Integrated Radiology & Pathology Diagnostic Services: The Time is Now at UCLA

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- The UCLA Radiology / Pathology Project is a joint collaboration / venture between the two departments and the Ronald Reagan-UCLA Medical Center.
- It is intended to create a new service in imaging and molecular diagnosis by combining state of the art, minimally invasive image-guided biopsy with rapid cytological review and tissue processing for biomolecular markers.
The service will have the capacity to provide combined cyto-histopathological and clinical diagnoses, clinical staging and ultimately molecular prognosis and response prediction in patients presenting for biopsy of indeterminate lesions in solid organs.

The intended users of this new service will include both UCLA Enterprise and non-UCLA clinicians and patients. These physicians will refer patients to UCLA for percutaneous biopsy of indeterminate lesions for classical cytological / histologic and immunohistochemical analyses as well as biomolecular analyses as these assays become available.
Objectives

- To consolidate the imaging, reporting, laboratory and patient record data from multiple separate proprietary systems (6-9+) to allow integrated access and reporting to a diverse user population.
- To build the system in such a way that each component is self-contained, exchanges information in a standard manner, and allows third-party and direct access.
- To avoid the use of platform or vendor-specific technologies.

Users

- The system will be used by both technical and non-technical users drawn from the following populations:
  - Clinicians (UCLA Enterprise and non-Enterprise)
  - Pathologists (UCLA Enterprise and non-Enterprise)
  - Radiologists
  - Administrators
  - Researchers
  - Education: Faculty and students
- Many users have overlapping roles. While segregation of identified and non-identified patient data may facilitate compliance, there must be a mechanism in place to easily toggle between the two for users in dual clinical-research roles.
Scale

- UCLA is a large clinical, teaching and research enterprise spanning multiple campuses, in partnership with other organizations and local clinics under the UCLA brand. We may acquire and partner with other organizations in the future.
- Additionally, because of our role in serving physicians and researchers in the community, our affected user base will likely be in the hundreds, if not thousands.
- Thus, any warehousing and/or web interface system should be built to scale easily, with the expectation that it will serve a much wider audience than just the Radiology/Pathology staff and in-house clinicians at UCLA Westwood and Santa Monica.

Security

- Anonymization for HIPAA compliance in a safe environment is a requirement for each component.
- As such, each component must be secured against external threat at the application, operating system, and hardware level.
- Messaging exchanges throughout all components and levels of the system must be digitally secure.
- RadPath platform will be logged at the system and application levels.
Use Cases

- Dr. Clinician wants to review the integrated molecular report and imaging on Patient Sally Smith.
- Dr. Clinician goes to a dedicated web site and accesses the information on Sally Smith, including diagnostic and interventional radiology images, pathology and immunohistochemical stains of target tissue, and the molecular analysis and corresponding images from gene mutation studies, microarray analysis, and FISH.

Use Case

- Dr. Clinician reviews all information on all patients referred to UCLA for percutaneous biopsy and molecular analyses.
- She is interested in receiving the data in tabular format to include various fields: MRN, data of procedure, histologic diagnosis, IHC stains performed, etc.
Use Case

- Office Staff of Dr. Clinician enters the system to create a PDF that serves as the source document for the patient’s chart.
- Dr. Jones has instructed him to capture the following on the PDF: patient demographics, pathology diagnoses, diagnostic radiology interpretation, interventional biopsy images, and H&E stains, IHC stains, and FISH image.

Use Case

- Dr. Radiologist wants to review the final molecular pathology results on her biopsy case three days earlier.
- The routine histologic and IHC analyses are available. The molecular results have not been entered into the report yet.
- She requests an autopage or email when the results are on line as part of the integrated report.
Dr. Radiologist wants to review his results of the past one year with respect to percutaneous biopsy yield and complications.

He is interested in seeing in tabular form all patients he specifically has biopsied, the types of equipment used, the number of passes obtained, final diagnoses, and complications.

Dr. Pathologist wants to review the findings of a particular case (an unusual or rare tumor diagnosis) with a group of residents and fellows for educational purposes.
Use Case

- Dr. Researcher needs to determine if there is sufficient tissue available to perform a new molecular test on the last 100 patients with a tissue diagnosis of lung adenocarcinoma.
- The purpose is to evaluate a prognostic biomarker panel and compare it to traditional clinical and stage variables.
- She queries the database for patients who have undergone percutaneous biopsy and subsequent surgical resections.

Use Case

- Dr. Researcher intends to perform gene expression analyses on all patients with Stage I-II adenocarcinoma with BAC features to compare differential gene expression signatures relative to outcomes.
Use Case

- Dr. Pathologist is interested in an accessible database to be used at conferences (tumor boards) on patient management.
- The interface should facilitate conference preparation and be flexible during presentation, e.g., to be able to readily bring up cases not previously listed as a conference case.
- The images need to allow for virtual microscopy review.

Use Case

- Dr. Pathologist needs to review and correlate previous and concurrent biopsies, including frozen sections, from his office, thus obviating the need to pull and track down old cases.
- This is necessary to improve turn-around time and speed up intra-operative consultation.
Dr. Pathologist and Dr. Radiologist both need a single source for pathology and radiology reports to better correlate disease processes.

Ms. Administrator is interested in determining the average cost per patient who is encountered through the RP joint venture. She would like to categorize patients by biopsy type, organ system, diagnoses, imaging modality, number of different pieces of equipment (needles, etc.) used, traditional and molecular analyses performed. She will present summary information regarding average cost per patient by organ system, and by imaging modality, including average number of specimens obtained and needle/core instruments used.