



Generating Flawless Slides for Digital Pathology

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Enhancing precision
cancer diagnostics

PHC
GROUP

Scanning And QC Your Slides

When scanning your stained slides there are few things to remember and steps to follow. Following these simple directions will help you create high quality digital images that can be viewed, shared analyzed and archived.

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- ❑ Thicker sections or tissue folds may cause the scanner to focus on the incorrect scanning plane, leading to out-of-focus image.

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- ❑ Spot check a few areas in the slide at high magnification.

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- ❑ Thicker sections or tissue folds may cause the scanner to focus on the incorrect scanning plane, leading to out-of-focus image.
- ❑ Review the entire scanned tissue area at a low magnification in your image viewer.
- ❑ Spot check a few areas in the slide at high magnification.
- ❑ Not every scan will be acceptable first time, most of the problems can be solved at this stage, some will require to go back and repeat one or more steps of the histology workflow.

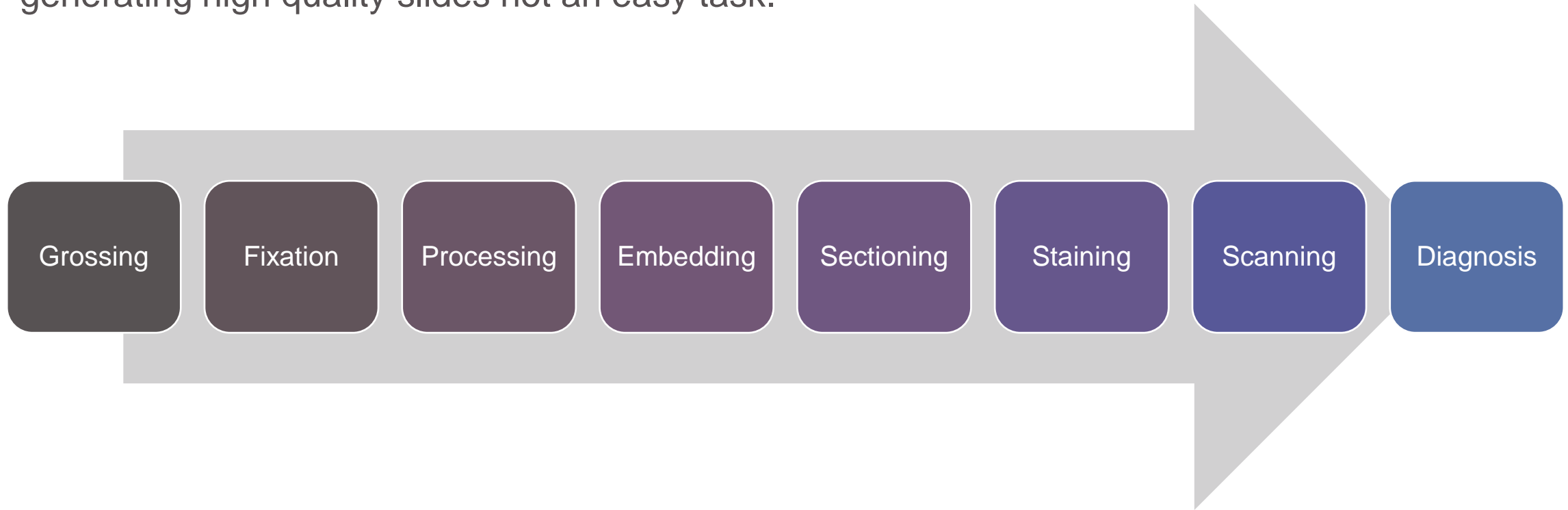
Poll Question # 1

Typically, scanning process is suspended when _____

- A. Tissue section thickness is inconsistent.
- B. Staining is too dark.
- C. Glass slide corner is cracked or broken off.
- D. There is too much autolytic changes in a specimen.

Understand Routine Histology Workflow

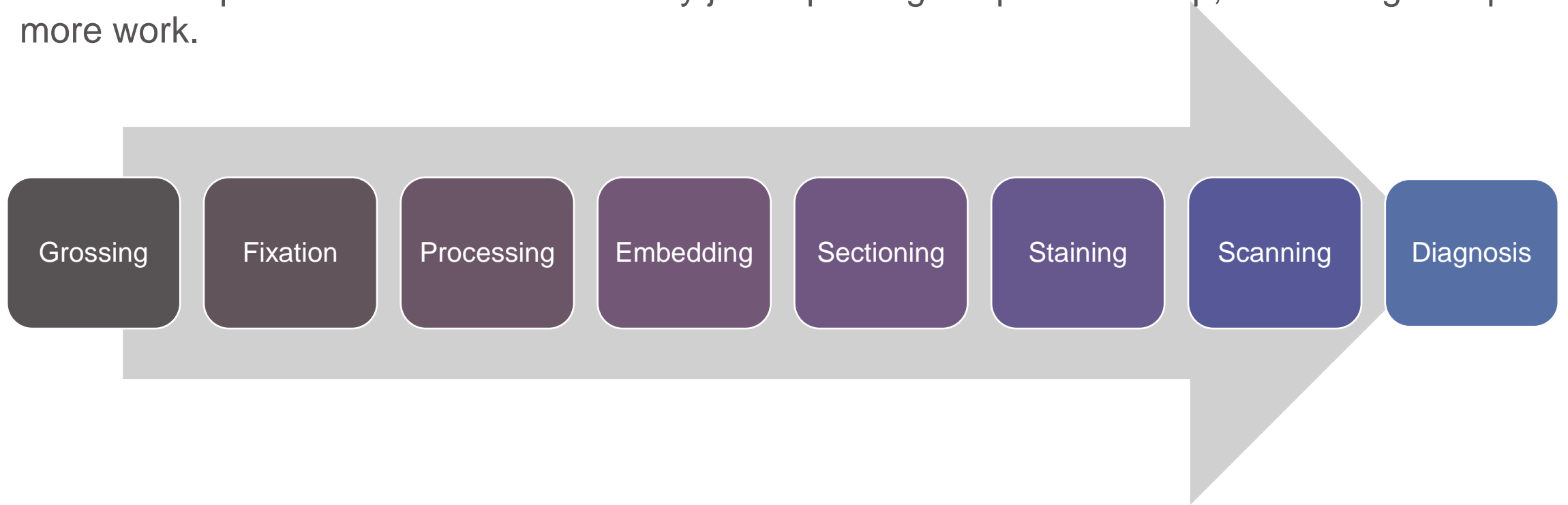
Histology workflow is a complex process with many different steps. Quality of each subsequent step depends on optimal work done on previous one. This interwinding dependence makes generating high quality slides not an easy task.



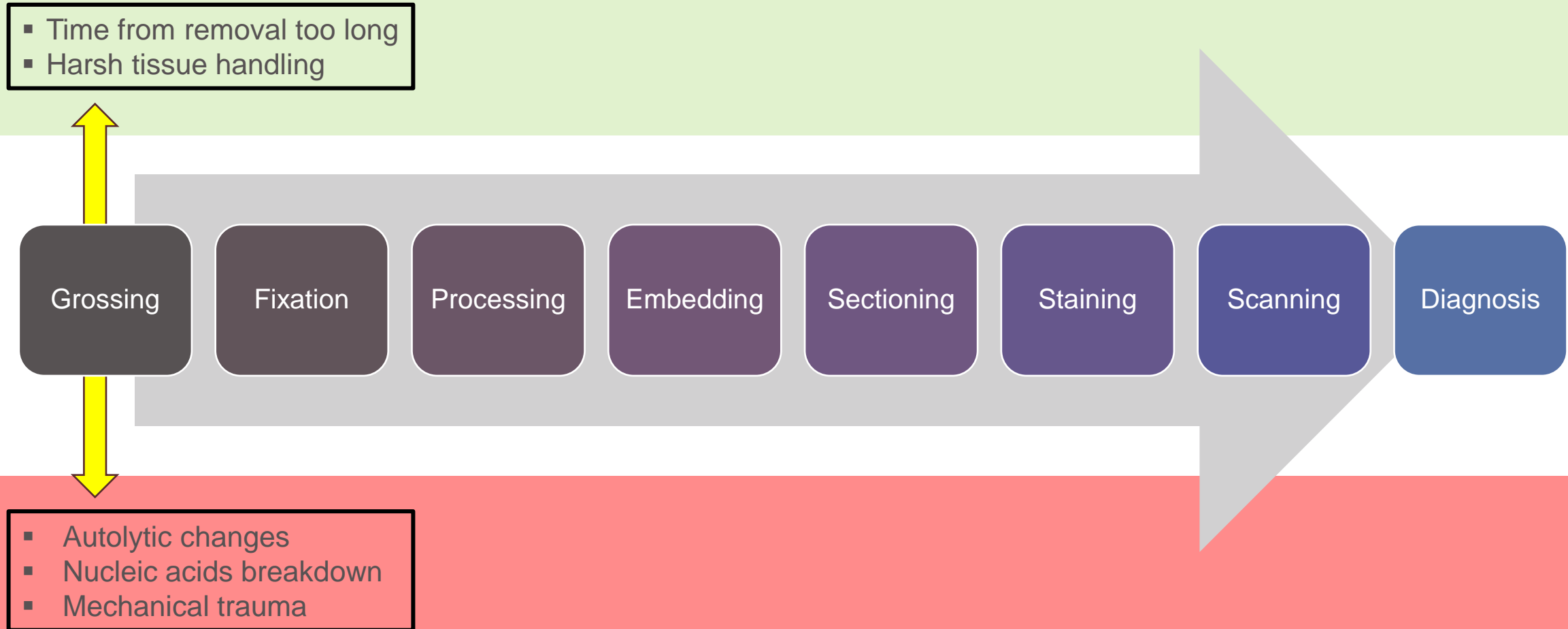
Routine Histology Workflow Challenges

Each step, when not optimally done, can cause problems making troubleshooting very hard. Here are examples of common mistakes leading to necessity for repeating work and wasting valuable time.

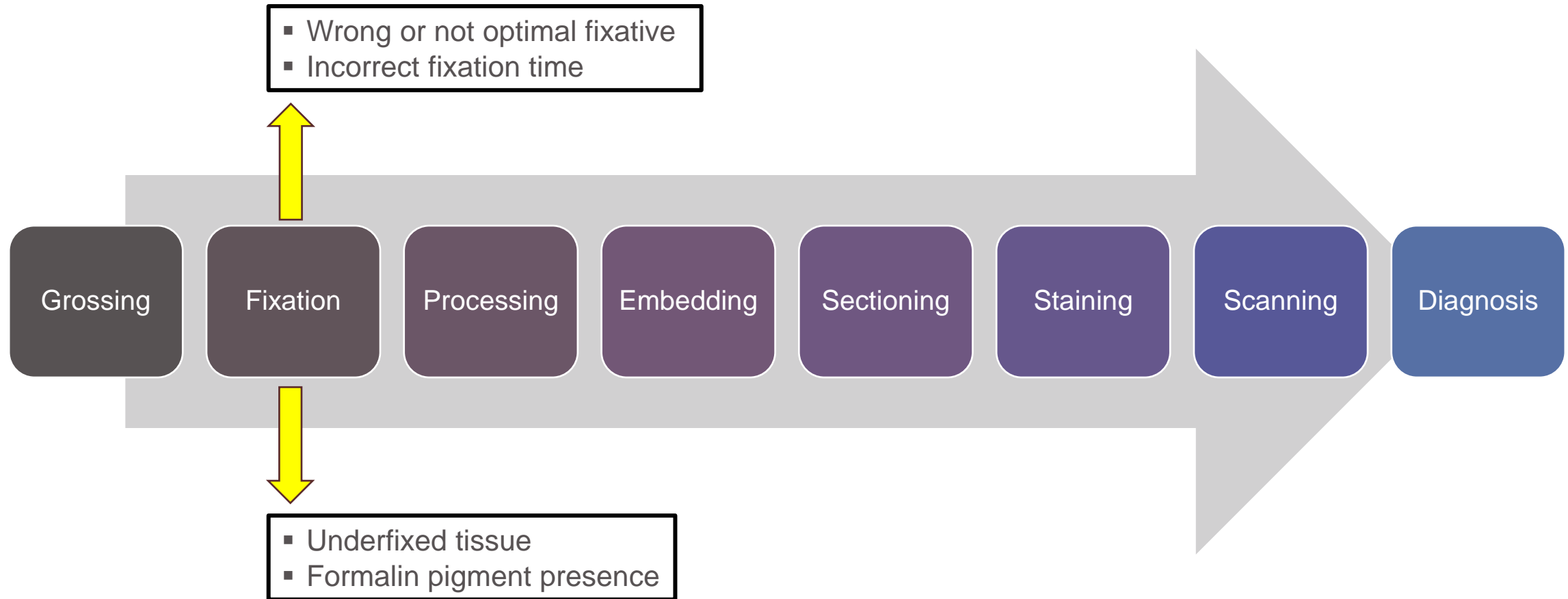
While some problems can be corrected by just repeating the previous step, others might require more work.



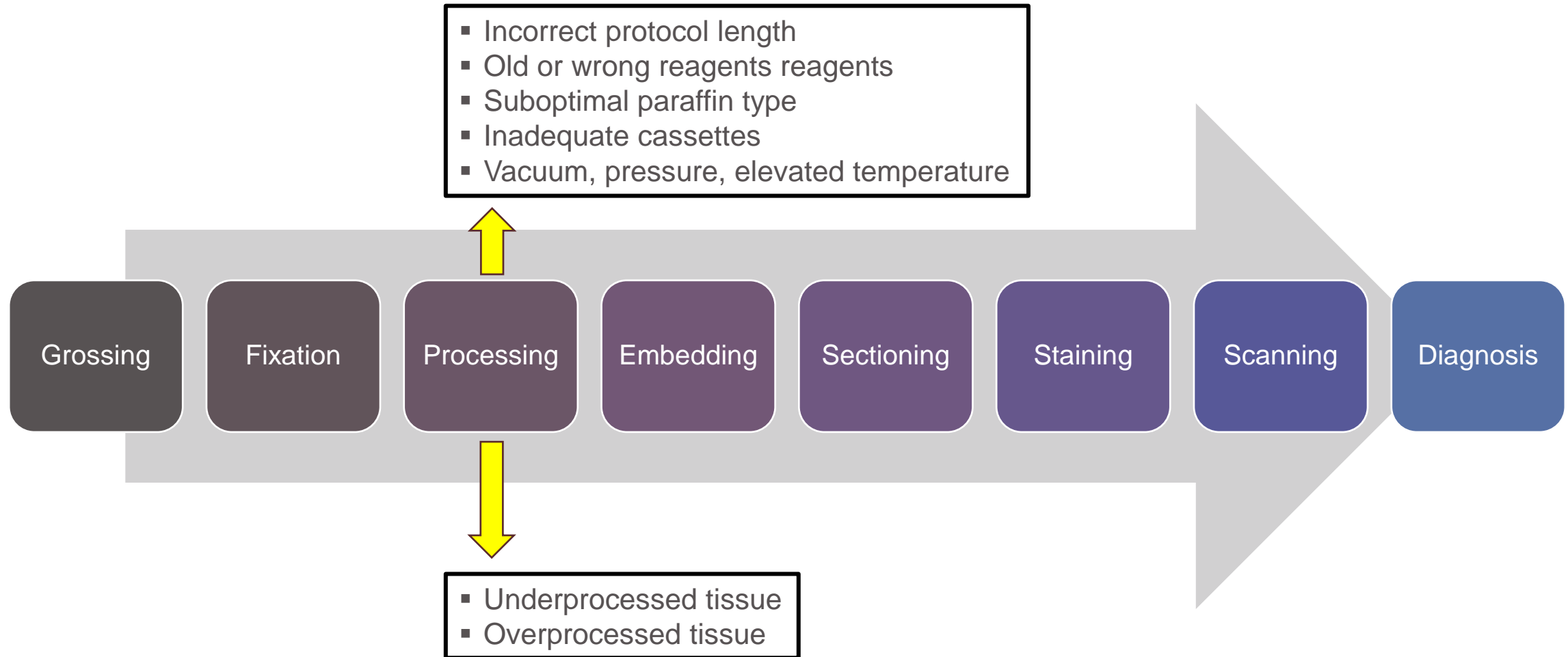
Routine Histology Workflow Challenges



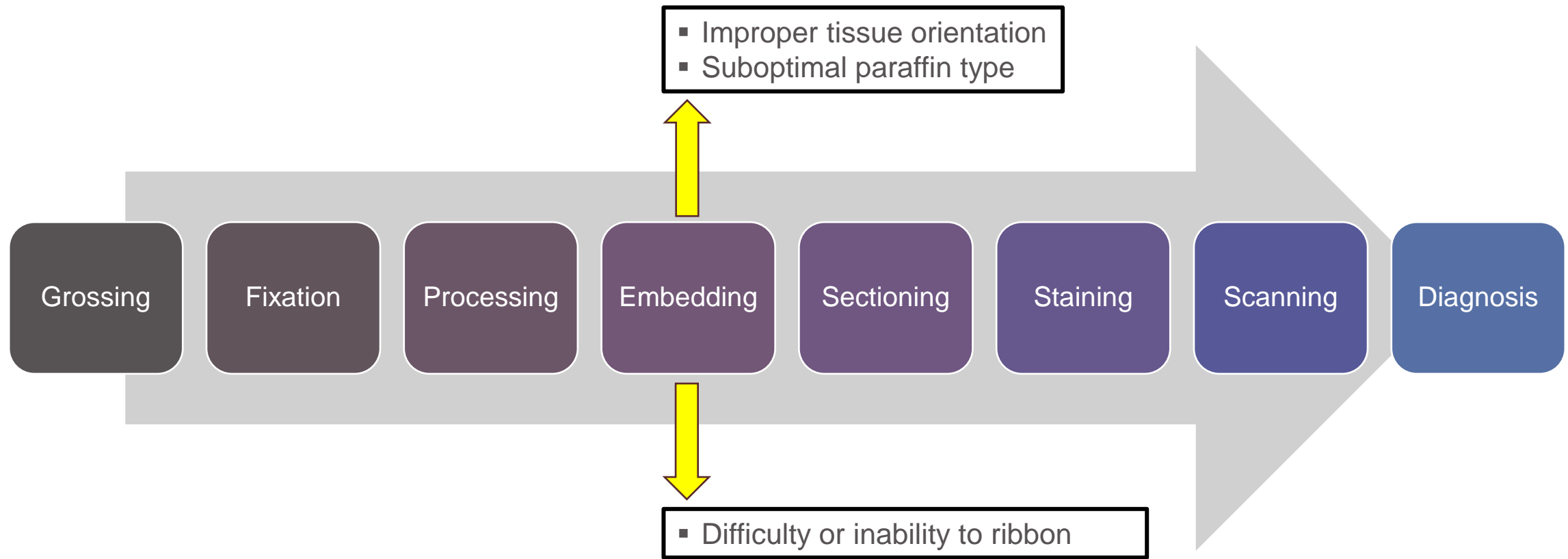
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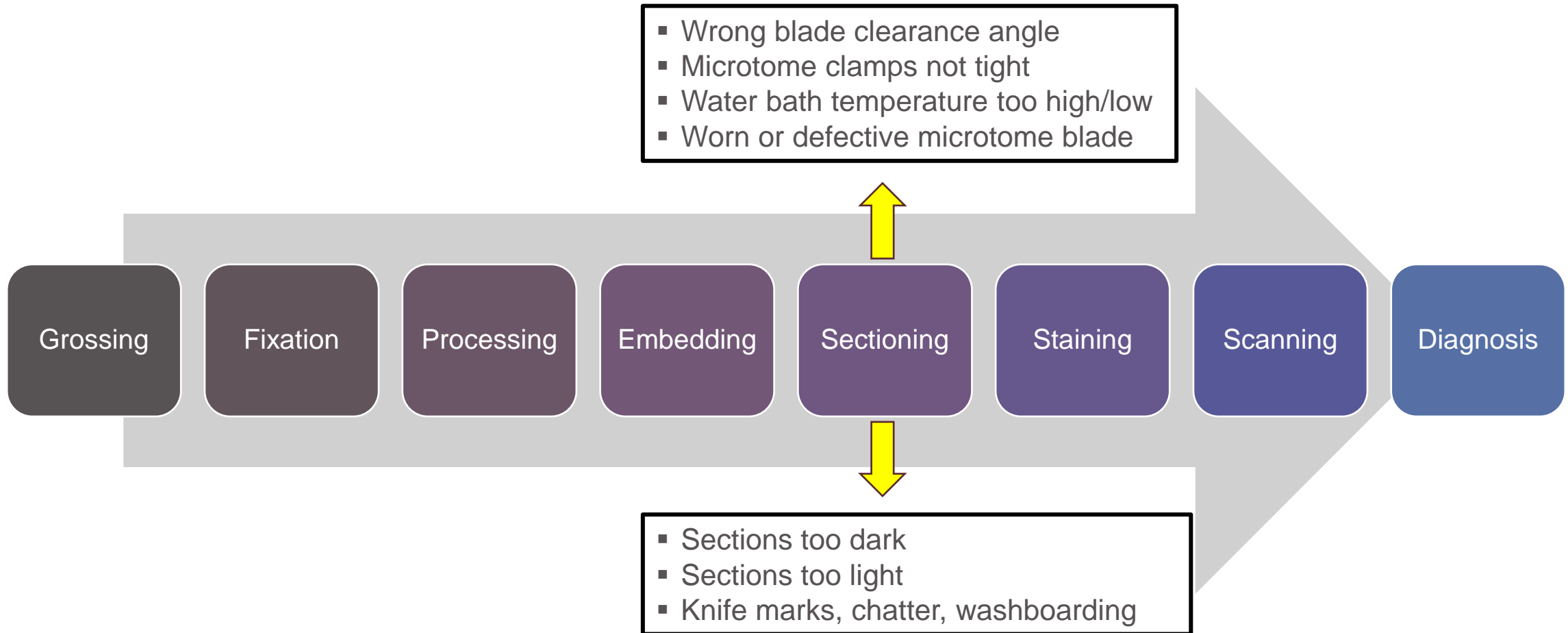
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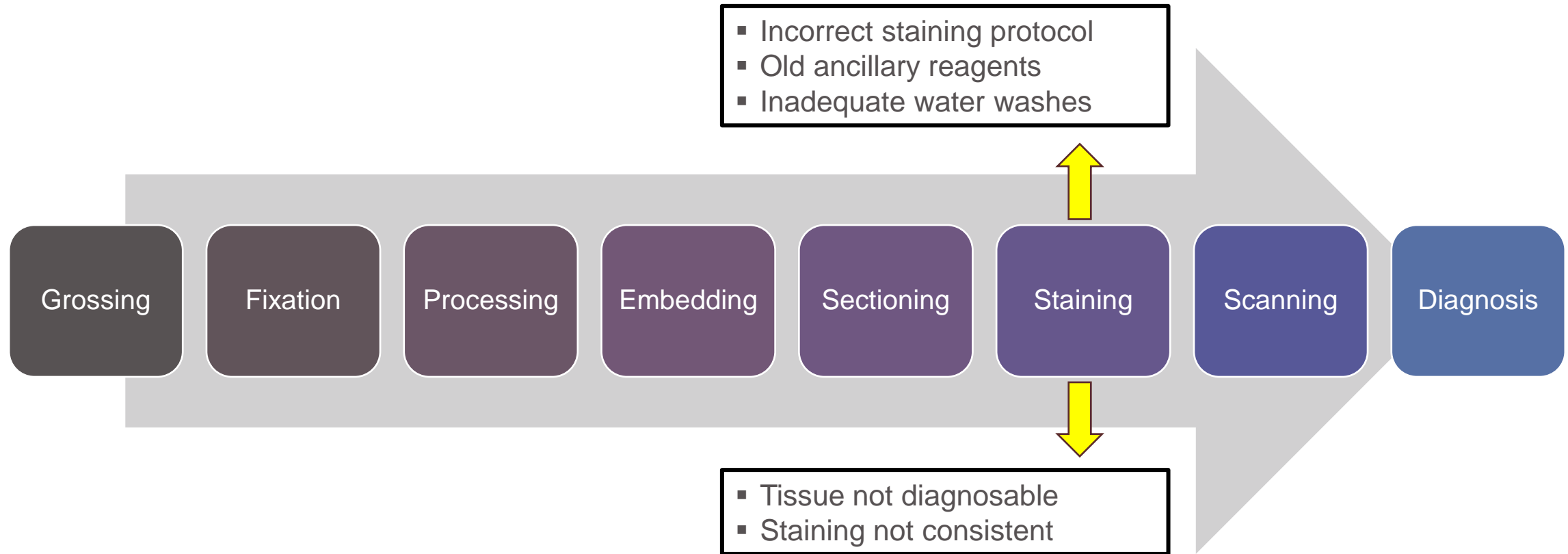
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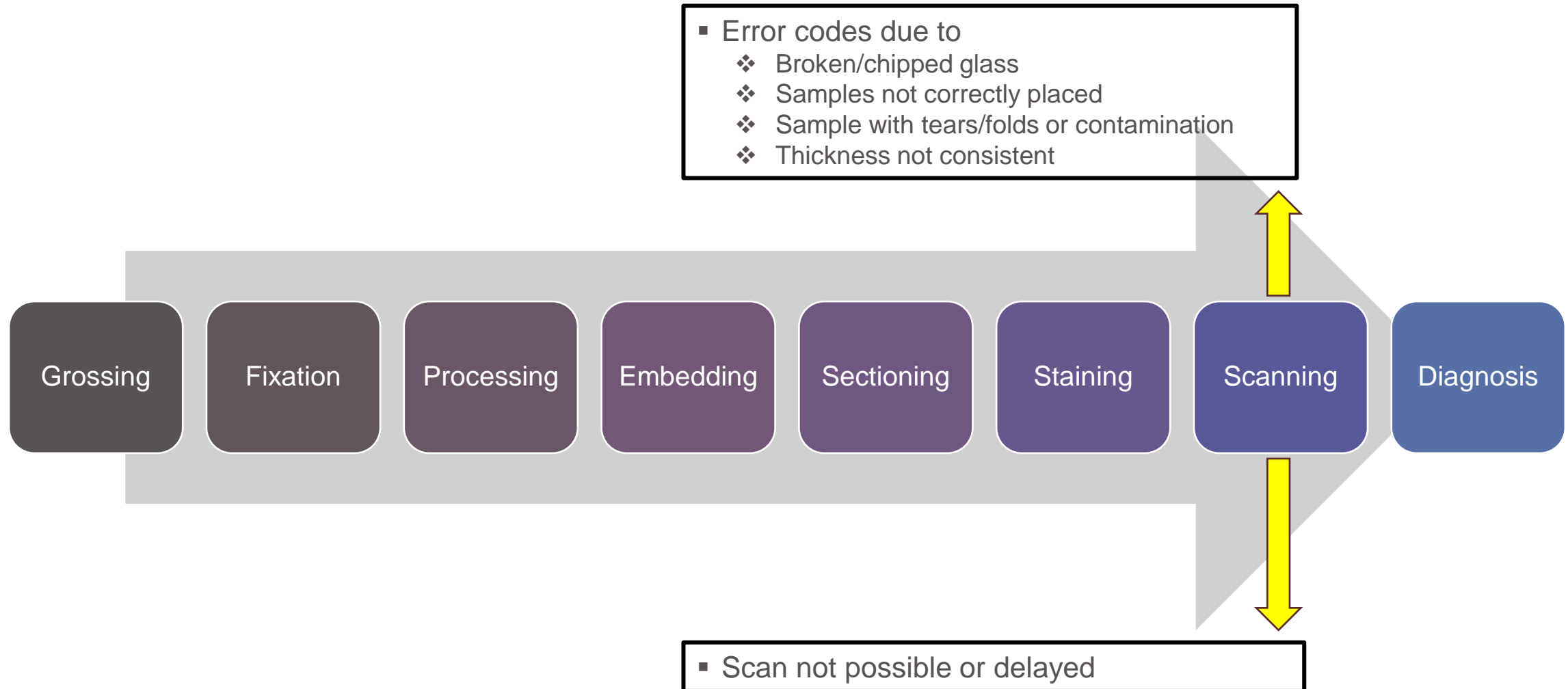
Routine Histology Workflow Challenges



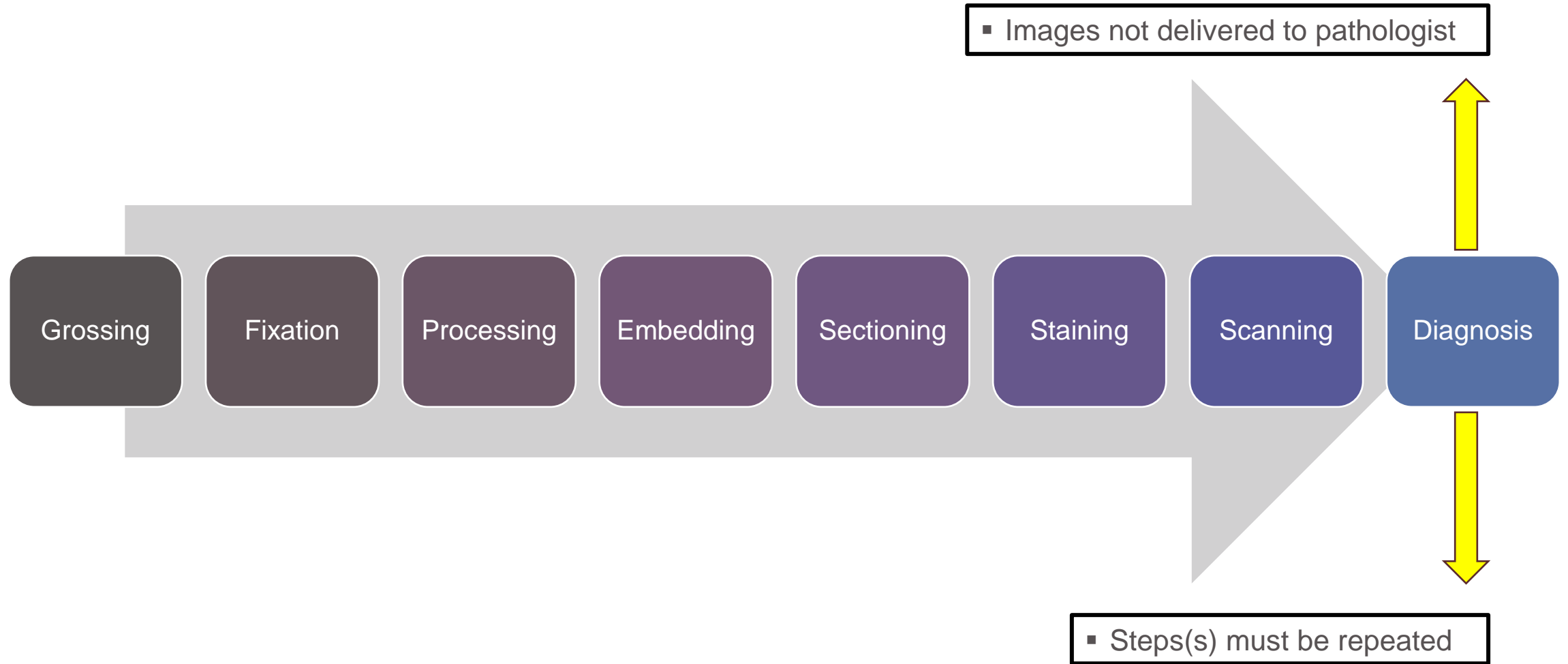
Routine Histology Workflow Challenges



Routine Histology Workflow Challenges

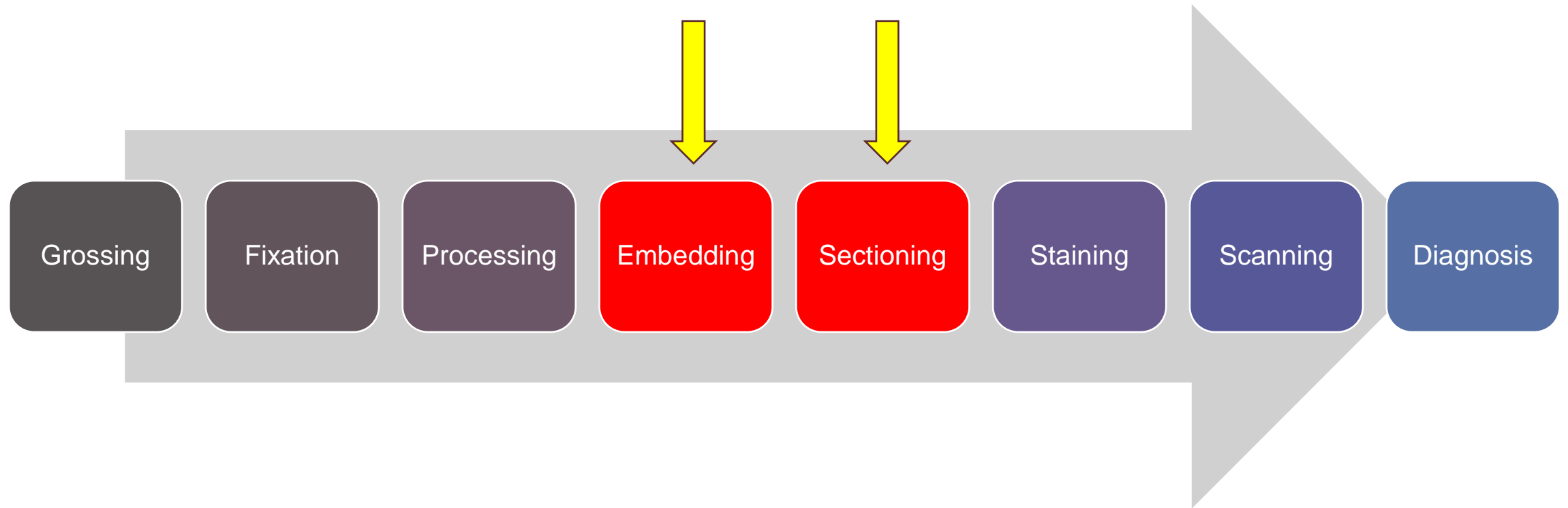


Routine Histology Workflow Challenges



Routine Histology Workflow

Any of the workflow steps can contribute to the quality of the stained sample, however, the most common mistakes come from the embedding and sectioning segments.



Poll Question # 1

Typically, scanning process is suspended when _____

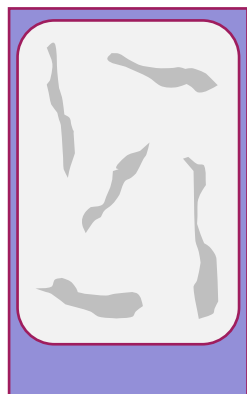
- A. Tissue section thickness is inconsistent.
- B. Staining is too dark.
- C. **Glass slide corner is cracked or broken off.**
- D. There is too much autolytic changes in a specimen.

Poll Question # 2

Scan **focus** may be compromised when _____

- A. Scanning thick (20 μm) tissue sections.
- B. There is a small fold within scanned specimen.
- C. There is dust particles on glass outside the stained sample.
- D. There is a pen mark on glass within scanned specimen.
- E. All of the above

Embedding



Large paraffin block containing multiple tissues. Tissues are spread out and misaligned.



Stained slide



Scanning time significantly increased

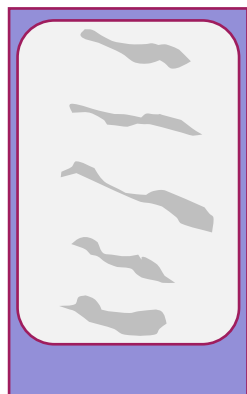


Focusing might be compromised

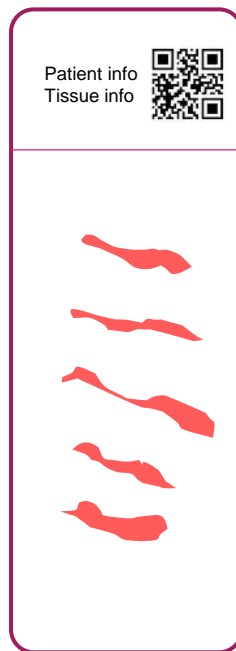


E-file size for archiving increased

Embedding



Large paraffin block containing multiple tissues. Tissues are aligned but spread out.



Stained slide



Scanning time significantly increased

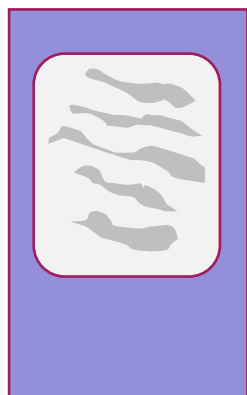


Focusing might be compromised

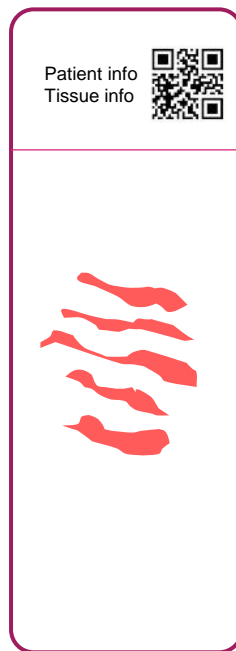


E-file size for archiving increased

Embedding



Medium or small paraffin block containing multiple tissues. Tissues are aligned and nicely grouped together.



Stained slide



Short scanning time

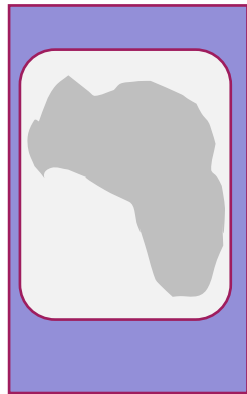


Focusing unchallenged

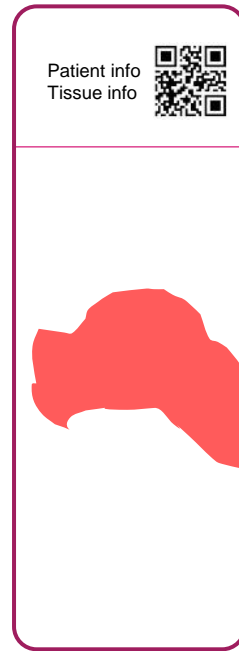


Small e-file size for archiving

Sectioning



Single, large piece of tissue



Incorrect tissue placement



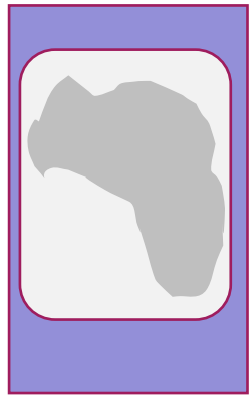
Entire tissue is not captured



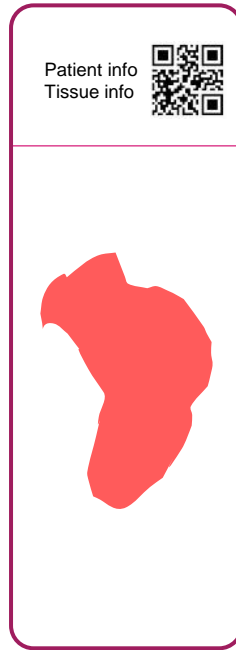
Diagnosis not possible

Tissue placed too close to the glass slide edge or even wrapping around the glass

Sectioning



Single, large piece of tissue



Centrally placed tissue within the scanning area



Correct tissue placement

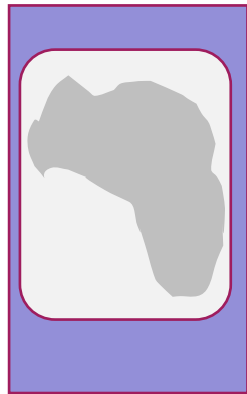


Entire tissue is captured

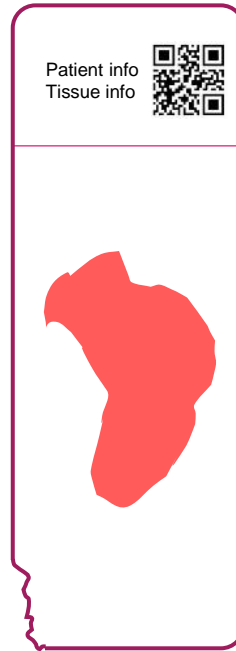


Diagnosis possible

Sectioning



Single, large piece of tissue



Centrally placed tissue within the scanning area but on a chipped or cracked glass slide



Correct tissue placement

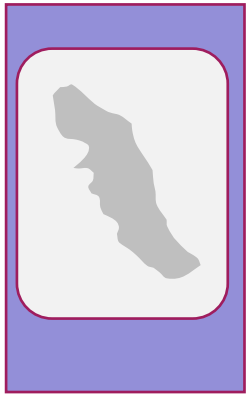
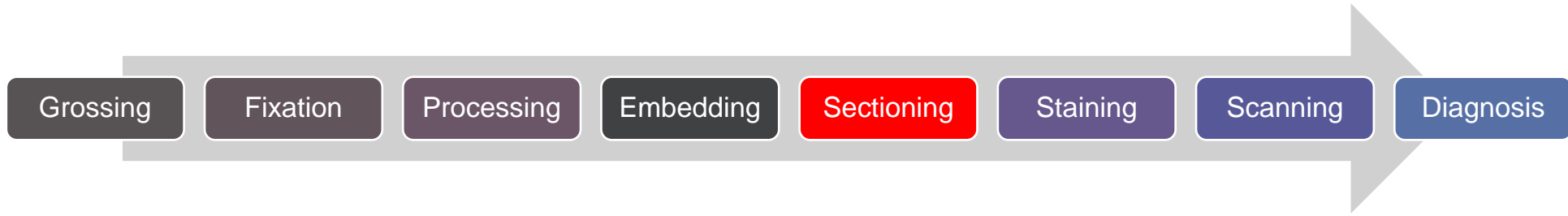


Glass slide not scannable



Diagnosis not possible

Sectioning



Single, large piece of tissue



Contaminated floatation
water bath, dirty glass slide



Focal plane not uniform

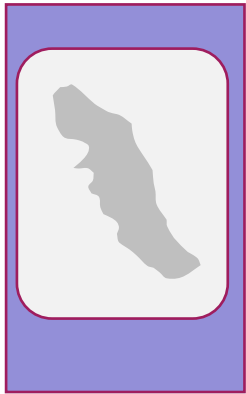
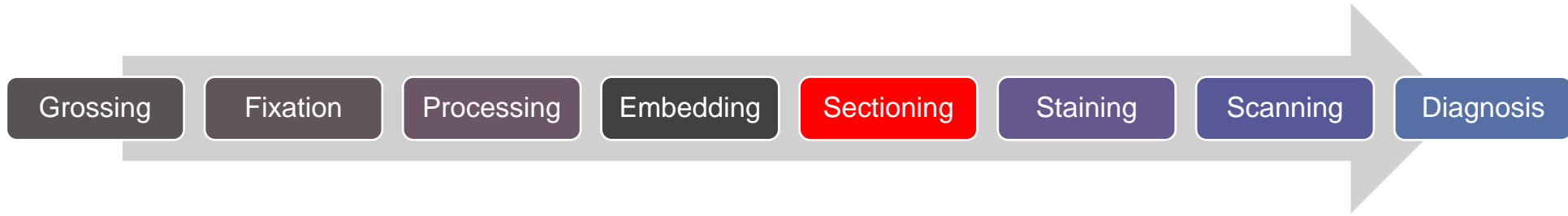


Scanning time extended or not possible



Diagnosis might not be possible

Sectioning



Single, large piece of tissue



Fingerprint(s) on a glass slide
or a coverslip



Focal plane not uniform

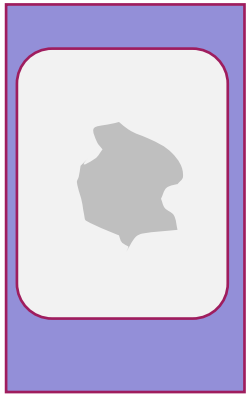


Scan interrupted



Diagnosis not possible

Sectioning



Single, large piece of tissue



Fold(s)



Focal plane not uniform

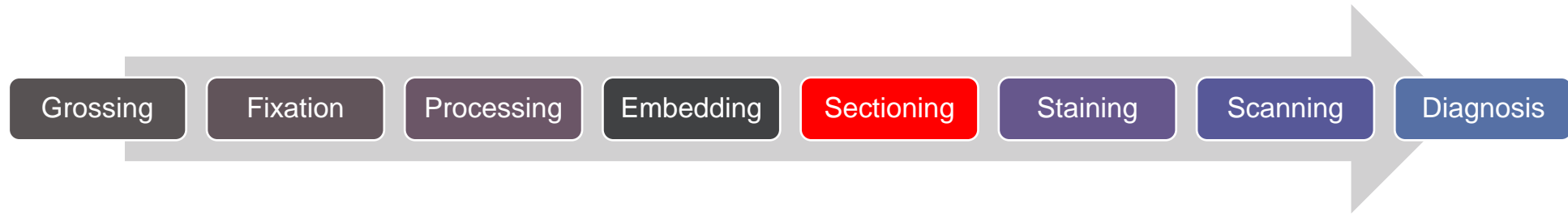


Scan interrupted

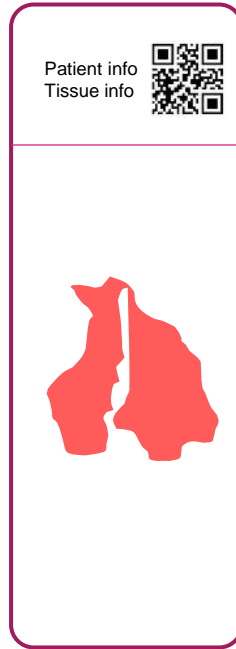


Diagnosis not possible

Sectioning



Single, large piece of tissue



Tear(s)



Tissue loss; section does not represent tissue collected

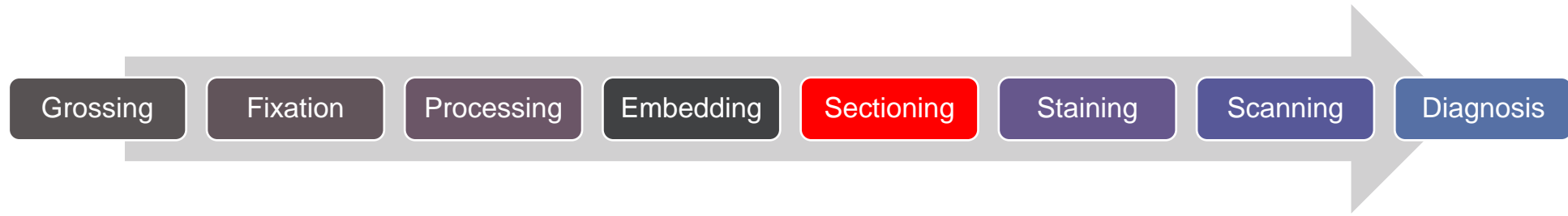


Sample rejected

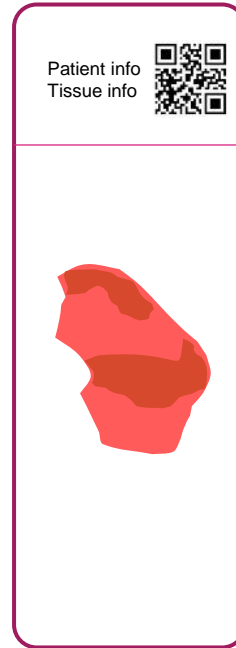


Diagnosis not possible

Sectioning



Single, large piece of tissue



Tissue sectioned too thick or containing thin-and-thick areas



Focal plane not uniform. For thick sections, multi-plane (z-stack) scanning may be necessary

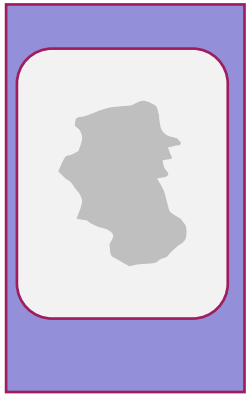
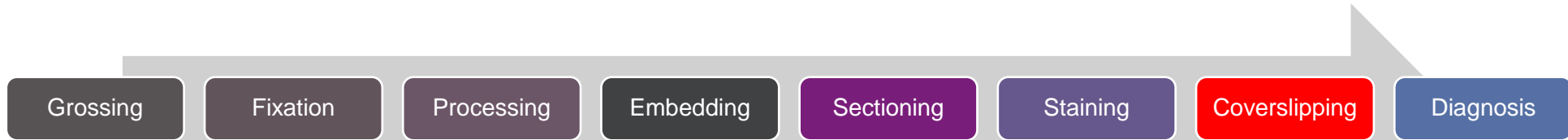


Scan interrupted or not possible

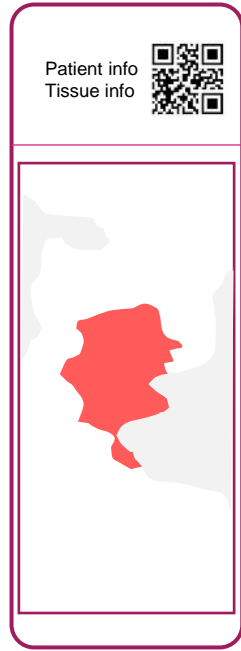


Diagnosis not possible

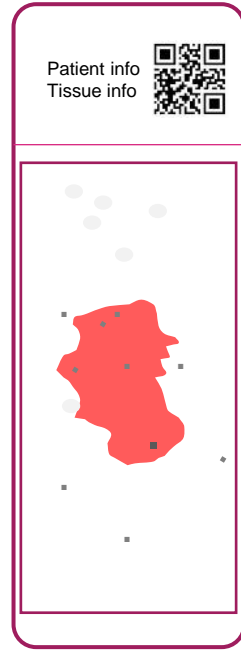
Coverslipping



Single, large piece of tissue



Air-pockets



Air-bubbles



Not enough mounting media,
media not aerated, instrument
not primed

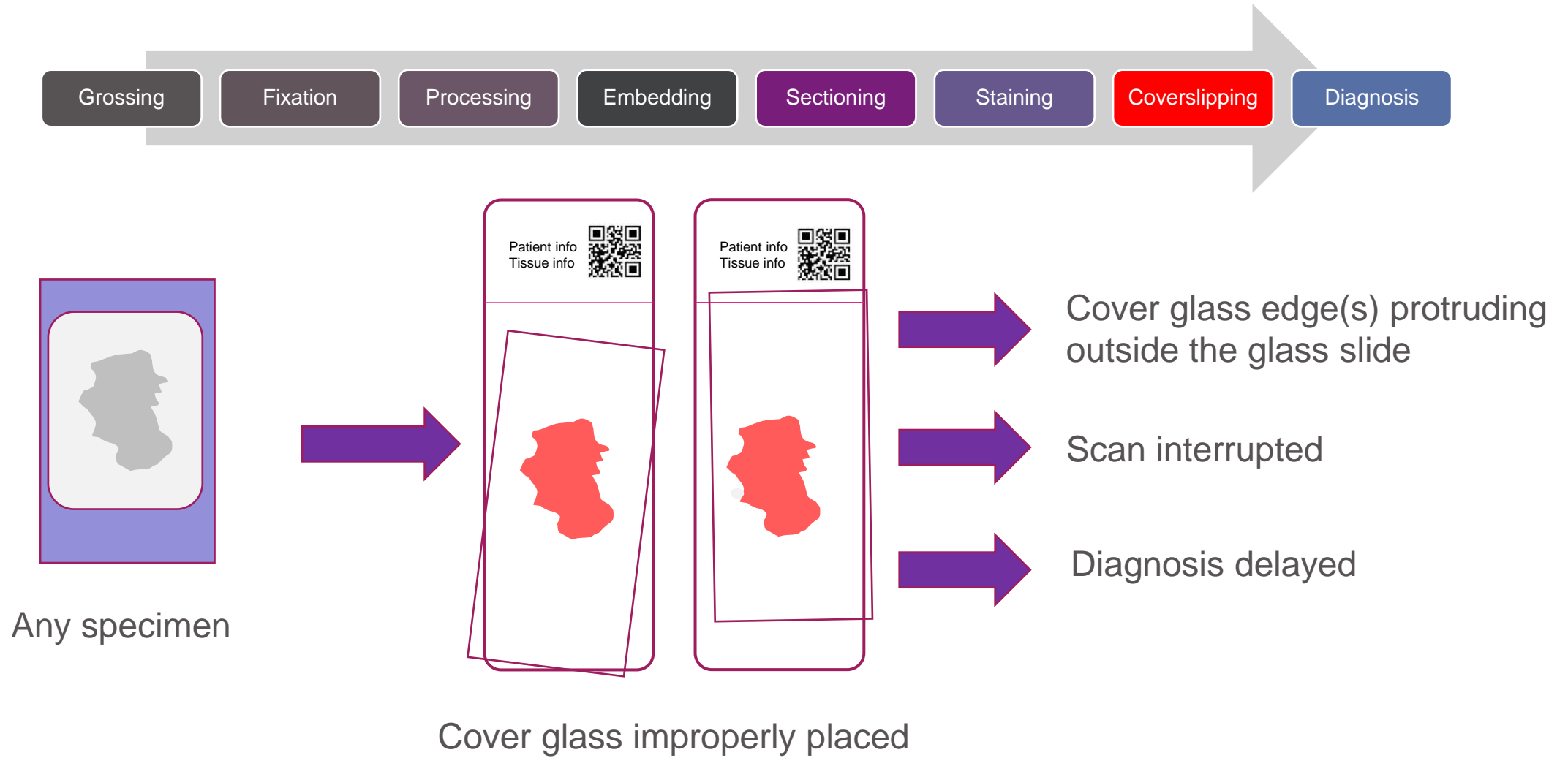


Scan out of focus or not possible

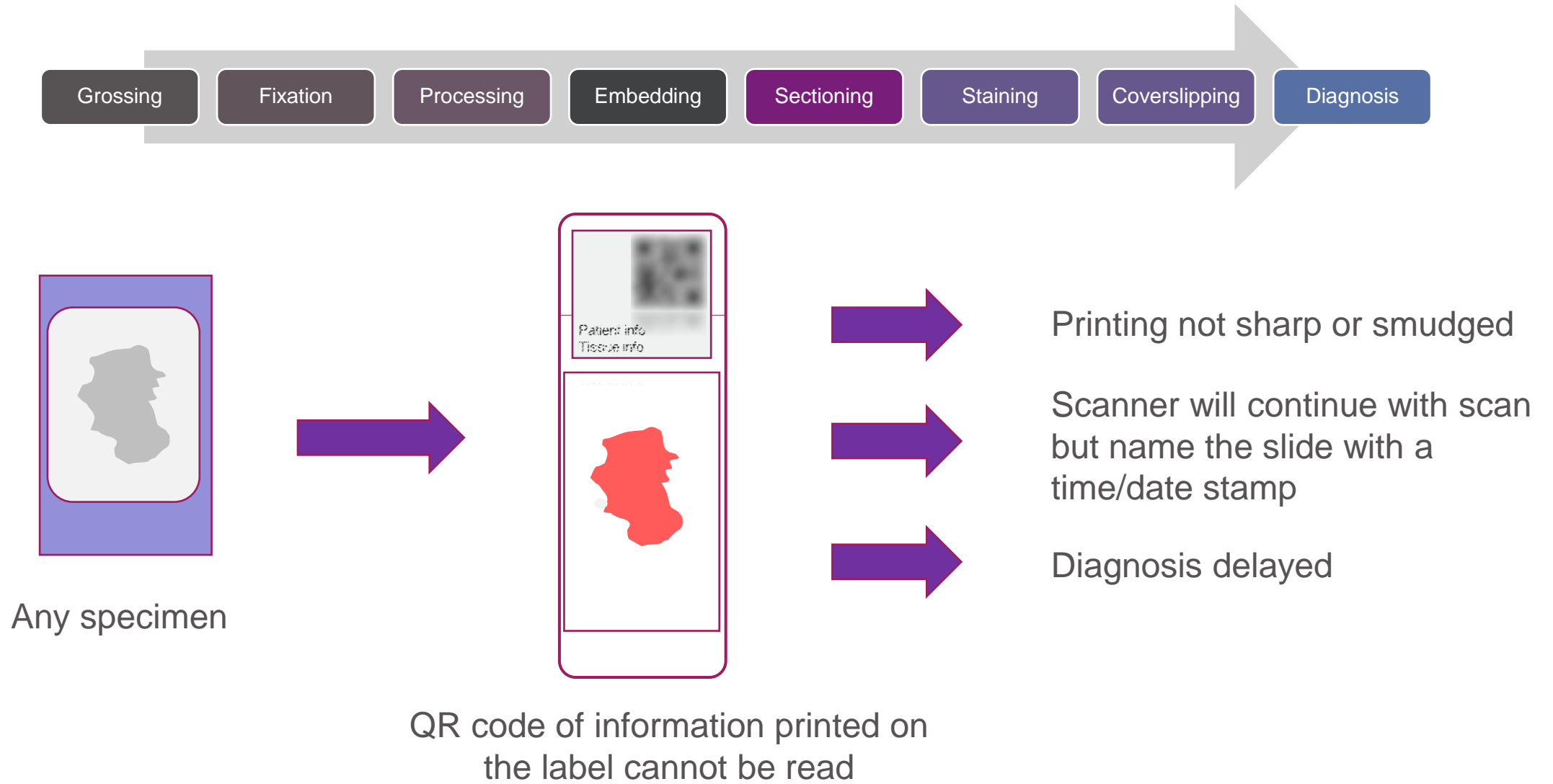


Diagnosis not possible

Coverslipping



Labeling



Poll Question # 2

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- D. There is a pen mark on glass within scanned specimen.
- E. All of the above

Last But Not Least: Printing

The most common error encountered while scanning is the number of slides being skipped due to an unrecognizable 2D barcode. This can result from poor slide label quality or poor printing quality.

Not all printers can print a good quality image (information, barcode) on a slide that is not designed for that specific printer. To avoid delays, use only recommended or validated microscope glass slides for that printer.

Slide printers:

- Inkjet technology – the oldest technology relying on depositing ink. Print might smear, if not handled properly.
- Thermal transfer technology – newer technology, works by using heat-sensitive carbon ribbon, which is melted onto the substrate as it passes over hot the print head.
- Laser technology – most advanced, latest technology. No ink or ribbon needed. Image is burned into existing painted area.



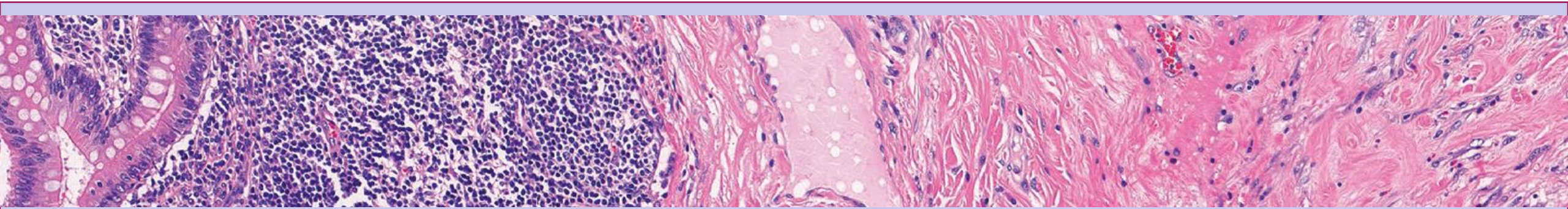
Slides Scan Ready - Summary

To prepare stained slides for imaging one must avoid common mistakes or know how to fix them.

Hastily prepared slides most will likely trigger errors while being scanned and consequently delivery of the images to a pathologist will be delayed.

To minimize user intervention near perfect slides must be prepared or actions need to be taken to improve their quality:

- Paraffin blocks can be re-embedded for better tissue alignment and aggregation.
- Microtomy can be repeated with greater care to avoid common mistakes (tears, folds, thickness).
- Pay great attention when choosing and handling microscope glass slides and coverslips.
- Coverslipping process can be improved to avoid formation of air-pockets and air bubbles.



Why Slides Quality Is Important?

Tissue preparation, embedding, sectioning and staining must be optimal in order to achieve high quality scans. Such scan can be only generated from optimized Digital Ready Slides.

Economic reasons:

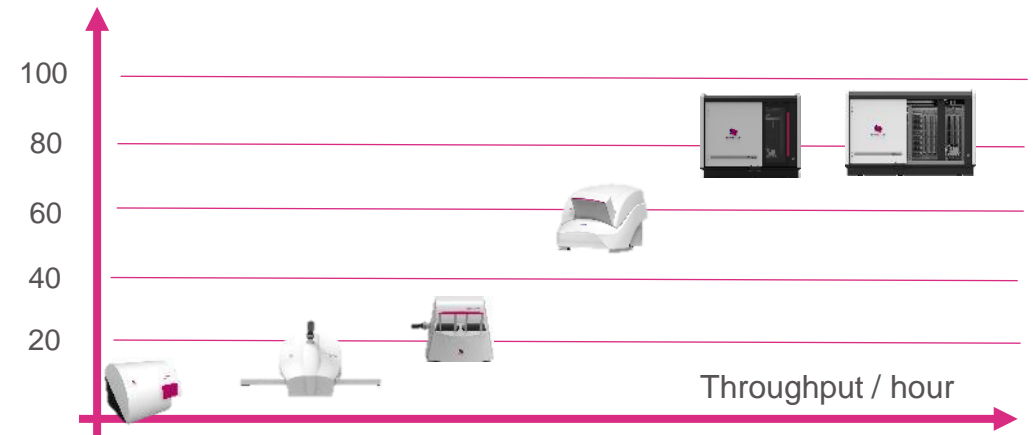
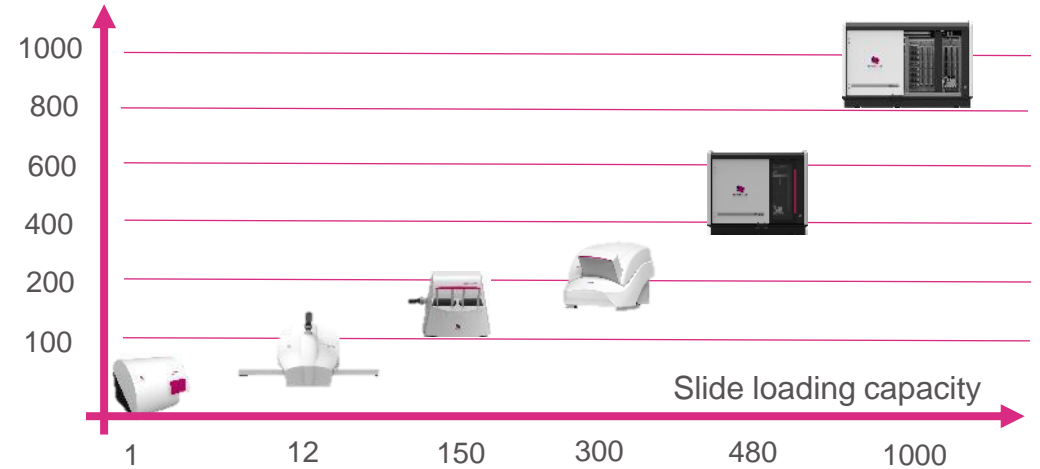
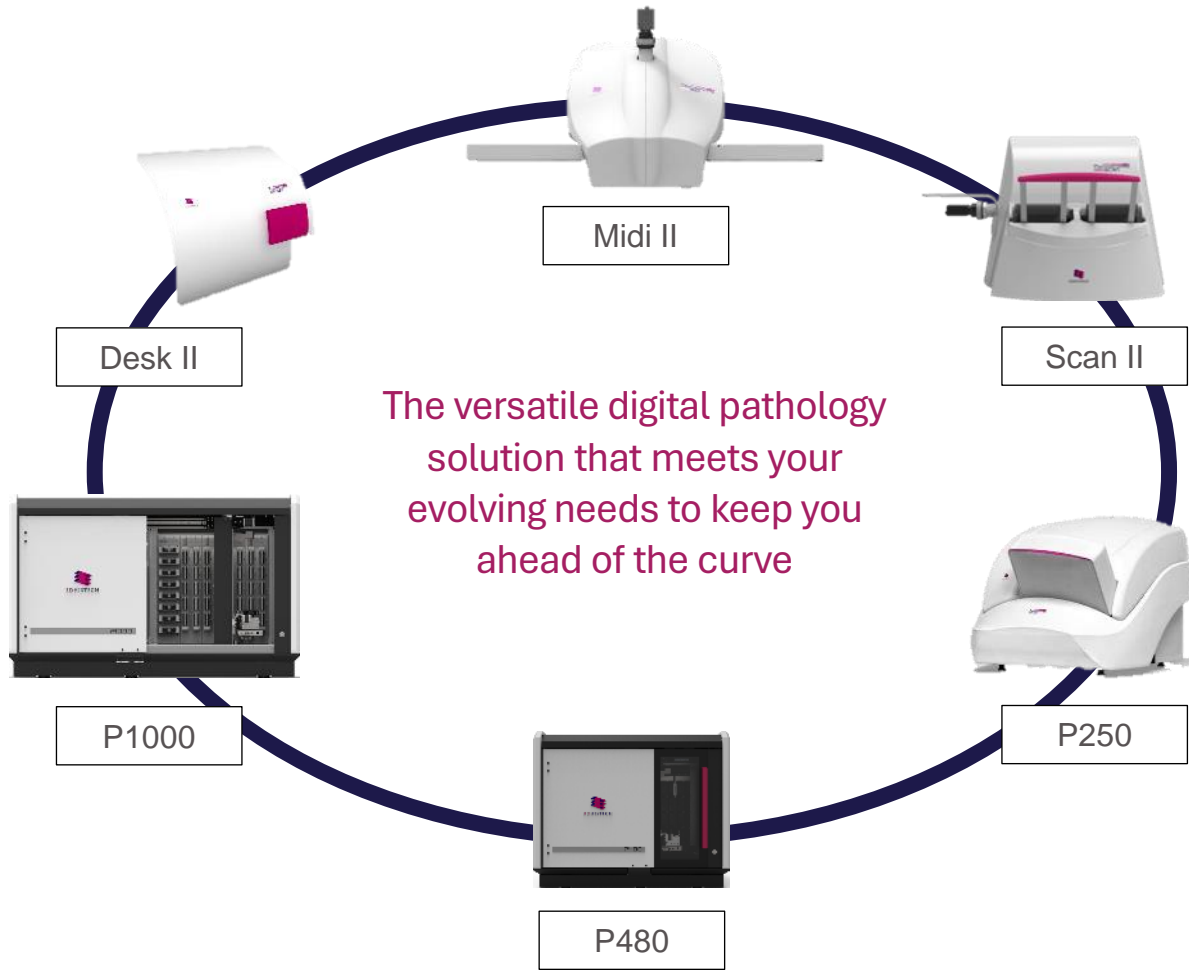
- ✓ Increase efficiency of pathologists
- ✓ Allows image sharing for diagnostics, education, publication and research purposes
- ✓ Slide digitization reduces the number of routine, manually reviewed slides, maximizing workload efficiency reducing turn-around time to report cases

Quality advantages:

- ✓ Reduced error rate
- ✓ Image analysis tools are used to derive objective quantification measures from digital slides
- ✓ IHC scoring and indexing (algorithm)
- ✓ Malignant tissue grading



Epredia's Digital Scanners Portfolio



A close-up photograph of several people in business attire clapping their hands. The focus is on the hands in the foreground, which are clapping together. The background is slightly blurred, showing other people also clapping. The overall atmosphere is one of appreciation and celebration.

**Thank you for
attending!**