SUNRISE

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Leveraging Real-World Radiation Medicine Health Data to Drive Evidence-Based Cancer Care Policies: Insights from the IAEA-SUNRISE Project

Background
SUNRISE (Sustainable Unified Network for Radiation Medicine Innovation and Scientific Excellence) project, under the IAEA's Rays of Hope initiative, is creating a global-scalable data-collection framework to strengthen access, quality, and equity in cancer care. It will accelerate the digital transformation of health systems in Member States under the Rays of Hope Innovation pillar.

Objective
Assess feasibility and perceived importance of core radiation-medicine data domains across diverse settings to inform policy and investment.

Methods
Global survey combined 5-point Likert scores and open responses spanning patient care, treatments, outcomes, infrastructure, and workforce. Countries were grouped by the World Bank 2025 income classification. Descriptive statistics of mean (± Standard Error) Likert scores and thematic synthesis of open-ended feedback identifying barriers and priorities.

Key Results and Findings

Survey Reach:
49 Countries, 75 institutes, 82 Health Professionals
32% Medical Physicists
28% Radiation Oncologists
9% RTTs 9% Radiology / Nuclear Medicine MDs
22% Other (administrators, researchers, dietitians…)

Data gaps between importance vs feasibility:
Survival outcomes → 4.2±0.09 vs 3.3±0.20
Nutrition → 3.8±0.15 vs 3.3±0.20
Economic data → 3.7±0.11 vs 3.1±0.21

Barriers:
Limited infrastructure and digital platforms
Manual workflows and fragmented systems
Lack of interoperability across institution

Income group mix:
12% LIC, 43% LMIC, 24% UMIC and 20% HIC

Geographic distribution:
42% Asia & Pacific, 30% Africa, 18% Latin America & Caribbean, and 10% Europe

Data collection practices:
~90% collect basic demographics/treatment data
~60% record staging & comorbidities

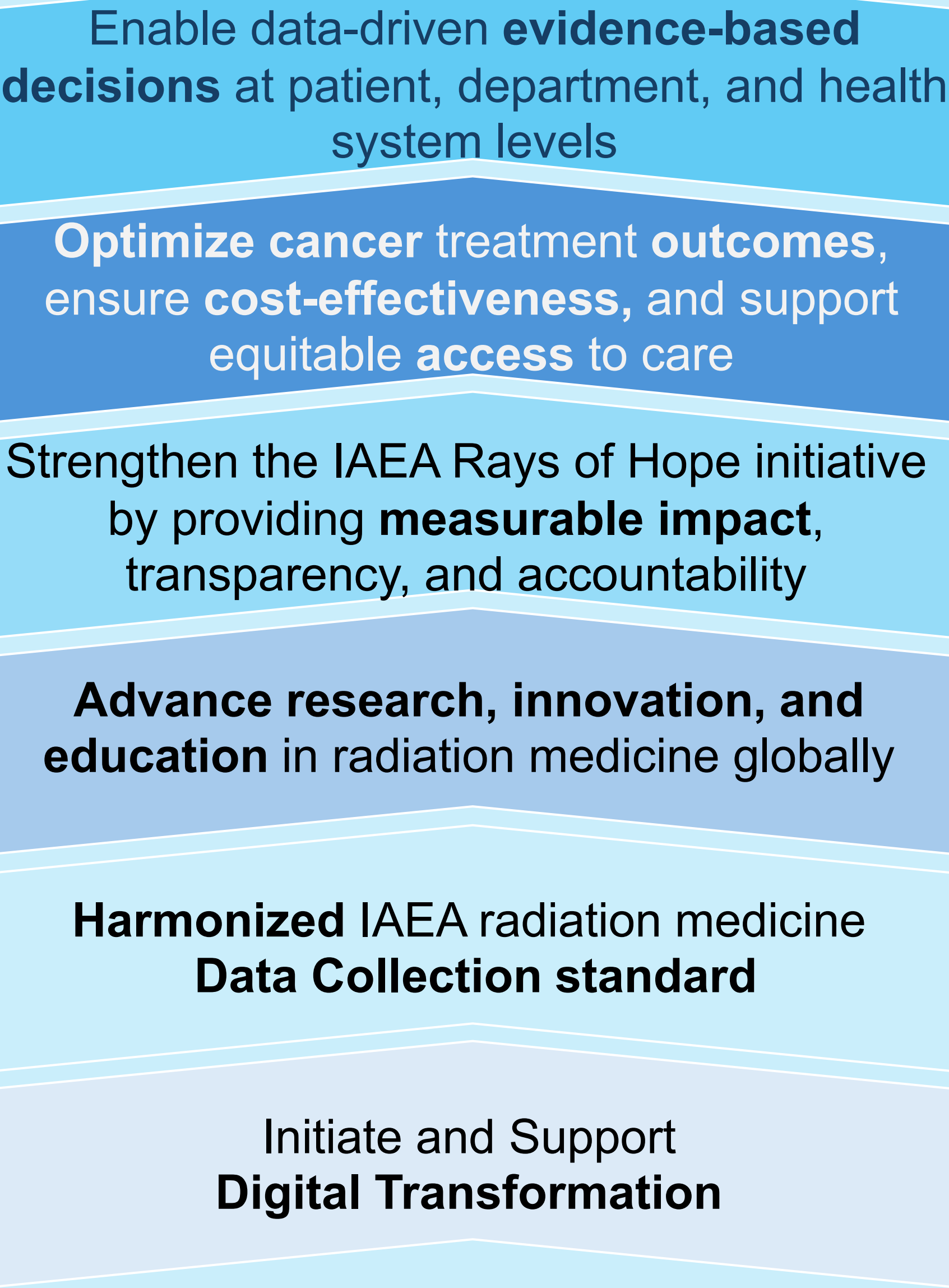**Equipment & Hospital Information Systems:**
Uptime tracked ~40% (yet 80% rate it essential)
~90% value data-sharing, ~50% have interoperable systems

Priorities Identified
Workflow integration, Investment in personnel, training, and workforce
Development of digital platforms & interoperable data systems

Conclusions:
Survival outcomes and patient-reported/socioeconomic data are highly valued but difficult to capture. SUNRISE addresses these gaps with a pragmatic, tiered framework that strengthens infrastructure, workforce, and systems - enabling equitable, evidence-based cancer care. Next project phases will embed patient input to align data elements with lived experience
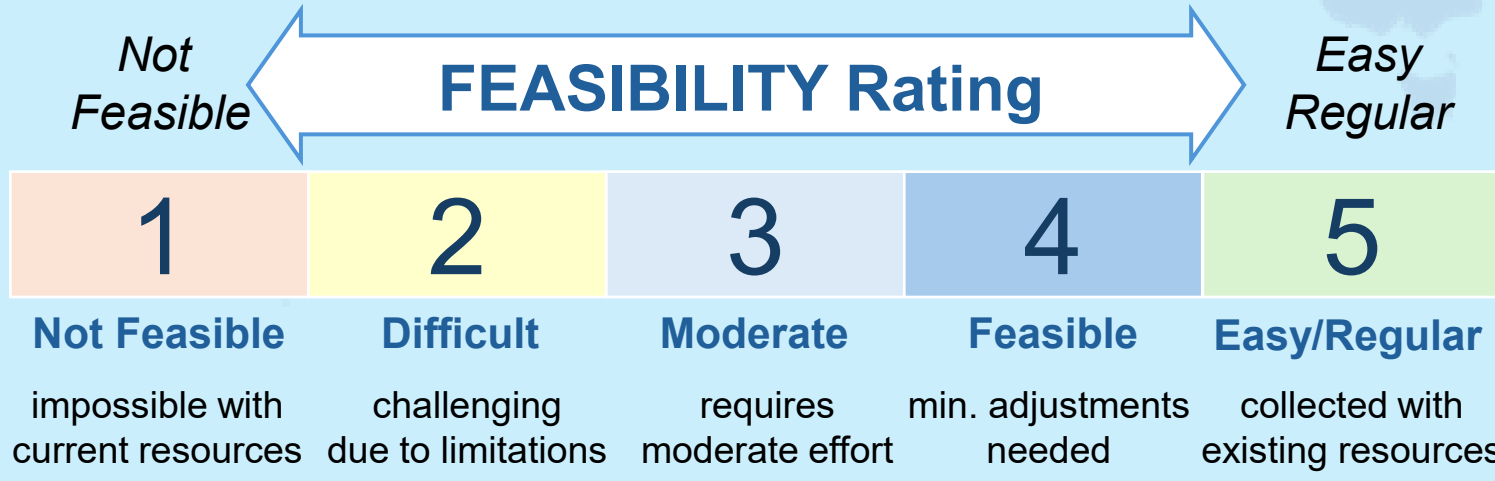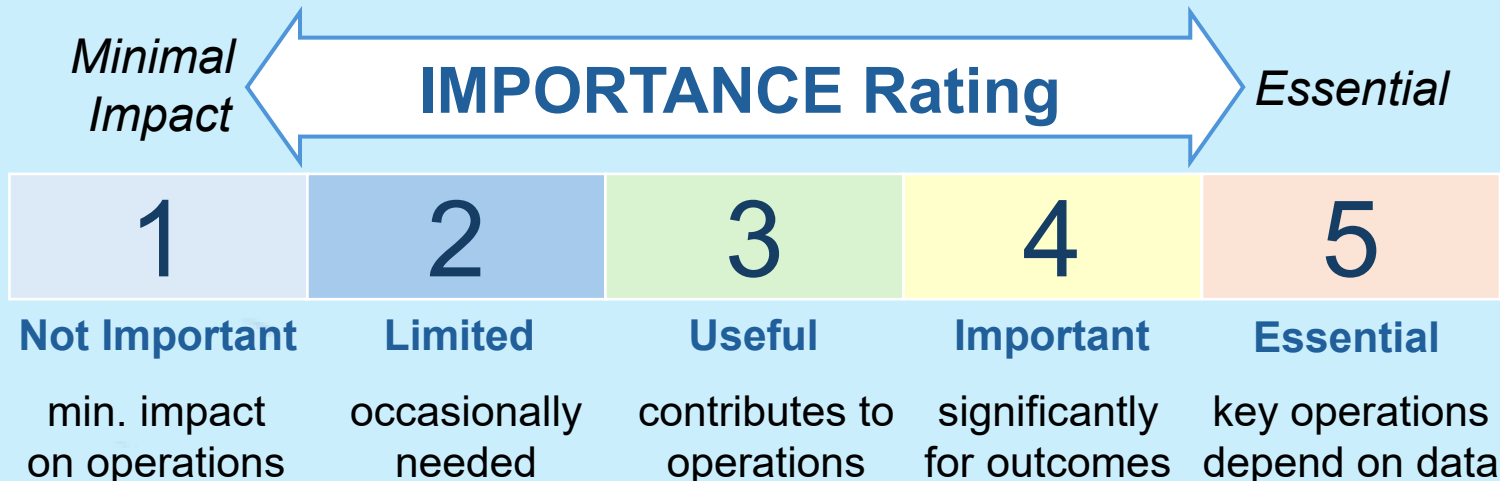

Enable data-driven **evidence-based decisions** at patient, department, and health system levels

Optimize cancer treatment **outcomes**, ensure **cost-effectiveness,** and support equitable **access** to care

Strengthen the IAEA Rays of Hope initiative by providing **measurable impact**, transparency, and accountability

Advance research, innovation, and education in radiation medicine globally

Harmonized IAEA radiation medicine **Data Collection standard**

Initiate and Support **Digital Transformation**

IMPORTANCE Rating
Minimal Impact — *Essential*

1	2	3	4	5
Not Important	Limited	Useful	Important	Essential
min. impact on operations	occasionally needed	contributes to operations	significantly for outcomes	key operations depend on data

FEASIBILITY Rating
Not Feasible — *Easy Regular*

1	2	3	4	5
Not Feasible	Difficult	Moderate	Feasible	Easy/Regular
impossible with current resources	challenging due to limitations	requires moderate effort	min. adjustments needed	collected with existing resources

Ethical Safeguards
Full compliance with GDPR, HIPAA, and national laws.
Justifications for each data element; voluntary participation.
Clear provisions for confidentiality, security, and responsible use of information.

Legal, Ethical, Personally Identifiable Information

Local Database API

Patient-level: HIS, EHR, CTMS, monitoring systems, manual entry.
Department-level: RIS, HRMS, billing records, equipment logs.
System-level: Cancer registries, GIS, financial/survivorship databases.

Data Source

ANALYTICS
AI/DL algorithms
Data Visualization,
Prediction, Reports

WHY HOW W E WHAT WHERE N S

Patient-Level Data
Objective: Identify demographics, disease profiles, treatment pathways, outcomes.
Elements: Age, sex, diagnosis date, cancer site, chemotherapy/radiation details, survival rates, treatment-related complications, nutritional/performance indicators, Quality

Department-Level Data
Objective: Assess resources, equipment use, staffing efficiency, cost-effectiveness.
Elements: Machine availability, patient throughput, downtime, staff-to-patient ratio, staff qualifications, cost and maintenance data

Health System-Level (*Governance*)
Objective: Understand broader system impacts and equity of access.
Elements: Geographic distribution of centres, time to treatment, disparities in access, cost-effectiveness of modalities, direct/indirect costs, adherence, impact of delays

Consensus
Data Elements
Key Indicators

IAEA
IAEA.SUNRISE DB

Country A
National Data Warehouse
Cancer Centre A.3
Cancer Centre A.2
Cancer Centre A.1

Country B

Country …
Country XYZ
National Data Warehouse DB hub

Country D
National Data Warehouse DB hub

Country C
National Data Warehouse DB hub