

APPLIED HEALTH INFORMATICS

Foundations of Health Informatics

Health Systems & Data Flow (LMIC & Oncology Focus)

Presenter: Chamberlain Nwanne, PhD



Memorial Sloan Kettering
Cancer Center



Copyright MSKCC. Confidential — do
not distribute without permission.

Health Systems & Data Flow (LMIC & Oncology Focus) – Learning focus

- ❑ Learning Focus: Understanding how data flows and connects across health systems (LMIC & Oncology context)
 - Patient journey as a data system
 - Data lifecycle: from capture to decision
 - Paper vs digital in LMICs
 - Where oncology data breaks and how to fix it
- ❑ Case study
- ❑ Discussion forum

Health Systems & Data Flow (LMIC & Oncology Focus) – Learning focus

- ❑ Health systems are not just buildings or hospitals. They are systems where people, processes, and tools work together to deliver care.
- ❑ In this unit, you will learn to see healthcare as a data system. Every patient visit creates information. That information must move smoothly from one place to another for care to be safe and effective.
- ❑ In oncology, good data flow is especially important because cancer care depends on:
 - Accurate diagnosis
 - Correct staging
 - Timely treatment
 - Long-term follow-up
- ❑ Many LMIC health systems struggle with broken data flow. This unit helps you understand where data breaks and why.

Foundations of Health Informatics – Learning objectives

□ Learning Objectives

By the end of this unit, learners will be able to:

- Map the patient journey to data capture points
- Explain the data lifecycle with examples
- Compare paper, digital, and hybrid systems
- Identify data breakdowns in oncology workflows

Health Systems & Data Flow – Key definitions

- ❑ Health system: All the people (patients, clinicians, staff), processes (workflows), and tools (paper or digital) used to deliver healthcare.
- ❑ Patient journey: The steps a patient follows from first contact with the health system through diagnosis, treatment, and follow-up.
- ❑ Data flow: How health information moves between people, departments, and systems over time.

A simple way to think about this: Care moves forward only when data moves forward.

Health Data Systems – Paper-Based Systems

- ❑ Paper systems are common in LMICs because they:
 - Paper registers dominate many clinics and most common in many LMICs
 - Data stored physically
 - Hard to retrieve, share, and analyze data
 - Low cost
 - Familiar to staff
- ❑ However, they make it hard to:
 - Find older records
 - Share information between departments
 - Track patients over time

Health Data Systems – Digital Systems

- ❑ Digital systems store data electronically, such as in an Electronic Health Record (EHR).
- ❑ Benefits include:
 - Structured and searchable patient data
 - Faster access to patient history
 - Easier reporting and analysis

Health Data Systems – Hybrid Systems

- ❑ Most LMIC facilities use hybrid systems, meaning both paper and digital tools coexist and are used together

- ❑ This often leads to:
 - Double documentation burden
 - Conflicting records
 - Delays in reporting
 - High risk of inconsistency

What is Health Data Flow?

Definition: Health data flow describes how information moves through healthcare systems as a patient receives care. It includes patient journey, data lifecycle, and reporting.

Sequence of care: Registration → Consultation → Diagnosis → Treatment → Follow-up

In an oncology example:

- ☐ A patient arrives with a referral
- ☐ Registration records personal details
- ☐ A clinician documents symptoms
- ☐ Pathology confirms diagnosis
- ☐ Treatment is planned
- ☐ Follow-up data is recorded

Each step depends on data from the previous step. If data is missing at any point, care is delayed or compromised.

Data Lifecycle



The data lifecycle describes what happens to health data from start to finish

- ❑ Collection: Data is first recorded during visits, labs, or pathology tests.
- ❑ Storage: Data is saved in paper files or digital systems (EHRs).
- ❑ Processing: Data is organized, coded, and structured (for example, assigning cancer stage).
- ❑ Use: Clinicians use data to make decisions.
- ❑ Reporting: Data is summarized and sent to registries or national systems. For example, registry, DHIS2

Important concept: Poor data processing leads to poor reporting

The Patient Journey (Oncology Example)

In cancer care, the patient journey includes:

- ❑ Registration – patient identity and demographics
- ❑ Consultation – symptoms and clinical findings
- ❑ Diagnosis – pathology and staging
- ❑ Treatment – chemotherapy, surgery, radiotherapy
- ❑ Follow-up – monitoring outcomes and visits

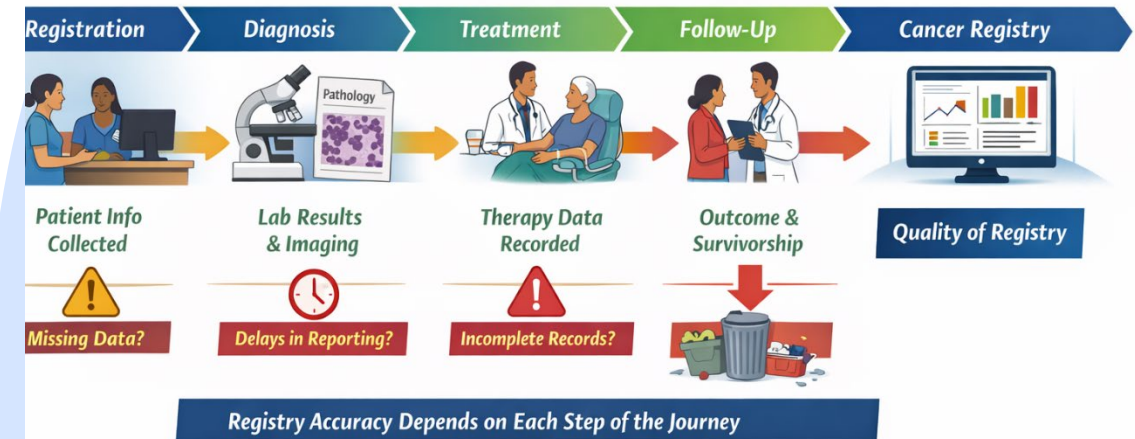
Each stage creates different types of data.

Later steps depend on earlier data

If pathology or staging data is missing, treatment decisions may be wrong leading to delays, errors, and poor outcomes.

Oncology Patient Journey & Data Flow

Points Where Data Can Be Created, Delayed, or Lost



Where Oncology Data Breaks

❑ Common Oncology Data break down points include:

- Missing pathology results
- Incomplete or incorrect staging information
- Delayed data entry into registries
- Loss of follow-up information

❑ These issues affect:

- Patient safety
- Treatment outcomes
- Program planning
- Research quality



Reflection on Patient Journey and Data Flow - Discussion topic 2

A patient arrives at a district hospital clinic in a low-resource setting with a referral letter for a breast lump. At registration, the patient's name, age, and address are written in a paper register. During the consultation, symptoms are written in the patient's paper file. The clinician requests a biopsy, but the pathology laboratory is located in another facility. The pathology result returns two weeks later on paper. The cancer stage is discussed verbally but is not clearly written in the chart.

Three months later, the patient does not return for follow-up, and there is no system to track missed appointments. When the hospital prepares cancer registry data, key fields are missing.

A. Map the data flow:

- i. What data is created at each step of this patient's journey?
- ii. Which step depends on data from a previous step?

B. Identify data gaps:

- i. What information is missing, delayed, or unclear?
- ii. How do these gaps affect patient care and reporting?

C. Health system factors

- i. Which parts of the system (people, process, or tools) most contribute to the data breakdown?
- ii. How does the use of paper records affect data flow?

D. Practical improvement

- i. Identify one realistic improvement that could strengthen data flow in this setting without major funding or new technology.



Memorial Sloan Kettering
Cancer Center

END