
Desi Rodriguez-Lonebear



Data Lineage Vs. Data Provenance

COMPARSION PARAMETERS

Goals

Components

Challenges

Compliance Requirements

Pricing

DATA LINEAGE

track data lifecycle
management

Portal, Capture,
Nurture

Maintenance

Easy

Open source & paid

DATA PROVENANCE

data lineage goals +
input methods

+ data input &
capture track

Complicated flow

Difficult

Mostly open source

Thank You