

# Precision Medicine

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Precision Medicine Pathology Experiential Internship

Summer 2022

AbbVie Bay Area (ABA)



abbvie

# 2022 Precision Medicine Pathology, Histology Internship

## I. PMed Pathology

## II. Project Overview

## III. The Broader Context

## IV. Conclusion

*“The right drug for the right patient at the right time is the mantra of personalized medicine”*

- Micheal O. Leavitt, Precision Medicine Coalition, 23 March 2007

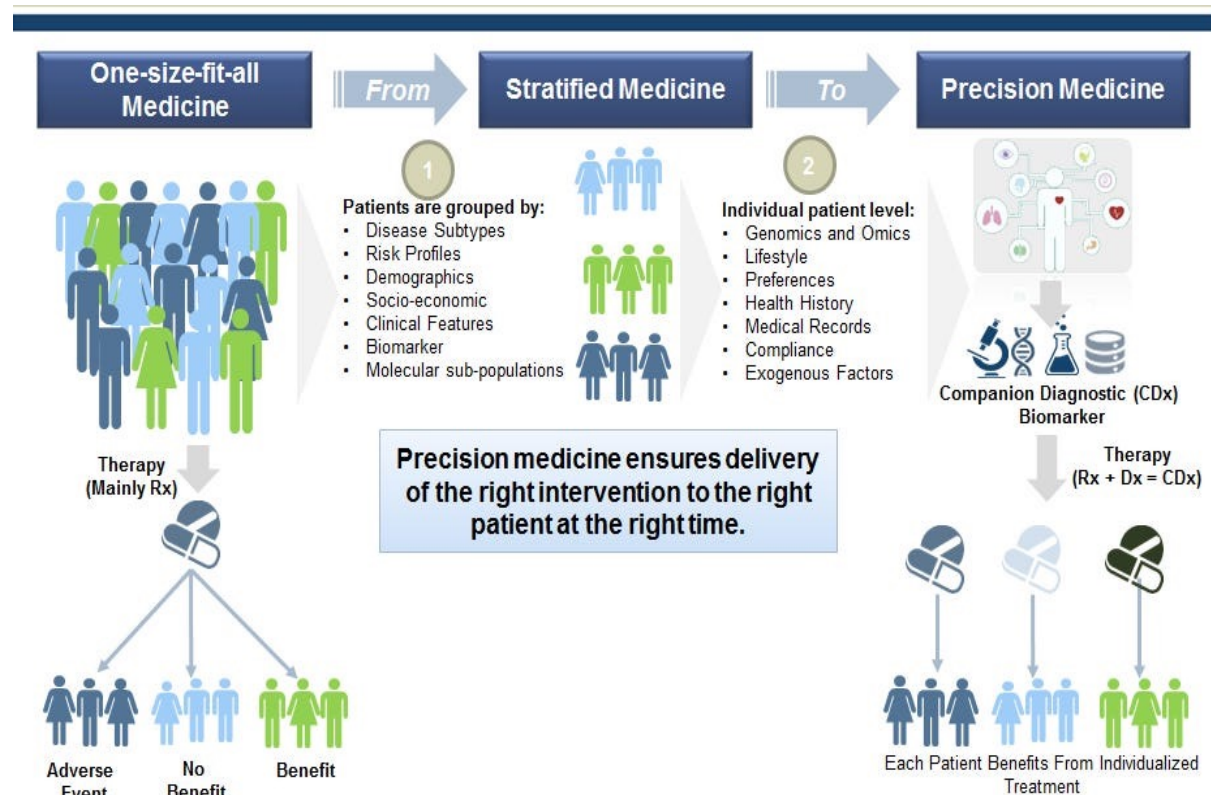


Figure 1: Paradigm Shift in Treatment (Frost & Sullivan, 2017)



# I. Precision Medicine Pathology

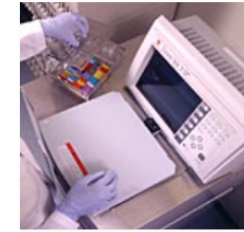
**Our Purpose:** To co-develop slide-based diagnostic tests for AbbVie therapeutic treatments – these tests are known as companion diagnostic (CDx) assays

## Subgroups:

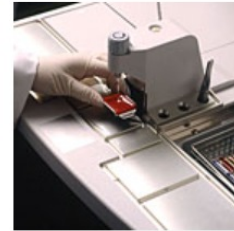
- A. **Histology:** Histology labs transform patient **tissue** into a preserved sample that can be viewed by pathologists under a microscope
- B. **Immunohistochemistry (IHC):** IHC labs utilize dyes and chemicals to colorize cellular structures and indicate the expression levels of specific biomarkers
- C. **Image Analysis:** Image analysts write algorithms and employ A.I. software to increase the efficiency and speed with which pathologists can read patient cases



+ Grossing & Fixation



+ Processing



+ Embedding



+ Sectioning

Figure 2: Histology Procedures (NSH, 2022)

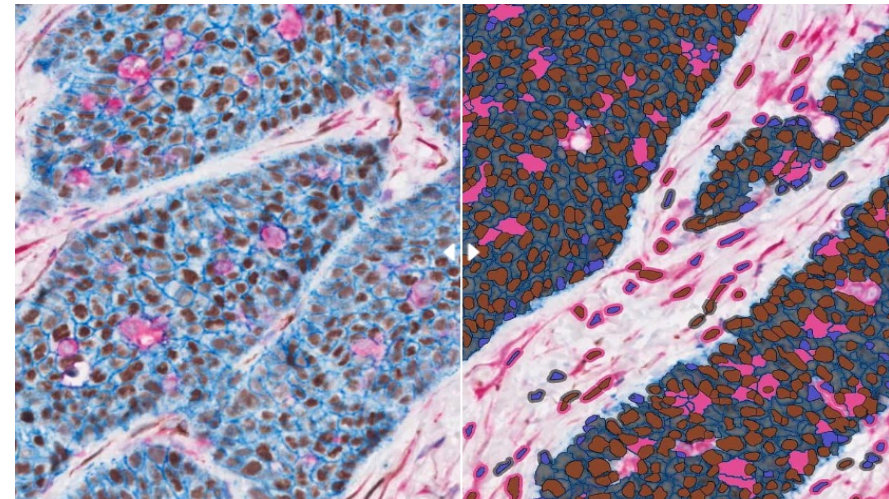


Figure 3: Multiplex IHC (Indica Labs, 2022)

## II. Project Overview: Frozen Specimen Metadata Curation

**Goal: To assist Precision Medicine Histology in migrating frozen biospecimen metadata**

- A. PMed Pathology is the first group to integrate information from patient samples into a unified database
  - 1) Company-wide initiative to merge biospecimen data from all AbbVie functional teams into a shared, interactive dashboard
- B. PMed histology lab has ~1,200 frozen samples that are matched to tissue blocks in the FFPE inventory
- C. Frozen sample data has not been well-documented in the past
  - 1) Each sample requires at least 20 fields of information
  - 2) Approximately 30,000 individual cells from sample data needed to be reviewed

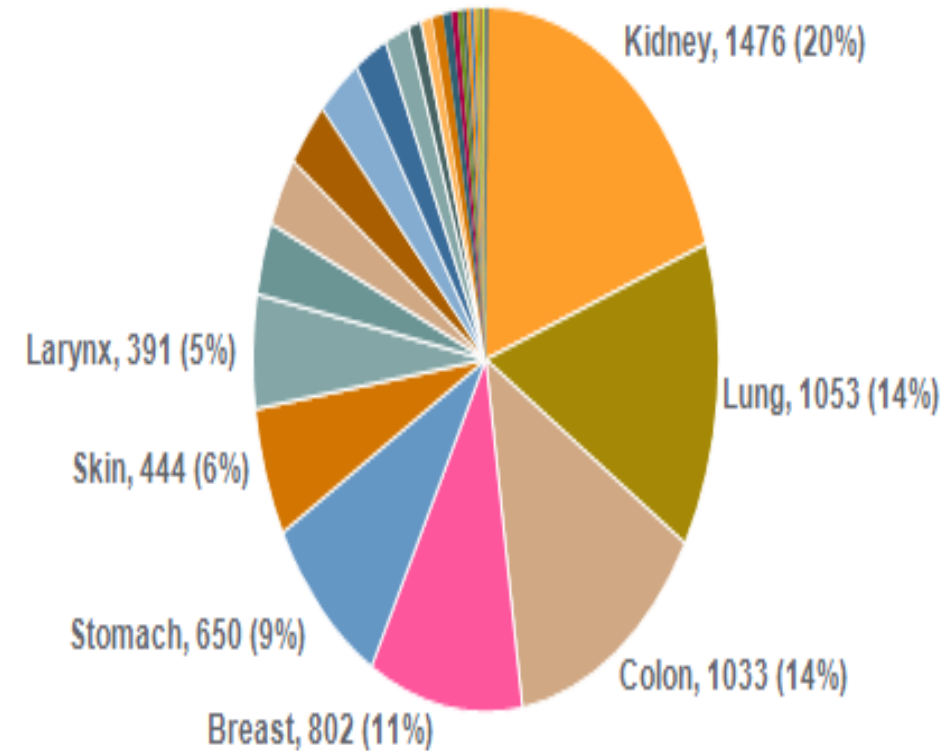


Figure 4: Spotfire Dashboard Visualization



## II. Project Overview: Teliso-V (ABBV-399)

### A. Background Information

- 1) AbbVie was granted FDA Breakthrough Therapy Designation (BTD) for Teliso-V on January 4, 2022
  - a. Phase III trials investigating the efficacy in treating c-met overexpressing, previously treated NSCLC
- 2) Eligibility for clinical trials is currently determined by a traditional IHC CDx screening for c-met amplification

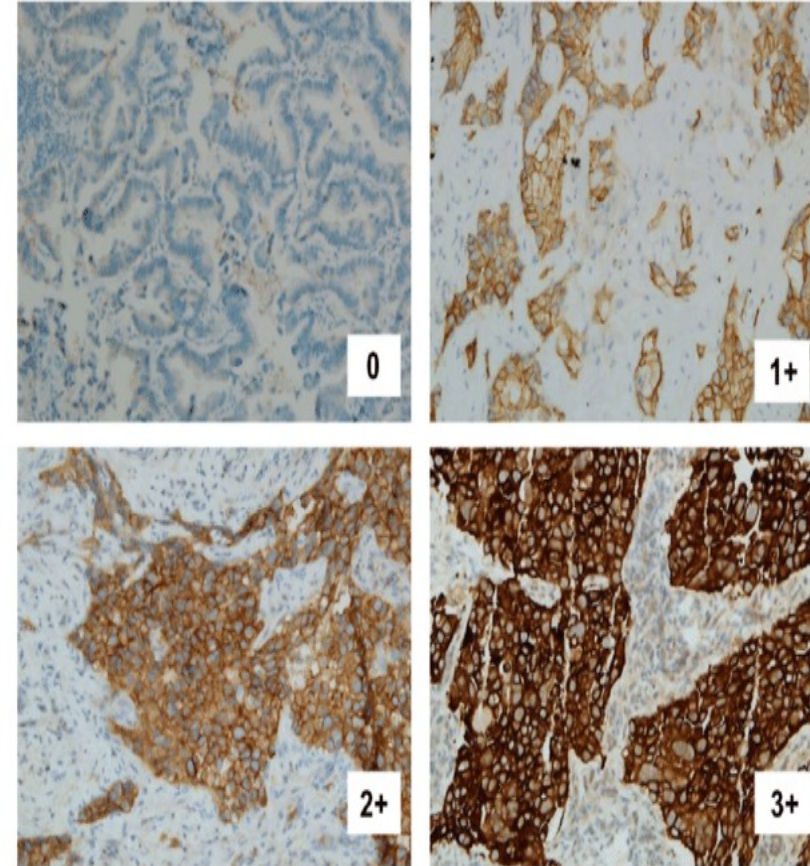


Figure 5: Traditional IHC stains for c-met amplification

### III. The Broader Context: NGS Data and Emerging Assays

A. Traditional CDx	B. Liquid CDx
1) Require tissue sampling – highly invasive	1) Minimally invasive, rapid, precise
2) Visualization of a single point in time	2) Long-term monitoring through repeated sampling
3) Limitation in number of biomarkers to be examined at once	3) Easier integration of NGS to analyze thousands of genes at one time



# IV. Conclusion

## A. How did I make an impact this Summer?

- 1) Pmed Pathology can leverage the frozen sample data and explore different sample types for CDx
  - a. Options other than tissue-based CDxs can maximize patient benefit and expand their opportunities for treatment
- 2) Pmed Pathology team can perform in-depth comparison between tissue and liquid assays
  - a. Since each frozen sample has a matched FFPE tissue block
- 3) NGS of these samples could:
  - a. Lead to the discovery of novel therapeutic targets
  - b. Predict drug resistance, optimal dosages, and potential side-effects

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