**Overview**

This data collection procedure describes a method for collecting the following information from multiple pathologists using digitized histological sections of breast cancer: 1) mitotic (Nottingham) scores from preselected image regions and 2) confidences measures indicating a pathologist’s certainty that an individual nucleus is a mitotic figure.

**Mitosis collection protocol**

1. Our in-house pathologist selects 100[[1]](#footnote-1) mitosis regions from 100 different patients (i.e. one region per patient) exhibiting the following characteristics[[2]](#footnote-2):
	1. Each area is a rectangle with an area equivalent to 10 fields-of-views (FOV) at 40x magnification[[3]](#footnote-3)
	2. The distribution of mitotic scores across patients is approximately
		1. 33% with scores of 3
		2. 33% with scores of 2
		3. 33% with scores of 1
2. From each rectangle, our in-house pathologist selects a representative box (2000x2000 pixels at approximately 0.25 microns per pixel)
3. Within each box, our in-house pathologist[[4]](#footnote-4) places a dot on each nucleus that could conceivably be a mitosis

**Mitosis scoring protocol**

Each (10 FOV) rectangle is sent to seven[[5]](#footnote-5) breast cancer pathologists[[6]](#footnote-6) who examine the entire rectangle and record the mitotic score.

**Individual Mitosis Evaluation**

Each (2000x2000) box is sent to the seven breast cancer pathologists. Within the box, each mitosis is examined (facilitated by our web-based viewer[[7]](#footnote-7), which magnifies each mitosis in succession) and categorized as follows:



1. This is the largest number of cases I think we can get pathologists to do in a reasonable time. [↑](#footnote-ref-1)
2. Several different data sources should become available. The data used will depend upon which arrives first. [↑](#footnote-ref-2)
3. This is the area recommended by CAP guidelines for measuring mitotic score. [↑](#footnote-ref-3)
4. Using our in-house pathologists is slow. Our engineers could probably do this quickly, and should do well enough. [↑](#footnote-ref-4)
5. We still need to recruit them. We have done something similar before, and it should not be a problem. In case of difficulties, we could relax the requirement of being a breast pathologist. [↑](#footnote-ref-5)
6. We could increase the number of samples (from the proposed 100) by sending only a subset of the cases to each pathologist. However, this adds another source of variability and could impact the statistical value of each sample. [↑](#footnote-ref-6)
7. Our viewer was designed to facilitate such experiments. Without it, such experiments would require too long. [↑](#footnote-ref-7)