Case Finder

optimized cancer registry case finding

Case Finding

- Case finding is the first step in the cancer registry process.
- Identify patients diagnosed with a reportable cancer.
- Case finding requires the review of data from patient charts: pathology reports, imaging exam reports, clinic notes and ICD-10 diagnosis codes.

Manual Case Finding

- Pathology reports are the most authoritative source of cancer diagnosis.
- Every day cancer registrars manually review printed out stacks of pathology reports, collating the pathology cases into cancer and non-cancer piles.
- Then manually input the cancer pile into cancer registry software.

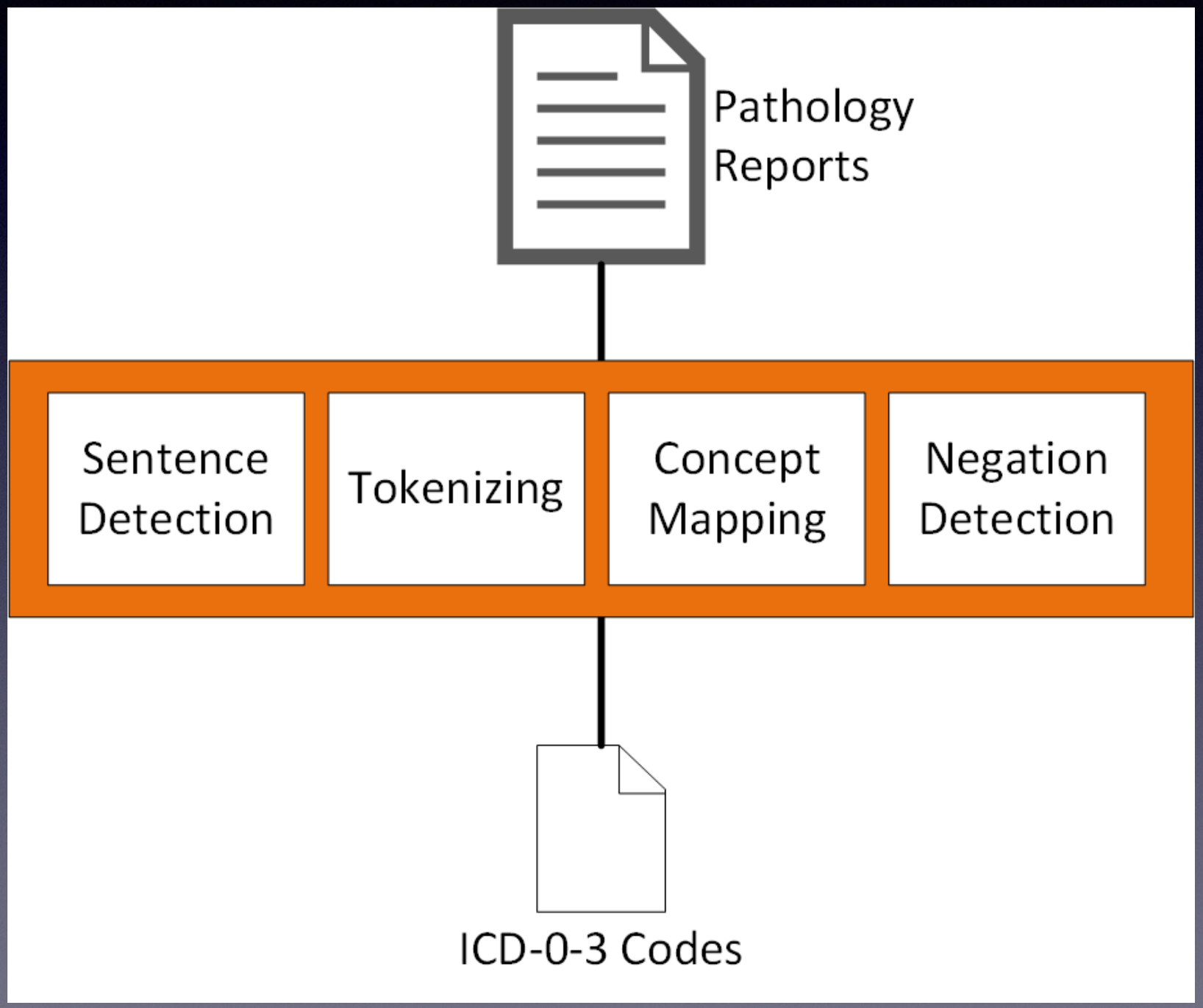
Cancer Registries

- Federal and state laws require the collection and reporting of cancer incidence, treatment and survival.
- Cancer registrars are trained, certified professionals with expertise in the area of interpreting and collecting cancer diagnosis, treatment and follow-up data.
- Surveillance, Epidemiology and End Results Program (SEER): https://seer.cancer.gov/
- North American Association of Central Cancer Registries (NAACCE): https://www.naaccr.org/
- National Cancer Registars Association (NACRA): http://www.ncra-usa.org/

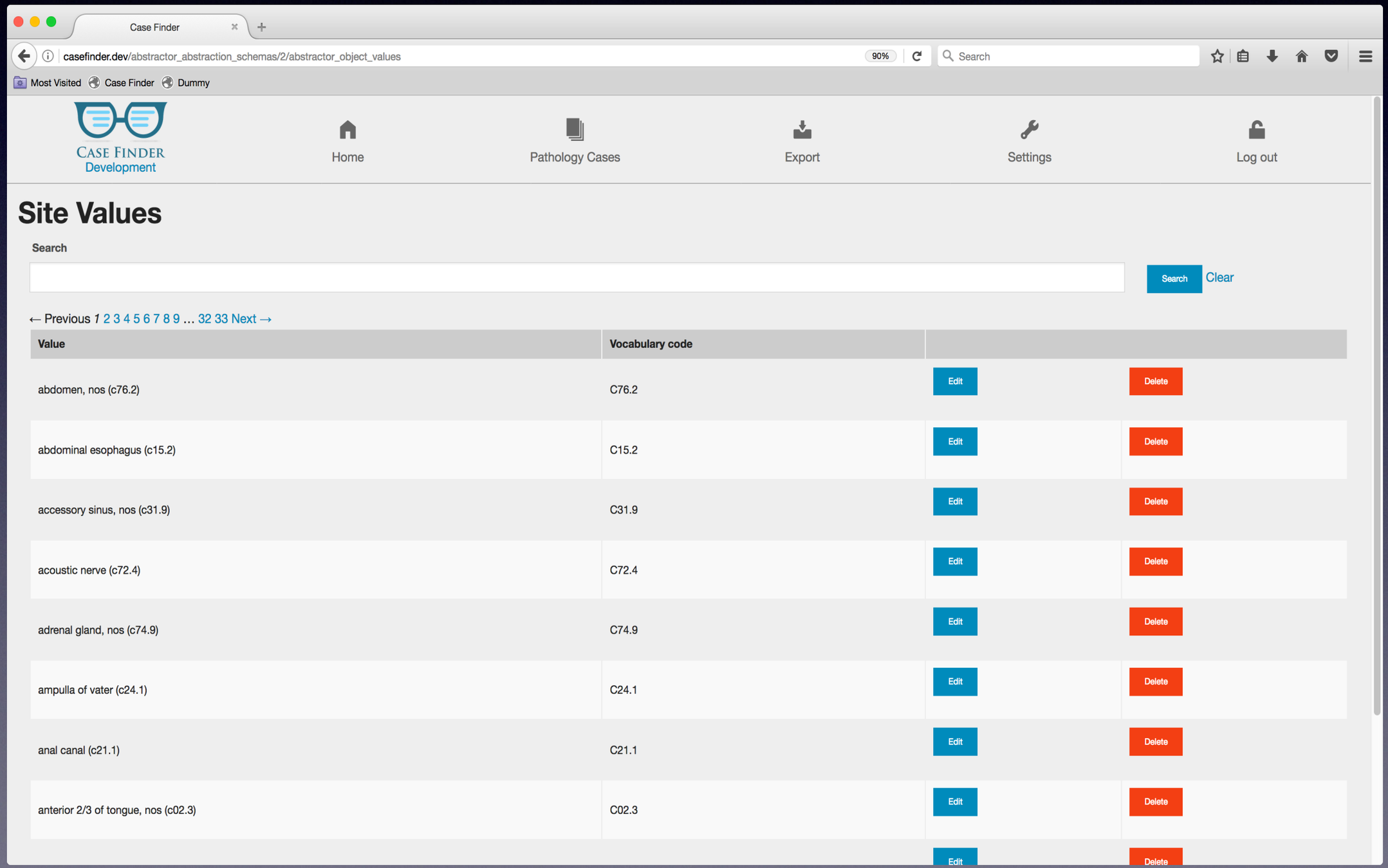
Optimized Case Finding: Case Finder

- Case Finder optimizes the case finding process for the review of pathology reports.
- Case Finder ingests order and result HL7 messages for pathology cases via HTTP from a local EHR. The ingestion of a case includes basic demographic information.
- Case Finder uses advanced natural language processing (NLP) techniques to analyze the text of the pathology case to generate suggestions for ICD-O-3 histology and site.
- ICD-0-3 histology and site are the data points necessary to determine if a pathology case contains a reportable cancer diagnosis.

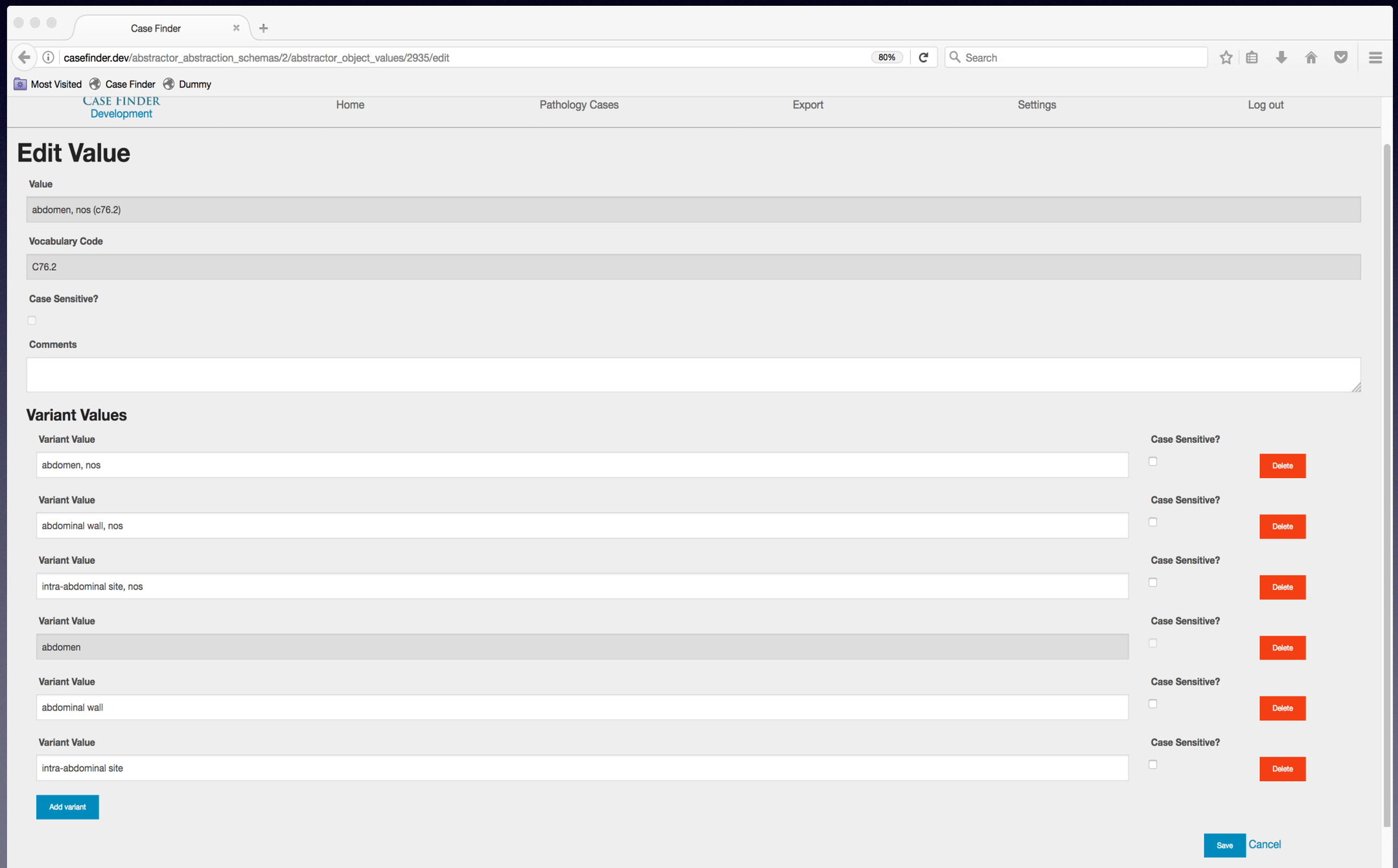
NLP: How it Works



Dictionaries User Interface



Dictionaries User Interface



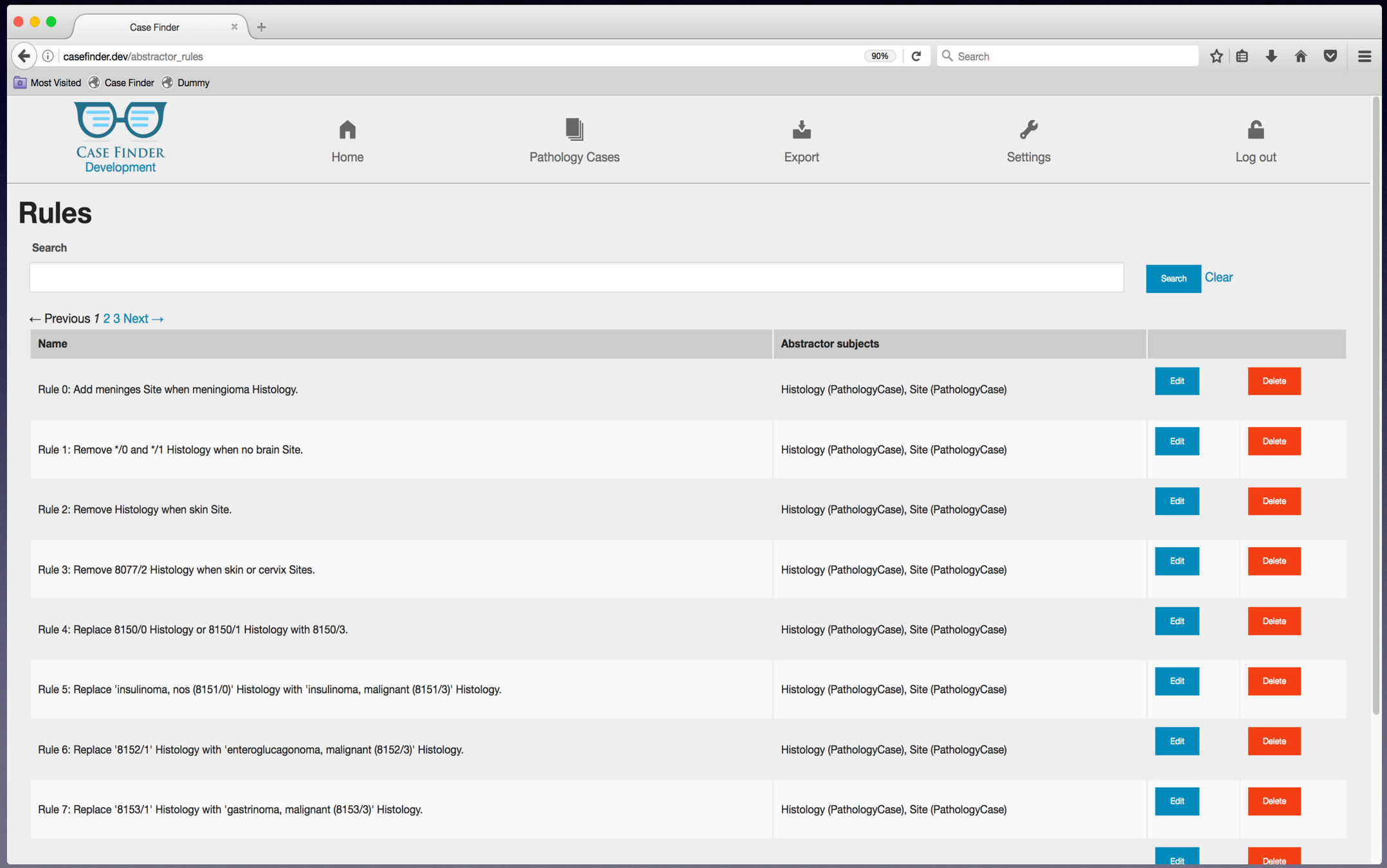
Rules Engine

- Uses a 'rule engine' to further refine NLP suggestions by post-processing suggestion combinations. Rules dictated by reporting agencies.

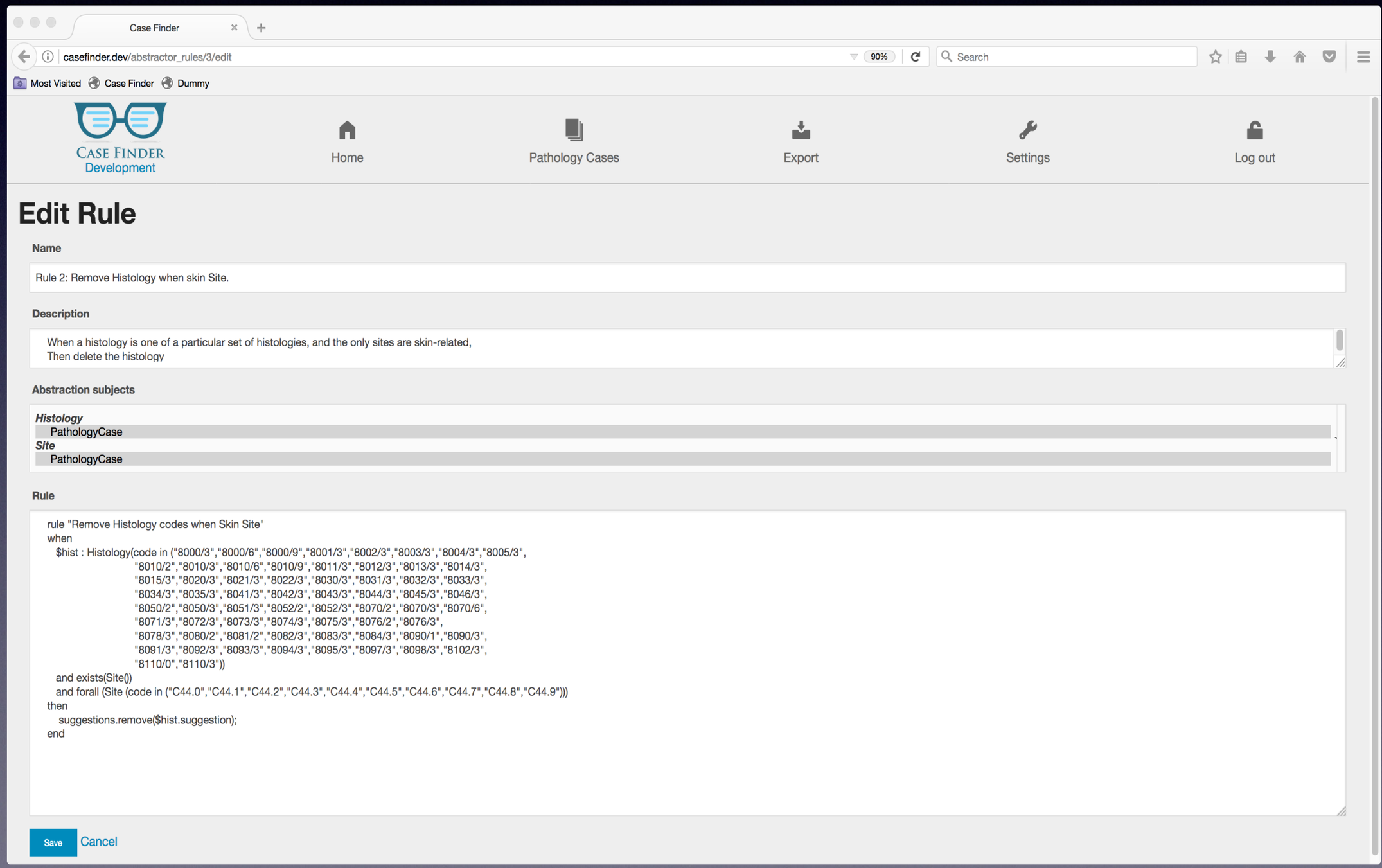
Example Rule

```
// ---------------------------------------------------------
// RULE DESCRIPTION
// ---------------------------------------------------------
// When a histology code has a */0 or */1 extension,
// and there are no brain-related sites,
// ---------------------------------------------------------
// Then delete the histology
// ---------------------------------------------------------
rule "Remove */0 and */1 Histology codes"
when
    $hist : Histology(codeMatches(".+/[0|1]"))
    and exists Site()
    and forall (Site (code not in ("C70.0","C70.1","C70.9",
                                   "C71.0","C71.1","C71.2",
                                   "C71.3","C71.4","C71.5",
                                   "C71.6","C71.7","C71.8",
                                   "C71.9","C72.0","C72.1",
                                   "C72.2","C72.3","C72.4",
                                   "C72.5","C72.8","C72.9",
                                   "C75.1","C75.2","C75.3")))
then
    suggestions.remove($hist.suggestion);
end
```

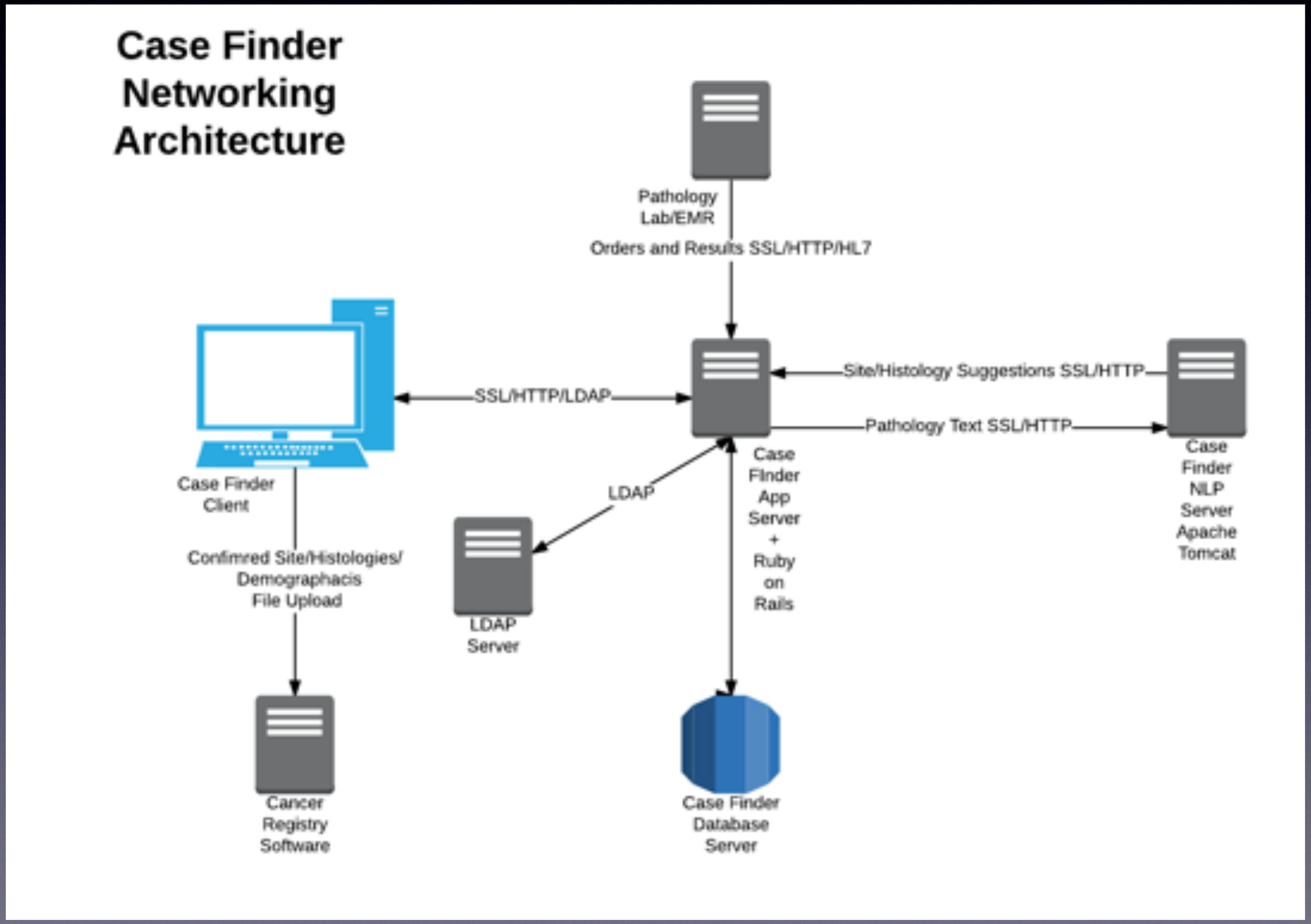
Rules Engine User Interface



Rules Engine User Interface



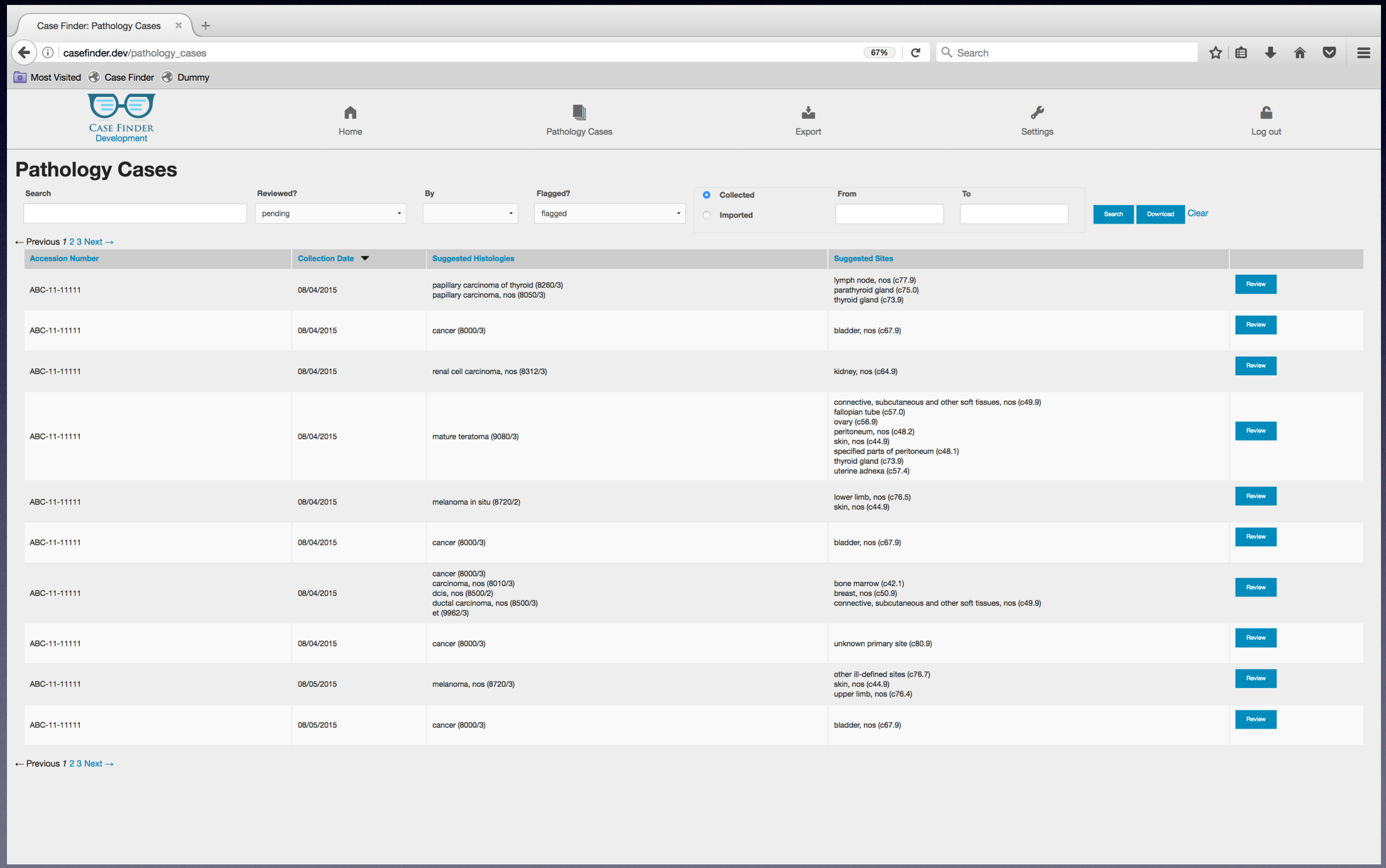
Case Finder Architecture



Presenting “Flagged” Pathology Cases

- Case Finder presents ‘flagged’ pathology cases to the user for review. A ‘flagged’ case is any pathology report that has a suggested ICD-0-3 histology. The high confidence of the Case Finder NLP relieves the user from needing to review ‘not flagged’ pathology cases.

Presenting “Flagged” Pathology Cases



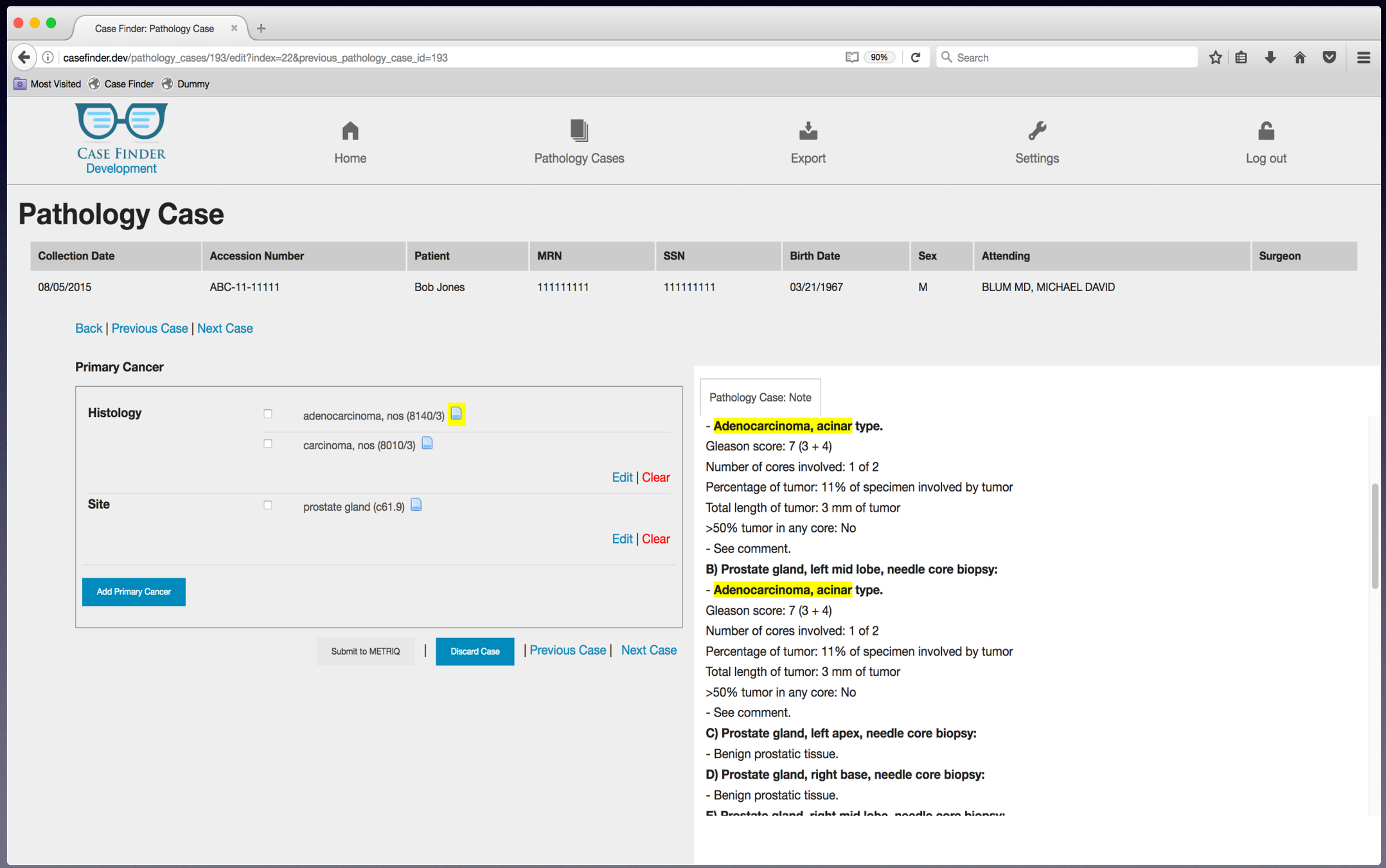
Reviewing a “Flagged” Pathology Case

- Case Finder presents the suggested sites and histologies for ‘flagged’ pathology cases to the user for confirmation or revision.

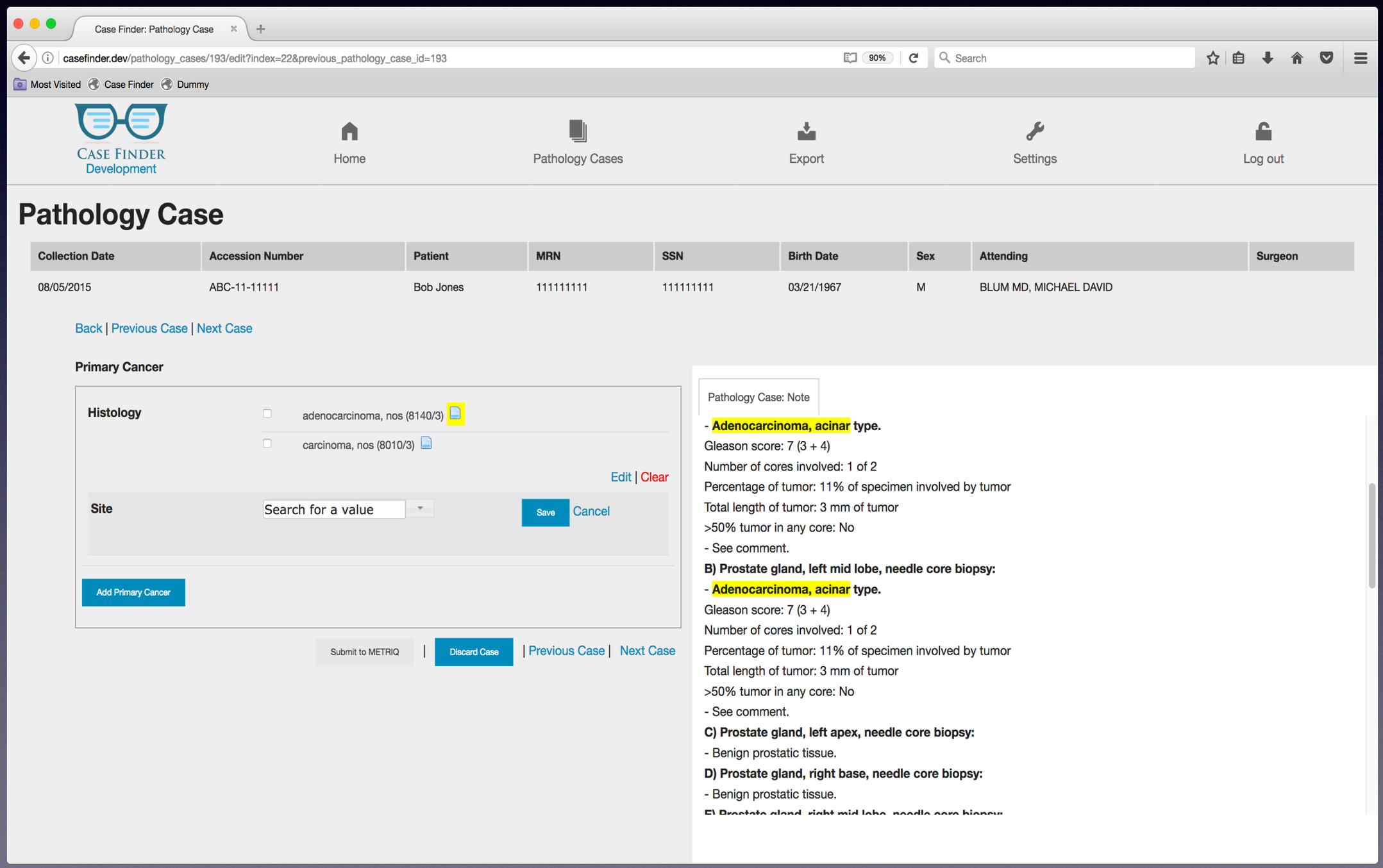
- Case Finder provides visual highlighting for the substantiation of its NLP suggestions.

- Case Finder allows the user to submit for export any pathology cases with a confirmed site/histology paring.

Reviewing a “Flagged” Pathology Case



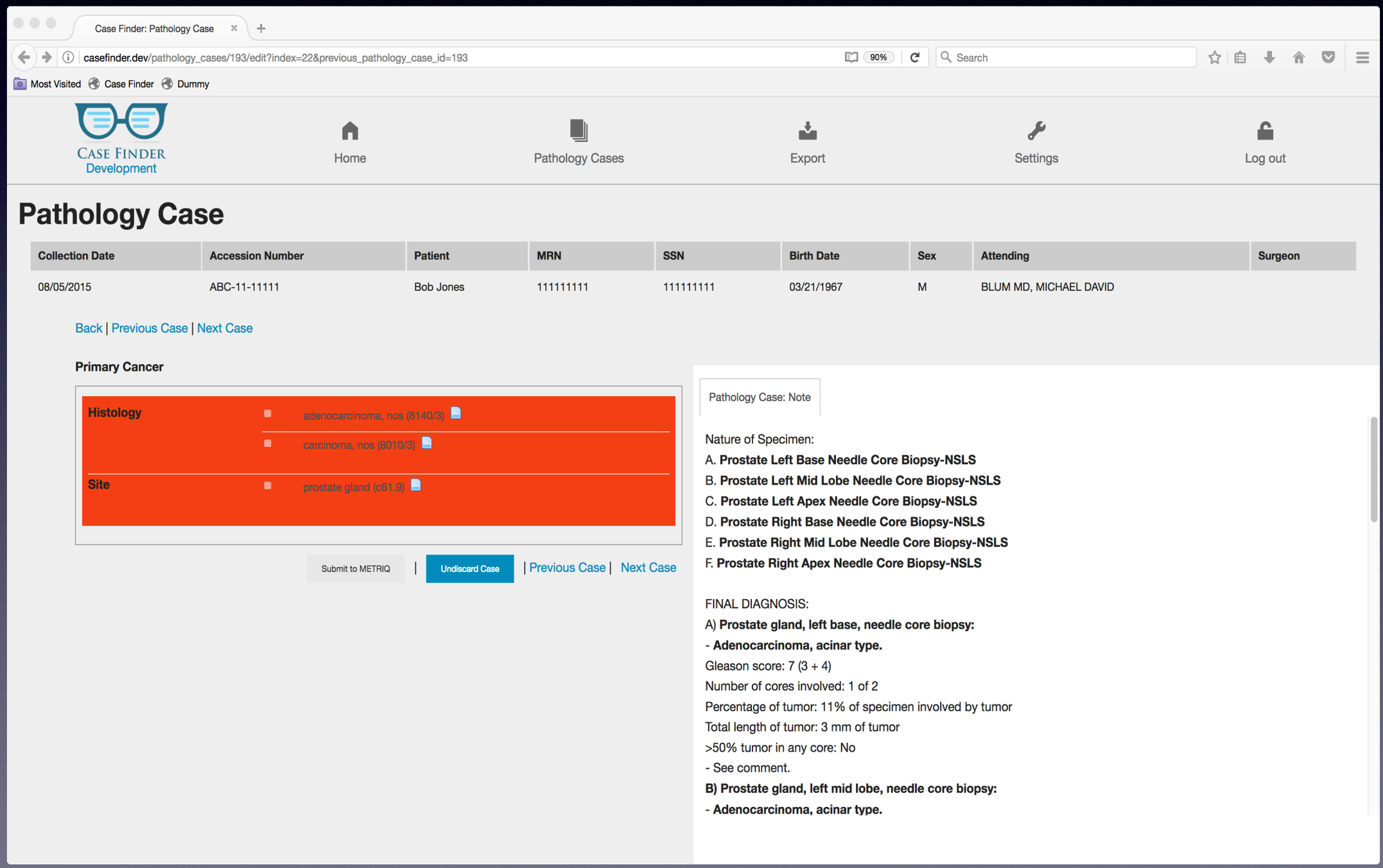
Reviewing a Flagged” Pathology Case



Discarding a “Flagged” Pathology Case

- Case Finder allows the user to discard pathology cases without a confirmed site/histology paring.

Discarding a “Flagged” Pathology Case

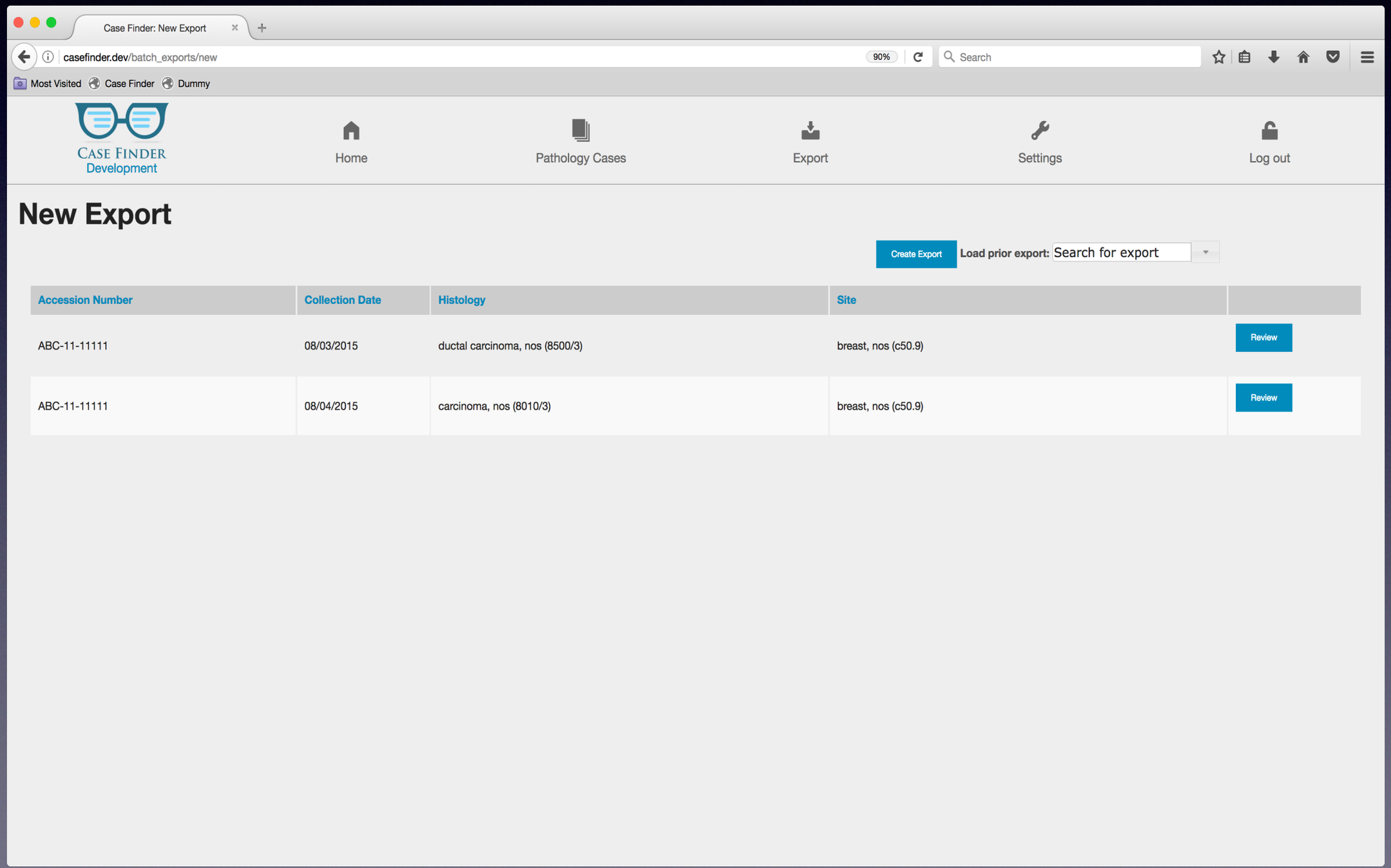


Exporting Confirmed Site/Histology Pairings

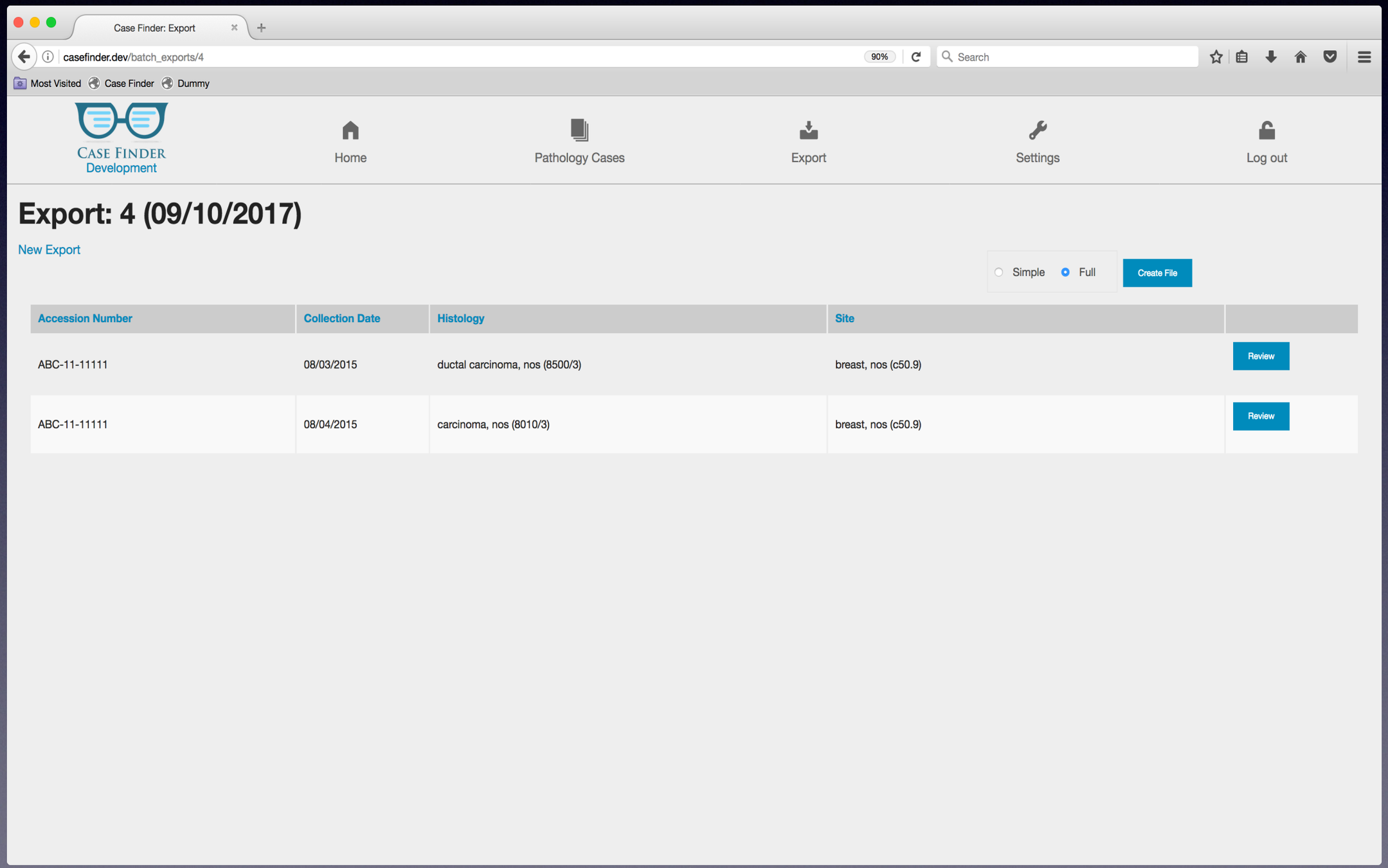
- Case Finder allows the user to export pending confirmed site/histology pairings along with basic demographics to a standard format for import into the local cancer registry software.

- The import process relieves the user from needing to manually input data into the local cancer registry software.

Exporting Confirmed Site/Histology Pairings



Exporting Confirmed Site/Histology Pairing



Case Finder Benefits

- Case Finder significantly reduces the time needed to review and input pathology cases for the case finding cancer registry process.

- The fundamental case finding data points of site and histology are not only valuable for reporting to the government. The timely and accurate collection of these data points could have many clinical, research and quality assurance applications. Exports could be directed to other destinations beyond cancer registry software.

- Case Finder is built on top of a generic data model and architecture that can be applied to track other data points on other document types beyond pathology reports.