BENEFITS OF A COMPOSITE REPORT
INCORPORATING INTERACTIVE MULTIMEDIA REPORTING PRINCIPLES

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INTRODUCTION:

• Standards development organizations (i.e., HIMSS, SIIM, IHE) are advocating for Interactive Multimedia Reporting (IMR) that incorporates images, video, tables, and graphs in radiology reports to better communicate information.

• However, multimedia alone does not address the discontinuity between disparate sources of information (e.g., radiology, pathology, laboratory, surgery) that often are stored in silos within an electronic health record (EHR).
We created an IMR solution that addresses this problem by connecting data from serial exams and medical events in a **Composite Report**.

The novel report display shows the most recent finding for each site of disease. When a user clicks on a finding, a graphical timeline will portray the history of that finding.

The “Homunculus” view is one way to access the data, but more often it is displayed in a “List” mode as shown in the next slide.
METHODS:

The IMR reporting solution works as follows:

1. Record events (e.g., radiological findings, surgical procedures) and voice descriptions.

2. Tag the information with metadata referenced to an ontology using natural language processing.

3. Assemble an IMR Composite Report with images and related data linked in graphical timelines.

**Step 1: Record images/voice**

Voice: A metastasis is identified in liver segment 4.

**Step 2: Tag with metadata**

Natural language processing (NLP) labels the finding with anatomy and diagnosis metadata. Disease metrics and DICOM image data are transmitted directly from the picture archiving and communication system (PACS).
• The composite report organizes findings according to an anatomical hierarchy.

• A “finding” comprises a timeline of connected “items” or “atoms.”

• When a user clicks on a finding, the history of that finding and additional detail is illustrated with images, graphs, and tables.

• Composite report data is most versatile when presented in an interactive web browser, but the same report data can be exported to other formats including PDF, Unicode text, CSV, xml, and json for different purposes.
RESULTS:

• To date the system has been used to generate 2505 composite IMR reports from 1509 patients with a total of 12,943 findings comprising 37,769 items.

• The average timeline consists of 4 items with the longest being 24 items.

A “Finding” in a composite report consists of a collection of linked “items” from serial exams and medical events, including laboratory and treatments.
DISCUSSION:

• Analyzing historical data in an EHR to comprehend the course of disease and treatment is tedious and time-consuming.

• Consequently, radiologists often compare a current exam to a limited number of prior studies to obtain a gestalt of what is happening with a patient.

• A composite IMR renders a more complete picture of a patient’s health status and offers benefits over conventional medical reporting.
• Quantitative disease graphs constructed from the entire compendium of radiological data can reveal insights that may not be evident when a radiologist compares a current exam to only a limited number of prior studies.

• In this example, 50+ metastases have been recorded (A). Filtering the data (B) reveals an outlier that is growing at a faster rate than others.
BENEFIT – ERROR MITIGATION

• Data discontinuity and errors can negatively impact patient safety. A composite IMR can perform compliance checks and mitigate discrepant results.

• In this example, a pathologist reports a right upper lung specimen, but it is from a left upper lung biopsy. The IMR can immediately alert report authors when errors occur.
CONCLUSION:

• A **Composite** IMR report connects data from a medical record to better tell a patient story and cultivate knowledge.