Mix-Up of Specimens –

and How to Avoid and Discover It

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Mix-up of Specimens – and How to Avoid and Discover It

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This lecture is about confusion of identities. It may bear the promise of being entertaining, as comedies of mistaken identity are a popular genre in theatres and movies,

but in medicine, confusion of identities is not quite that funny, no matter where it occurs – whether in the operating room with surgery being done on the wrong patient or the wrong arm or leg, in the nursery with confusion of newborns, on the medical ward, arranging wrong medications, or in the laboratory where blood samples may be confused with one another. Because mistakes become more common with decreasing size and increasing number of items, handling of blood samples is especially prone for mix-ups.

Proficiency Evaluation of Clinical Chemistry Laboratories

G. F. Grannis, H.-D. Grümer, J. A. Lott, J. A. Edison, and W. C. McCabe[1]

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Table 6. Frequency of Laboratory Mistakes

Type of Mistake	Rate of occurrence (mistakes per 100 specimens) 1/1/69–12/31/70		
(1) Specimen mix-up	0.89		
(*a*) clerical area		(0.35)	
(*b*) specimen preparation area		(0.12)	
(*c*) analytical areas		(0.42)	
1. manual area			(0.13)
2. AutoAnalyzer area			(0.13)
3. enzyme area			(0.16)
(2) Incorrect chart readings	0.66		
(3) Dilution and calculation	0.60		
(4) Poor reagent or standard solutions	0.75		
(5) Other, or unexplained	0.56		
(6) Mistakes in Proficiency Laboratory	0.19		
Total:	3.65		

Chemistry Laboratory functions as an y, and has provided performance of the and to obtain oby. In this report we principles of laboratnd illustrate some am in identifying ng the performance with that of other boratory mistakes. to emphasize both unity for improved ry laboratories.

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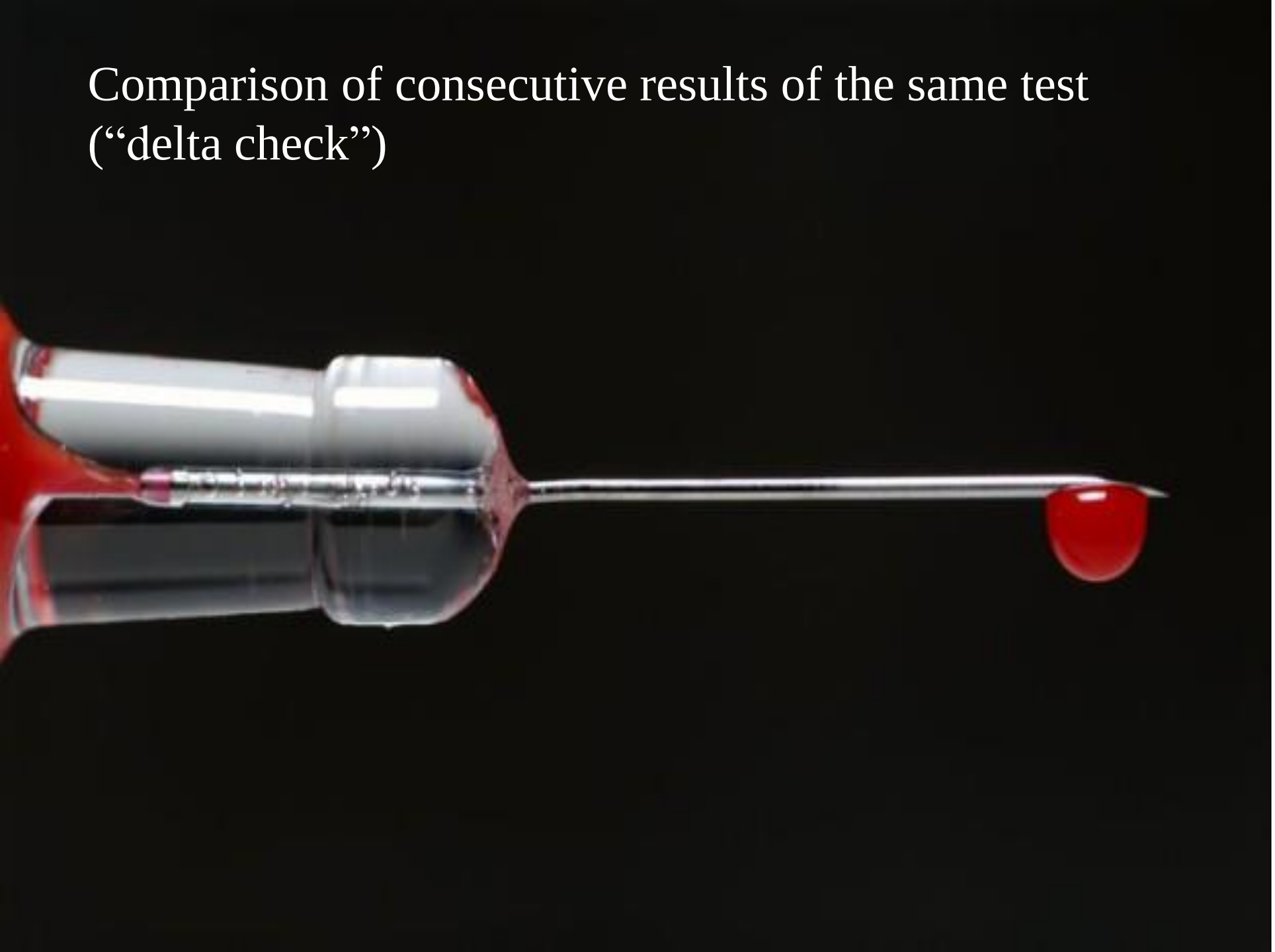
based primarily on ure introduced by urther described by Copeland (*9*) and Sax et al. (*10*). Commercial

Studies from clinical chemistry laboratories revealed a frequency of specimen mix-up of nearly 1% – an enormous number.
In order to come to grips with that problem, several methods have been proposed,

Comparison of consecutive results of the same test (“delta check”)



including the so-called “delta check” that compares consecutive results of the same test in the same patient,

Comparison of consecutive results of the same test (“delta check”)

Co-determination of the blood group of the patient with every blood test

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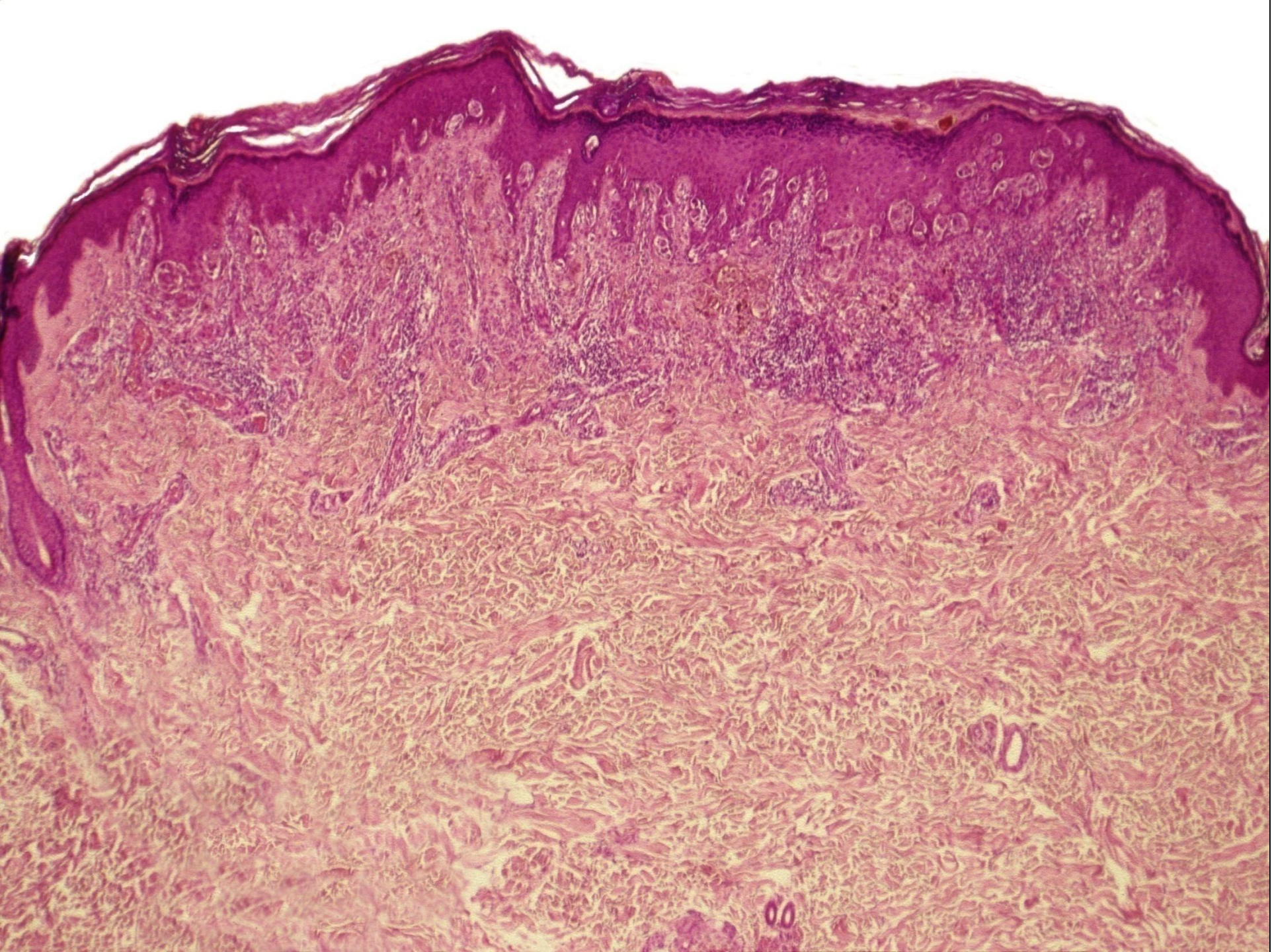
Co-determination of the blood group of the patient with every blood test

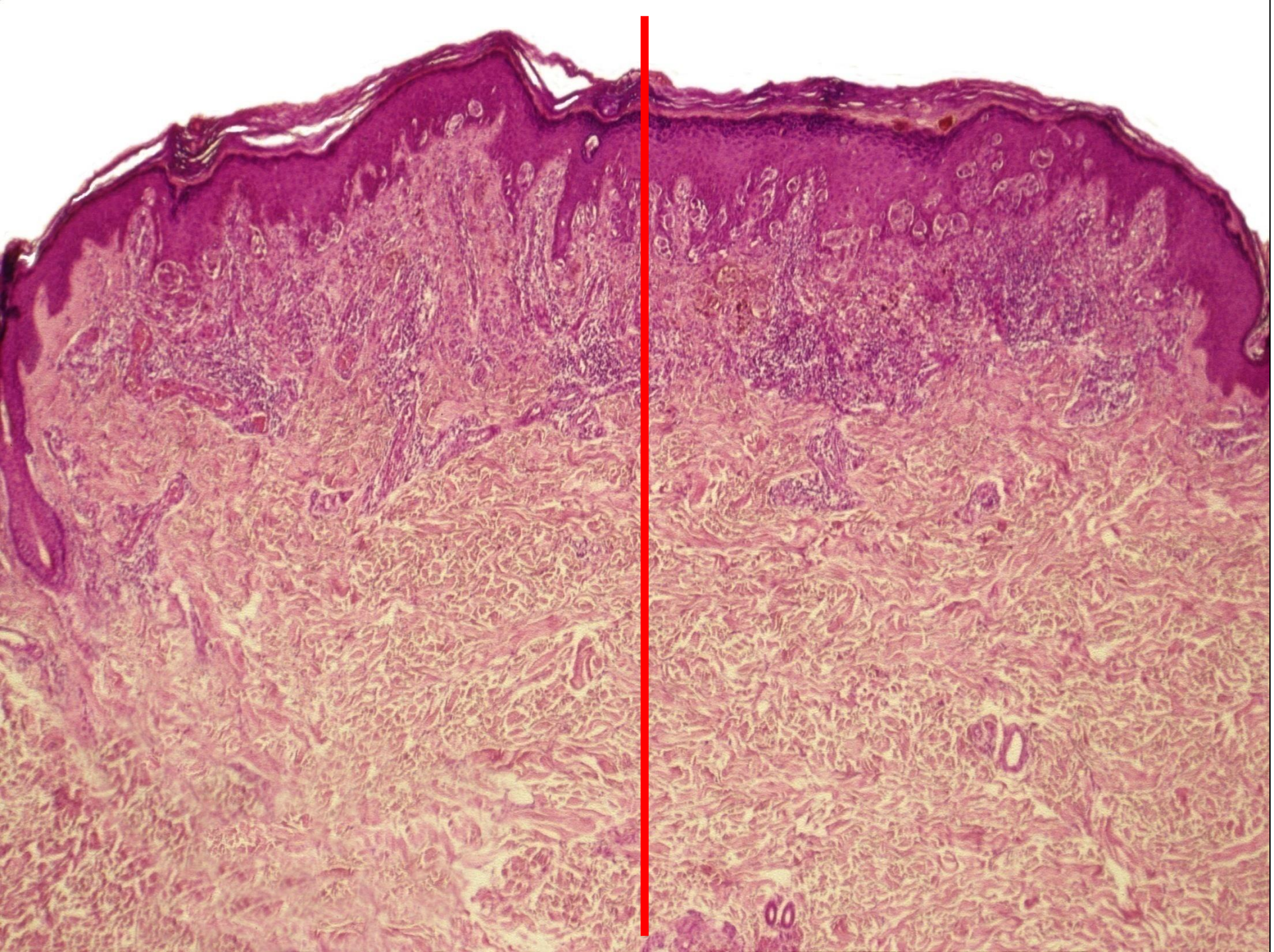
Concurrent determination of parameters in two different laboratories (“split-specimen design”)

and concurrent determination of parameters in two different laboratories, the so called *“split-specimen design.”* Those methods, however, although laborious and expensive, are not always telling, e.g., in patients with the same blood group, and they are not transferable to other fields of medicine. In dermatopathology, for example, the “split-specimen design”

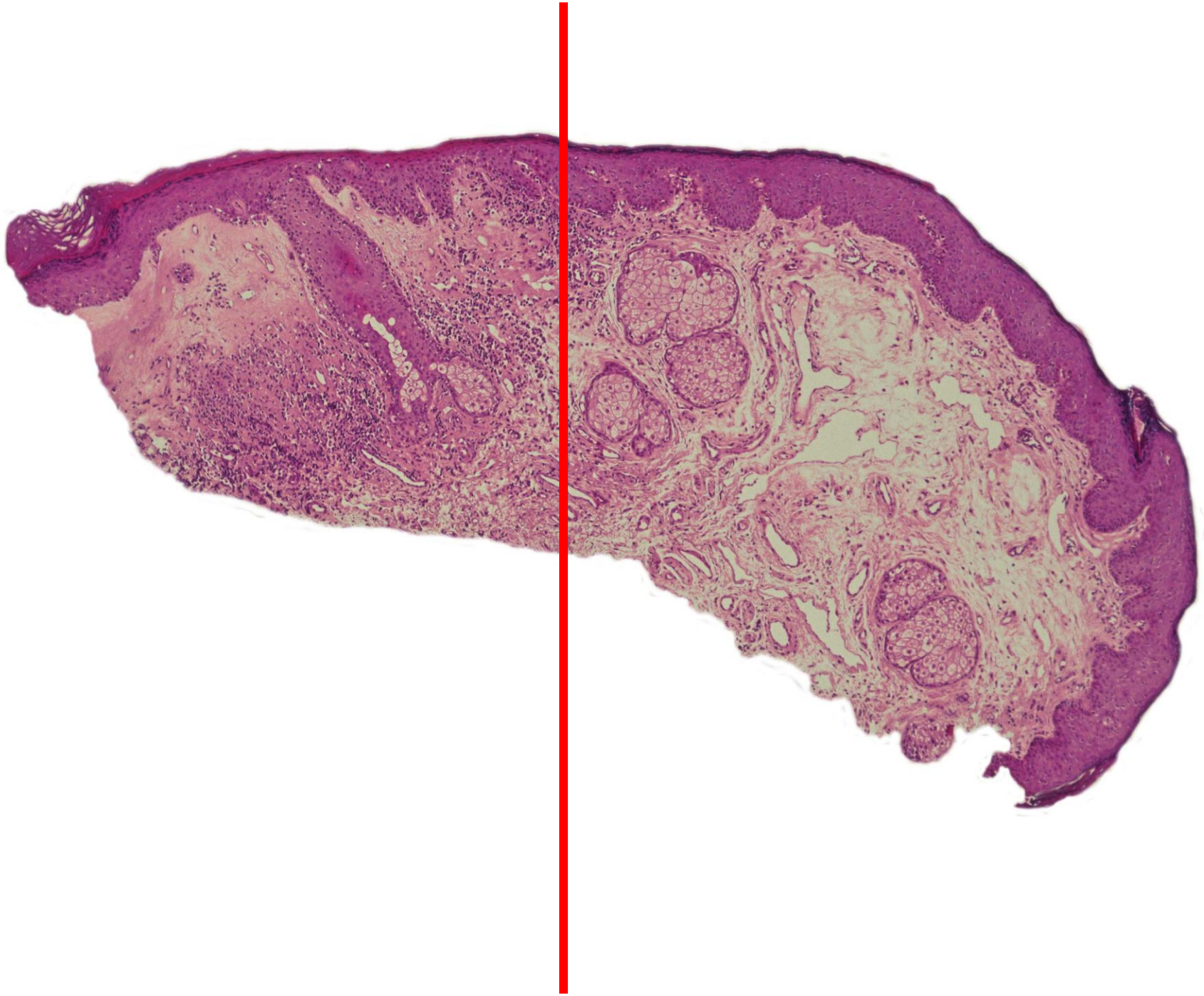
cannot be used because of the small size of most biopsies



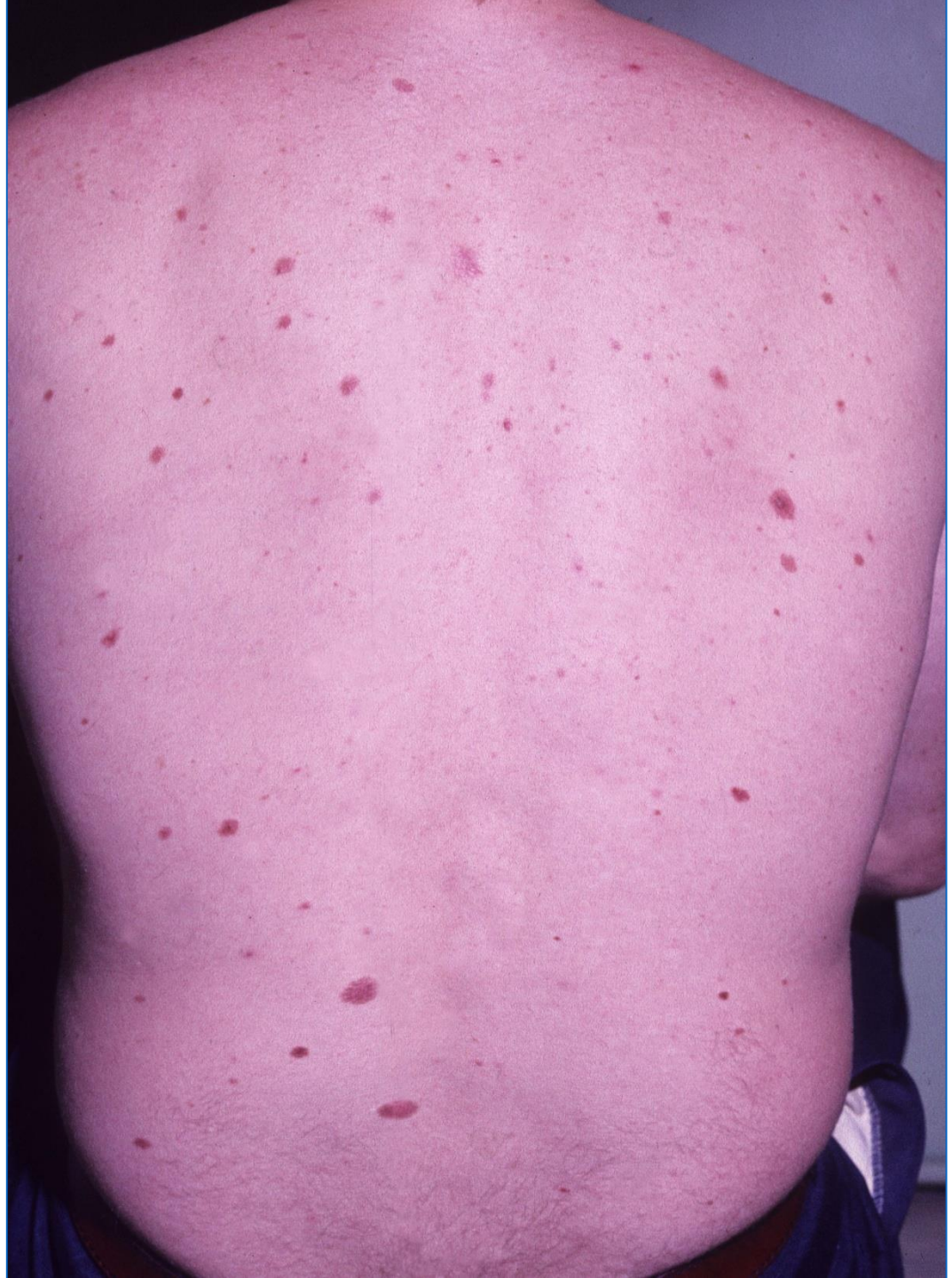
and the necessity to assess all criteria for diagnosis and to weigh them against one another.



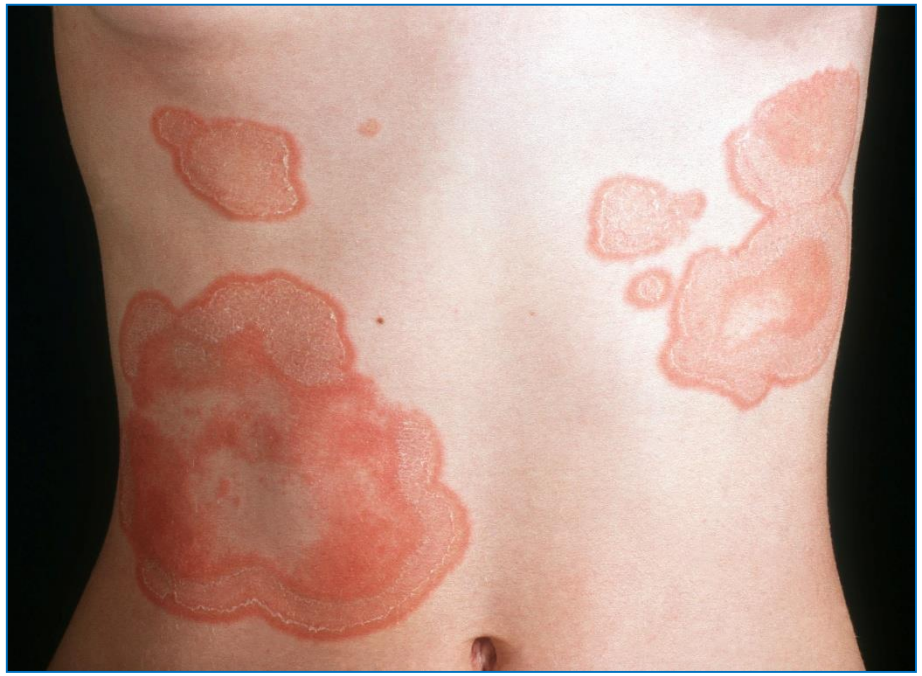
If provided with only one half of the lesion, such as a Spitz's nevus, a specific diagnosis may be impossible. Moreover, relevant findings are often confined

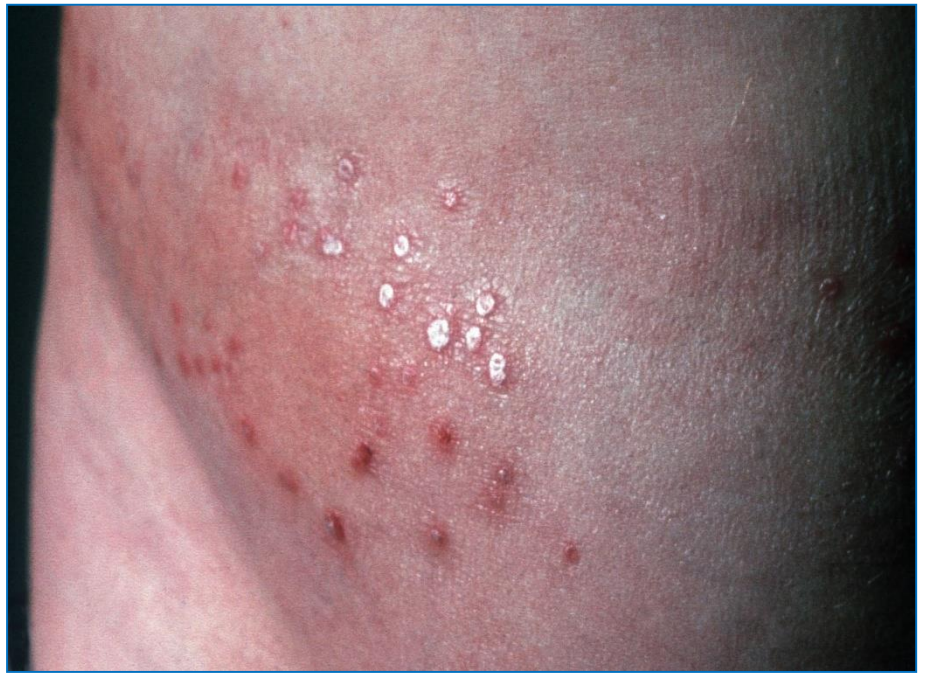


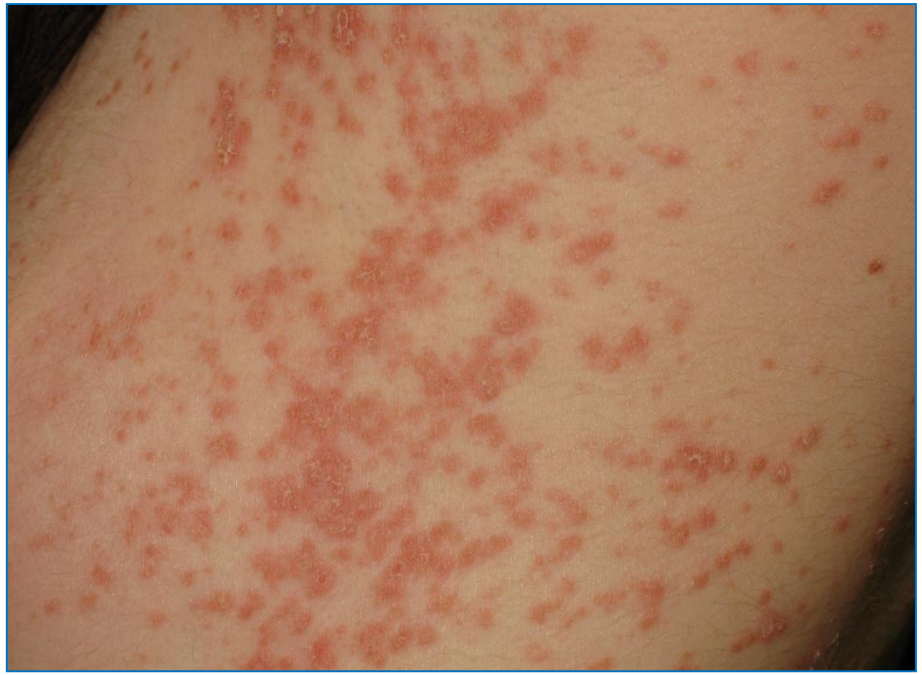
to a single focus, not only in neoplasms but also in inflammatory dermatosis. Hence, the *“split-specimen design”* would often lead to discordant results in the absence of any mistake.

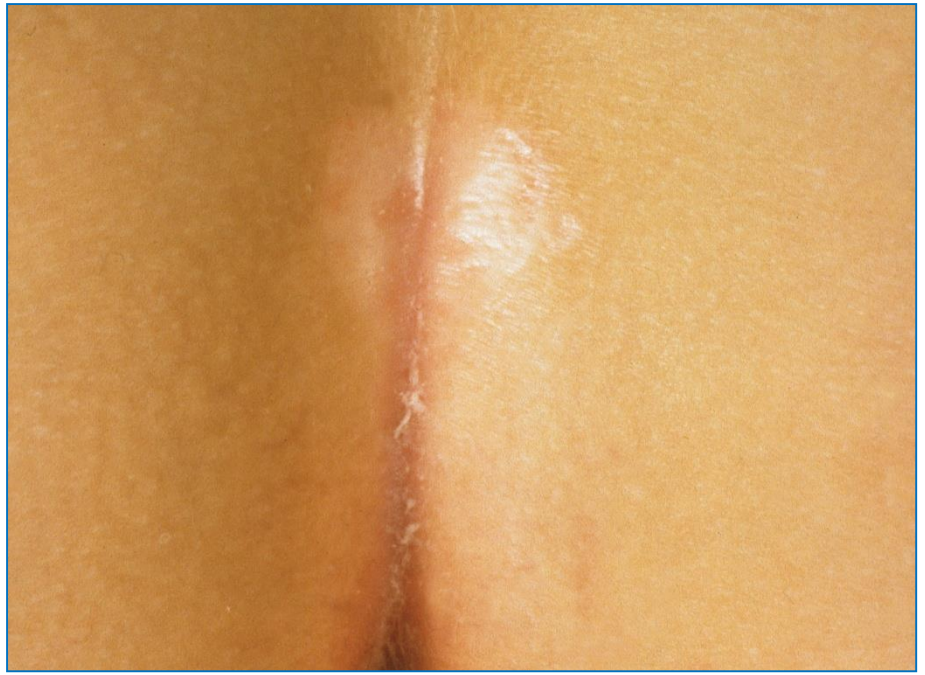


Likewise, detection of specimen mix-up through consecutive determination of the same parameter is not possible in dermatopathology, as every biopsy stands for itself. This is not only true for neoplasms

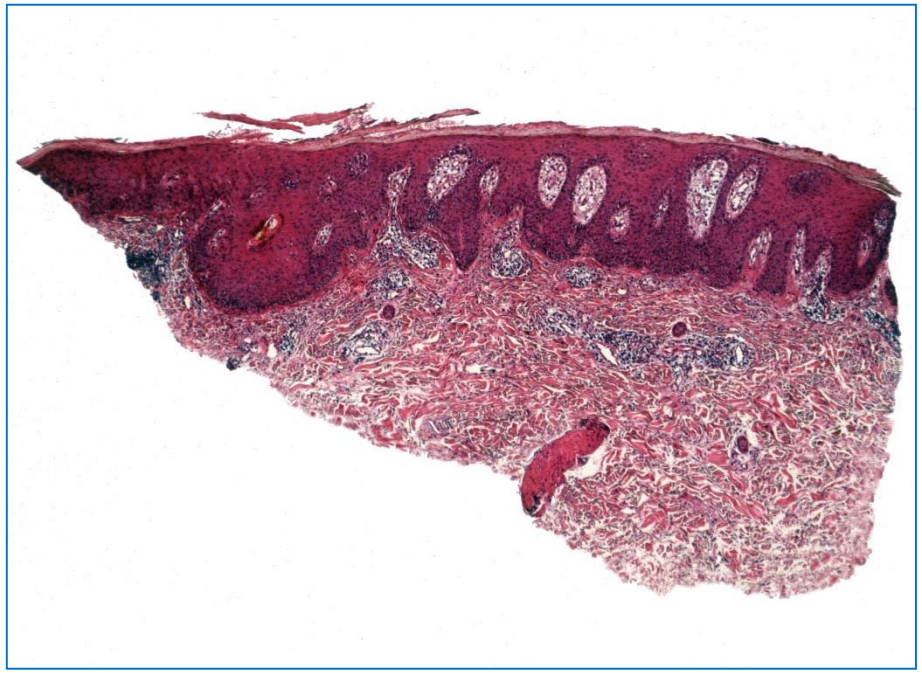


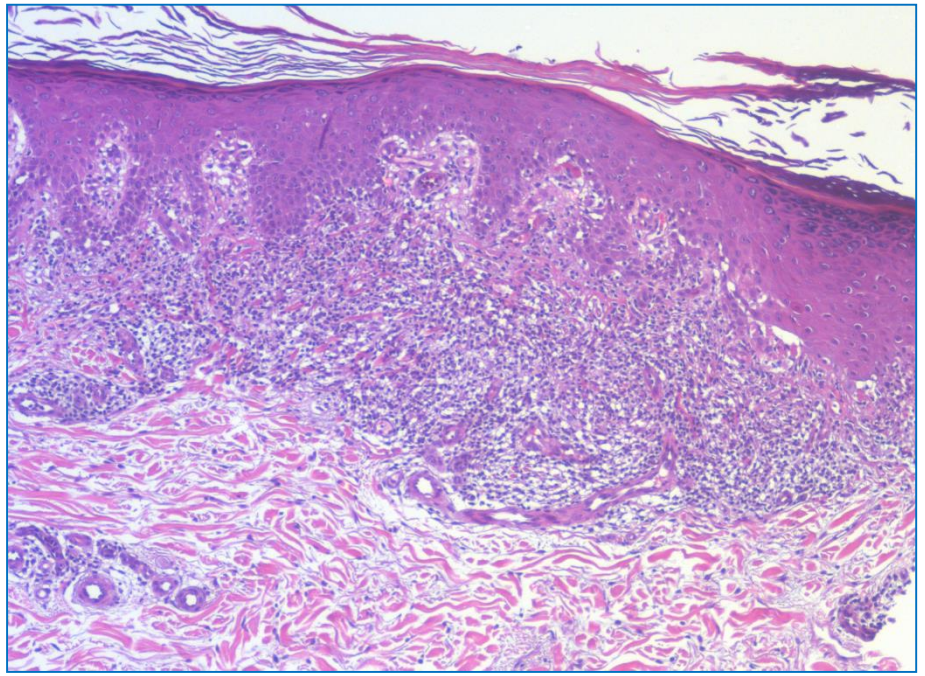


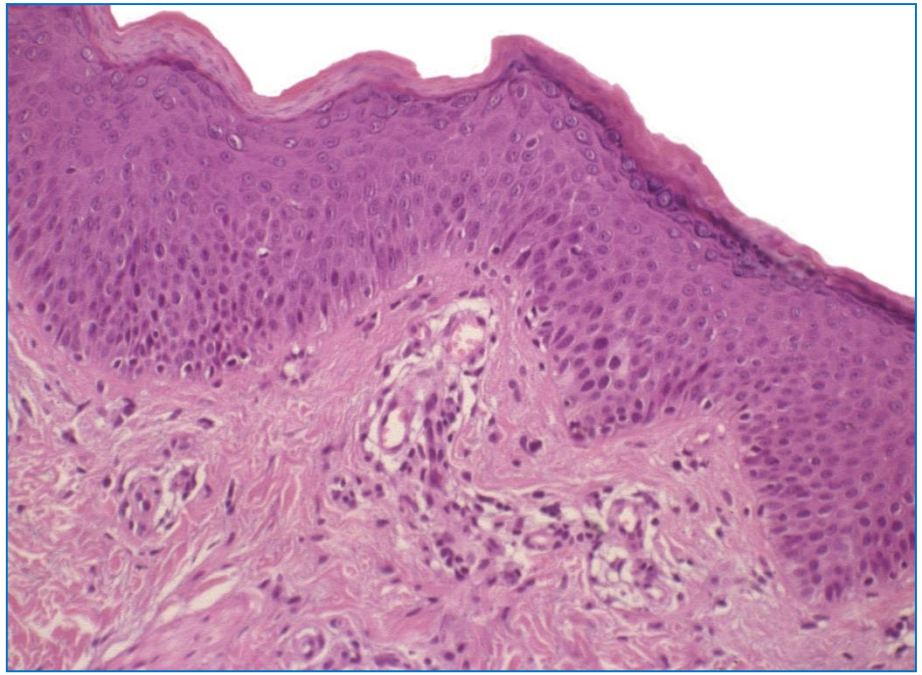


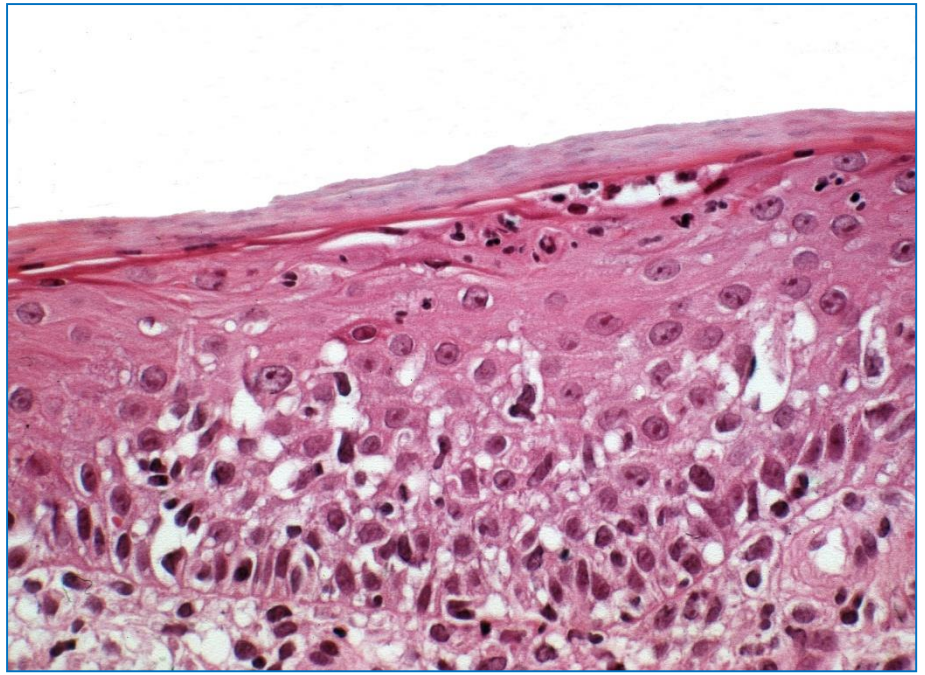


but also for inflammatory dermatoses. The latter may present themselves in so many different ways that discrepancies do not indicate a specimen mix-up –

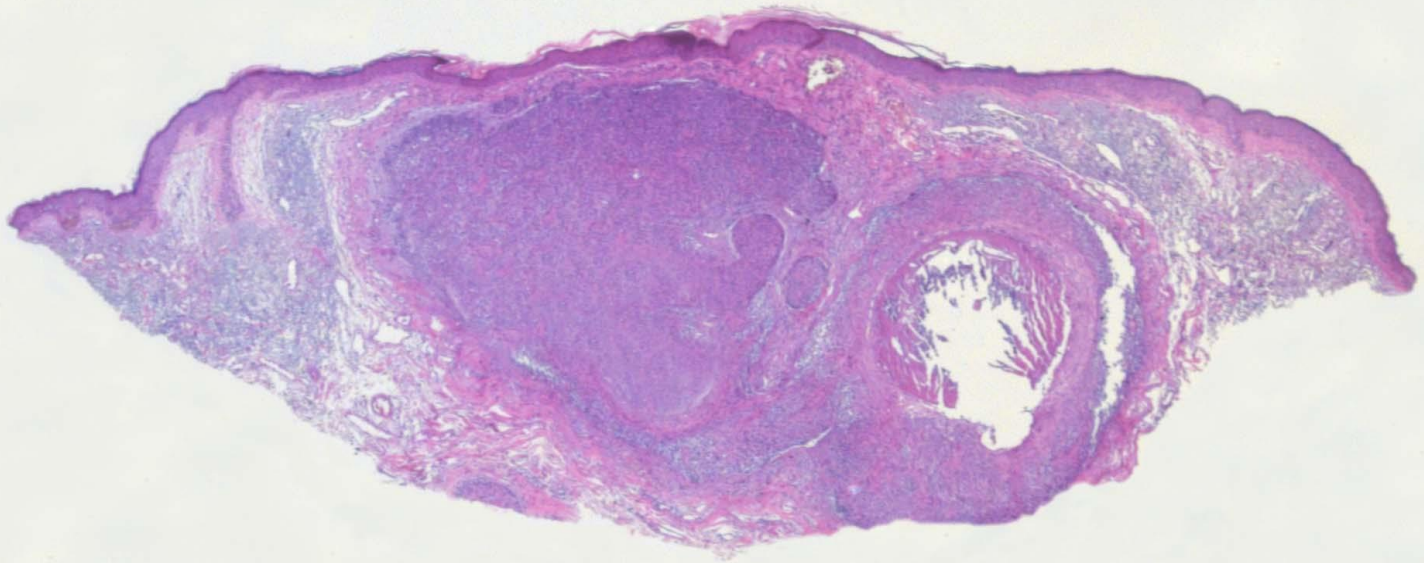




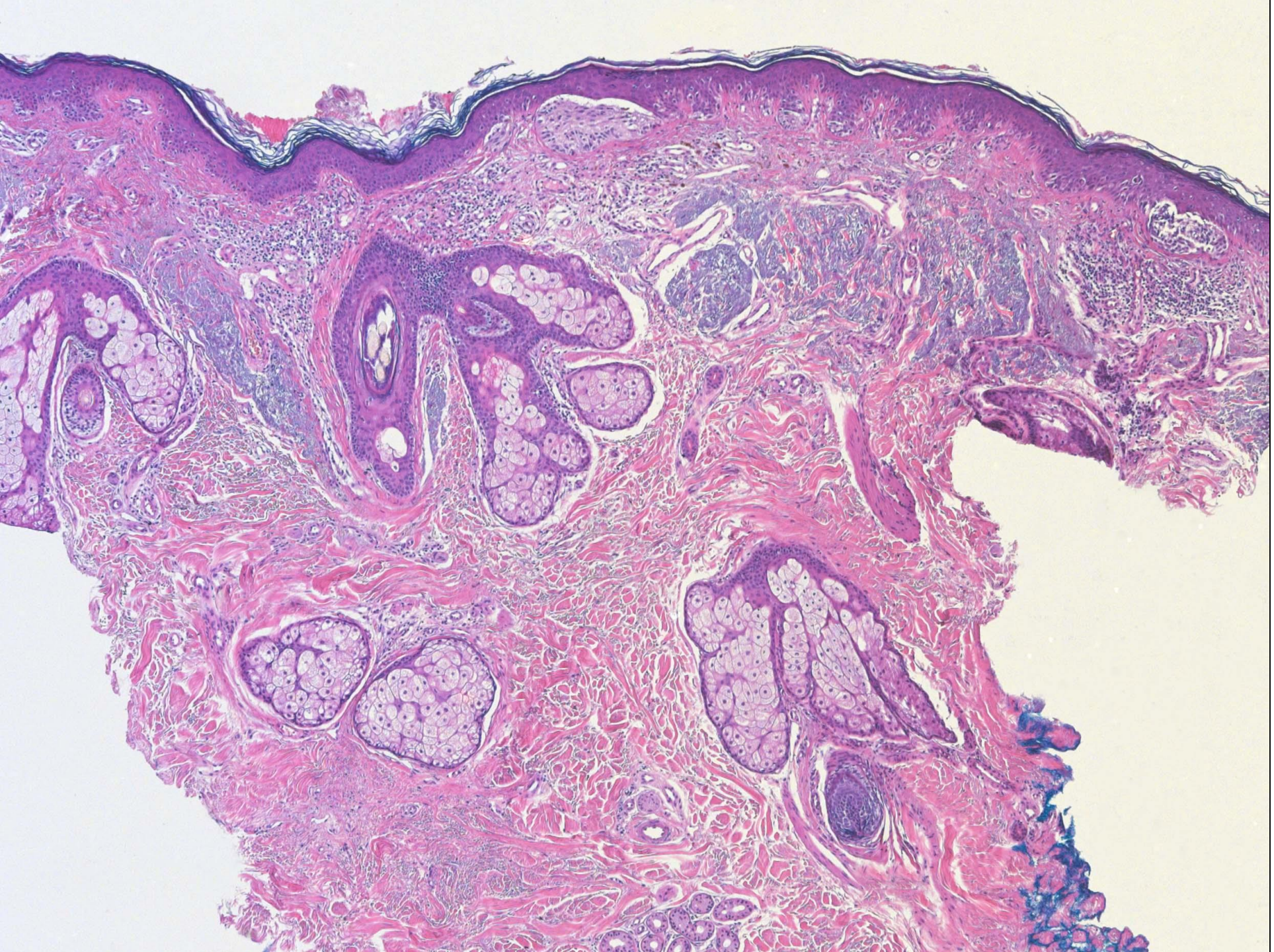




just think of the many faces of psoriasis. The suspicion of a specimen mix-up is aroused chiefly

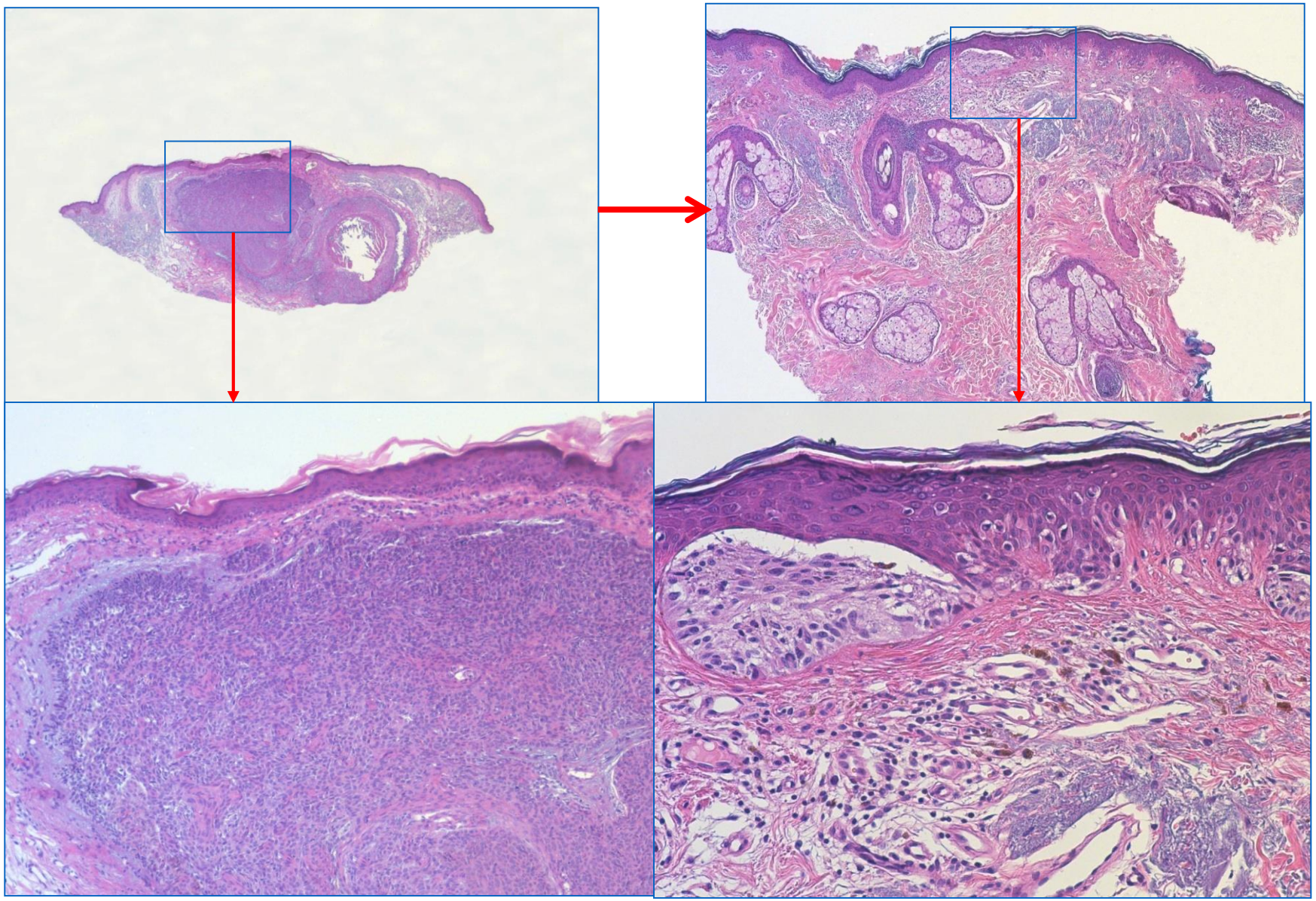


by divergent diagnoses of a neoplasm in an incisional biopsy and the subsequent re-excision specimen. This is an example: a basal-cell carcinoma in the first biopsy,



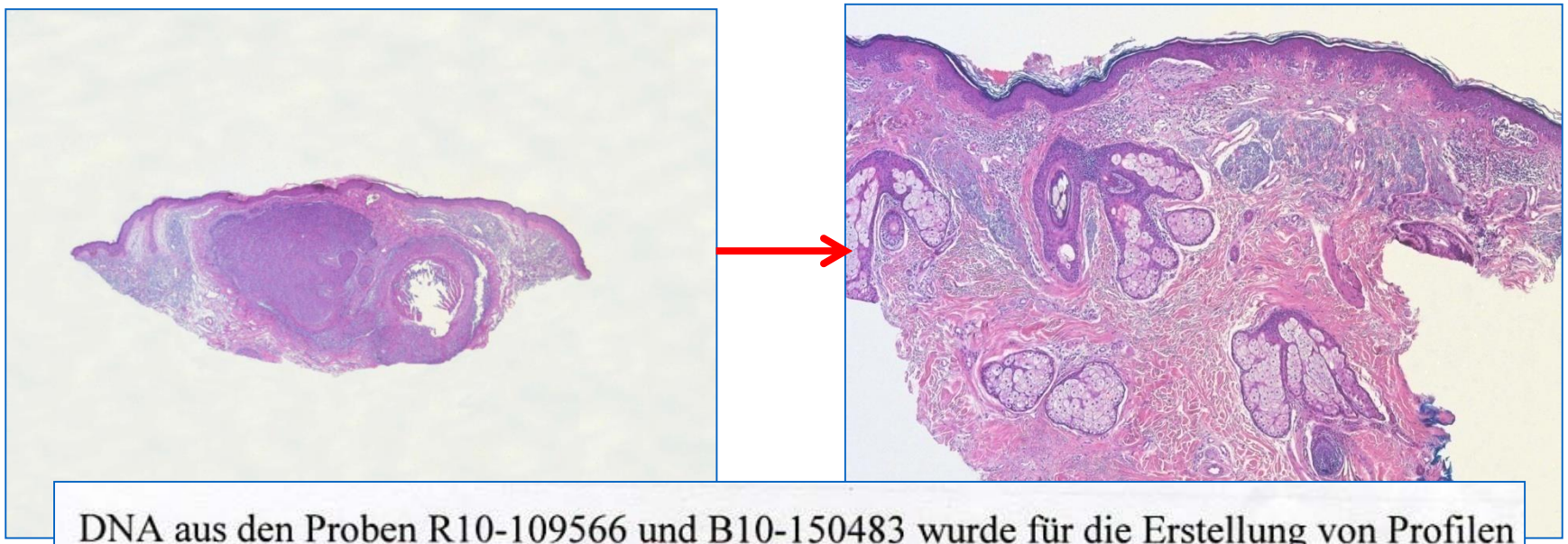
and a melanoma in situ in the absence of remnants of the basal-cell carcinoma in the re-excision.
In such cases that are suggestive of a specimen mix-up with significant consequences, the identity of the patient can be checked by a method also used for genetic fingerprinting in forensic medicine,

Short Tandem Repeat Analysis



namely, “short tandem repeat analysis,” i.e., analysis of repeating sequences of short base pairs of DNA that often show many alleles in one locus.

Short Tandem Repeat Analysis



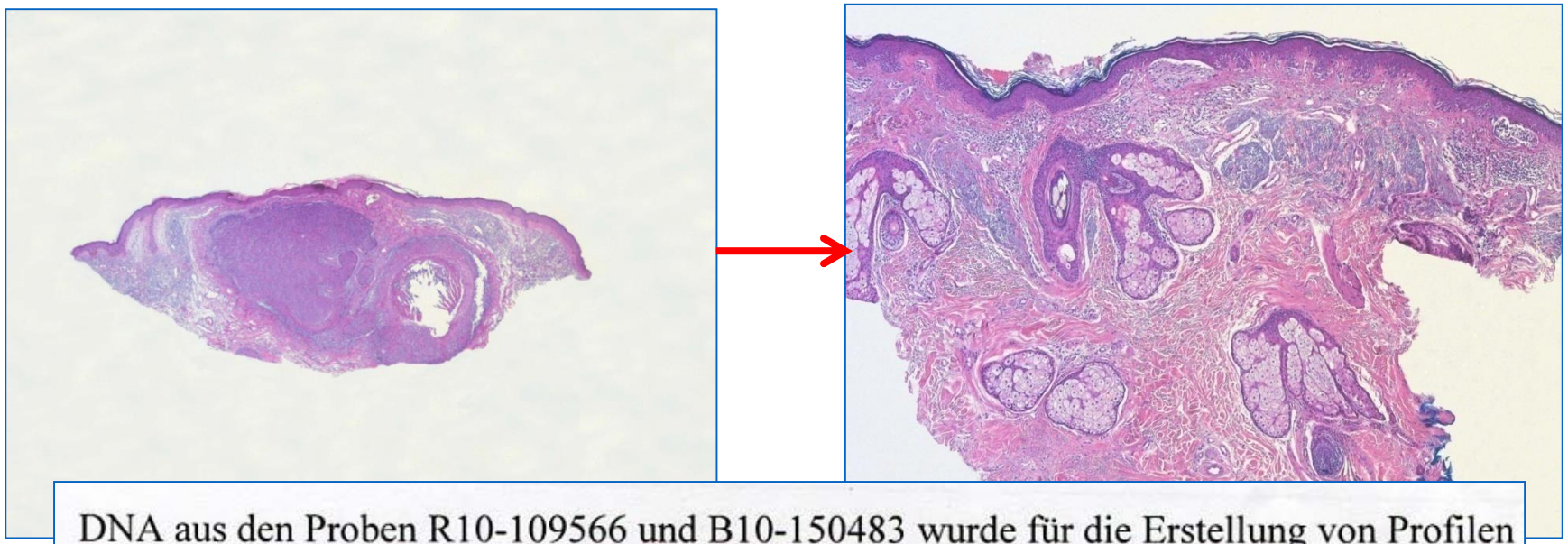
DNA aus den Proben R10-109566 und B10-150483 wurde für die Erstellung von Profilen eingesetzt, mit folgendem Ergebnis:

Locus LPL: beide Proben Allele 11/ 12
Locus F13B: beide Proben Allele 6/ 9
FESFPS beide Proben Allele 10/ 12
F13A01: beide Proben Allele 3.2/ 6
D7S820: beide Proben Allele 10/ 12

Damit ist praktisch erwiesen, daß beide Proben von derselben Person stammen.
Die Wahrscheinlichkeit einer zufälligen Übereinstimmung liegt bei 0.0000017, d.h. bei 1: 588 235.

The frequency of those alleles in the general population is known. For example, in Germany, alleles 11 and 12 in the LPL locus are seen

Short Tandem Repeat Analysis



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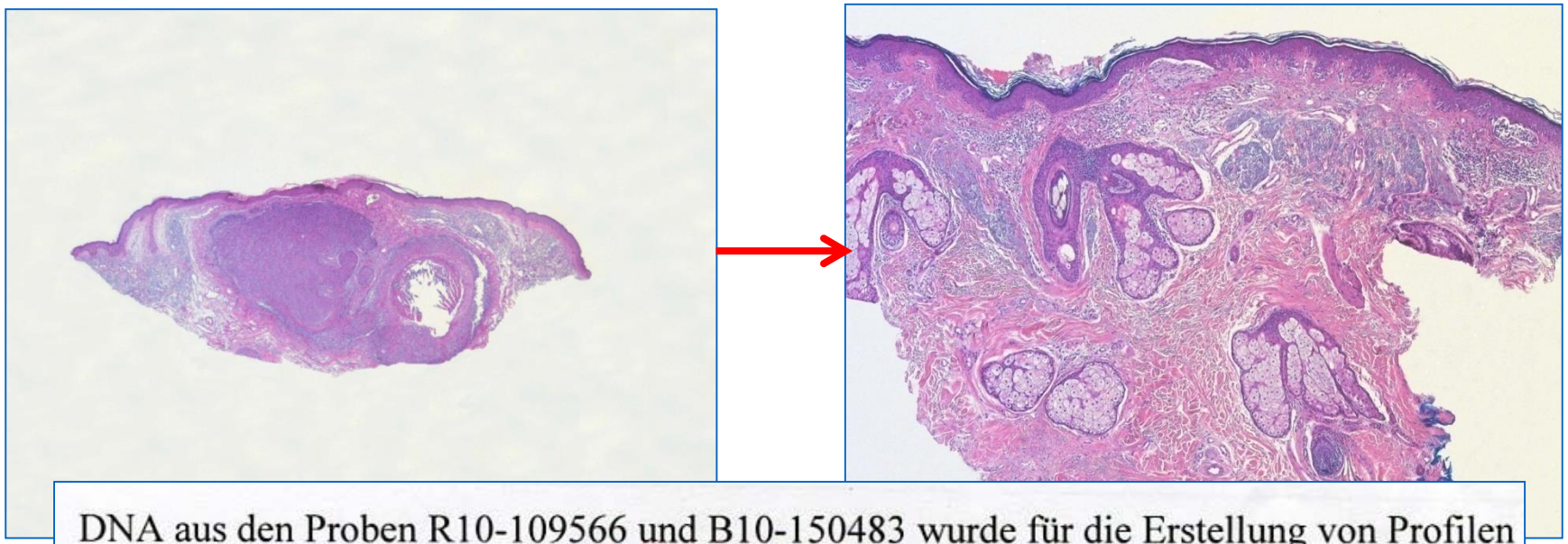
in about 27 and 20 percent of the population, respectively. In order to calculate the frequency of that combination, those numbers must be multiplied with one another.

Short Tandem Repeat Analysis



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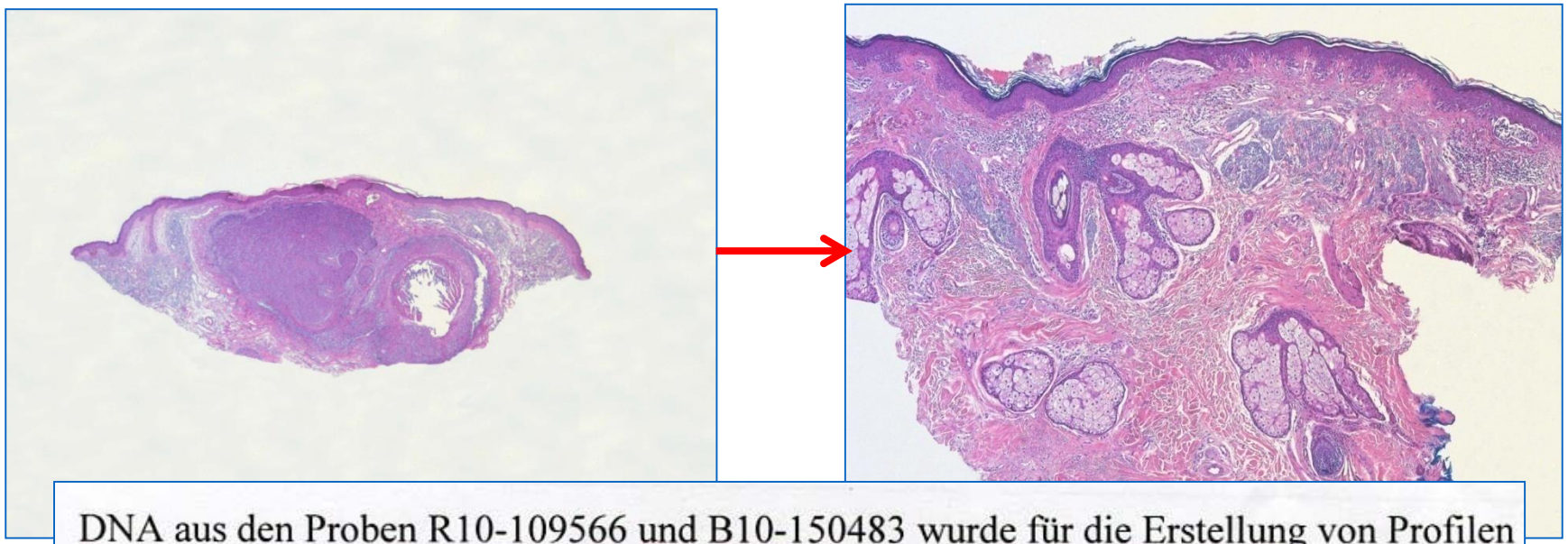
The result is 0.1110, which means that the combination is seen in about 11% of the population.

Short Tandem Repeat Analysis



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Locus F13B: beide Proben Allele 6/ 9		= 0,0838
FESFPS beide Proben Allele 10/ 12		= 0,0449
F13A01: beide Proben Allele 3.2/ 6		= 0,0443
D7S820: beide Proben Allele 10/ 12		= 0,1180

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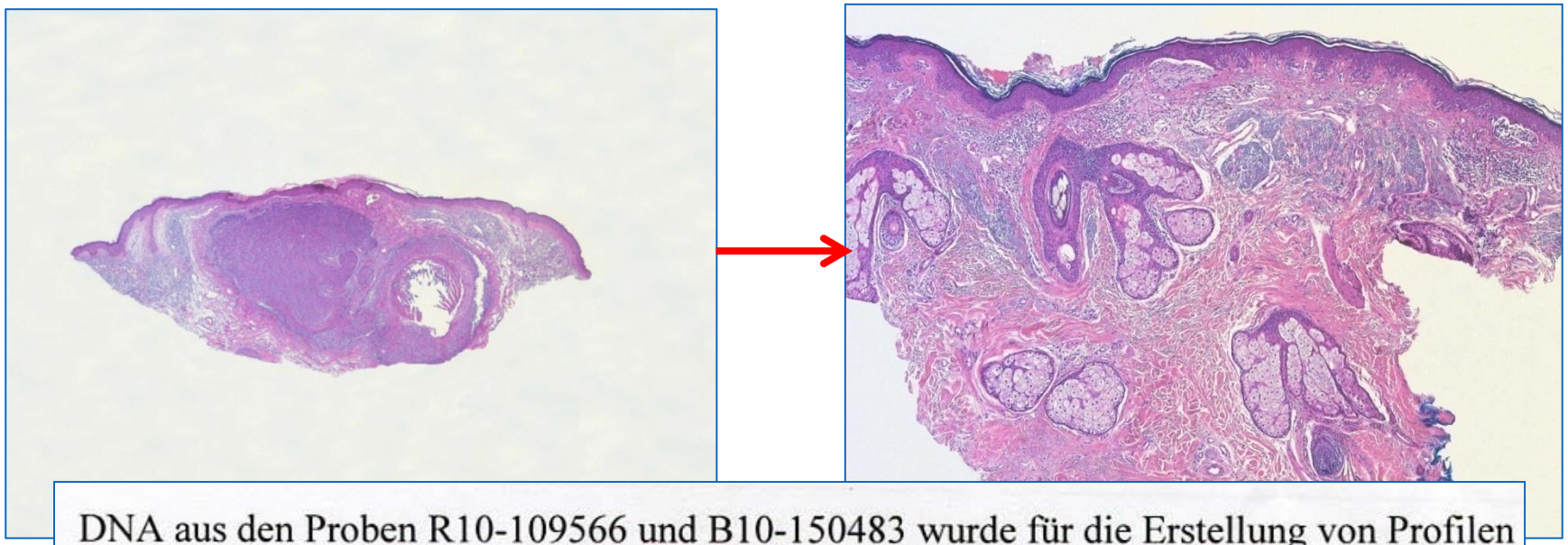
In the same way, other loci can be assessed. In the case under discussion, identical alleles were found in all loci. The probability of that occurrence by chance can be calculated once again by multiplication of all those values,

Short Tandem Repeat Analysis



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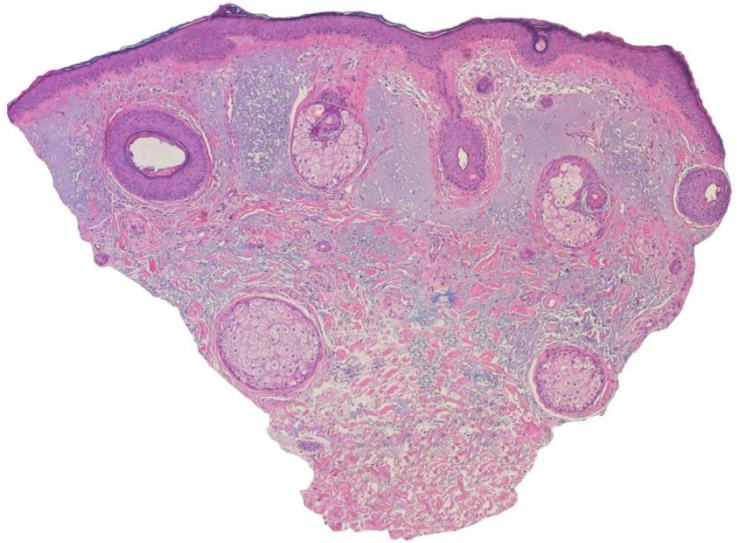
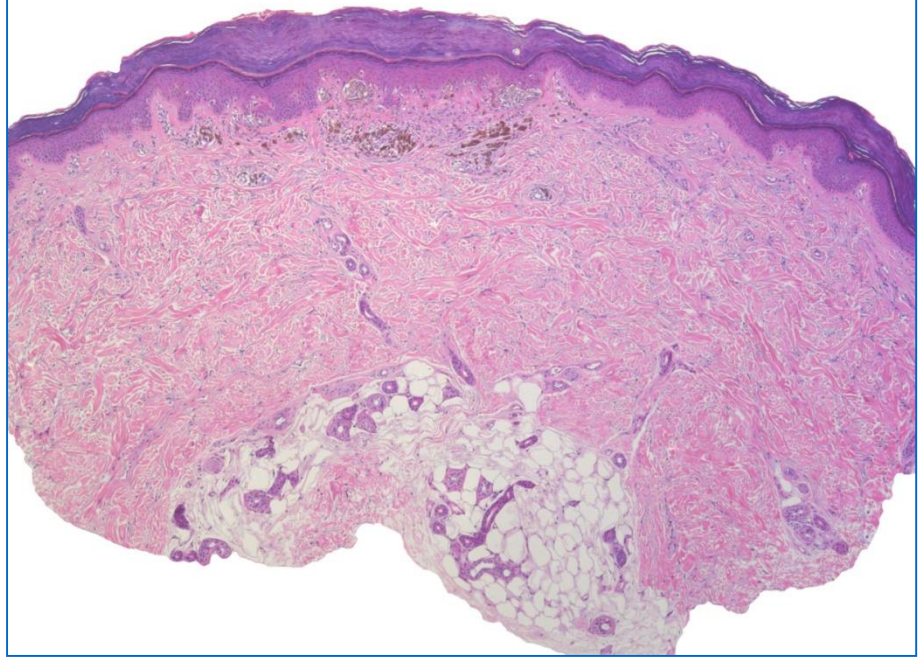
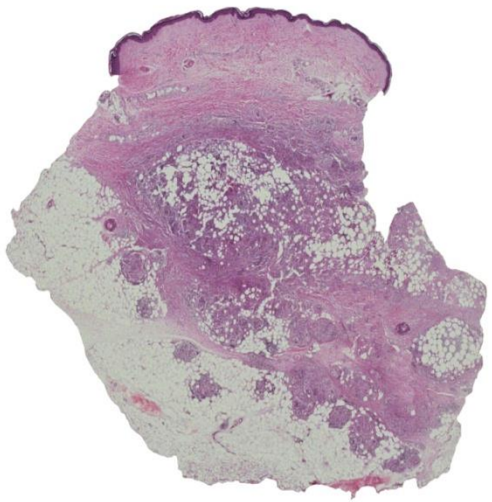
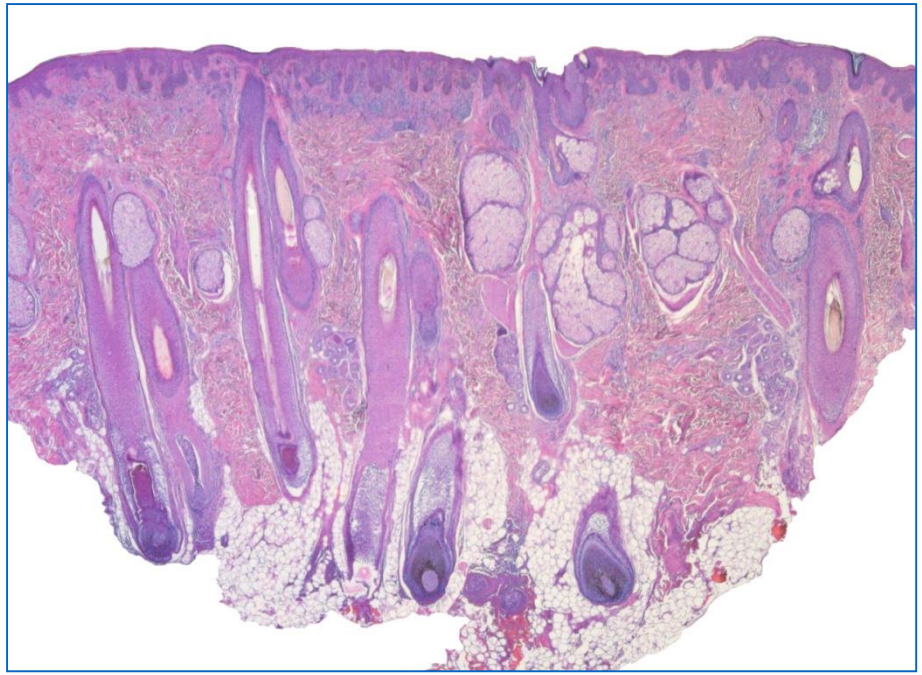
the result being one in 588,000 cases. Hence, the conclusion is justified that, despite discordant histopathologic findings, both specimens came from the same patient. Molecular identity testing is very reliable, but it cannot detect a mix-up of two specimens from the same patient, and, of course, it is too laborious to be used routinely.

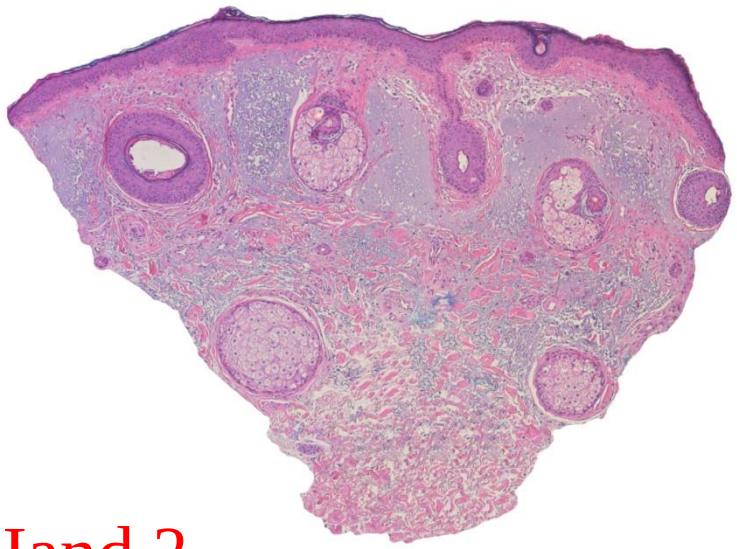




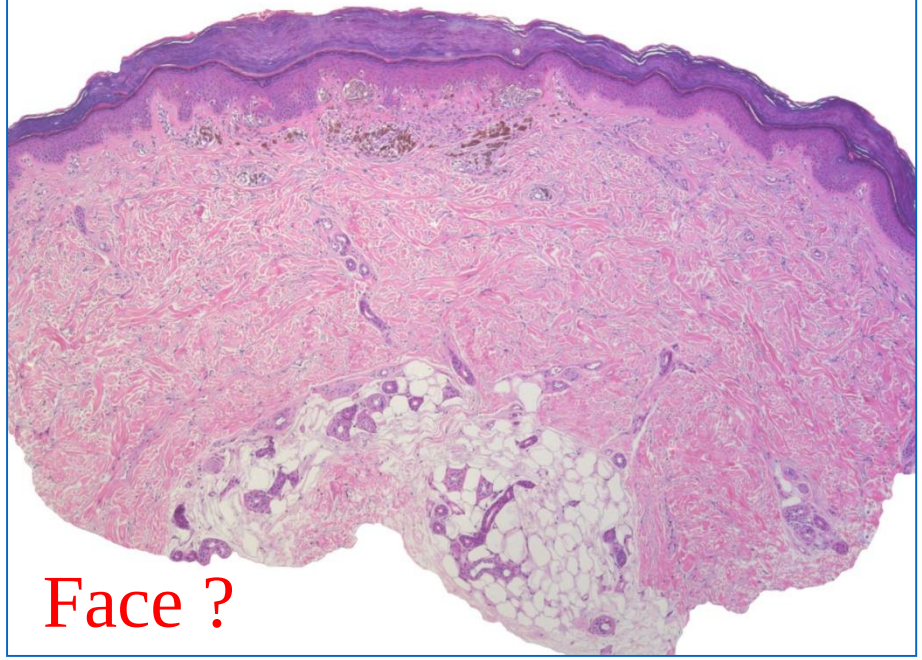




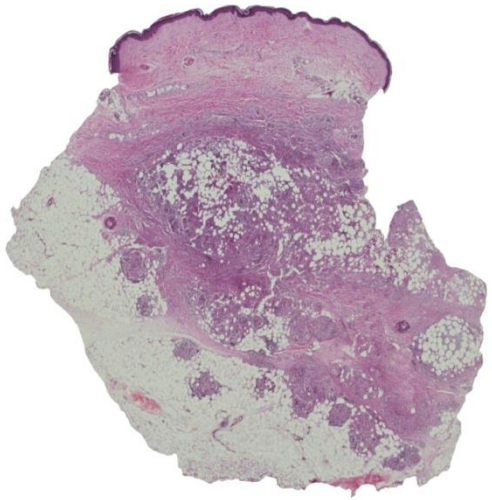
In general, other clues are needed for detection of a specimen mix-up. One of them is the anatomic site. For example, large sebaceous glands in this biopsy specimen indicate the face,



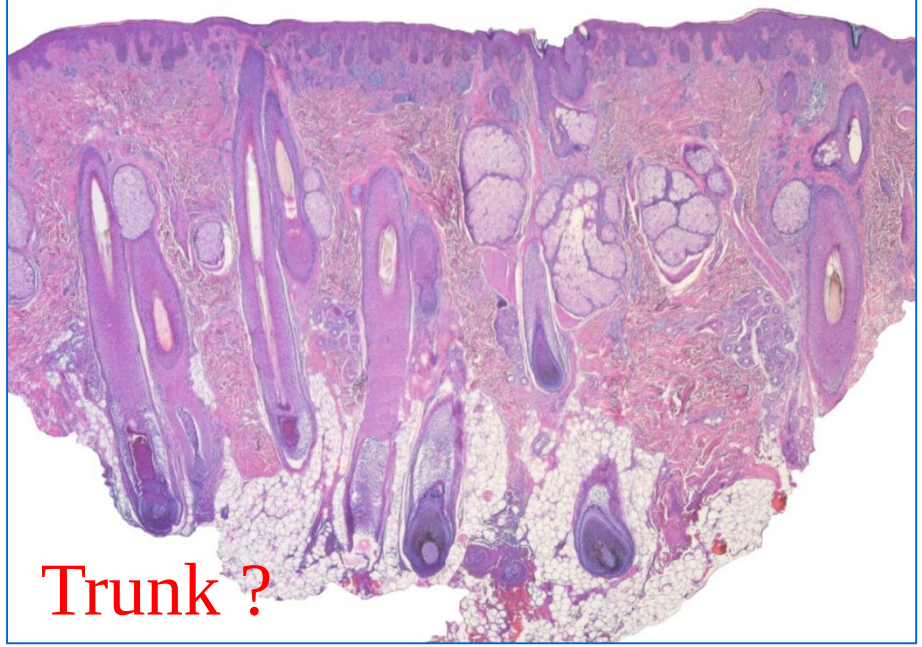
Hand ?



Face ?

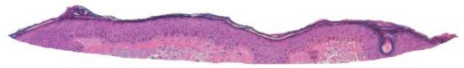


Neck ?

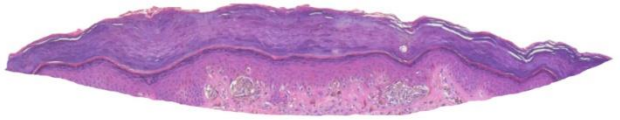


Trunk ?

and if the hand is said to be the site of origin, there must be a mistake. Vice versa, thick compact orthokeratosis indicates hands or feet; this is not specimen from the face. In this specimen, dermis and subcutis are far too thick for the neck, and the terminal hair follicles in this specimen exclude the trunk; this is a biopsy from the scalp. It requires great alertness to detect such incongruities among hundreds of specimens,



Hand ?

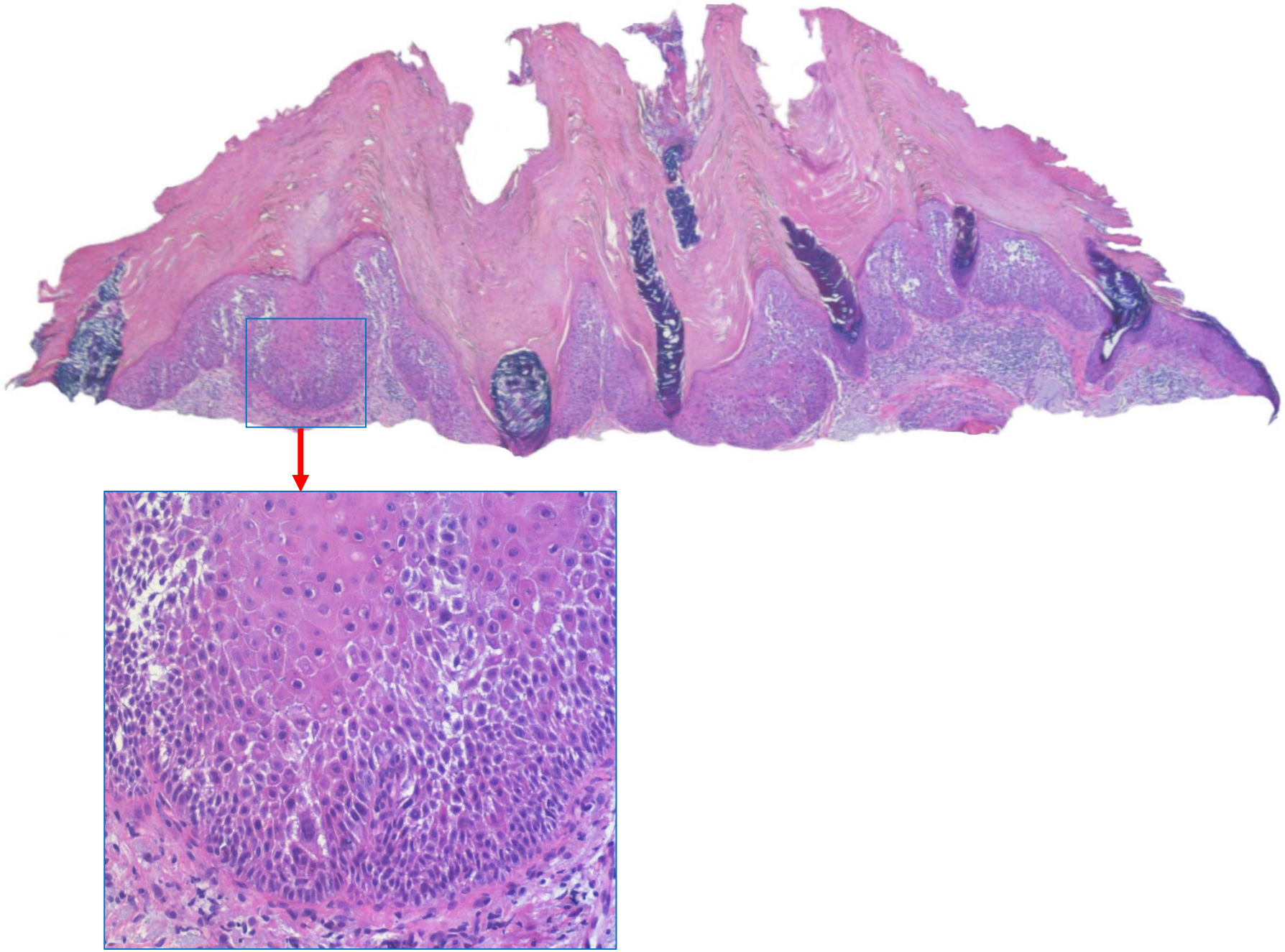


Face ?

Neck ?

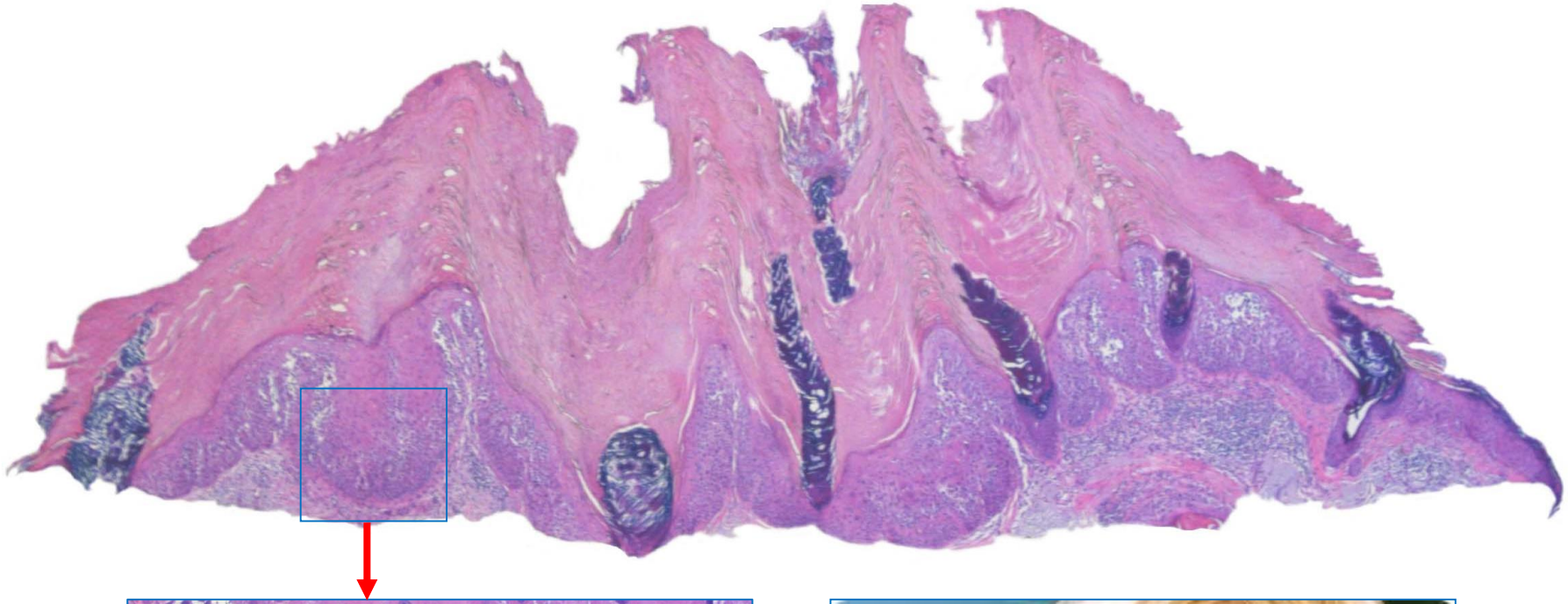
Trunk ?

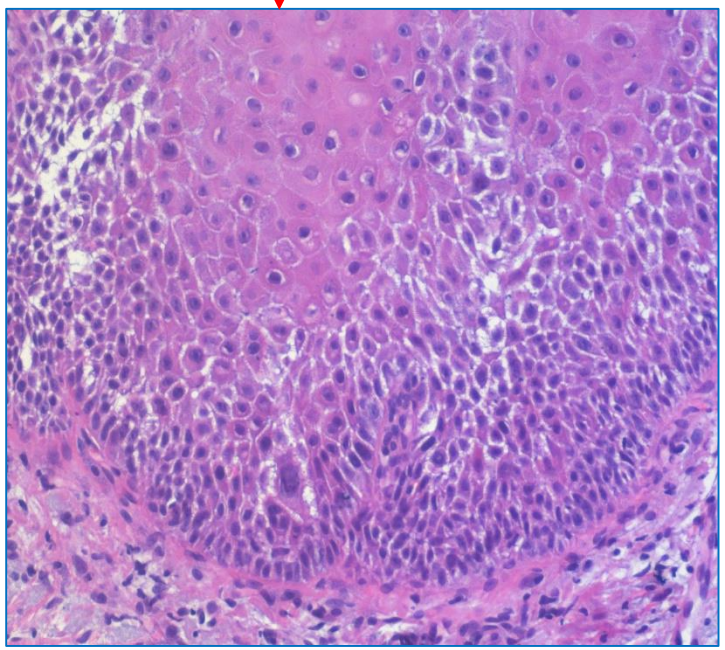
and chances are diminuished if specimens are too small and do not permit the anatomic site to be identified. In superficial shave biopsies, detection of a specimen mix-up on the basis of anatomy is practically impossible.

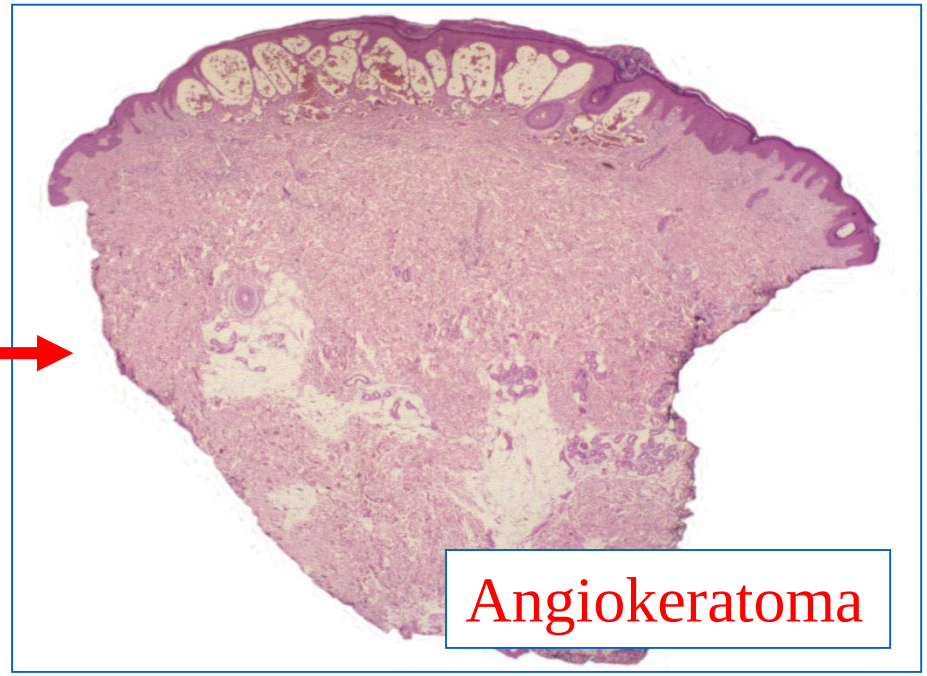


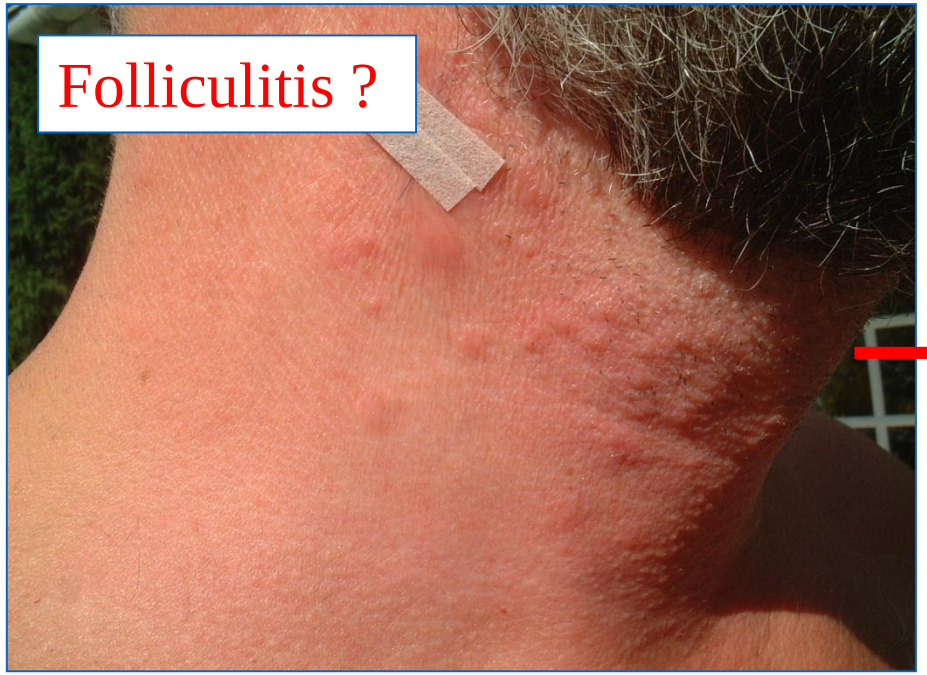
In such instances, the only chance to detect a confusion of specimens is discrepancies between clinical and histopathologic findings. Some constellations are incompatible with one another and proof of a mix-up. For example, if a solar keratosis such as this one

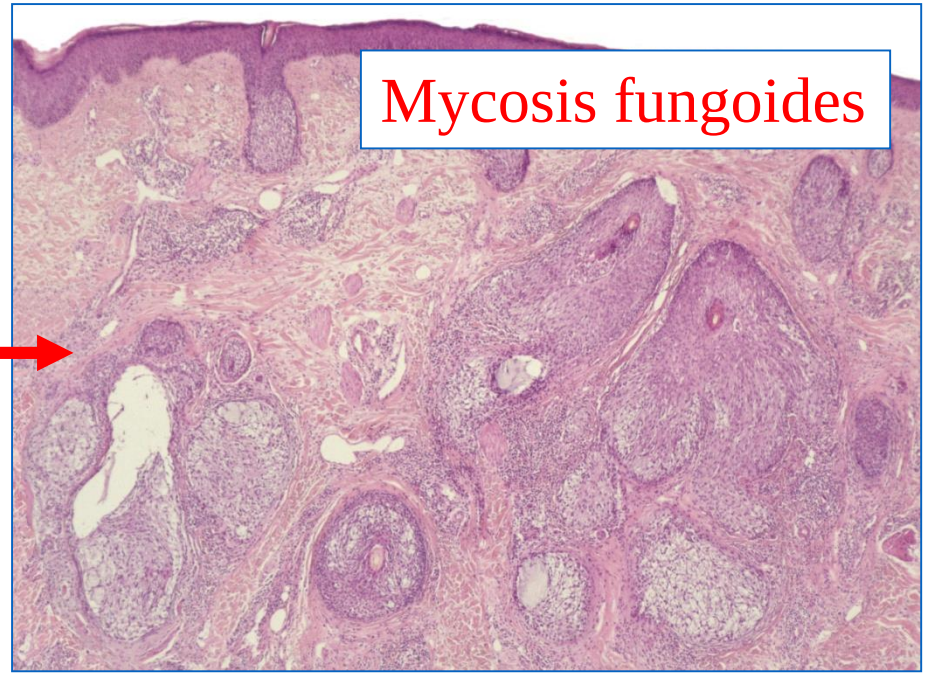
comes from an infant, a mix-up must have happened.



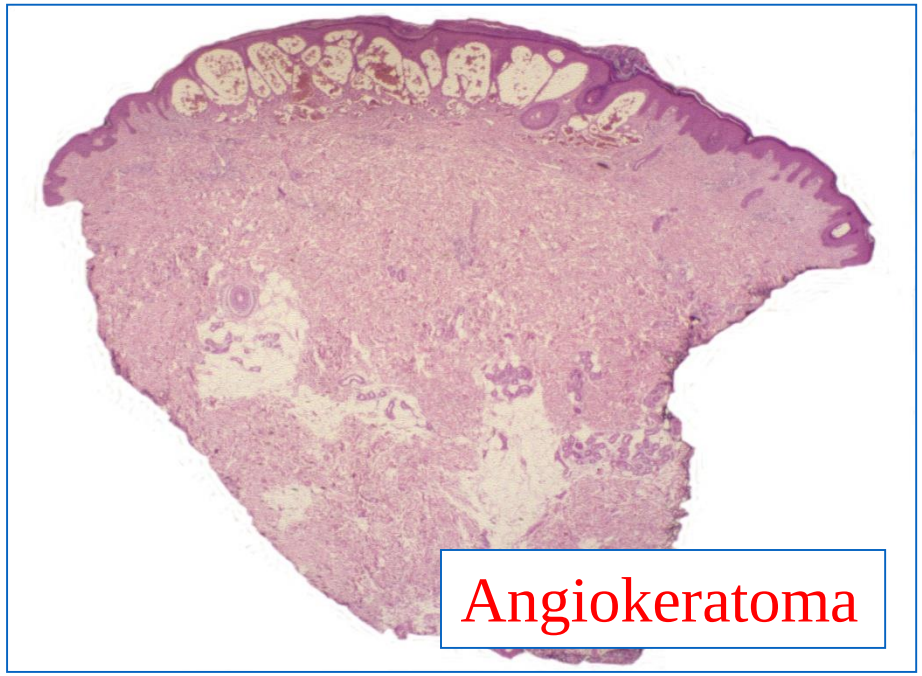


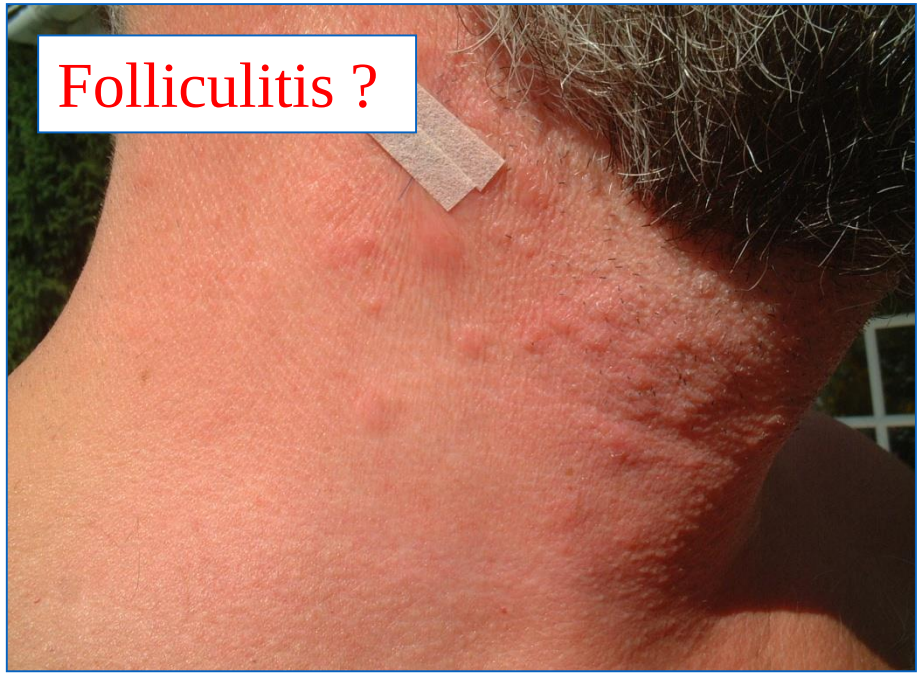


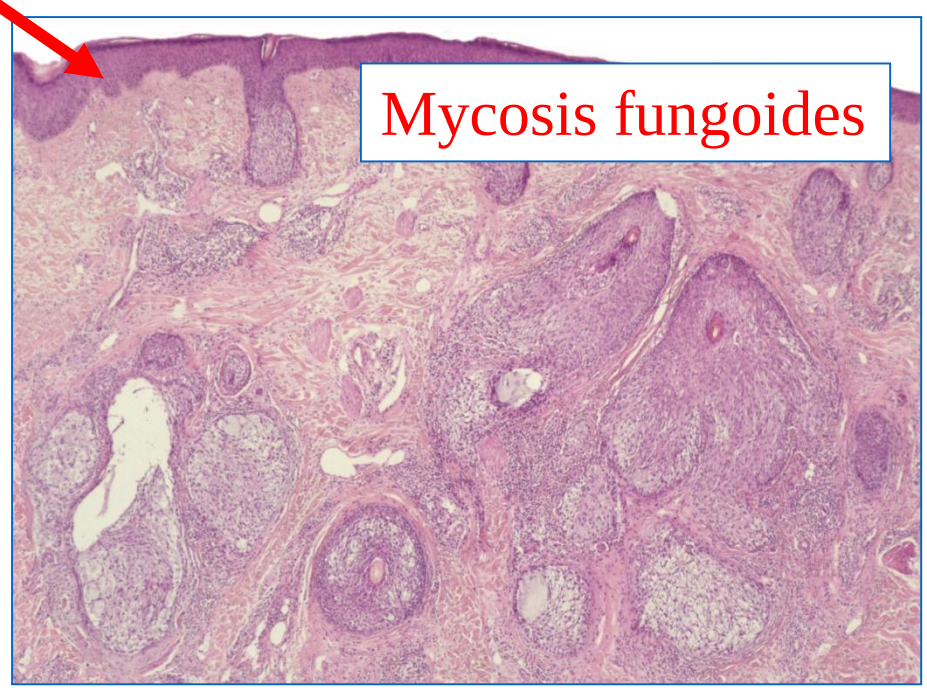




Some discrepancies between clinical and histopathologic diagnoses are easy to explain, e.g., clinical suggestion of melanoma in a case of angiokeratoma or clinical suggestion of follicultis in a case of folliculotropic mycosis fungoides.



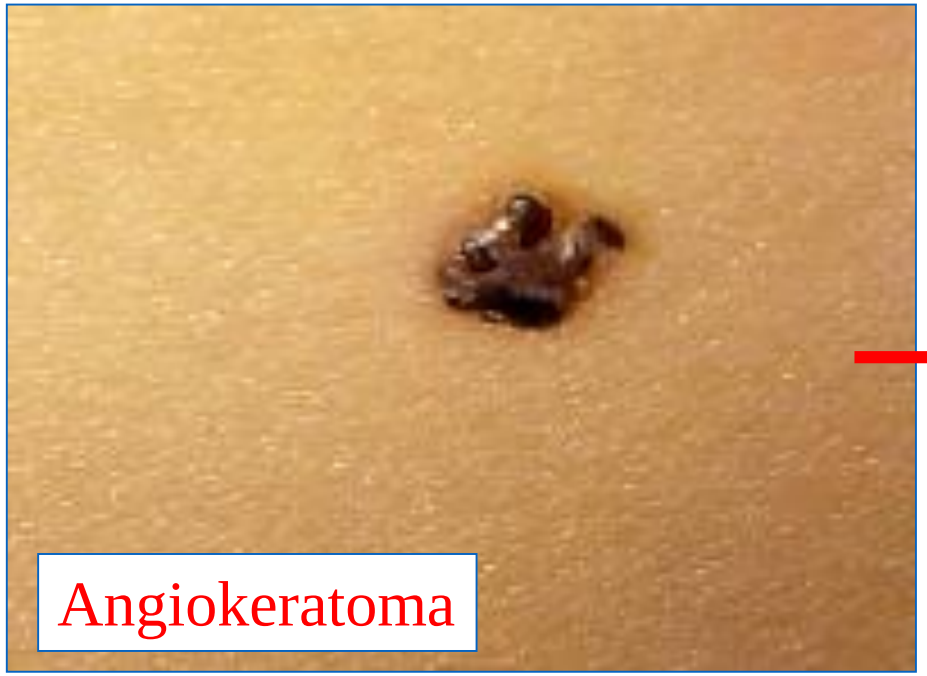


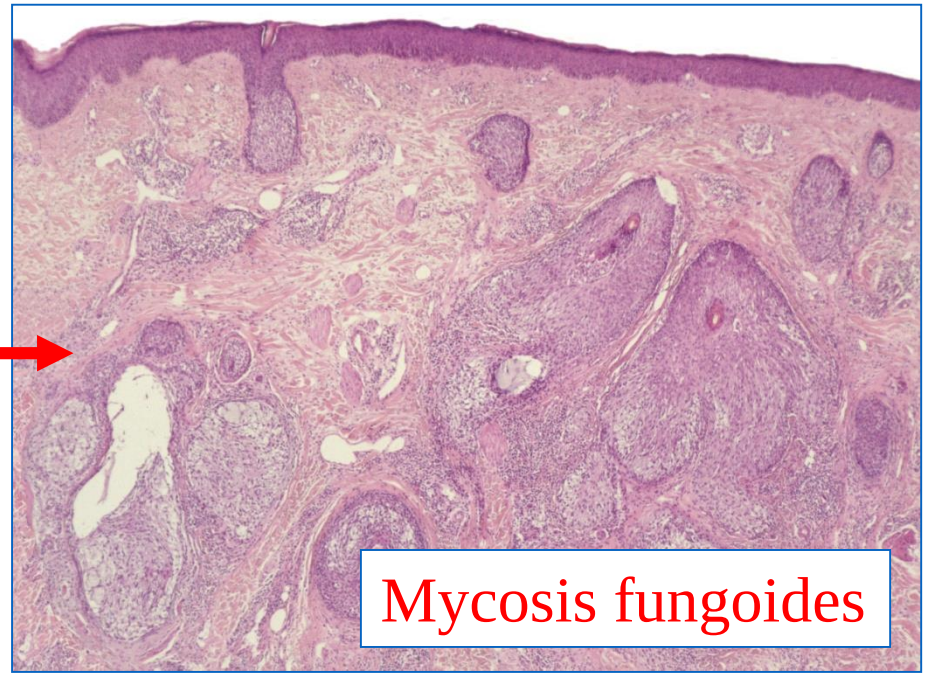


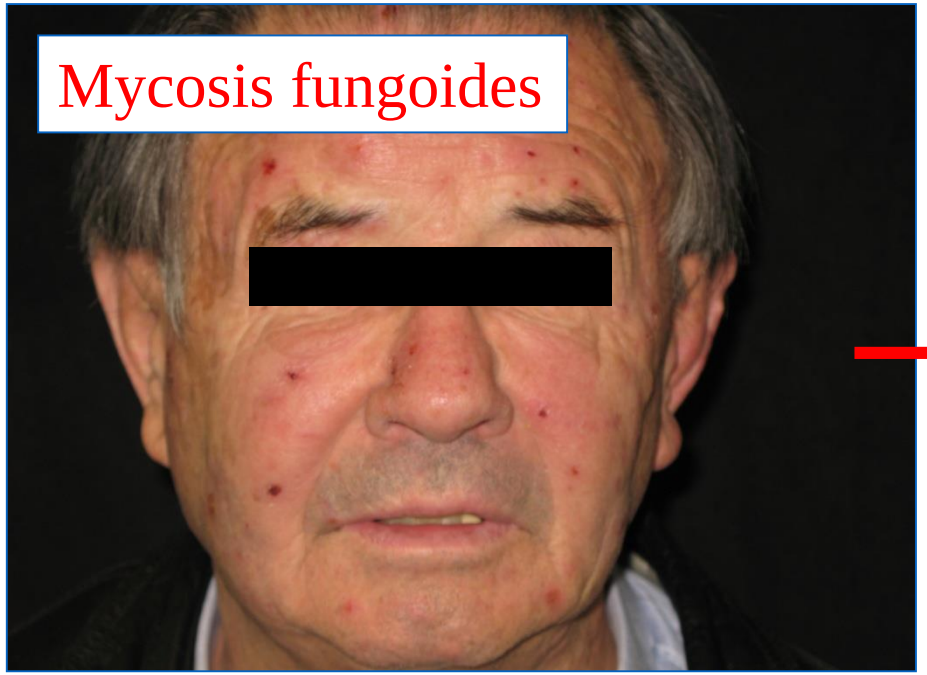
However, if a specimen comes under the clinical diagnosis of melanoma and shows signs of mycosis fungoides, a specimen mix-up must be invoked.

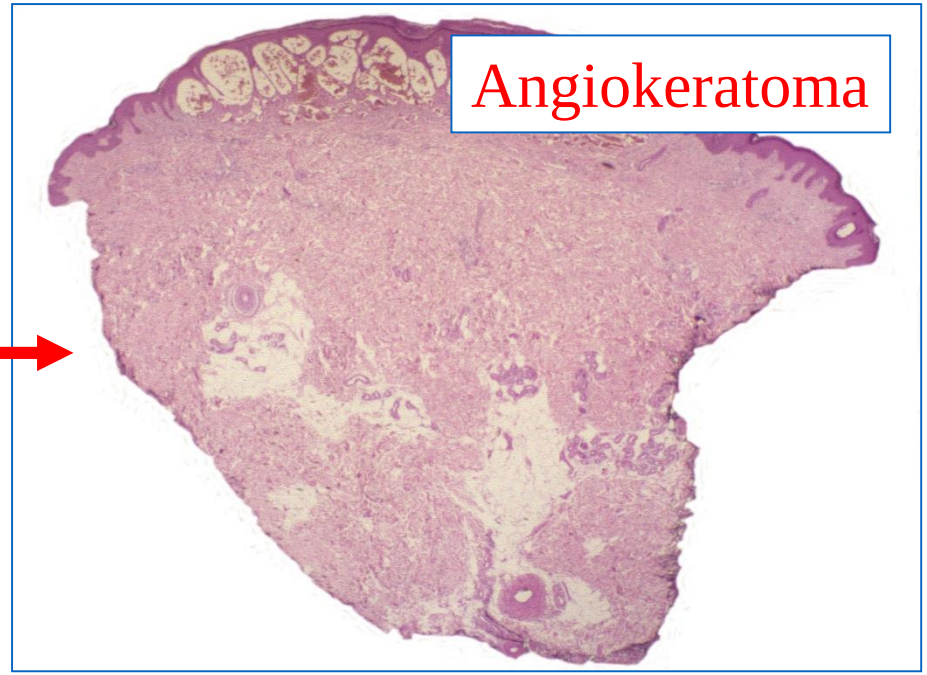
How to proceed in such a case?

First, the preceding and subsequent slides should be checked for a corresponding inconsistency.

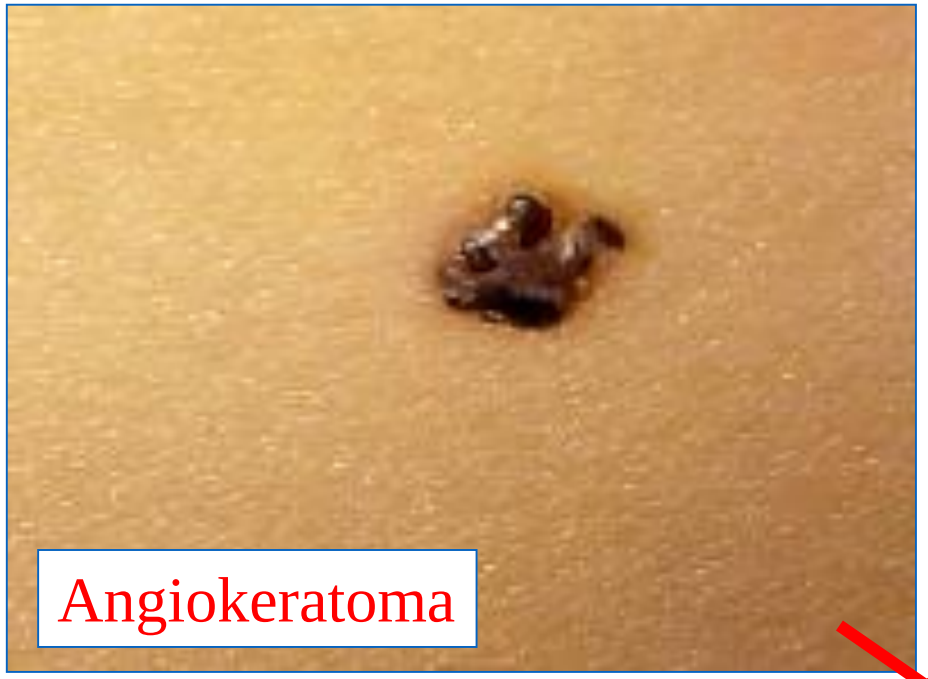


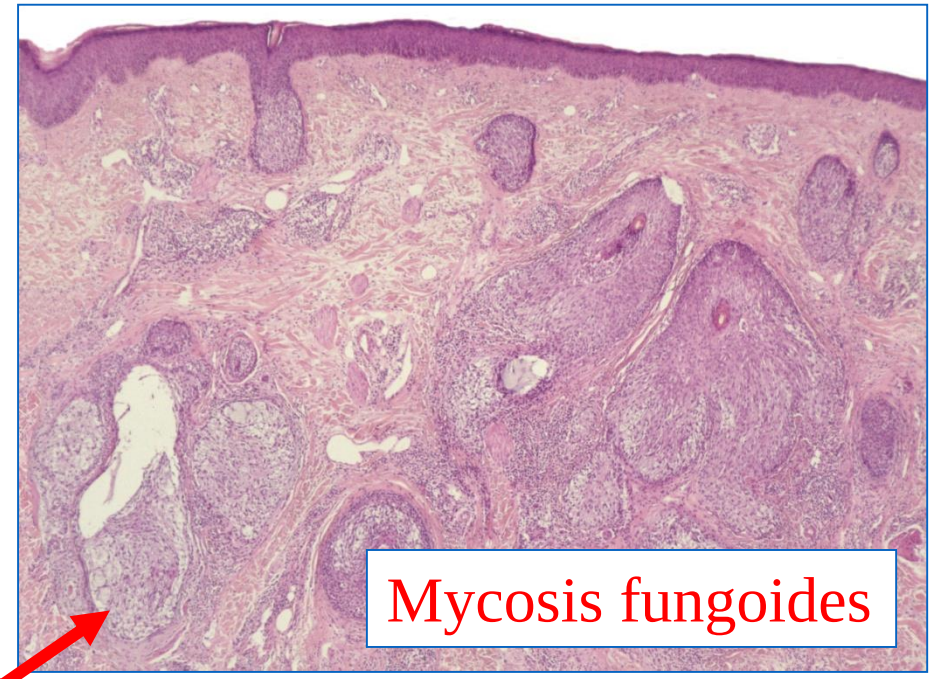


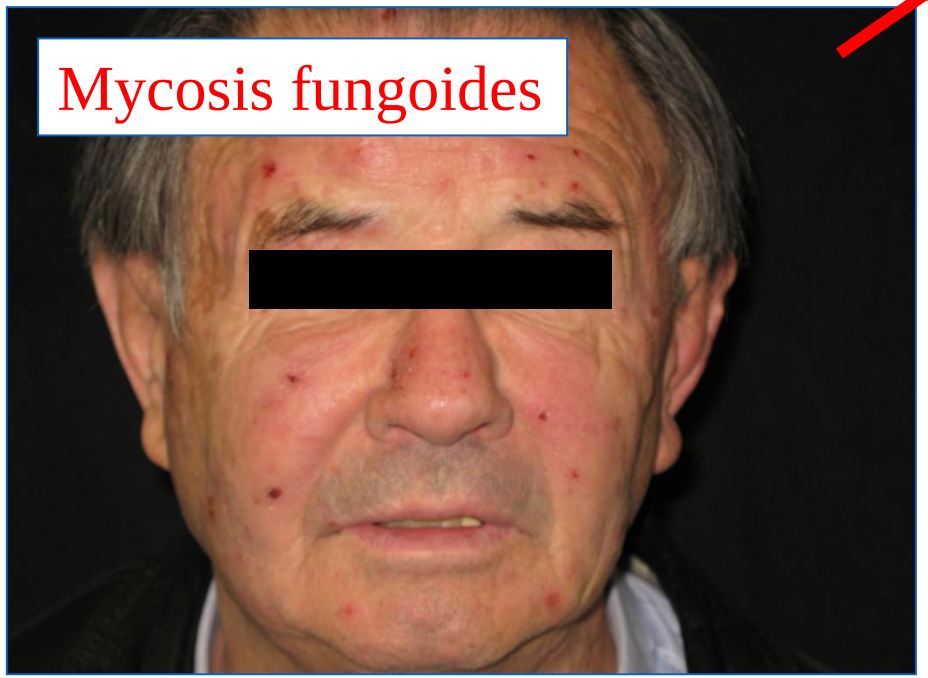


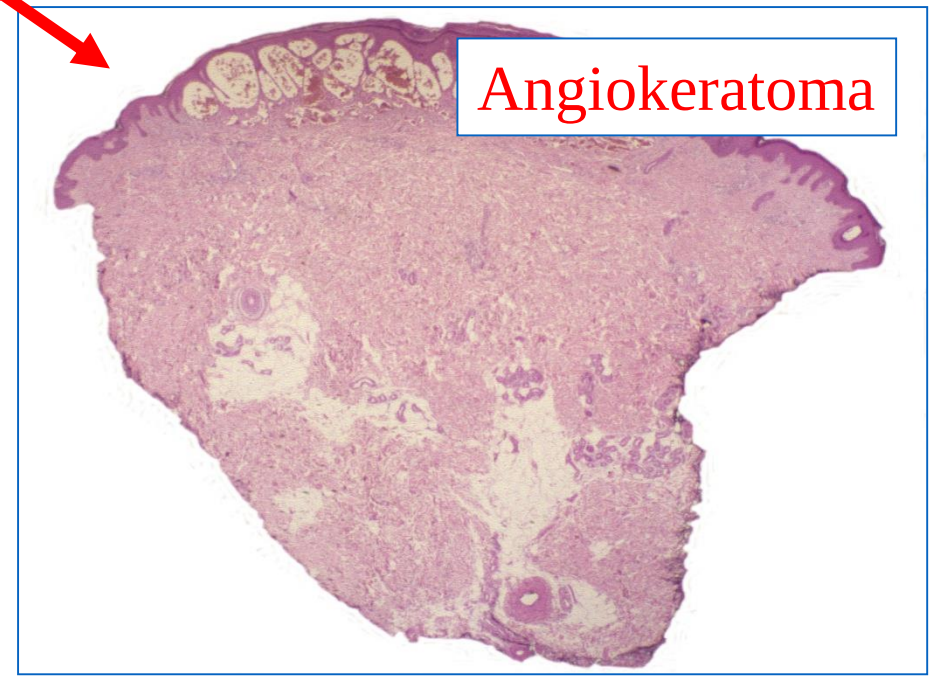


For example, if one specimen comes in as angiokeratoma and shows findings of mycosis fungoides, whereas the next one comes in as mycosis fungoides and shows angiokeratoma, it is clear that those two specimens were confused with one another. Usually the question, whether the mix-up occurred in the operating room or the laboratory cannot be decided,



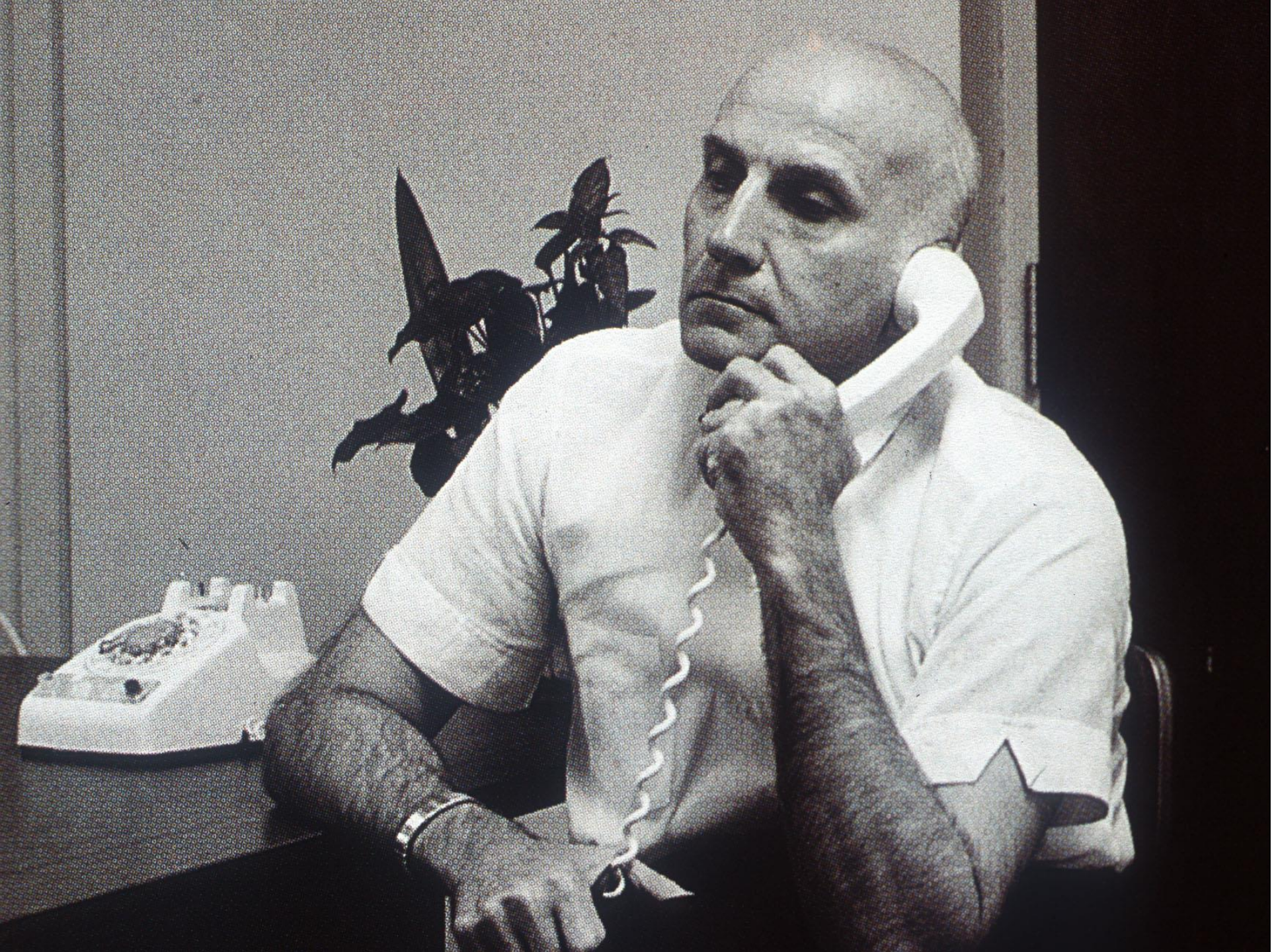




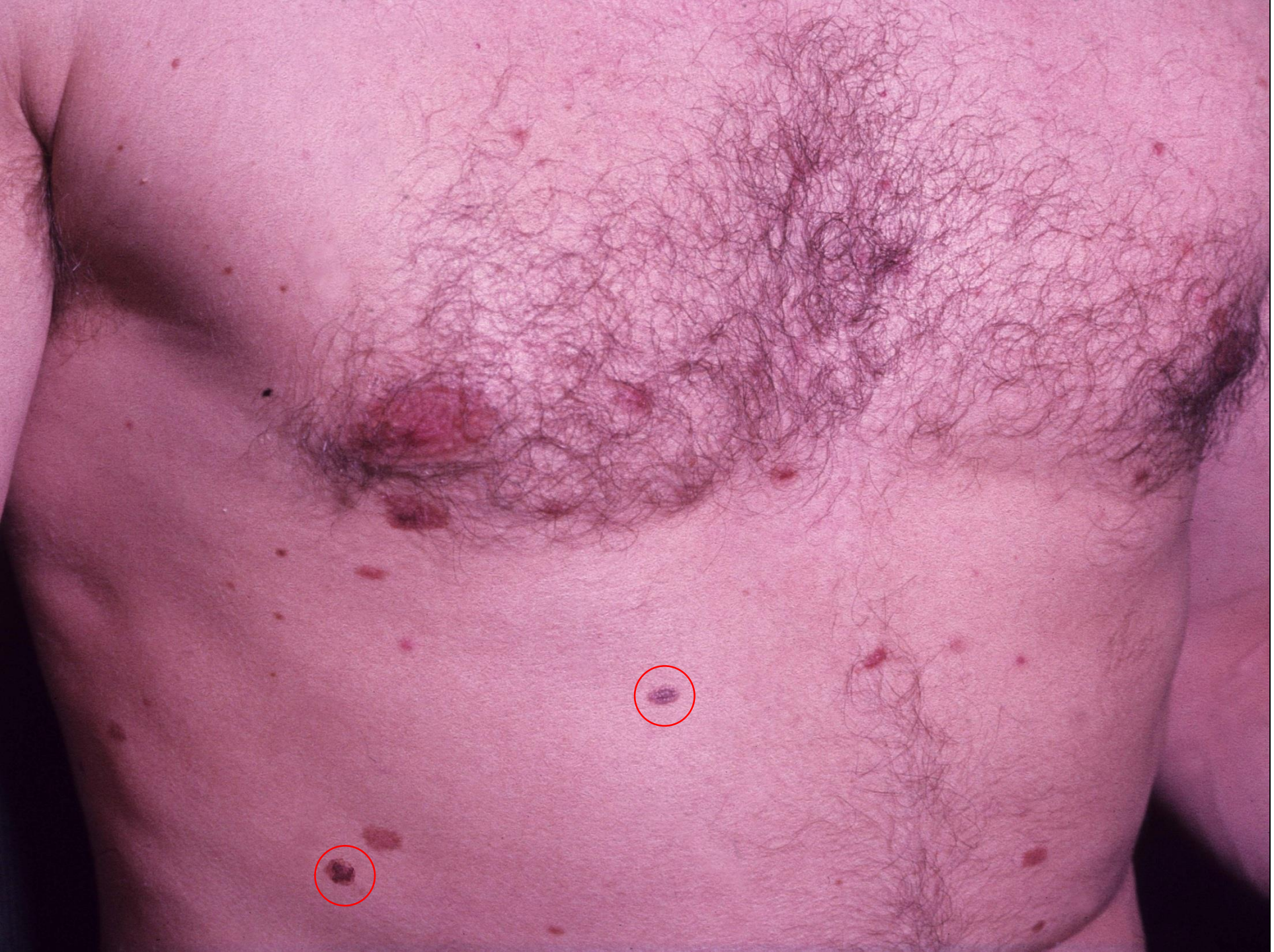


but all one needs to do for restoring order is to switch the numbers of both specimens.

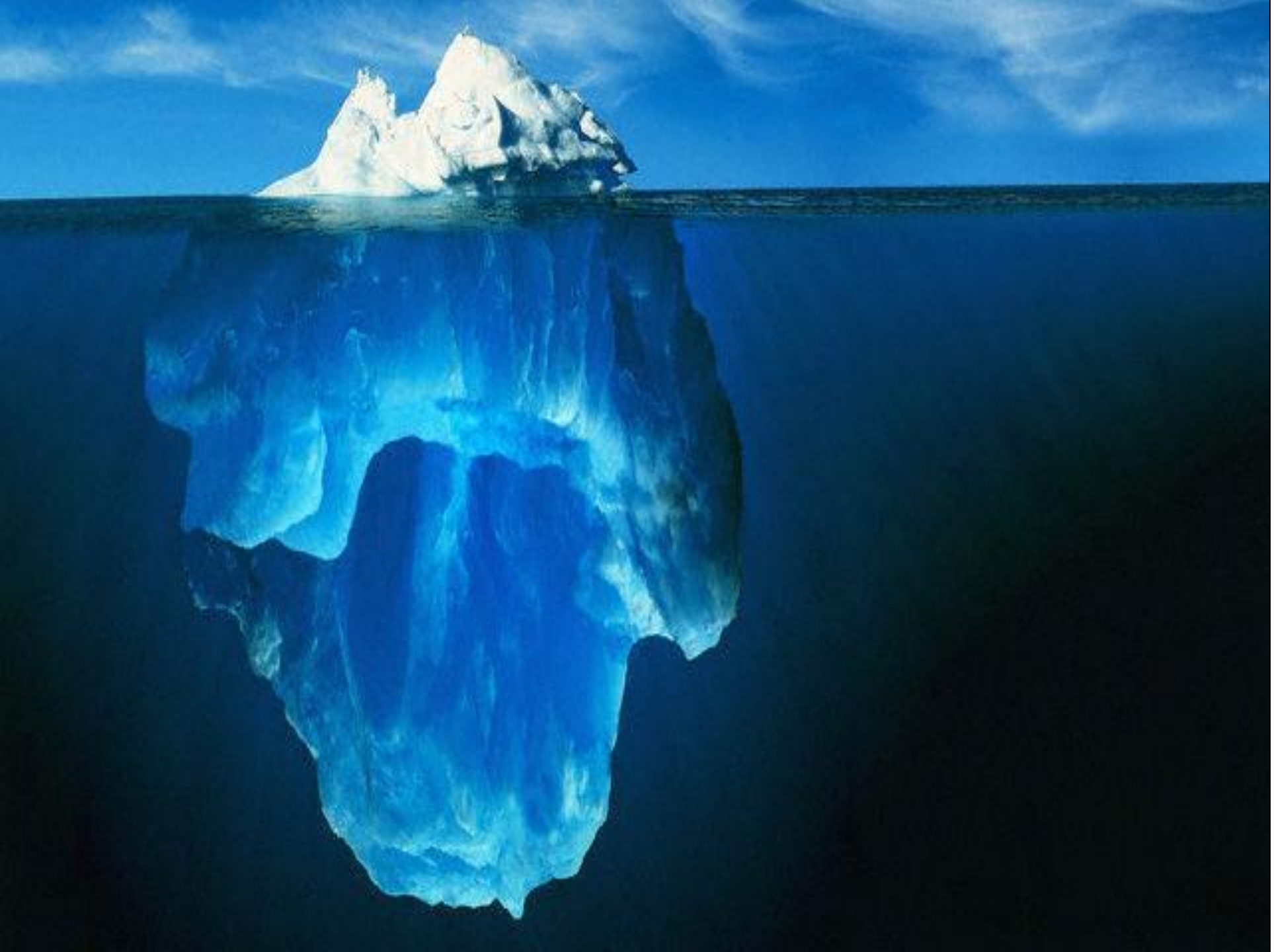
If no corresponding inconsistency is found, slides and paraffin blocks should be compared in order to exclude the error most easy to detect, namely, use of a wrongly labelled slide. Once the identity of the specimen on the slide and in the paraffin block has been confirmed, all specimens of the same submitting clinician of the same day should be checked for inconsistencies. If no other inconsistency is found, the reasons for the incongruity between clinical data and histopathologic findings can sometimes be clarified



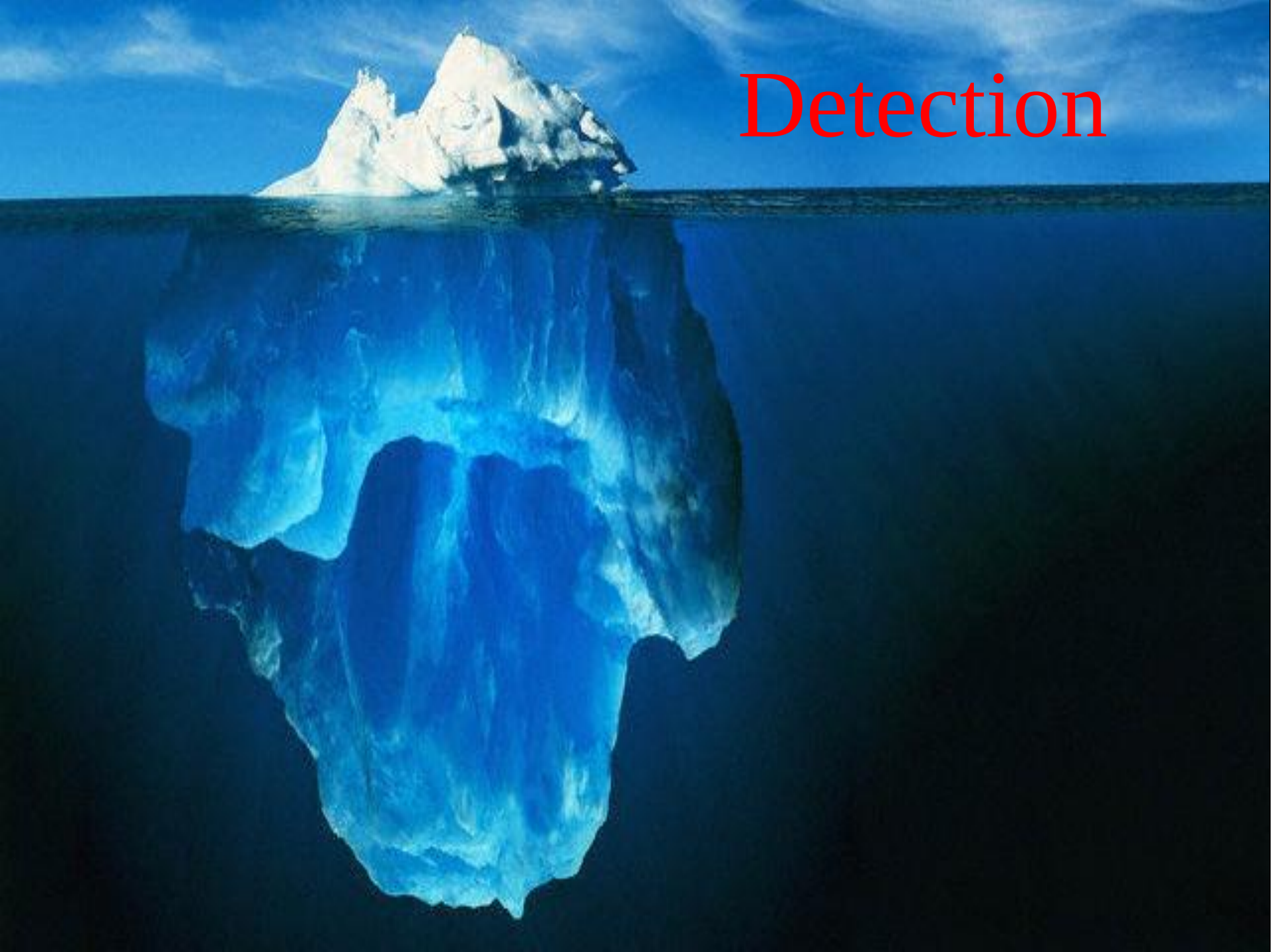
by consultation of the submitting clinician. However, often such problems cannot be resolved, and recognition of a specimen mix-up



is virtually impossible in the case of two similar lesions, such as a melanocytic nevus and a melanoma from the trunk of the same patient. The dark figure of mix-ups of histopathologic specimens is probably substantial, and the cases noted – a few per week in a big laboratory of pathology or dermatopathology –



are nothing but the tip of the iceberg.



Because detection is so difficult,

prevention of specimen mix-ups is of upmost importance. In order to melt the iceberg down from the bottom, a clearly structured workflow is essential,

from labelling and dispatch of specimens in the operating room

to correlation of specimens with request slips and later blocks and slides in the laboratory,

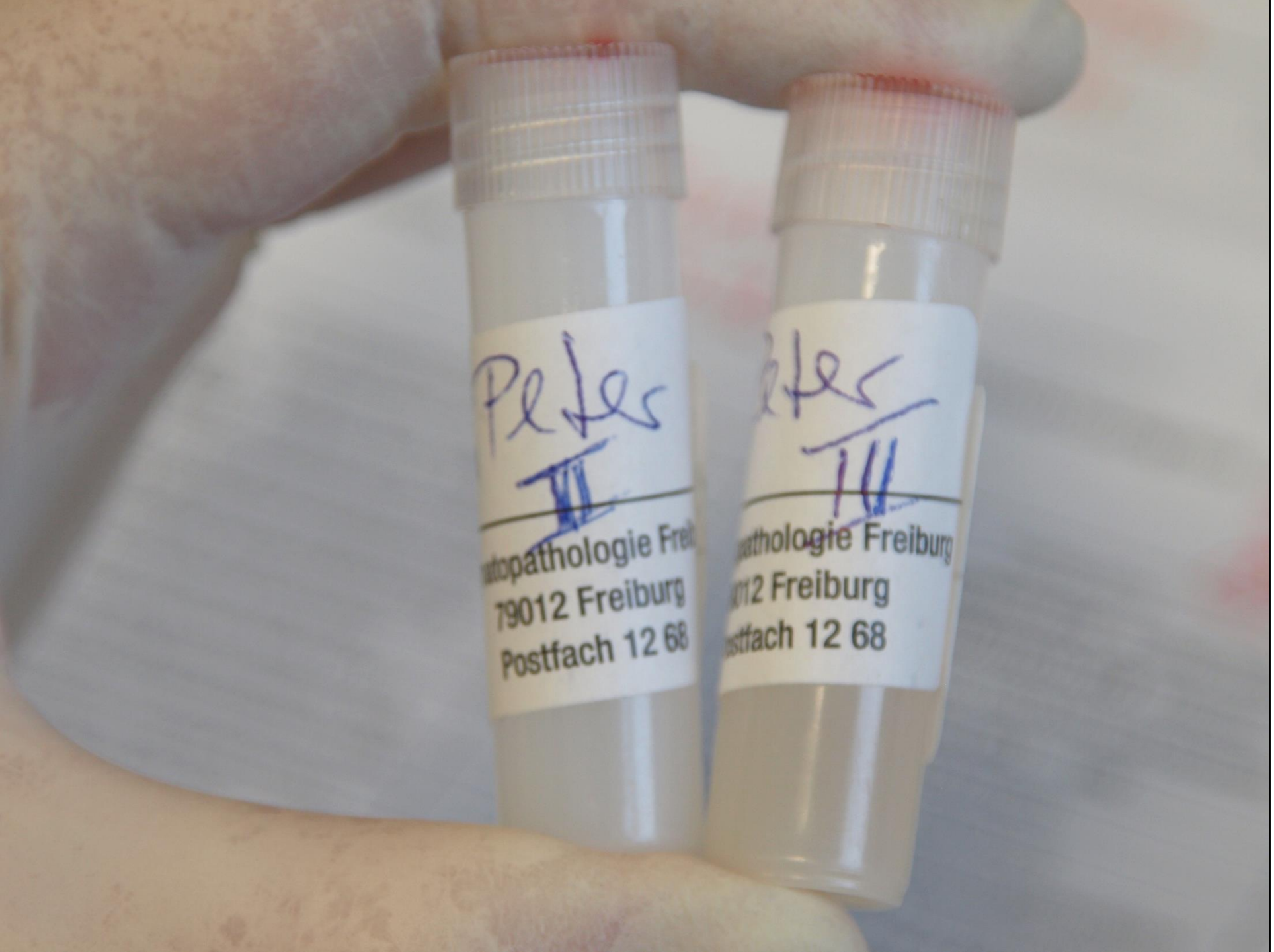
assessment of slides at the microscope,

and computer entries by secretaries. The most critical steps are the first ones. There is unanimity in the literature that most mistakes occur in the preanalytic phase.

In the operating room, the likelihood of confusion of specimens is greatest in the case of many small procedures, rather than a few larger ones. This puts dermatologists at special risk. To avoid mistakes, the file of the current patient should be kept separate from all other files. If several biopsies are taken from the same patient,

they should be deposited in a fixed, unchangeable sequence – at best in small, numbered shelves.

Sample bottles should be labelled and request forms completed immediately after the procedure, and before the next patient is called in.



When numbering consecutive bottles, Arabic numerals are preferable to Roman ones because the latter are prone to confusion. For example, the Roman numeral “III” may be read as “II” if two bars are placed too close to one another, or as “IV” if one of them is written slightly obliquely.

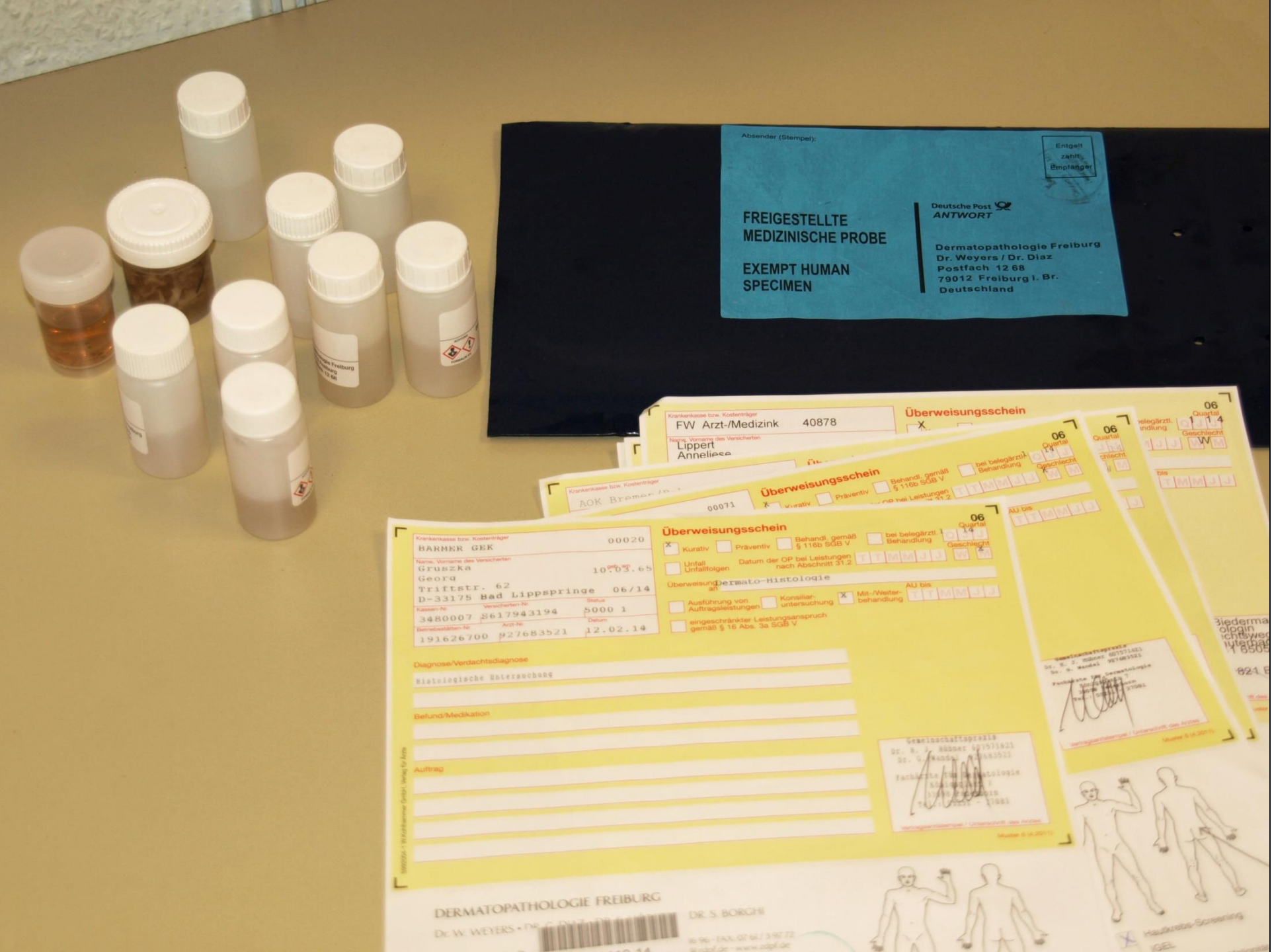
Before dispatching bottles, they should be checked for presence of a specimen.

Covers should then be screwed down tightly. If covers are loose, and formalin leaks out,

it may render labels illegible, especially if a permanent marker pen is used

whose ink is dissolved by formalin.

Use of adhesive labels with written or printed data is preferable. Depending on the batch, however, not all labels adhere firmly; therefore, firm adherence should checked.



Last, sample bottles and request slips should be checked for completeness and concordance in regard to names, numbers, and biopsy sites.

Medical error in dermatology practice: Development of a classification system to drive priority setting in patient safety efforts

Alice J. Watson, MD, MPH,[a] Kelley Redbord, MD,[b,c,d] Jame
James Kostecki, MS,[f] and Robert
*Boston, Massachusetts; Rockville, Maryland; Vienna, Virgi
Cleveland, Ohio; and Atlanta*

Background: To date, no study to our knowledge has examine
dermatology practice.

Objective: We sought to collect and categorize physician-repo

Methods: A survey regarding most recent and most serious
dermatologists attending US meetings. A total of 150 response
errors and 130 most serious errors. Survey responses, along with
were used to develop a classification system for medical error

Results: The respondents' demographics reflected the specialt
years, and 60% were in solo or group private practice. Of the most
a year or less, and 86% did not result in harm to patients. The most
most serious errors were related to assessment (41% and 31%, res
respectively). Assessment errors were primarily related to investigations, and commonly involved the biopsy pathway. Intervention errors in the most recent and most serious errors were split between those related to medication (54% and 27%) and those related to procedures (46% and 73%). Of note, 5 and 21 wrong-site surgeries were reported in the most recent and most serious errors groups, respectively.

Limitations: Our findings are subject to respondent and recall bias and our classification system, although an important first step, is likely incomplete.

Conclusion: Our findings highlight several key areas of patient care in need of safety initiatives, namely the biopsy pathway, medication management, and prevention of wrong-site surgery. (J Am Acad Dermatol 2013;68:729-37.)

Table V. Top-10 most recent errors reported

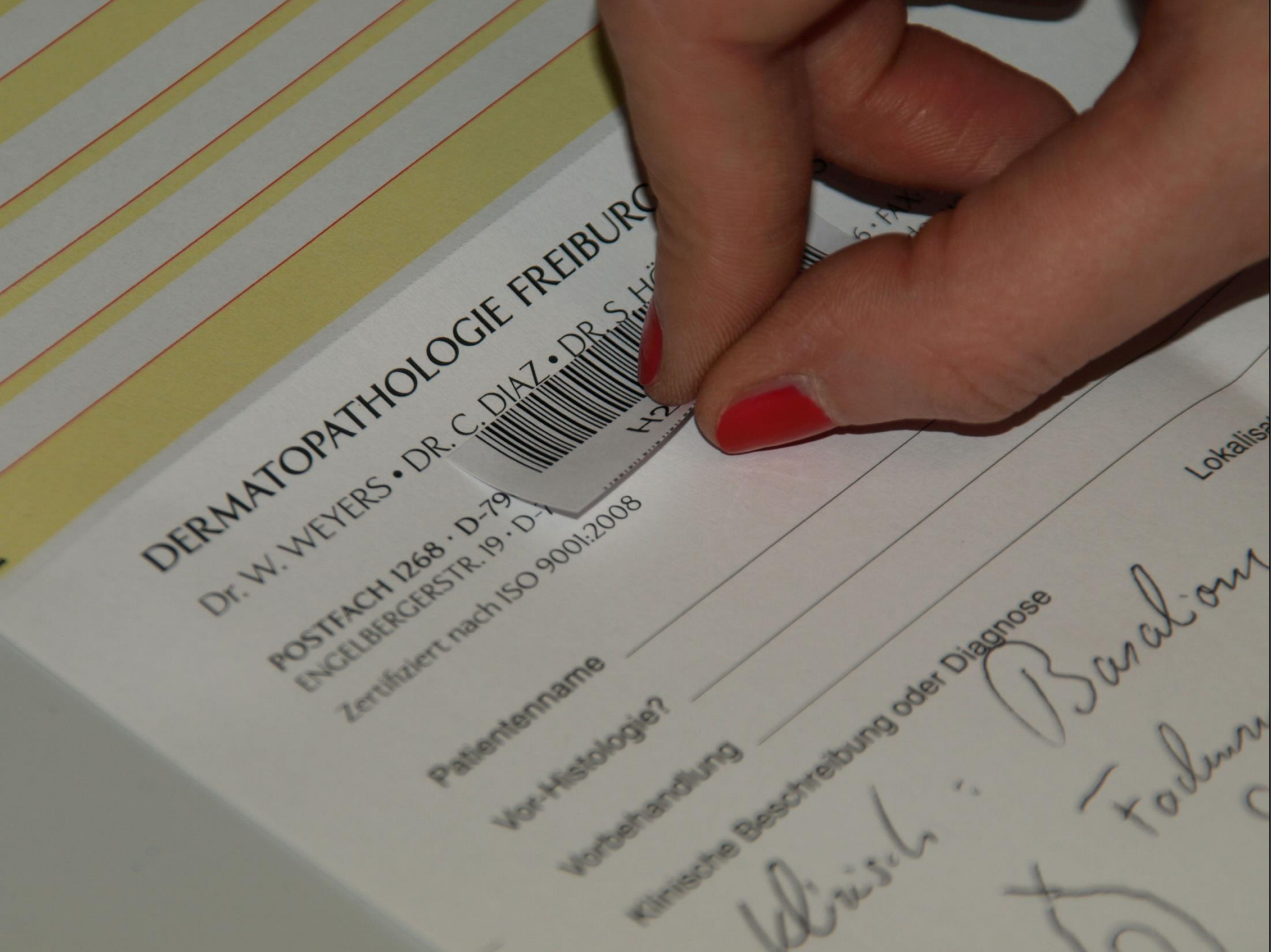
Rank order	Category	Percent of total reported (n)*
1.	Preanalytical error—incorrect information on sample bottle/ request form	18% (27)
2.	Postanalytical error—delayed or absent response to test	6% (9)
3.	Preanalytical error—inaccurate quality/ quantity of specimen	5% (7)
3.	Administration error by provider	5% (7)
3.	Postanalytical error—problem reporting result to physician	5% (7)
6.	Prescribing error—medication with known allergy/contraindication ordered	4% (6)
6.	Laser	4% (6)
6.	Dispensing error—wrong dose dispensed	4% (6)
9.	Wrong-site surgery	3% (5)
9.	Analytical error—problem with laboratory processing of sample	3% (5)

*n = 146, Excludes insufficient information (3) and not an error (3).

According to a recent survey concerning *"medical error in dermatology practice," "assessment errors were primarily related to investigations"* and nine of ten of those errors "involved the biopsy pathway," the most common error being *"incorrect information on sample bottle or request form."*

The most critical step in regard to specimen mix-up, however, is the unpacking of envelopes in the laboratory, with correlation of sample bottles and request forms and numbering of specimens. This should always be done by two persons, allowing for mutual control. Moreover, strict order is essential. Only one envelope should be unpacked at a time,

and the workspace must be big enough to allow sample bottles and req uest forms to be spread out. Sample bottles should be placed on top of the corresponding request forms. Several specimens from the same patient should be compiled



before labeling them with ascending pathology numbers corresponding to the sequence of biopsies indicated on bottles and request forms. This is best done with bar codes that prevents incorrect transcription of data in all subsequent work steps.

Efficacy of an incident-reporting system in cellular pathology: a practical experience

Emad A Rakha,[1] David Clark,[2] Brinder Singh Chohan,[1] Maysa El-Sayed,[3] Soumadri Sen,[1] Liz Bakowski,[1] Simon O'Connor[1]

[1]Department of Cellular Pathology, Nottingham, University Hospitals NHS Trust, Nottingham, UK
[2]Department of Pathology, Lincoln County Hospital, Lincoln, UK
[3]Department of Public Health, Faculty of Medicine, Menofia University, Egypt

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ABSTRACT

Background and aims Incident reporting (IR) refers to systematic documentation of adverse incidents to facilitate their appropriate investigation and institution of corrective or remedial actions, and provide data to identify risk trends for recurrent problems. Minimisation of errors and reduction in process variation is recognised as an important goal of quality management and is an essential part of continuous quality improvement

a major risk to patients, such as specimen loss or mix-up, whereas 27% were associated with moderate risk and 59% with minor or insignificant risk.

Conclusion Major risk incidents are relatively rare in the cellular pathology laboratory. IR should be included as an

for patients', which recommended that all NHS staff be trained to identify and report adverse incidents,[2] and is integral to the quality management systems required as part of Clinical Pathology Accreditation (CPA) standards.

The systematic documentation of incidents that forms the basis of IR must include their subclassification. Published data on the role of IR in cellular pathology in particular remains extremely for ssifi- tory ical) ther the verse rring pec- o its g of olves n for ents. f an se to

the potential for harm ('near miss') is another possible dividing line, although the importance of the latter group must not be underestimated, as by definition, only chance factors have prevented harm resulting in these cases.

… a bar coding system … achieved a 98% reduction in labelling-related errors compared with a corresponding period prior to introduction of the system.

J Clin Pathol 2012; 65: 643-648

In a recent study from England, the authors reported that *"… a bar coding system … achieved a 98% reduction in labelling-related errors compared with a corresponding period prior to introduction of the system."*

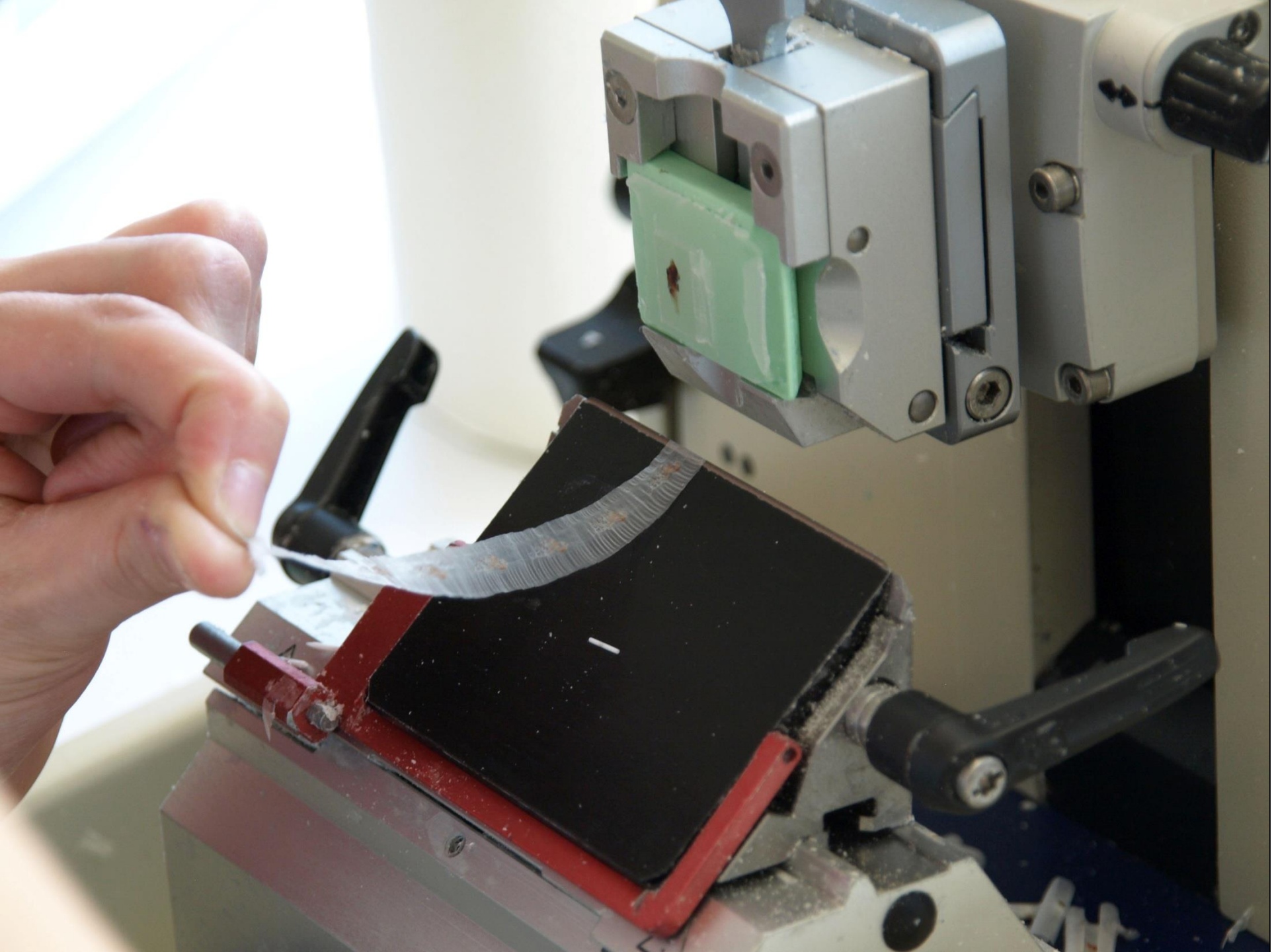
The order established during unpacking and numerical labeling of specimens must be maintained in all subsequent worksteps. In the laboratory, this begins with the trimming of specimens to enable them to fit into appropriately labeled tissue cassettes; bottles and cassettes must be aligned in ascending order.

Cassettes are then placed into the tissue processor

and must be aligned again afterwards for embedding of specimens in paraffin blocks. The pathology numbers on cassettes and blocks must be checked for concordance before opening the next cassette.

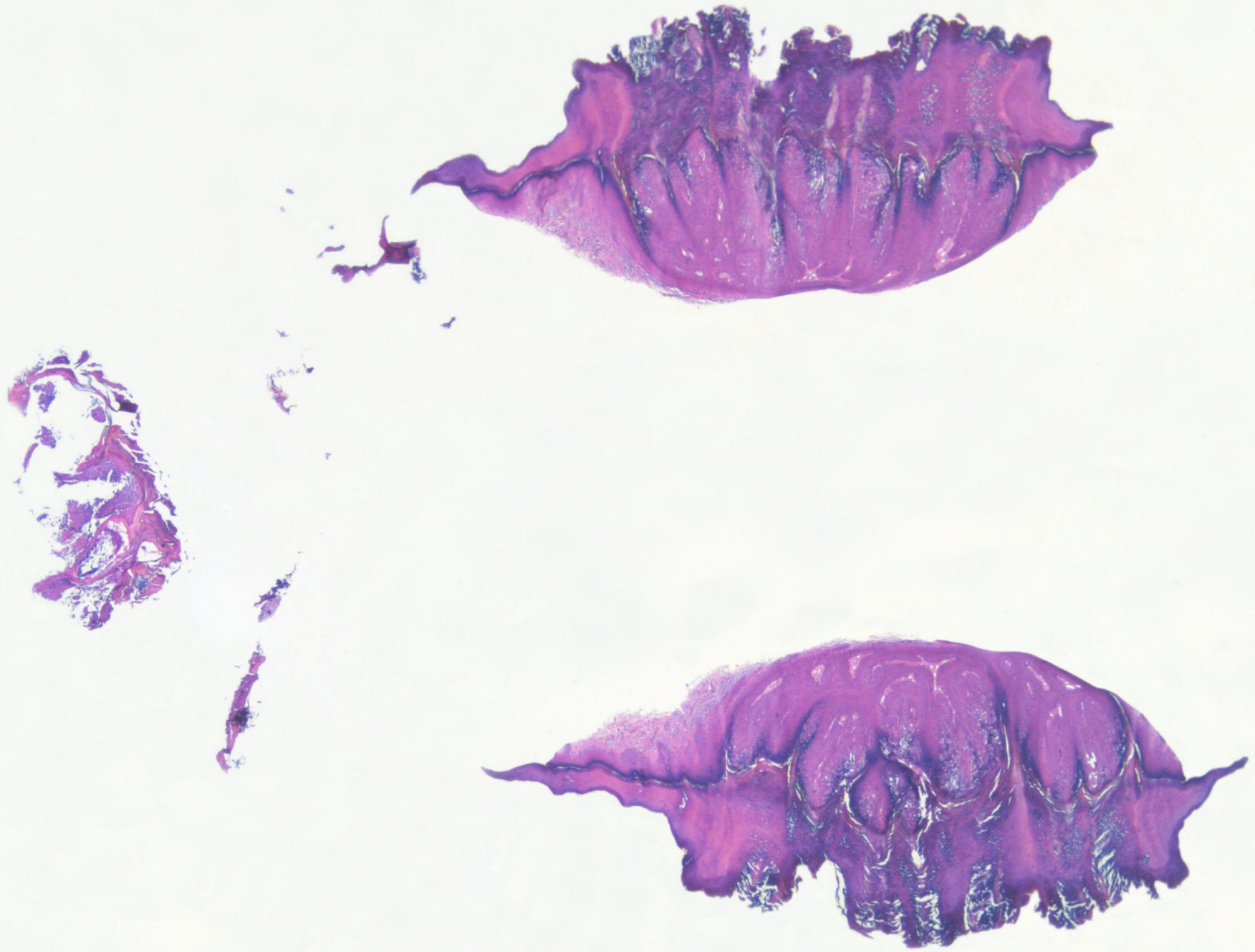
Moreover, forceps must be cleared in order to prevent fragments of one biopsy to be incorporated in the block of another.

Paraffin blocks are then aligned once again in ascending order on a refridgerated plate

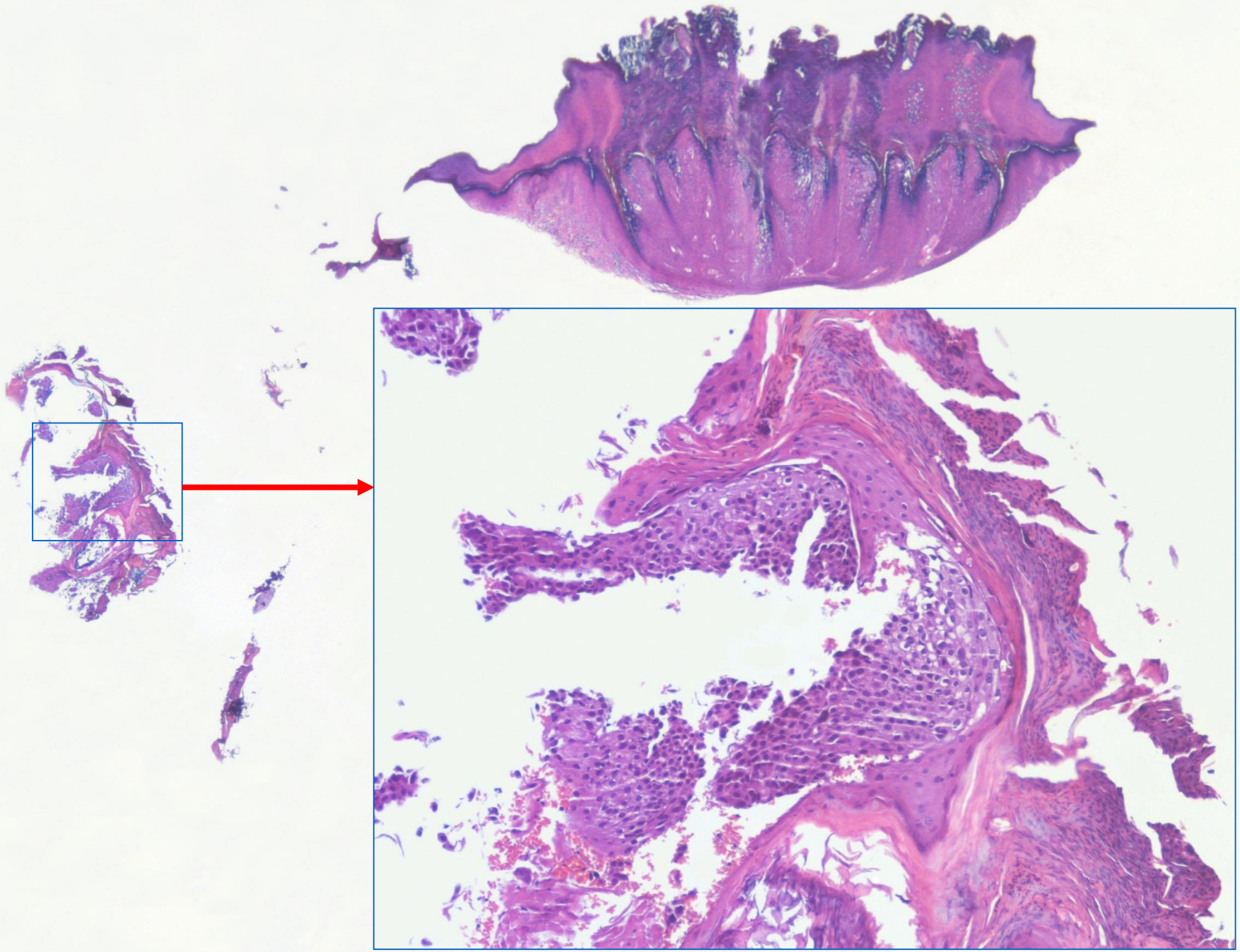


from where they are taken for cutting sections at the microtome. The resulting thin ribbons of tissue

are transferred to a warm water bath where they are allowed to float on the surface before being scooped up onto the slide. The water bath must be cleaned regularly. If fragments of tissue become detached and remain on its surface,



they may be transferred onto another slide. This is an example: a wart and, in addition, a so-called “floater”



with a solar keratosis from some other block. Such “floaters” bear the risk of misdiagnosis, and they are not uncommon.

Extraneous Tissue in Surgical Pathology

A College of American Pathologists Q-Probes Study of 275 Laboratories

Gordon N. Gephardt, MD, Richard J. Zarbo, MD, DMD

Objective.—To develop a multi-institutional reference base of extraneous tissue (contaminants) in surgical thology.

Design.—In 1994, participants in the College of Ameri- Pathologists Q-Probes quality improvement program formed prospective and retrospective evaluations of ex- neous tissue found in surgical pathology microscopic tions for a period of 4 weeks or until 1000 slides were iewed in each participating laboratory.

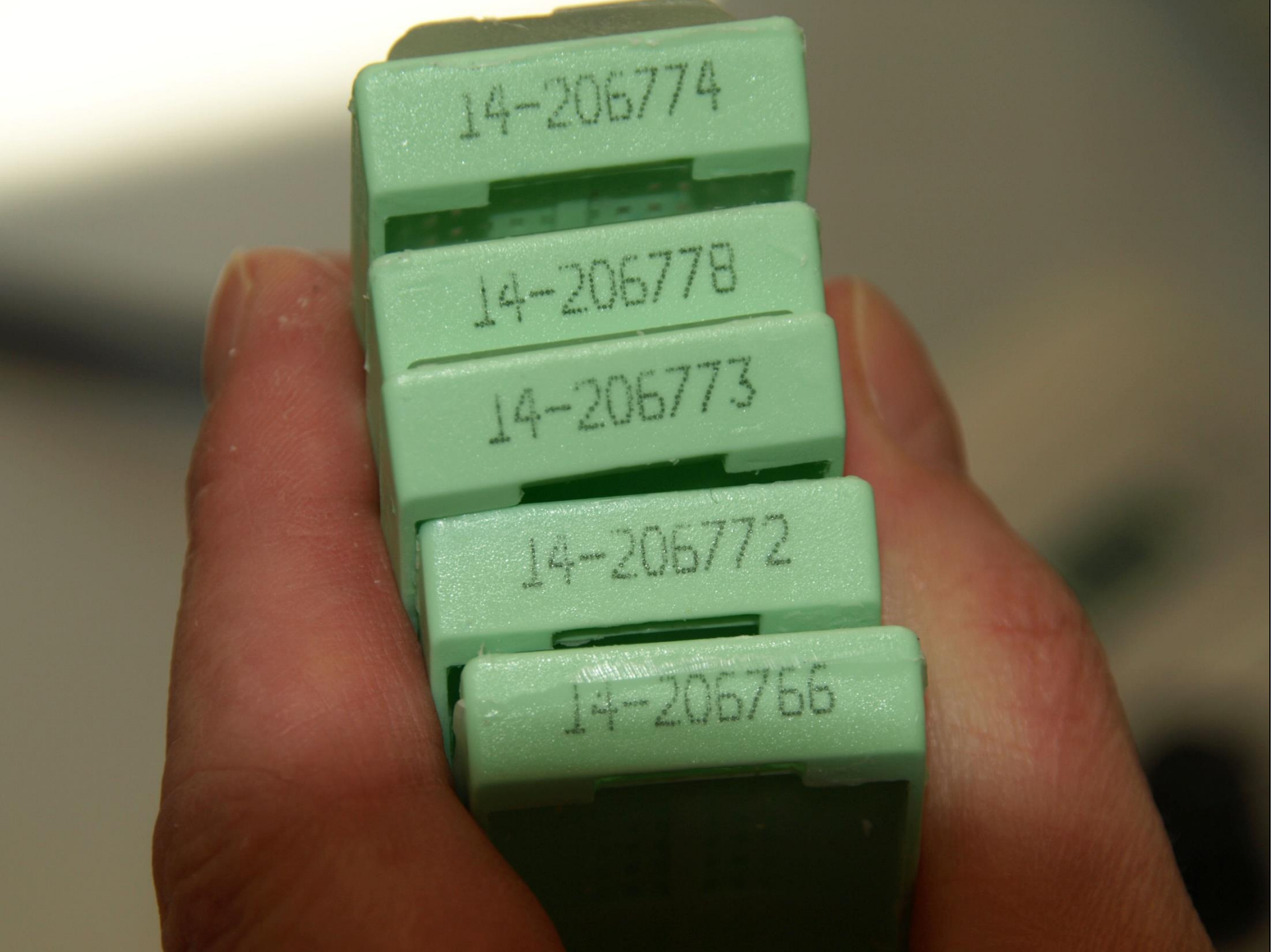
Participants.—Two hundred seventy-five surgical pathol- laboratories institutions, predominantly from North erica.

Main Outcome Measures.—Extraneous tissue contami- ion rate for slides in prospective and retrospective re- ws; staffing and practice procedures; location of extra- ous tissue on slides; type of extraneous tissue (normal, normal, nonneoplastic, neoplasm, microorganisms, etc); ss of extraneous tissue (slide or block contaminants); rce of extraneous tissue (different or same case); origin extraneous tissue (pathology laboratory, physician's of- e or operating room); and degree of diagnostic difficulty used by extraneous tissue.

Results.—Three hundred twenty-one thousand seven ndred fifty-seven slides were reviewed in the prospective dy, and 57 083 slides in the retrospective study. There as an overall extraneous tissue rate of 0.6% of slides 74/321 757) in the prospective study and 2.9% of slides 53/57 083) in the retrospective study. Of those slides sors, and 64.9% had guidelines for maintaining water baths free of extraneous tissue. A total of 98.9% used lens paper, filter bags, or sponges for processing fragmented and small specimens. Written protocols for documentation of extraneous tissue in surgical pathology reports were established in 6.1% of laboratories, for removal of extraneous tissue from blocks in 5.7%, and for removal of extraneous tissue from microscopic slides in 4.7%. In 24% of laboratories no comment or record was kept to document extraneous tissue. Extraneous tissue consisted of neoplasm in 12.7% of the prospectively reviewed slides and in 6.0% of the retrospectively reviewed slides. For the prospective study, 59.4% of extraneous tissue was classified as slide contaminants, and 28.4% was found to be contaminants within the paraffin block; for the retrospective study, 72.9% was classified as slide contaminants and 15.9% as block contaminants. For the prospective study, 63.2% of extraneous tissue was presumed to be from a different case, and in the retrospective study, 48.5% was presumed to be from a different case. Over 90% of extraneous tissue was thought to originate from the pathology laboratory. The degree of diagnostic difficulty caused by extraneous tissue was judged to be severe in 0.4% of slides in the prospective study and 0.1% of slides in the retrospective study. In the prospective study, it could not be determined whether the tissue in the diagnostic sections was extraneous in 0.6% of slides, and in the retrospective study, it could not be determined whether tissue in the diagnostic sections was extraneous in 0.1%.

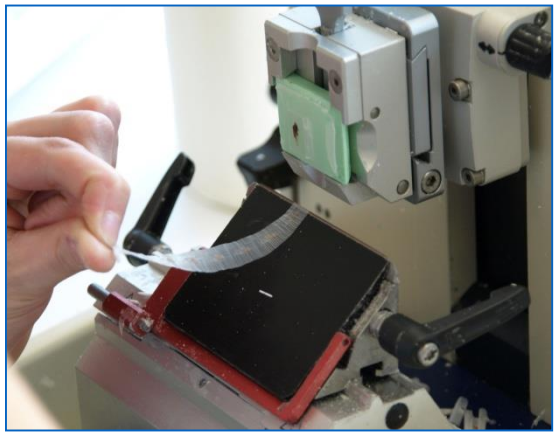
In a study on *"extraneous tissue in surgical pathology,"* there was an *"overall extraneous tissue rate of 0.6% of slides … in the prospective study and 2.9% of slides … in the retrospective study."* In about 60% of cases, the *"extraneous tissue was classified as slide contaminants,"* taken up from the water bath, whereas *"28.4% was found to be contaminants within the paraffin block."*

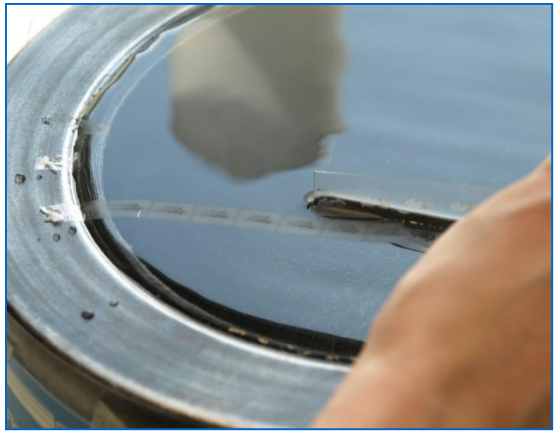
When cutting sections at the microtome, numbers on the blocks and slides must be checked for concordance. The latter are placed in ascending order next to the water bath.



Numbers on slides and block should be printed on because handwriting is prone to error.

Among thousands of numbers written by hand, there are always deviations that may cause confusion; for example, this “2” may be misread as “7.” Printed numbers prevent such errors.





In sum, in the operating room and laboratory, there are numerous sources of error that may result in a mix-up of specimens. Any distraction interrupting the normal workflow, such as inconsistent information on sample bottles and request forms that require telephone calls and postponement of tissue processing, enhances that risk. Because error cannot be excluded, a final inspection is essential.

Before slides leave the laboratory, slides and blocks are compared with one another, and the correct ascending order of slides and request forms is verified. This is best done by two persons, rather than a single one.

Pathologe
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Übersicht

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[2] Institut für Pathologie am Clemenshospital Münster

Präparateverwechslungen: Ursachen, Auswirkung, Prävention

… the error rate could be reduced from up to 1% to about 0.1‰ by independent double control (one technician reads aloud the number on the block, the other compares it with the specimen slide, followed by countercheck from the specimen slide to the block).

Zusammenfassu

Die steigende Zah
zur Diagnosesiche
Jahren zu einer Ve
aufkommens in Ir
führt. Es wurden k
zur Qualitätssiche
Diagnostik entwi
schriften zur Orga
nahme bis zur -aufarbeitung existieren (bislang) nicht. Der Verdacht auf Gewebeverwechslungen wird sicherlich häufiger geäußert als tatsächlich Verwechslungen auftreten. Wichtig ist, an die prinzipielle Möglichkeit einer Vertauschung zu denken, diese Be-

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lichkeiten
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den, zeigen die Wichtigkeit und Größenordnung dieses diagnostischen Verfahrens.

Inhaltliche Qualitätssicherungsmaßnahmen einschließlich Fortbildungsveranstaltungen werden durch die

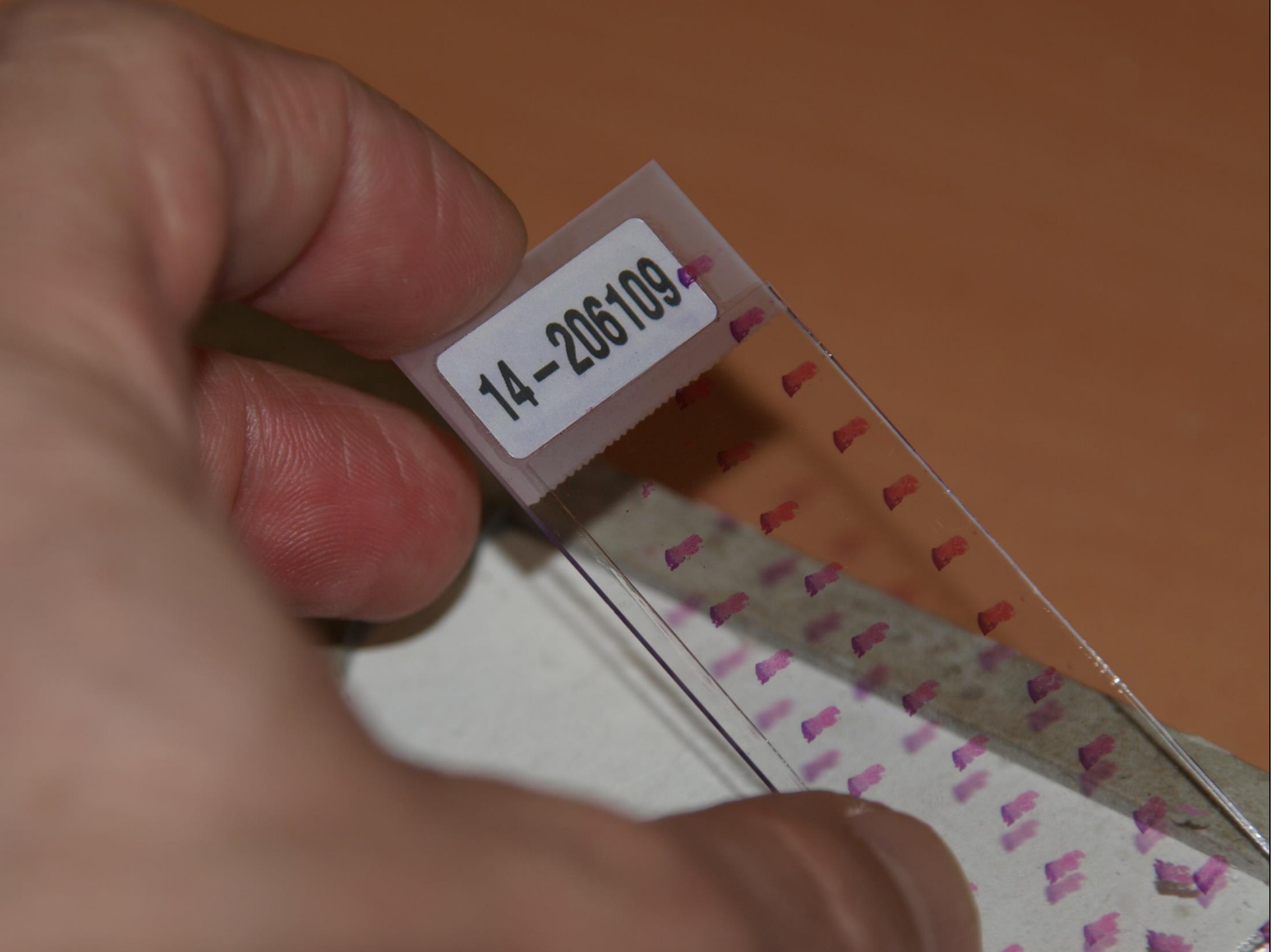
von Behältnissen durch den Pathologen bietet weitere Einflußmöglichkeiten.

Zu den möglichen „externen" Fehlerquellen gehören u.a.:

- Unvollständige Beschriftung der Pro-

According to one study, *"the error rate could be reduced from up to 1% to about 0.1‰ by independent double control (one technician reads aloud the number on the block, the other compares it with the specimen slide, followed by countercheck from the specimen slide to the block)."*

If everything works out fine, specimen slides and request forms reach the microscope and are placed at both sides of it, correctly labeled, cut, and in corresponding order. The challenge is now to keep that order.

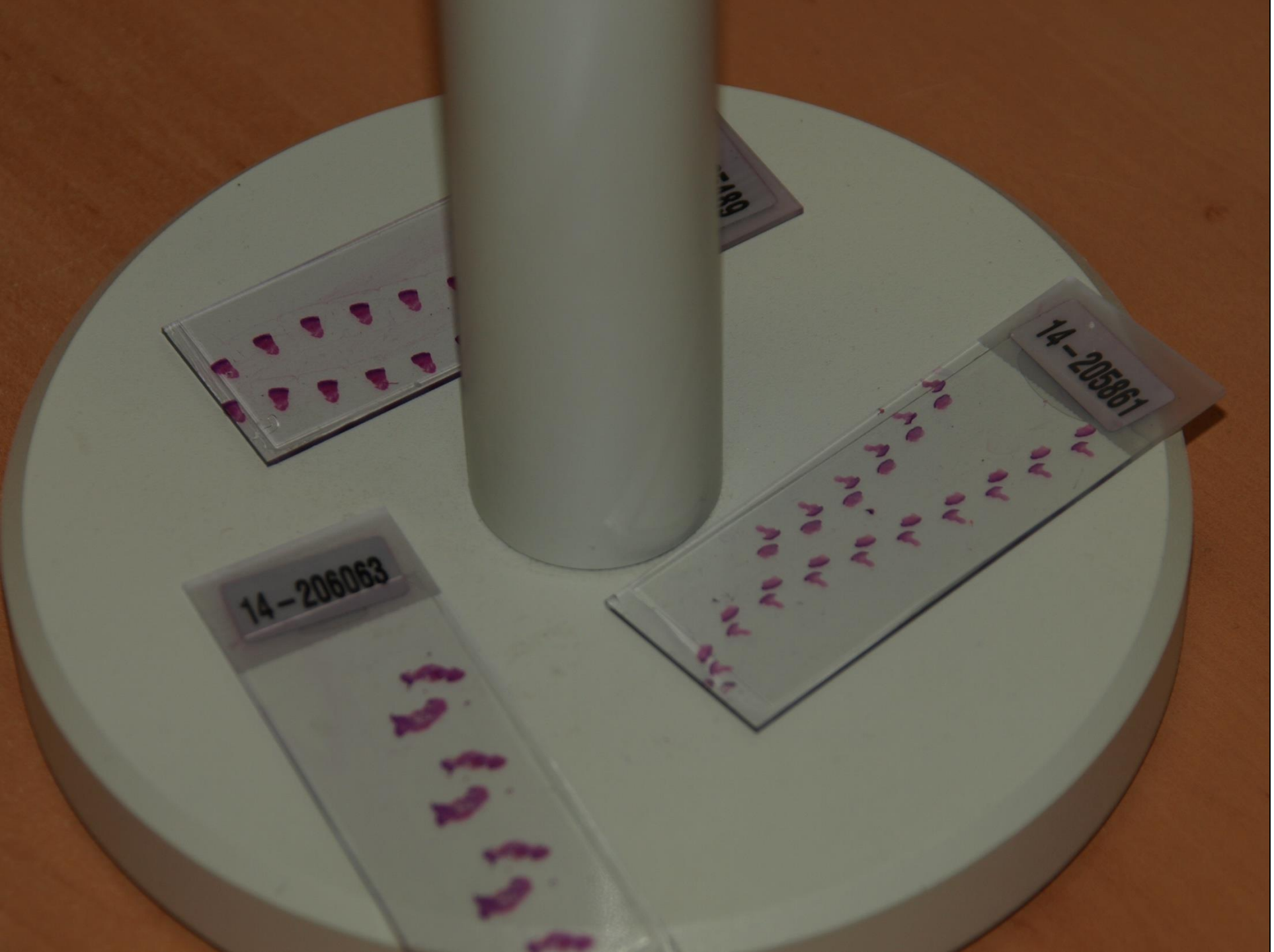


When taking the first slide from the tray, nothing can go wrong because it is the top one. A few specimens down, it is much easier to pick the wrong slide. Therefore, one should strive to go through the entire tray before an interruption. In the case of an interruption, I have formed the habit

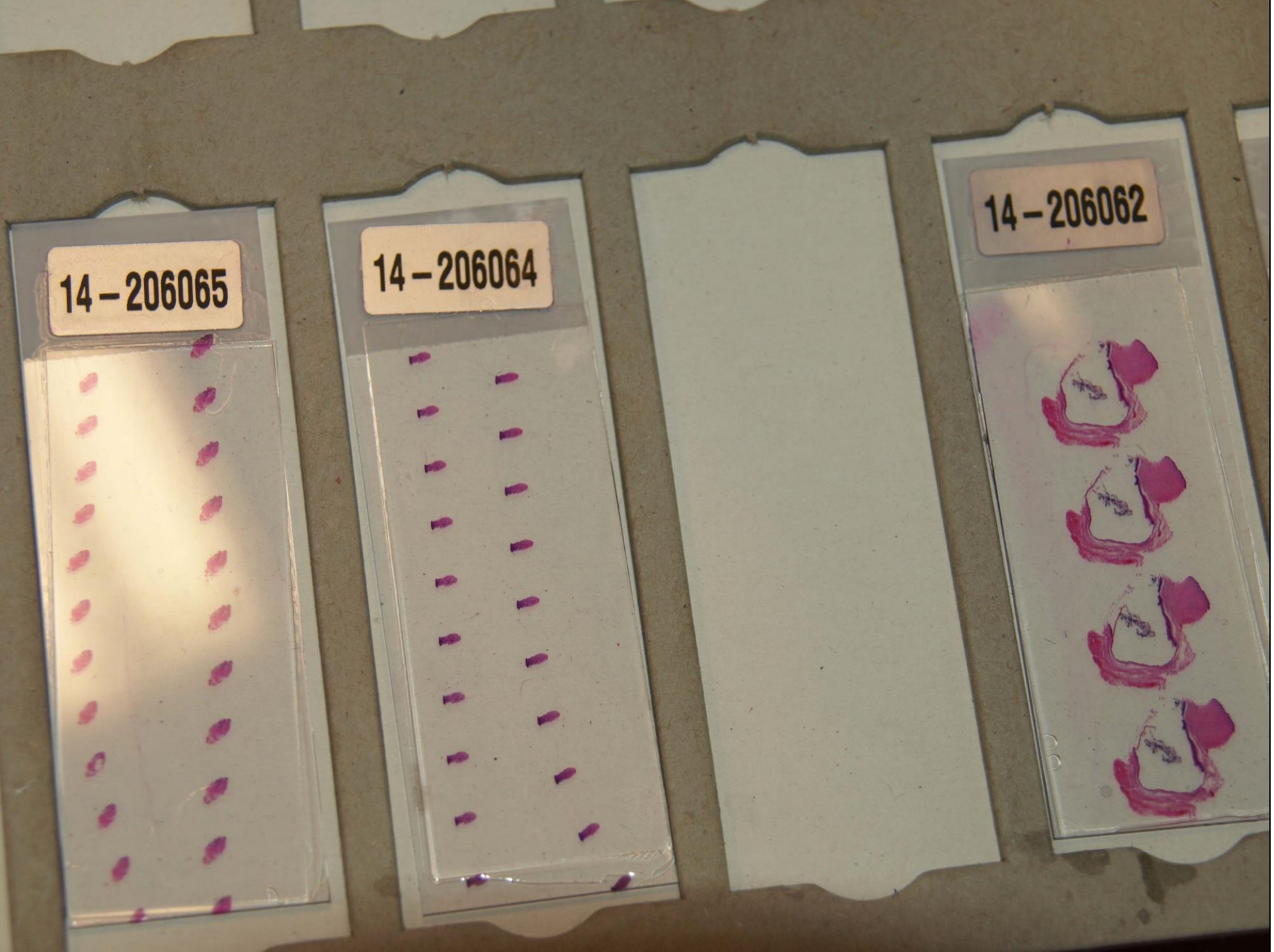
of placing the next slide obliquely in order to have it immediately at disposal when resuming work.

When going through a tray without interruption, there is little risk of picking the wrong slide because disposal of the old and picking of the new slide is done in one continuous movement. Errors may occur when there are several slides for the same case, or if a space is kept free, e.g., for a special stain that is not ready yet.

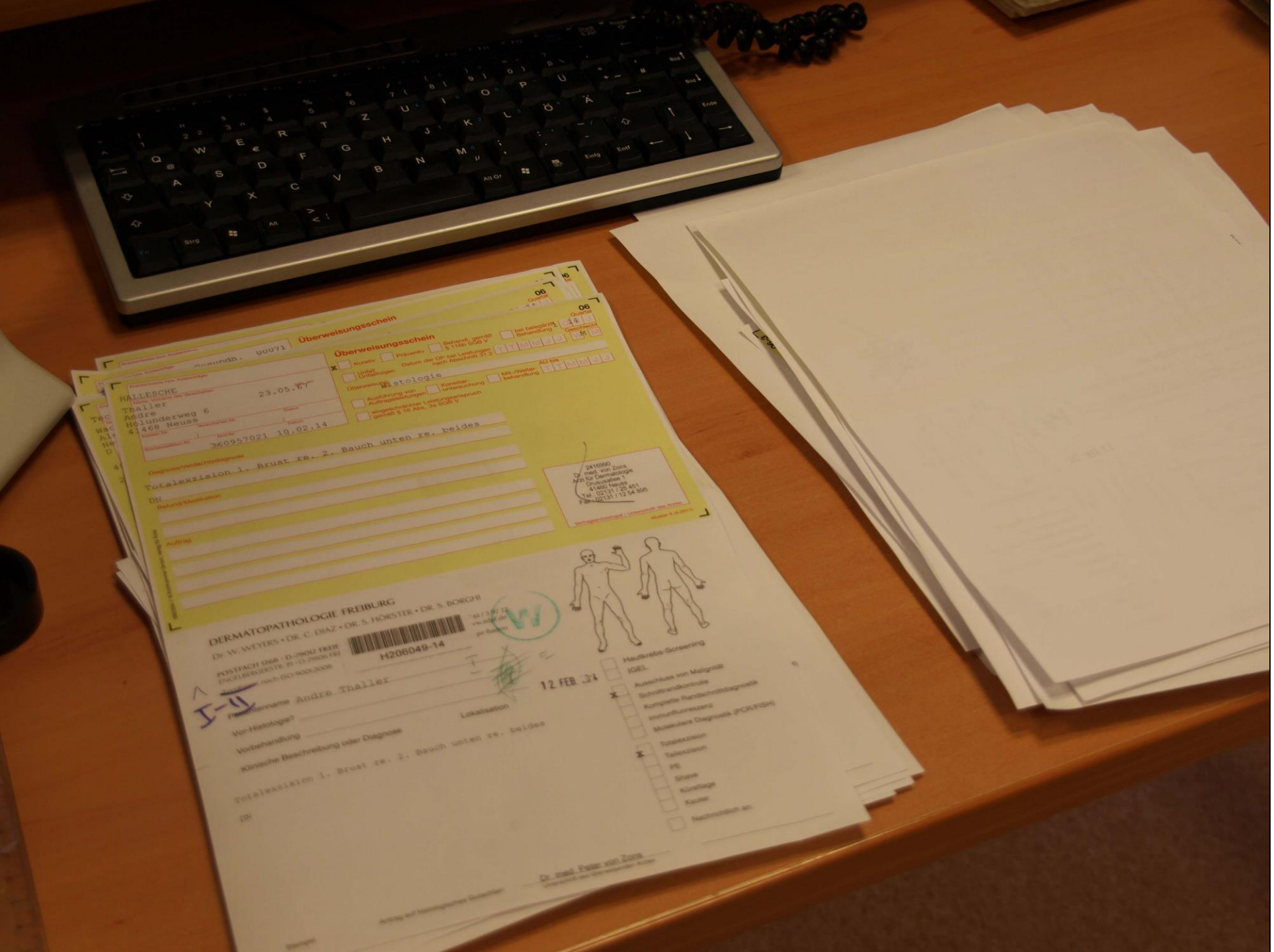
In order to prevent slides from being put down in the wrong space, breaches in the sequence should be marked clearly by a placeholder.



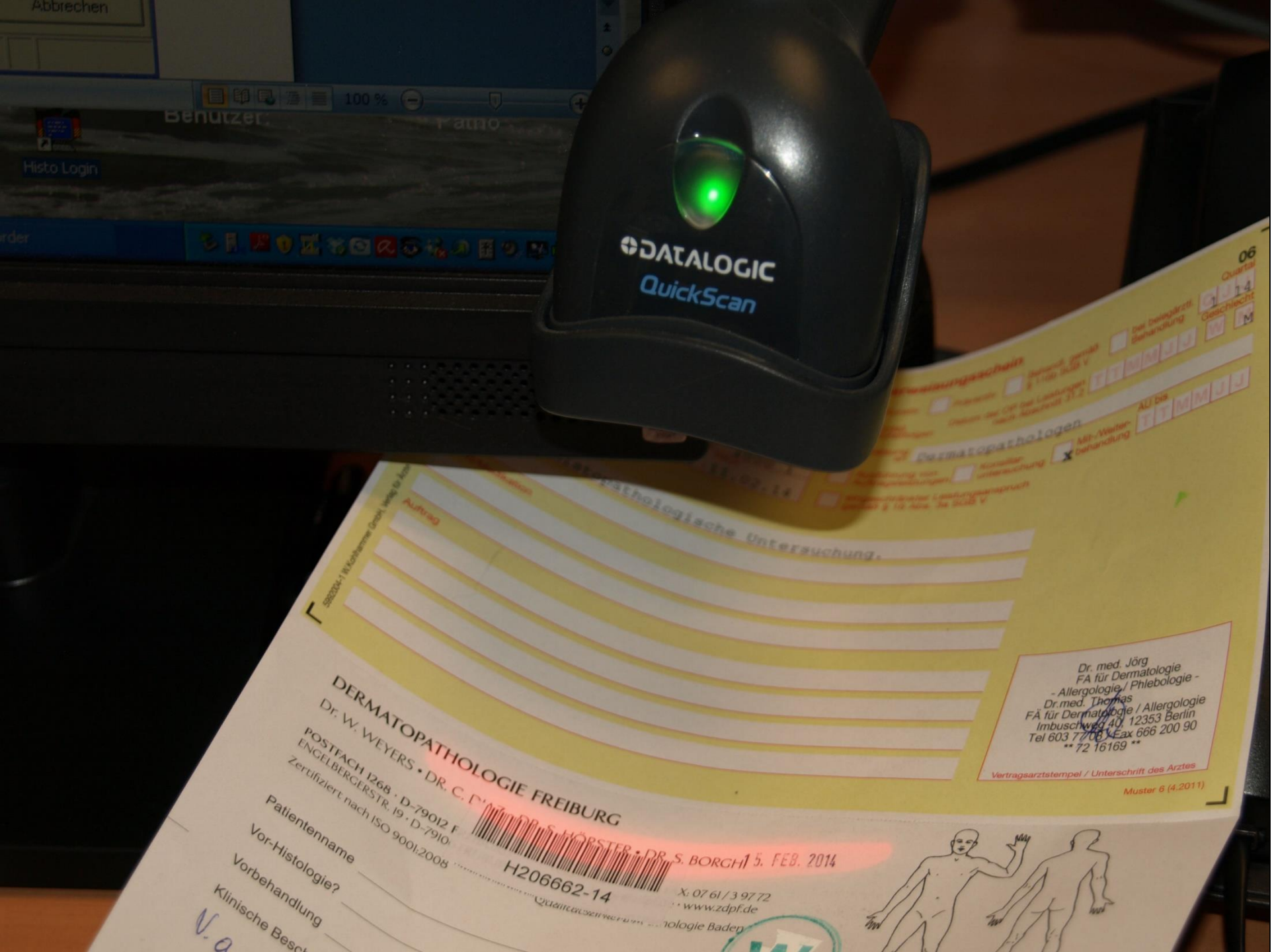
If a slide is put aside, e.g., in order to show it to colleagues later-on,



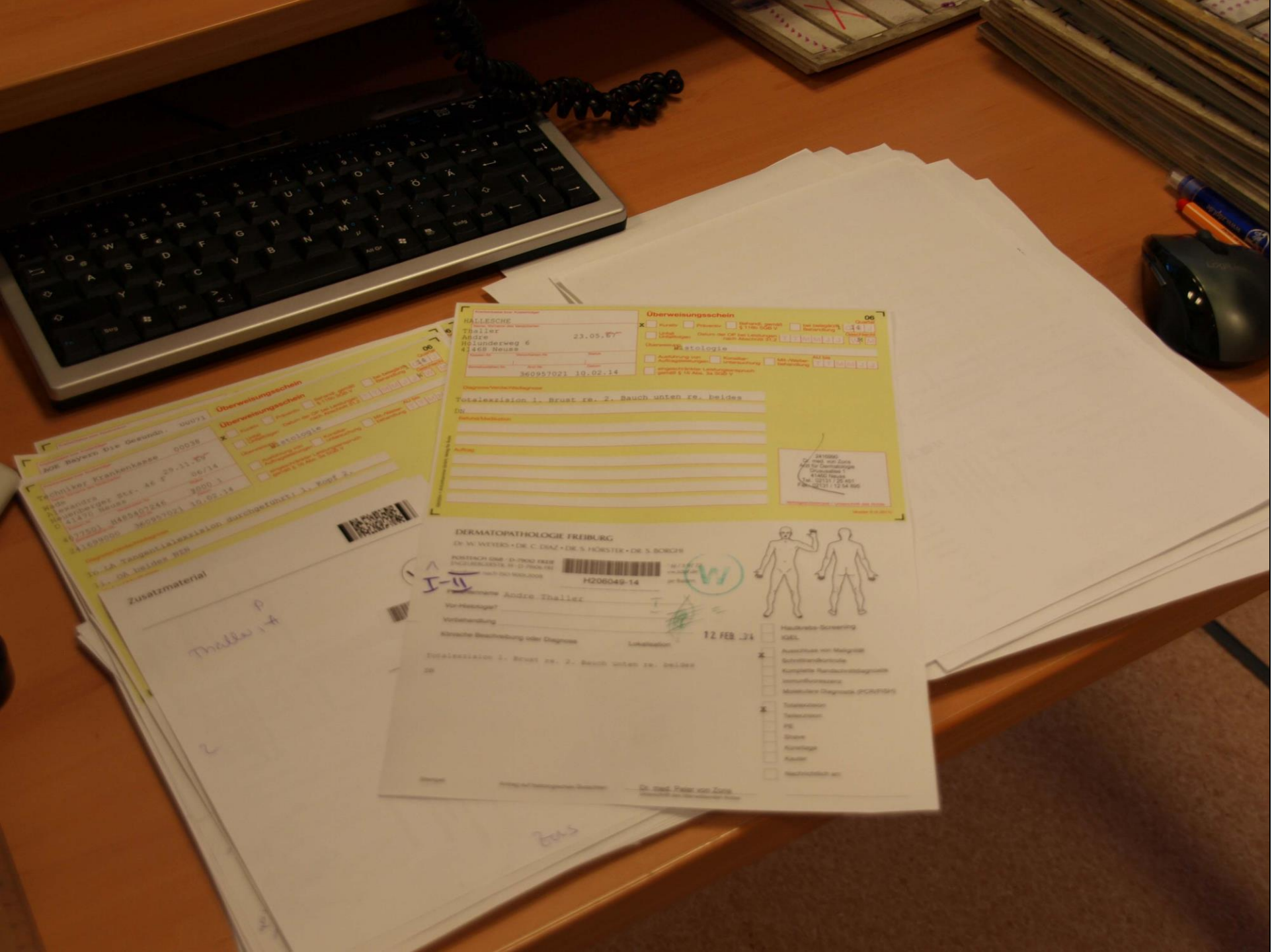
This is a a source of error. It may happen easily that a subsequent slide is put back in the empty space, and that one continues with the next slide on the tray that has already been studied, the consequence being that slides and request forms no longer correspond to one another.



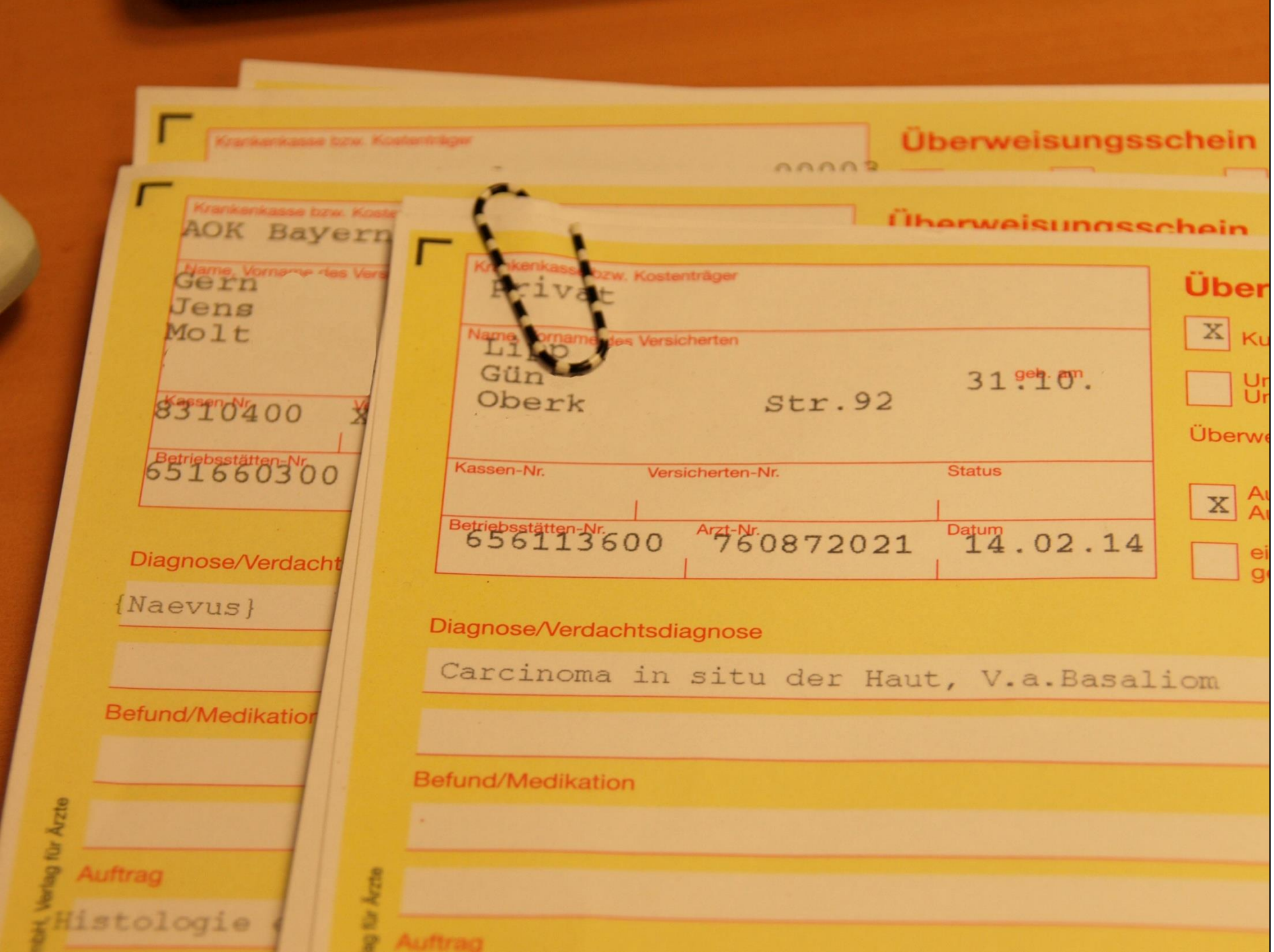
Errors may also derive from the pile of request forms on the other side of the microscope. Request forms of cases already studied should be turned over and placed back-side-up, and only the form of the next case should be visible.



If the diagnosis can be made at a glance, that form can be turned over immediately after having been scanned; if the case takes more time,



I have found it convenient to place the scanned request form obliquely on the pile before turning it over after having finished the case. Of course, it is essential that only one request form is picked up at a time.

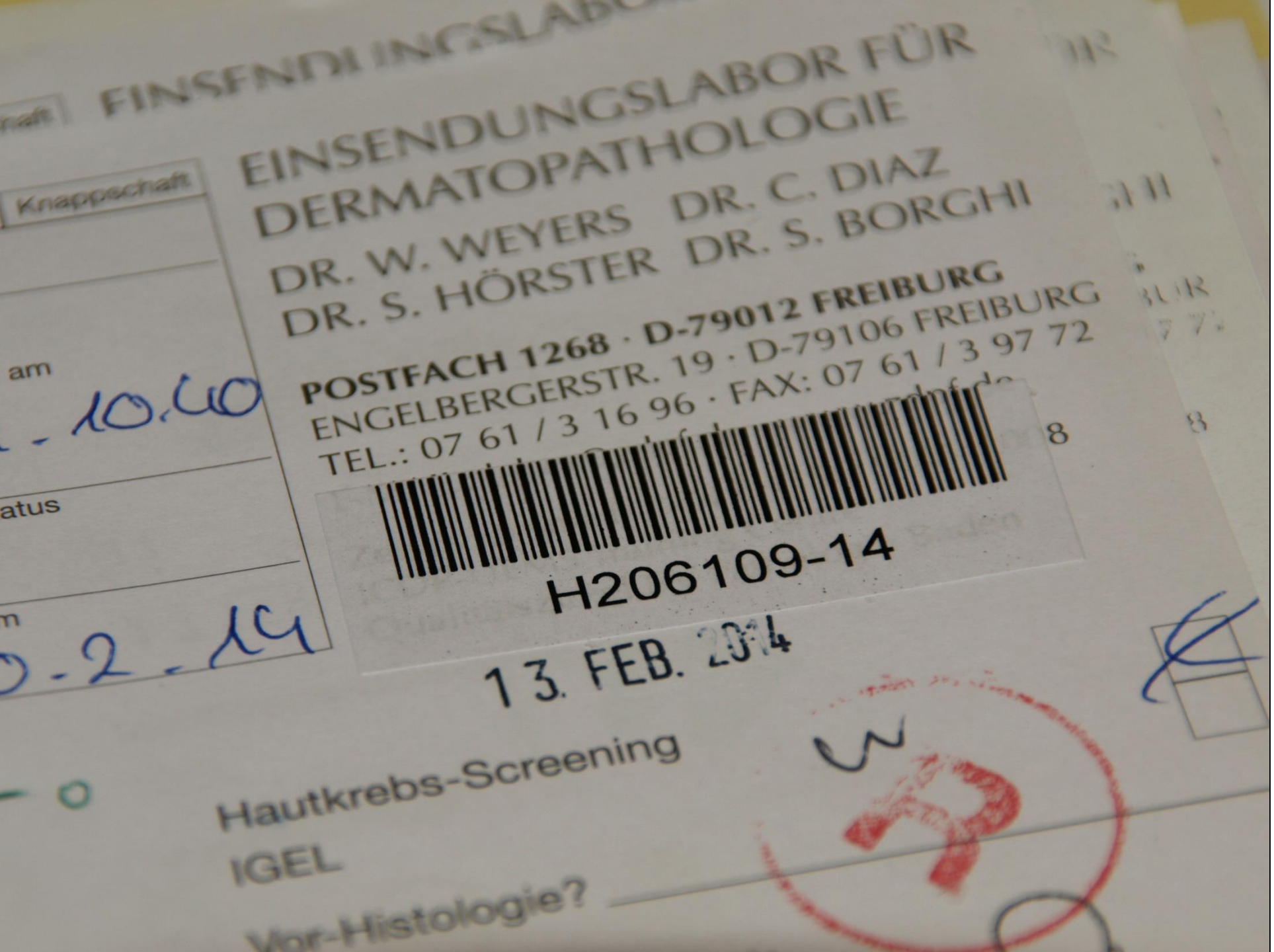


In that respect, paper clips that attach some additional information to a request form are a source of danger because they may capture another sheet. In that instance, slides and request forms do no longer correspond to one another. As a rule, such deviations are noticed readily,

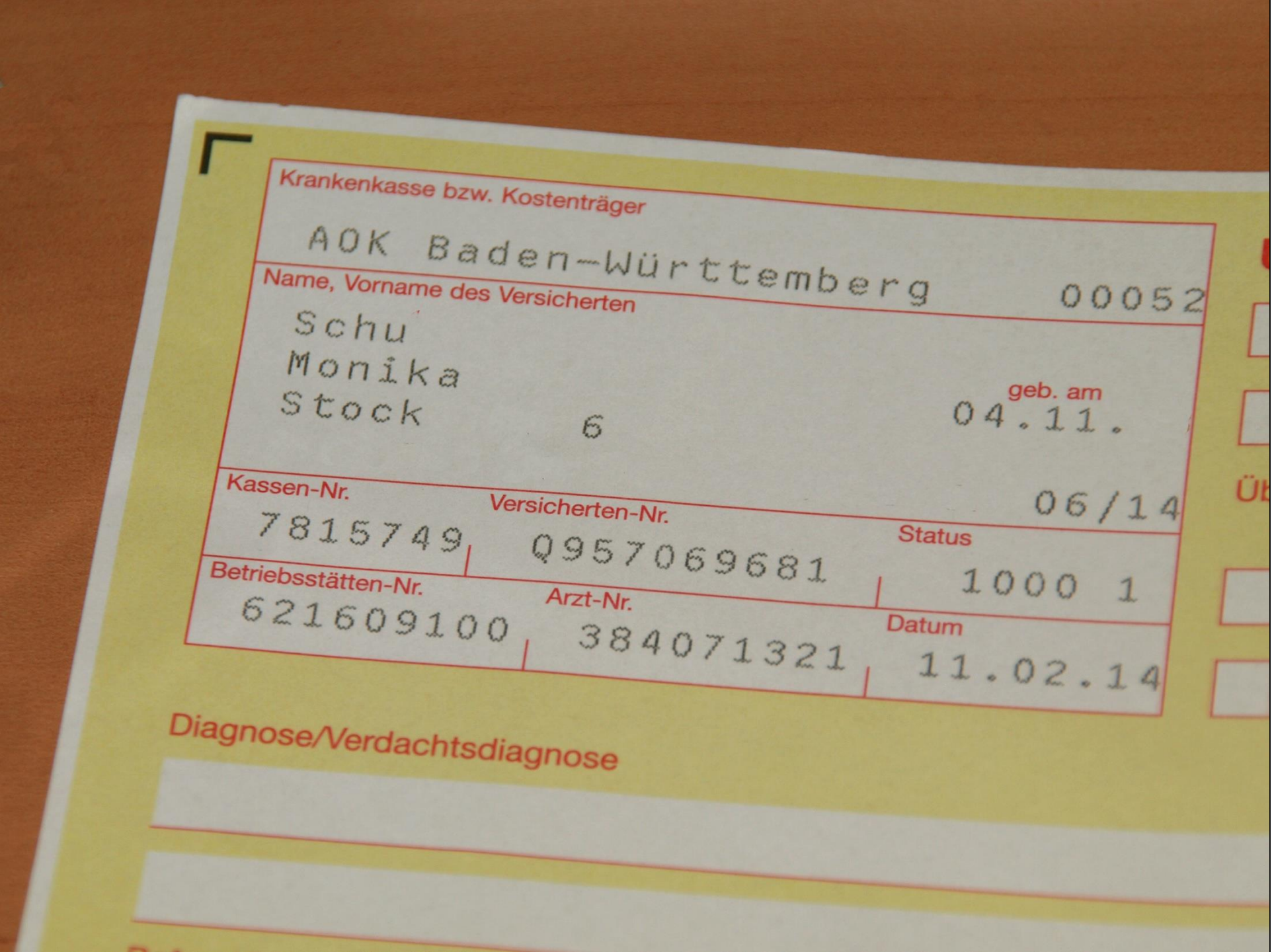
but if work is interrupted at that very moment, e.g., through a telephone call, the risk is substantial that a patient is given a completely wrong diagnosis.
Because such errors may occur easily, as many safety measures as possible should be included in one’s routine workflow,

just as a mountaineer does not rely on his hands only but also uses one, or better two, safety ropes.

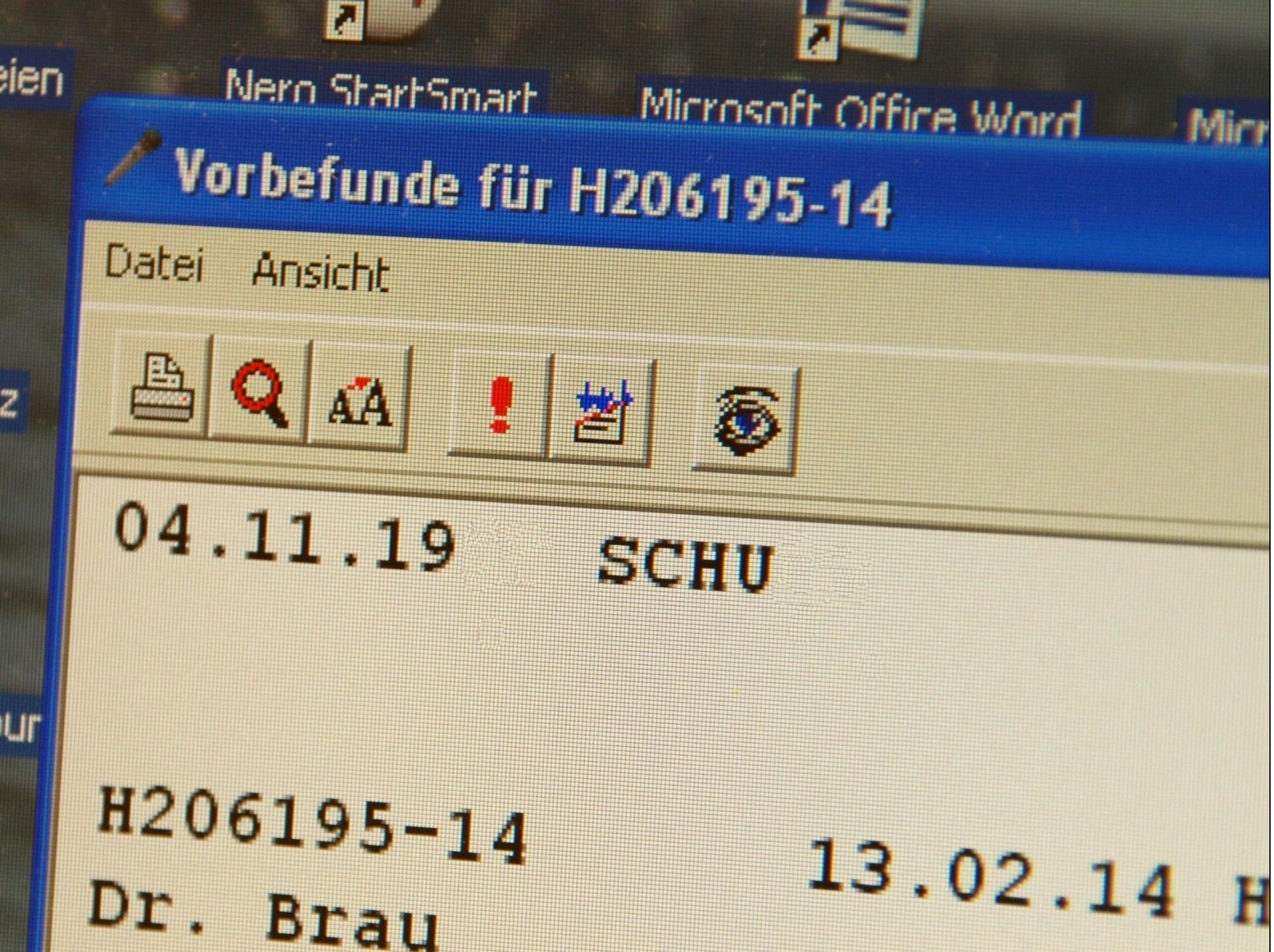
The conformity of biopsy and patient can be checked by four quick glances: on the number of the slide when putting it on the microscope stage,



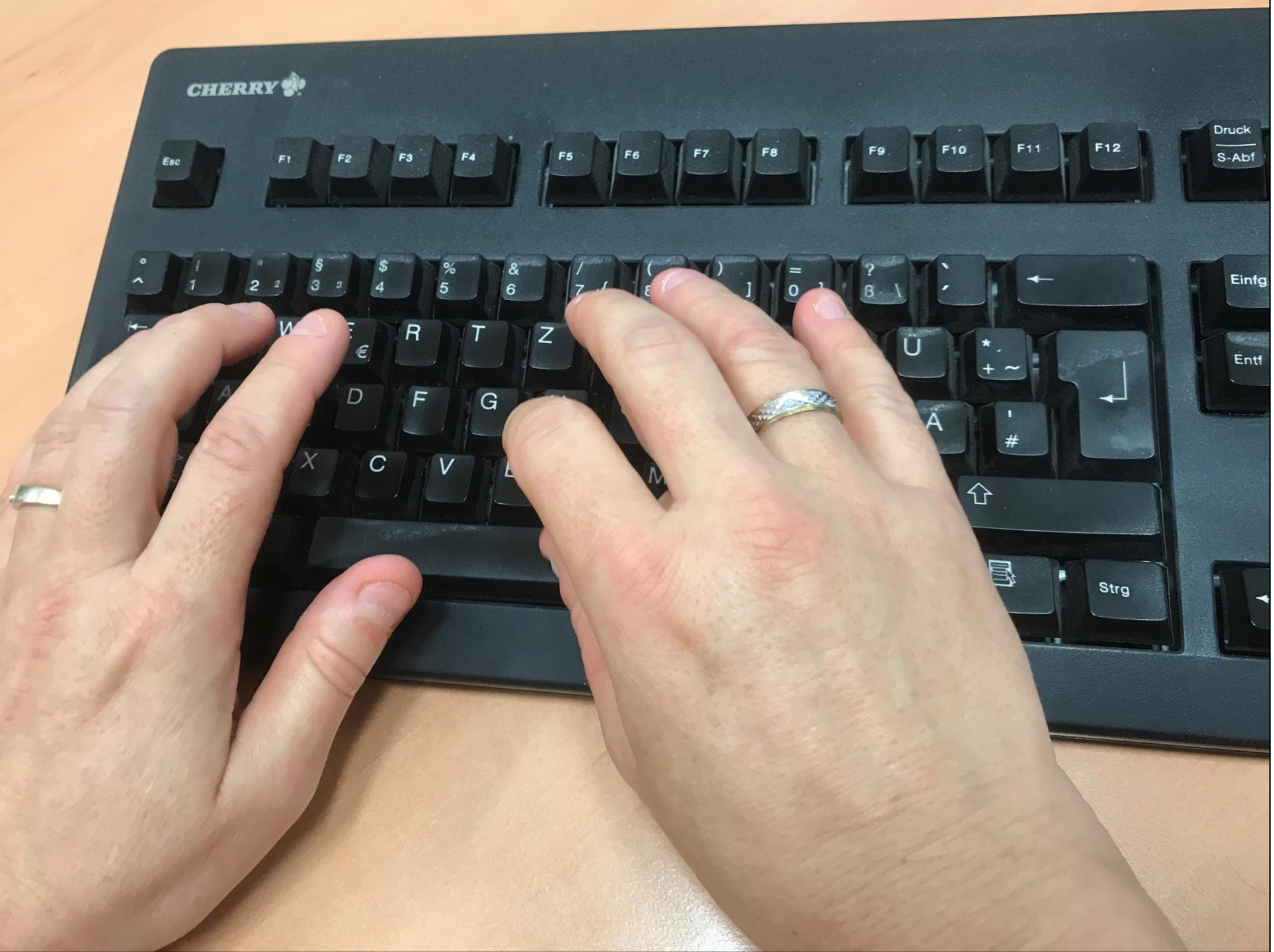
on the number on the request form when picking it up for scanning,



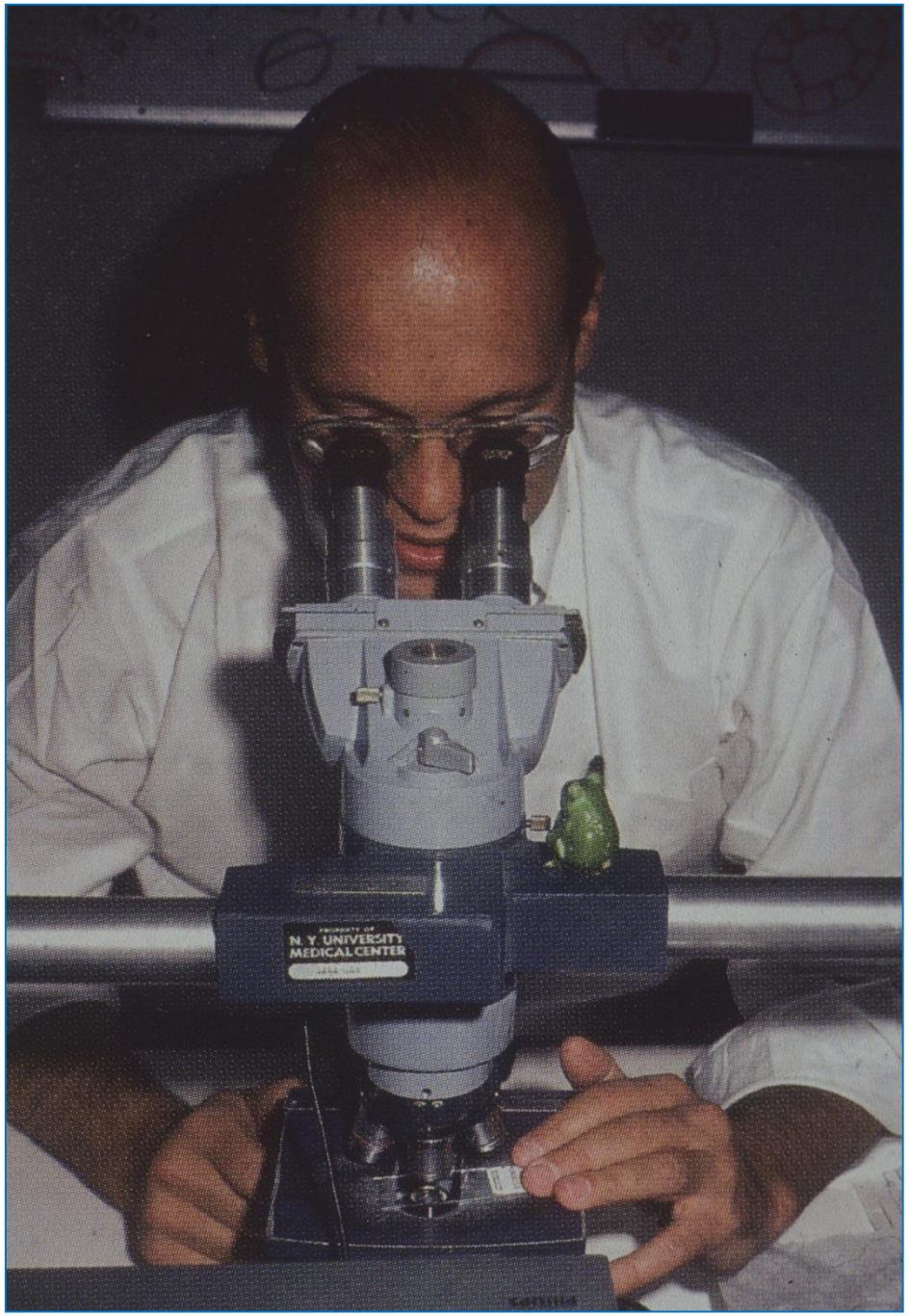
on the name of the patient on the request form,



and on the name popping up on the computer screen in order to check for correct entry of patient data. After verification, the slide can be studied.



The next problem are computer codes used for creating pathology reports. Those codes facilitate work tremendously but also go along with risks. A text typed or written traditionally may be replete with typing errors, but, as a rule, a word remains intelligible even in the case of incorrect typing.



7A Verruca vulgaris

7B Verruca vulgaris with inflammatory cell infiltrate

7C Verruca vulgaris, resolving

…

8A Squamous cell carcinoma in situ (Bowen's disease)

…

9A Squamous cell carcinoma

…

10A Spongiotic dermatitis, probably allergic contact dermatitis

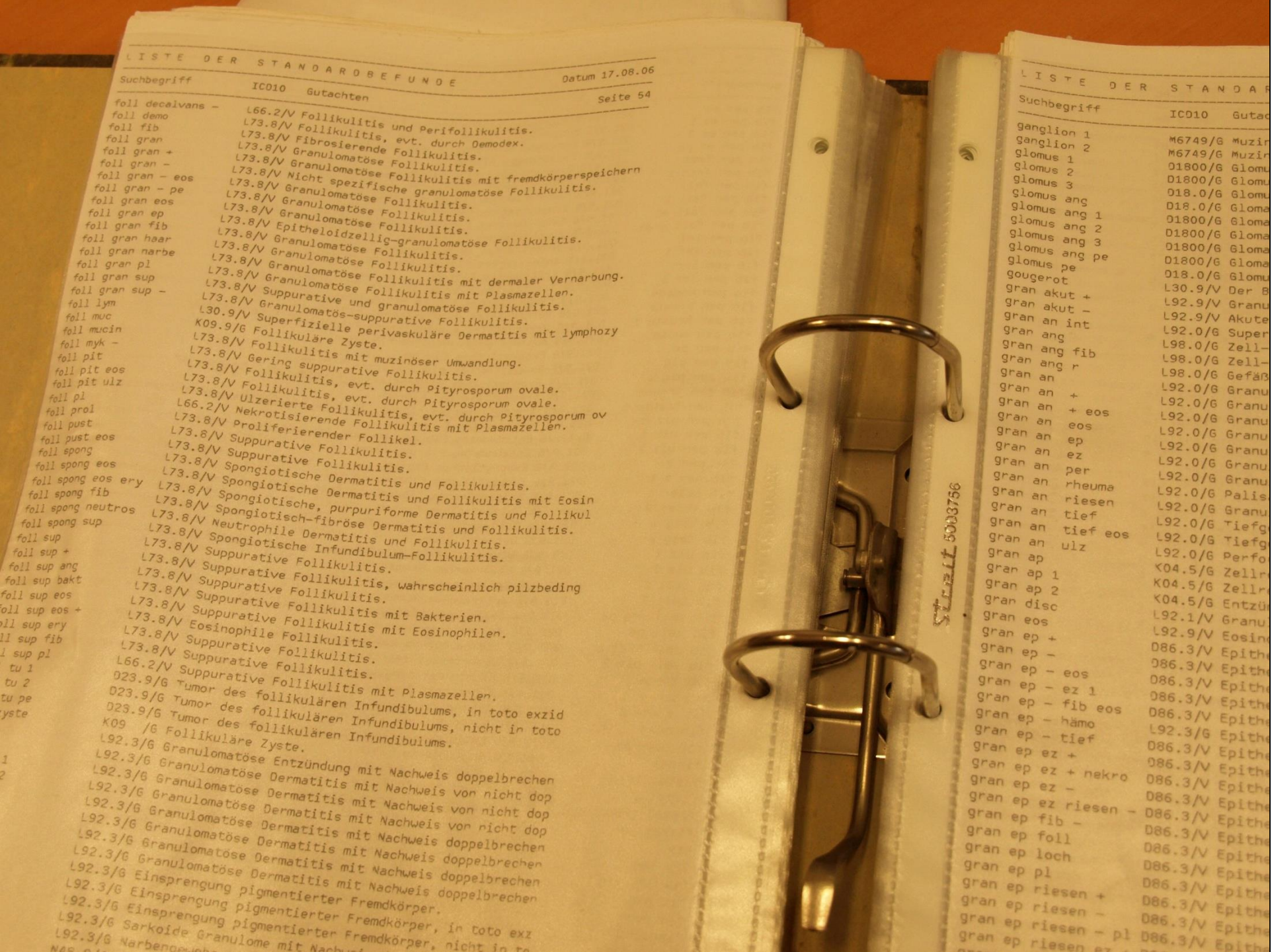
…

11A Lichen planus

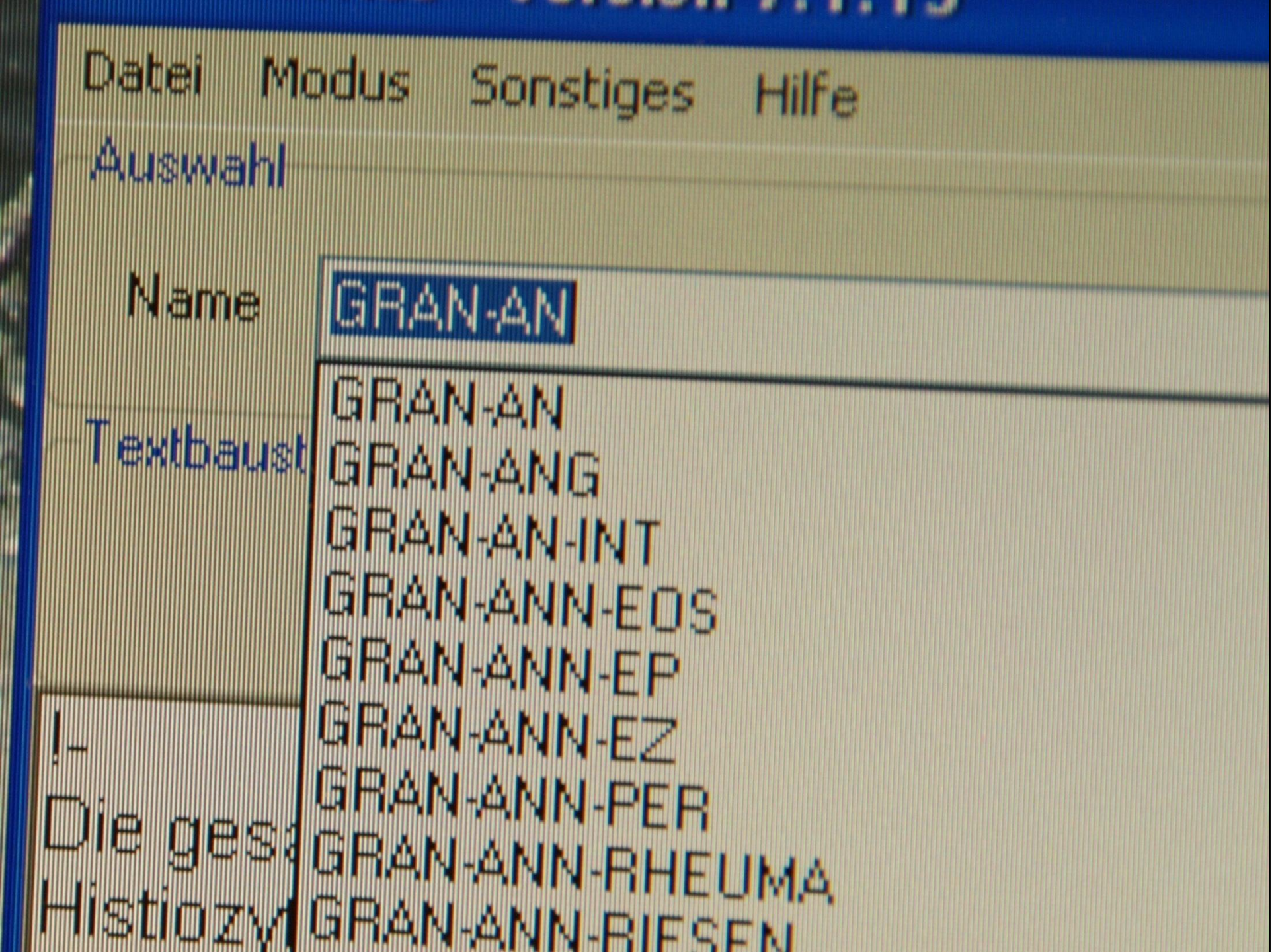
…

By contrast, the accidental transposition of letter characters or numerals in a computer code may create a completely different content, especially if that code is very brief. Therefore, the striving for simplicity and brevity should not be exaggerated; a certain measure of redundancy is essential. A negative example in that regard are computer codes like "7A" or "8A" that have been used for decades at the world's leading laboratory of dermatopathology by A. Bernard Ackerman in New York City. Those brief codes are error-prone

because a slip of the tongue or a minimal deviation of one finger on the computer keyboard suffice to turn a “7A” into an “8A,” thus creating a different diagnosis.



By using codes that are slightly longer and reflect their content visibly, such as “Foll-gran” for granulomatous folliculitis or “Gran-an” for granuloma annulare, those sources of error are mitigated. Even with such codes, however, sources of error must be kept in mind.



If two codes resemble one another in their visual presentation or phonetically, such as “Gran-an” and “Gran-ang,” the diagnosis of richly vascularized granulation tissue may be given for a case of granuloma anulare. Recognition and elimination of such sources of confusion enhances the reliability of histopathologic diagnosis.

Codes must also be written down or spelled out clearly because, in the end,

it depends on the secretaries what appears in the pathology report. The same rules apply to the secretariat as to the microscope desk: pathology numbers and names of patients in the computer and on request forms must be counterchecked, forms that have been completed must be turned over and placed back-side-up, and only the form of the next case should be visible.

If several forms are dispersed across the desk, and the workflow is interrupted by a telephone call or some other event, there is an enhanced risk of incorrect entry of data.

Finally, all reports must be sorted to the referring physicians, and by those physicians to the corresponding patients –

all in all a very complex procedure involving many different persons, all of which may occasionally make a mistake. A clearly structured workflow helps to reduce mistakes and to melt down the iceberg of specimen mix-ups, but does not dissolve it. Therefore, in addition to prevention, detection is important.

Detection

Secretariat
Computer entries

↑

Microscope
Assessment of slides

↑

Laboratory
Correlation of specimens with request forms, blocks, and slides

↑

Operating room
Labelling and dispatch of specimens

In order to be able to detect mistakes, however, some clues must be provided during preceding work steps; without clues, even the best detective has no chance.

AOK | LKK | BKK | IKK | VdAK | AEV | Knappschaft

Name, Vorname des Versicherten

geb. am

Kassen-Nr. | Versicherten-Nr. | Status

Vertragsarzt-Nr. | VK gültig bis | Datum

EINSENDUNGSLABOR FÜR DERMATOPATHOLOGIE

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ICDP-UEMS Training Centre
Qualitätszirkel BV Pathologie Baden

Klinische Beschreibung oder Diagnose

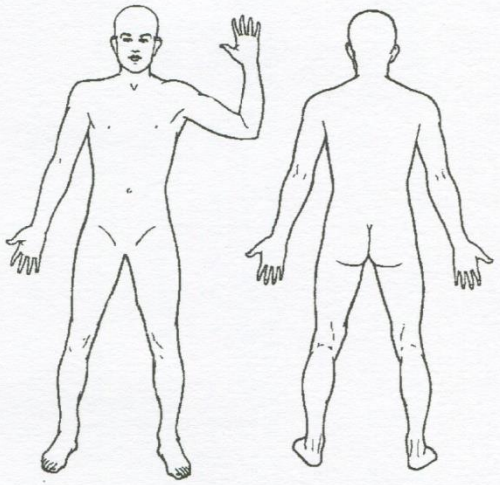
Hautkrebs-Screening
IGEL

14. SEP. 2012

Vor-Histologie? _____

1) NEV re. Arm

2) " Wange



Lokalisation

Vorbehandlung

- [ ] Ausschluss von Malignität
- [ ] Schnittrandkontrolle
- [ ] Komplette Randschnittdiagnostik
- [ ] Immunfluoreszenz
- [ ] Molekulare Diagnostik (PCR/FISH)
- [ ] Zusatzinformationen (Literatur etc.)
- [ ] Nachrichtlich an: _____

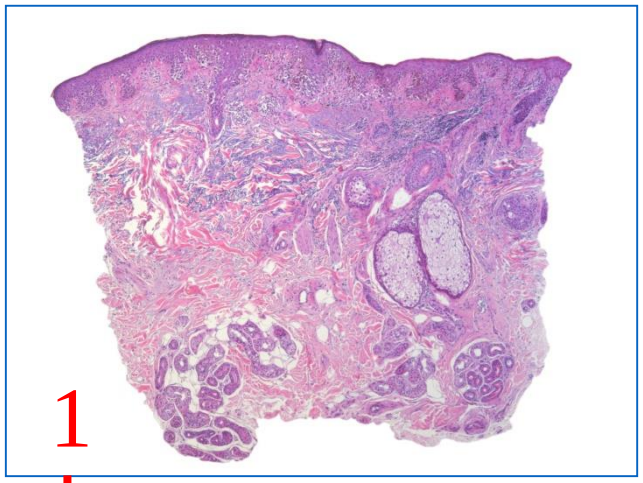
- [x] Totalexzision — 1
- [ ] Teilexzision
- [x] PE — 2
- [ ] Shave
- [ ] Kürettage
- [ ] Kauter

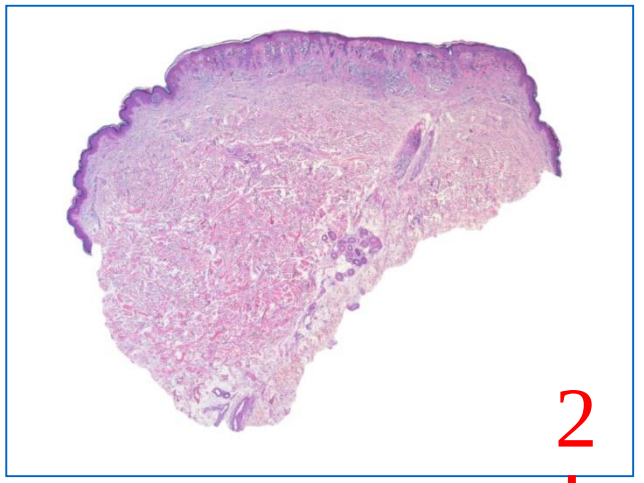
Stempel

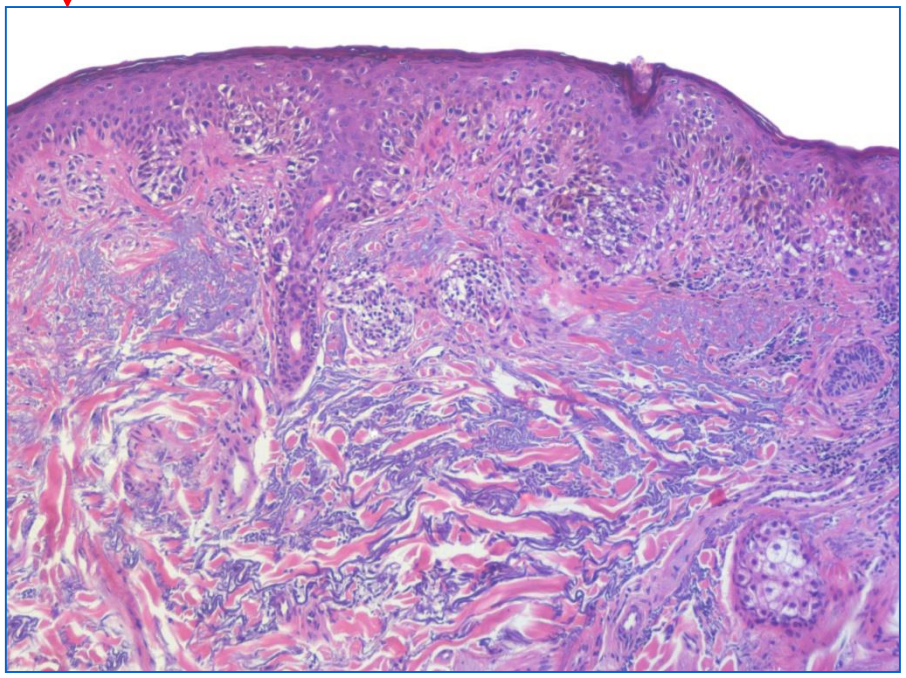
Antrag auf histologisches Gutachten

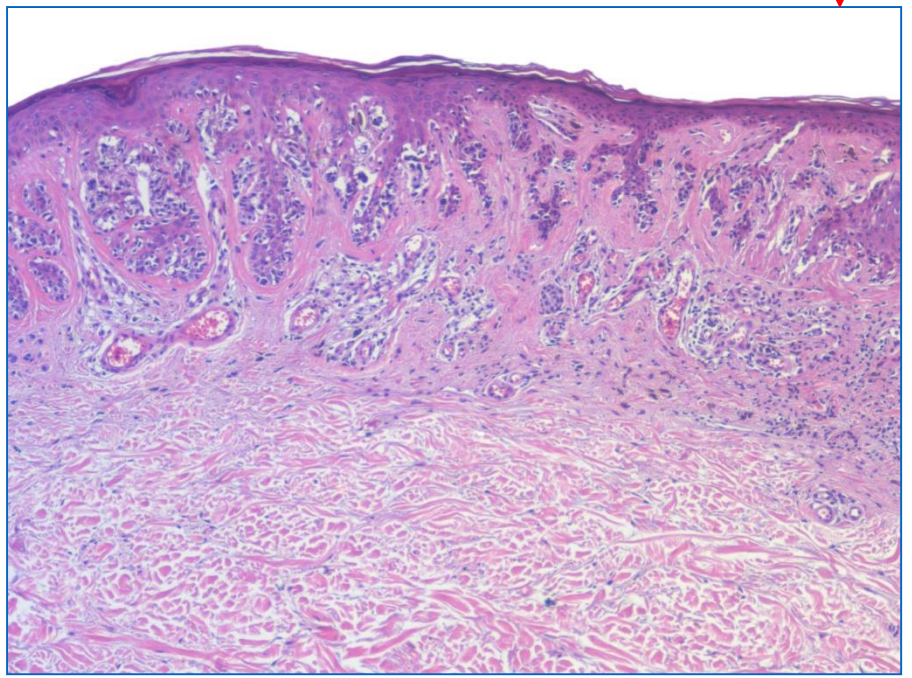
Unterschrift des überweisenden Arztes

One example: we received two biopsy specimens from the same patient under the clinical diagnosis of a nevus, one from the arm and the other from the cheek, one as excisional and the other as incisional biopsy.

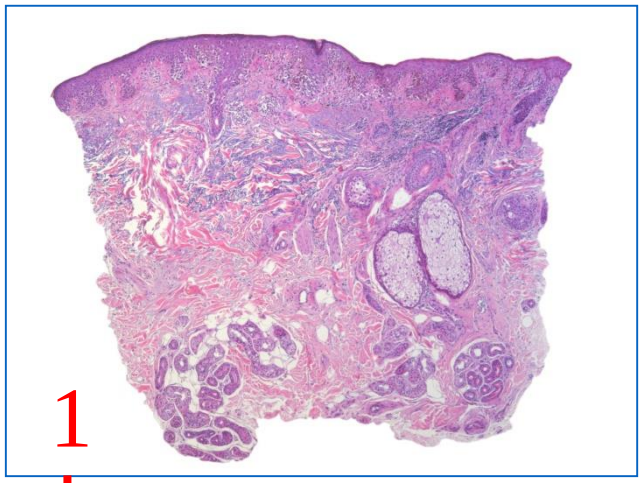


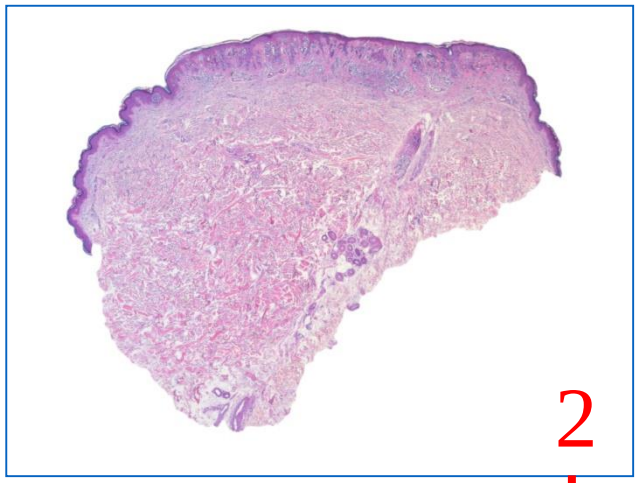


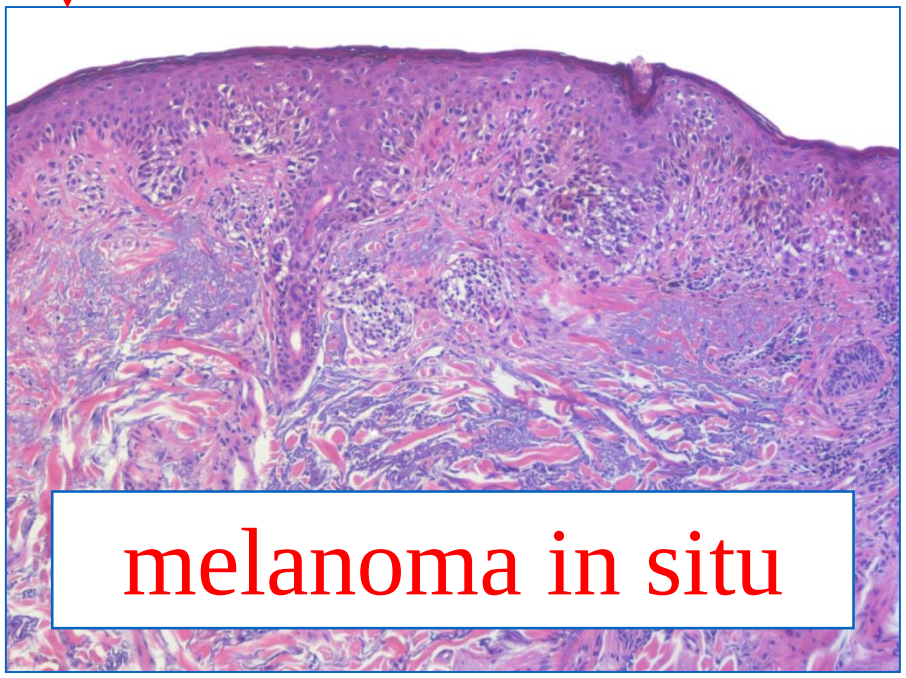


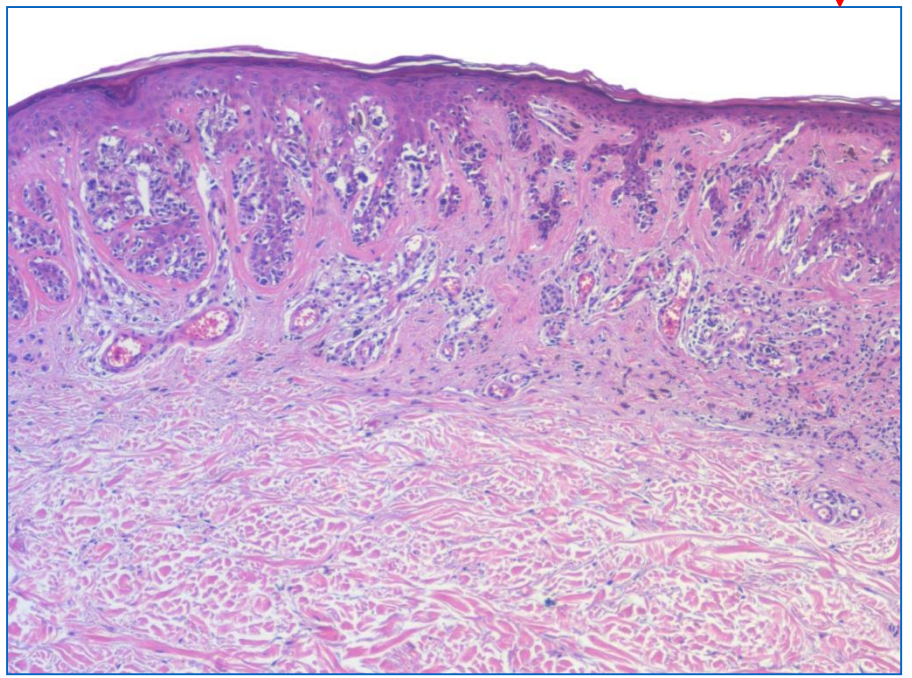


Case 1 showed an intraepithelial proliferation of melanocytes with predominance of solitary melanocytes and some melanocytes above the junction:

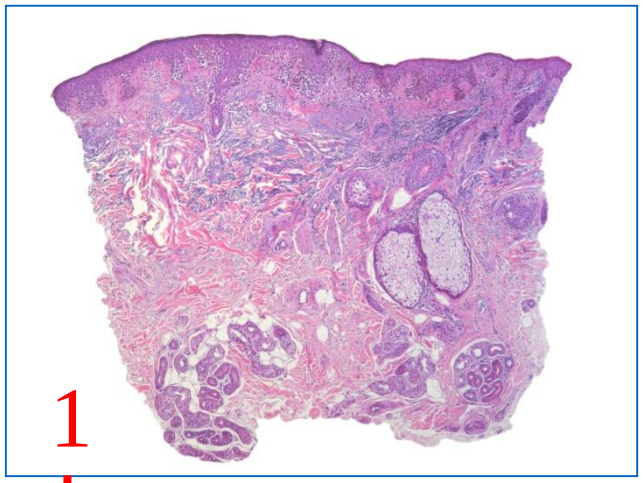


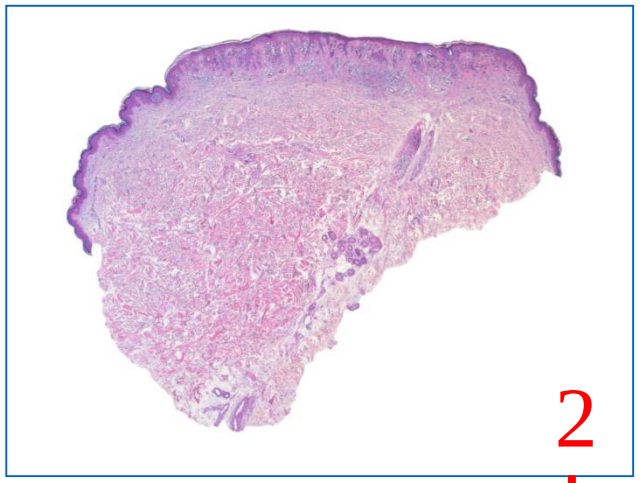


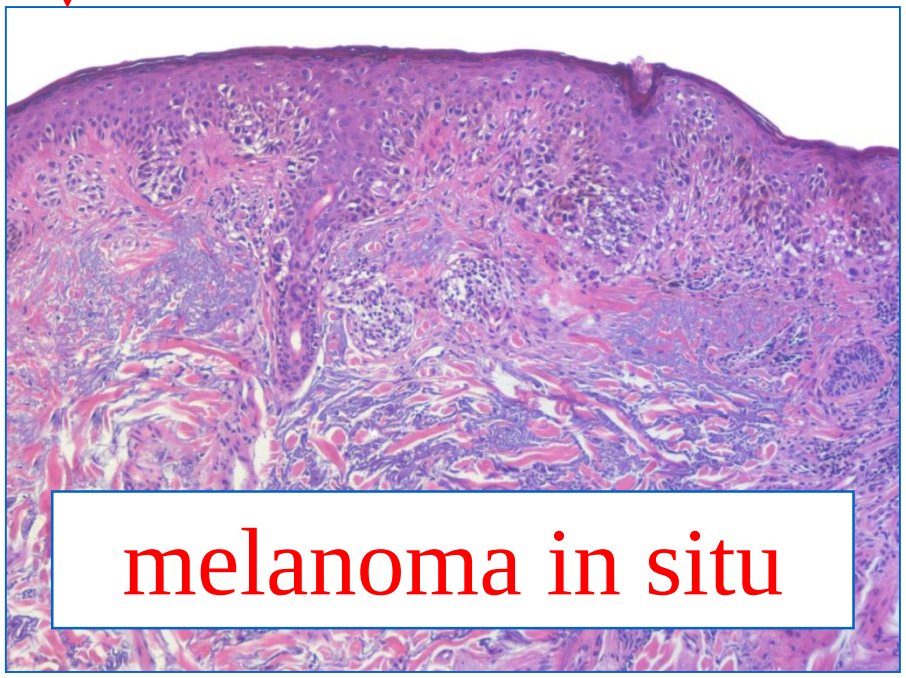


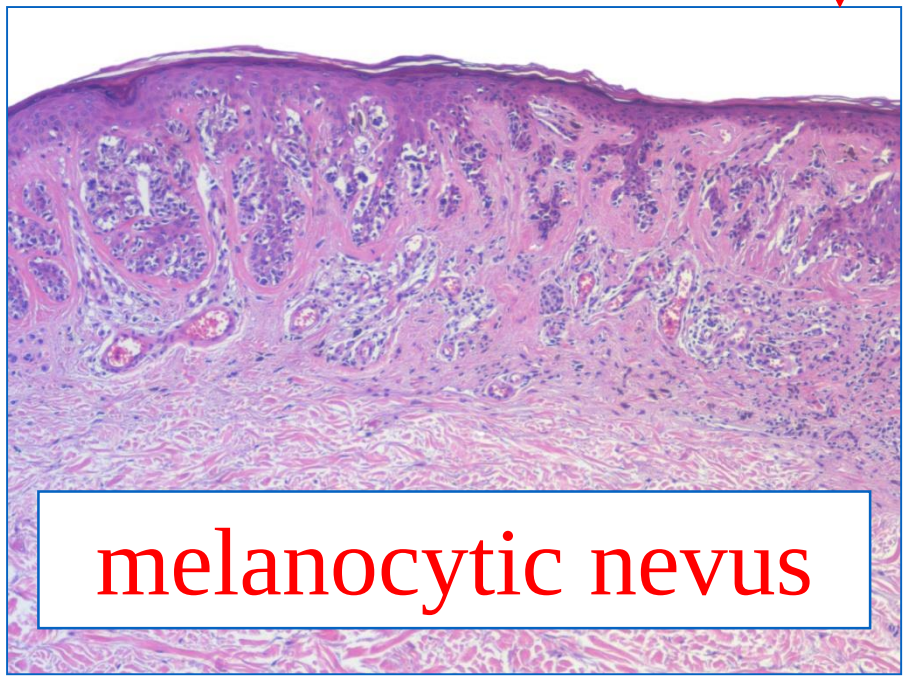


a melanoma in situ. Case 2 showed a symmetrical melanocytic lesion composed of nests of melanocytes at the junction and in the papillary dermis:

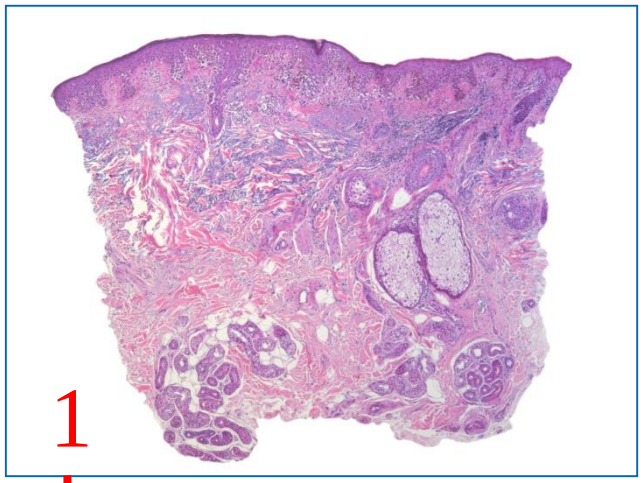




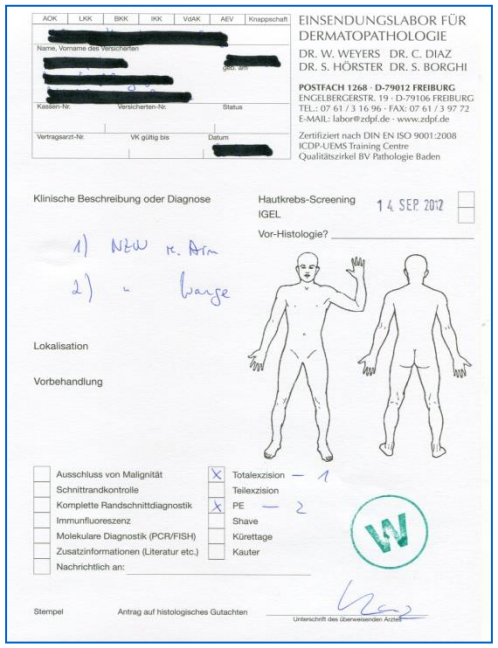


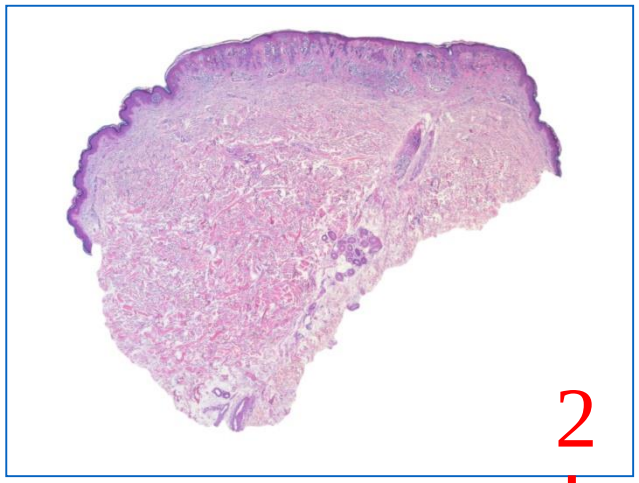


a compound nevus. The first case, however, seems to be a punch biopsy. The specimen showed prominent solar elastosis, and the lesion extends to lateral margins,

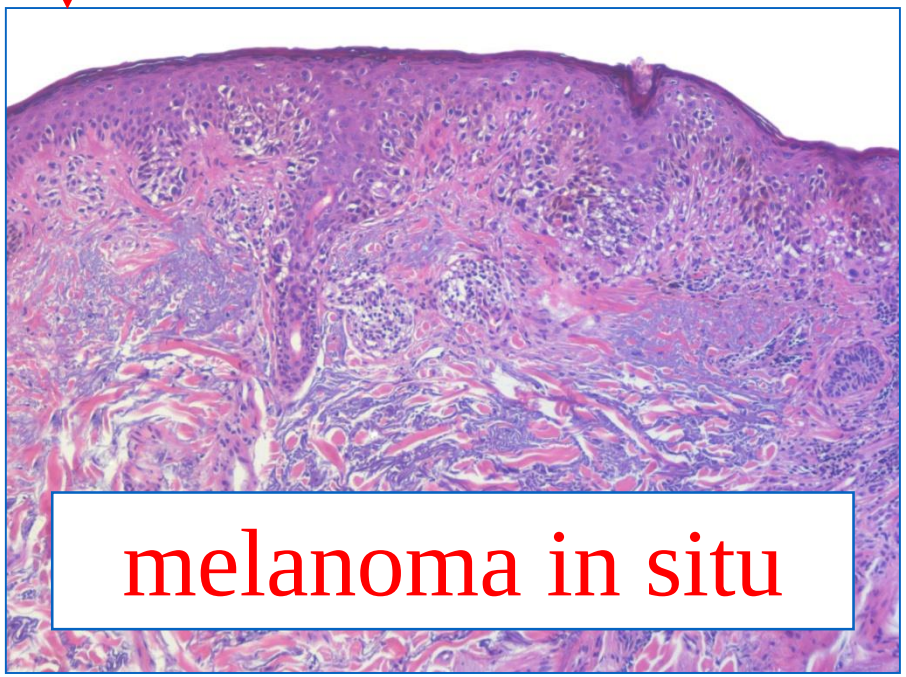


1

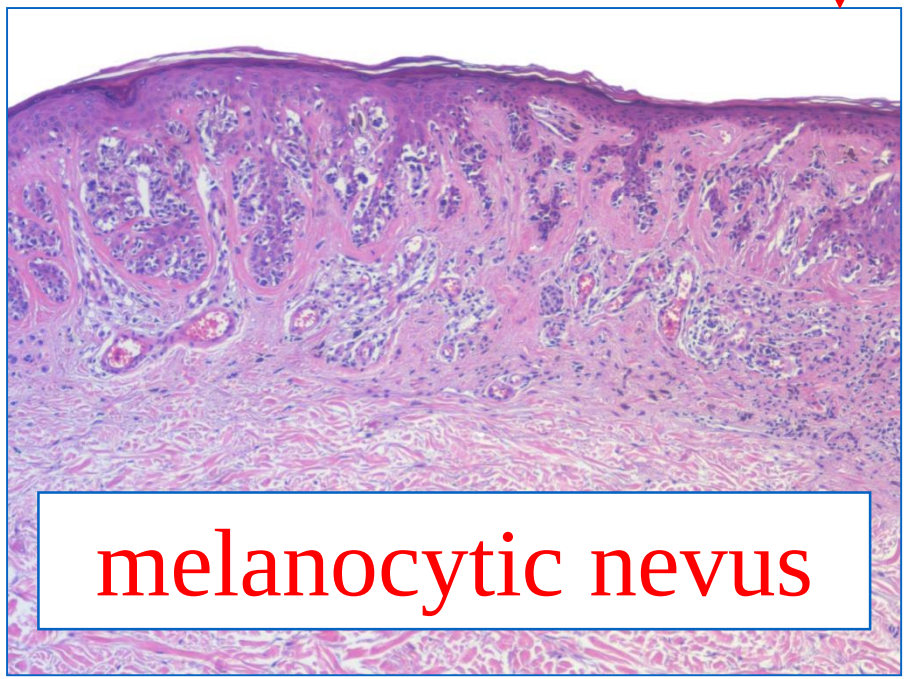




2

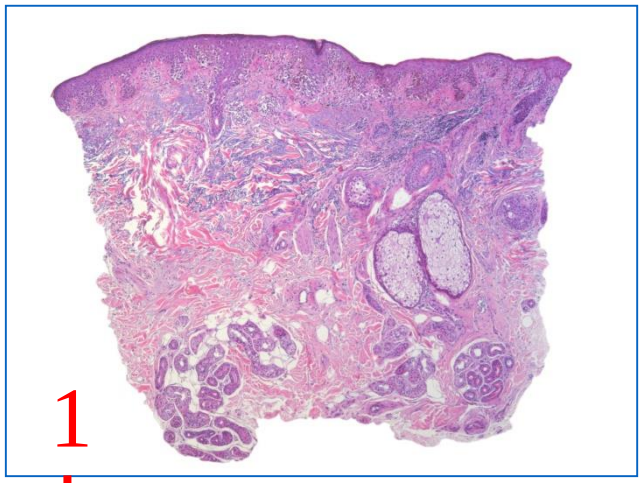


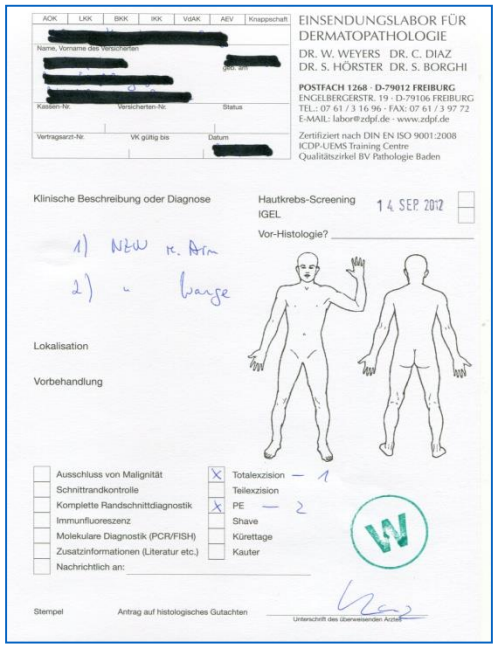
melanoma in situ



melanocytic nevus

although it was said to come from the arm and to have been removed completely. By contrast, the lesion in the second biopsy has been removed completely, and there is no solar elastosis. Evidently, both specimens have been mixed-up, either in the operating room or in the laboratory. Recognition of that mistake is extremely important because, otherwise, a re-excision would be performed for the completely removed nevus on the arm, whereas the incompletely removed melanoma in situ on the cheek would be allowed to grow.

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Zertifiziert nach DIN EN ISO 9001:2008
ICDP-UEMS Training Centre
Qualitätszirkel BV Pathologie Baden

Klinische Beschreibung oder Diagnose

Hautkrebs-Screening
IGEL

14. SEP. 2012

Vor-Histologie?

1) NtW re. Arm
2) " Wange

Lokalisation

Vorbehandlung

- [ ] Ausschluss von Malignität
- [ ] Schnittrandkontrolle
- [ ] Komplette Randschnittdiagnostik
- [ ] Immunfluoreszenz
- [ ] Molekulare Diagnostik (PCR/FISH)
- [ ] Zusatzinformationen (Literatur etc.)
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- [x] Totalexzision — 1
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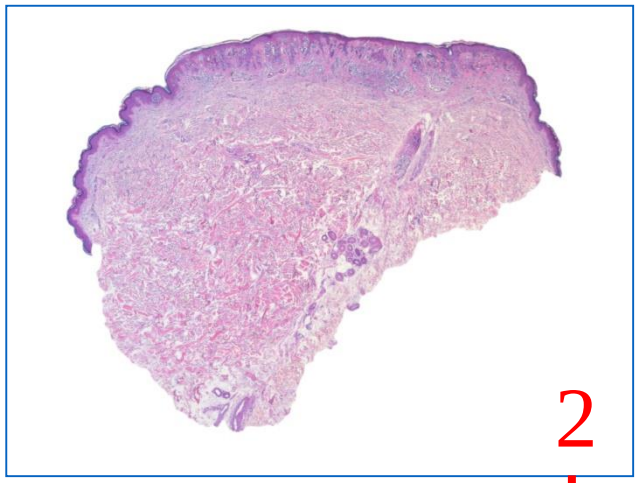
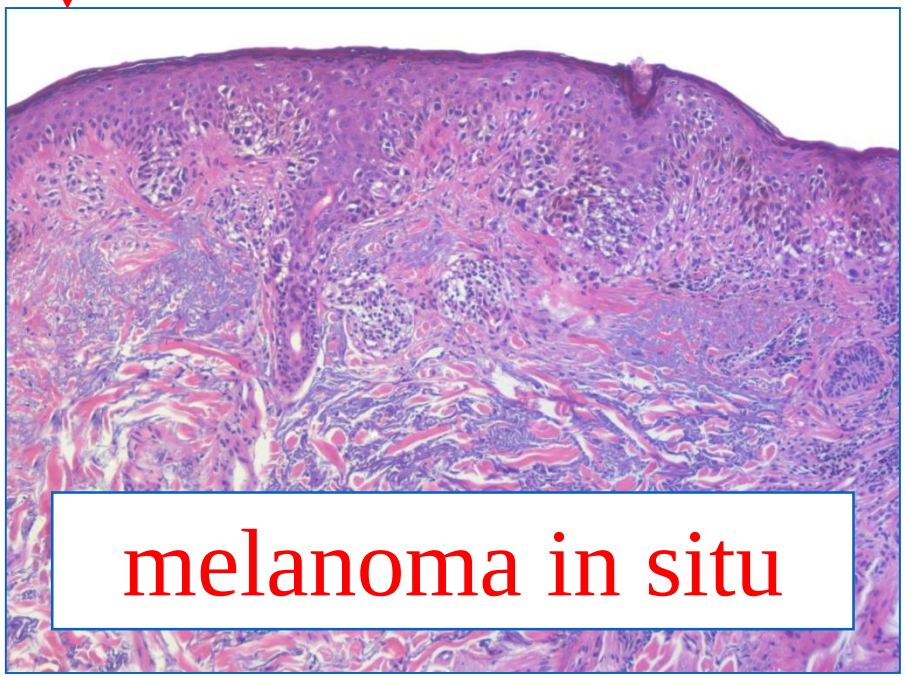
- [ ] Küretage
- [ ] Kauter

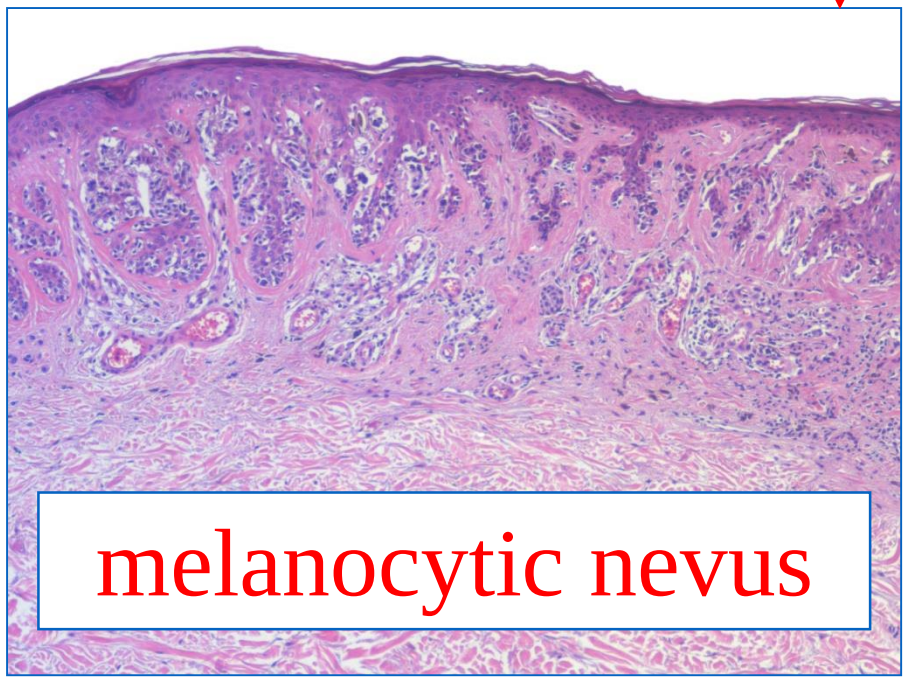
Stempel

Antrag auf histologisches Gutachten

Unterschrift des überweisenden Arztes







Fortunately, the mistake was recognized, but only because of adequate information on the request form. And even with those data, the mistake would probably have gone unnoticed if lesions had been removed by shave technique that often does not the anatomic site to be discerned.
Unfortunately, superficial shave biopsies are becoming more and more common,

AOK | LKK | BKK | IKK | VdAK | AEV | Knappschaft

Privat/Debeka

Name, Vorname des Versicherten

[redacted]

Kassen-Nr. | Versicherten-Nr. | Status

Vertragsarzt-Nr. 181626500 | VK gültig bis / | Datum 22.08.18

EINSENDUNGSLABOR FÜR DERMATOPATHOLOGIE

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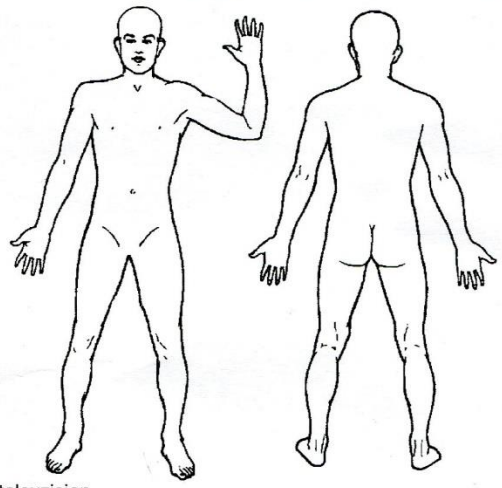
ENGELBERGERSTR. 19 · D-79106 FREIBURG
TEL [redacted] FAX: 07 61 / 3 97 72
E-M[redacted]

H130158-18

23. AUG. 2018

Klinische Beschreibung oder Diagnose

Hautkrebs-Screening
IGEL
§ 115 b – OPS-Code _____
Vor-Histologie? _____



Lokalisation

Vorbehandlung

- ☐ Ausschluss von Malignität
- ☐ Schnittrandkontrolle
- ☐ Komplette Randschnittdiagnostik
- ☐ Immunfluoreszenz
- ☐ Molekulare Diagnostik (PCR/FISH)
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- ☐ Teilexzision
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- ☐ Shave
- ☐ Kürettage
- ☐ Kauter

Stempel

Antrag auf histologisches Gutachten

_____
Unterschrift des überweisenden Arztes

and request forms are often filled incompletely, incorrectly, or not at all. In such instances, a mistake cannot be remedied.

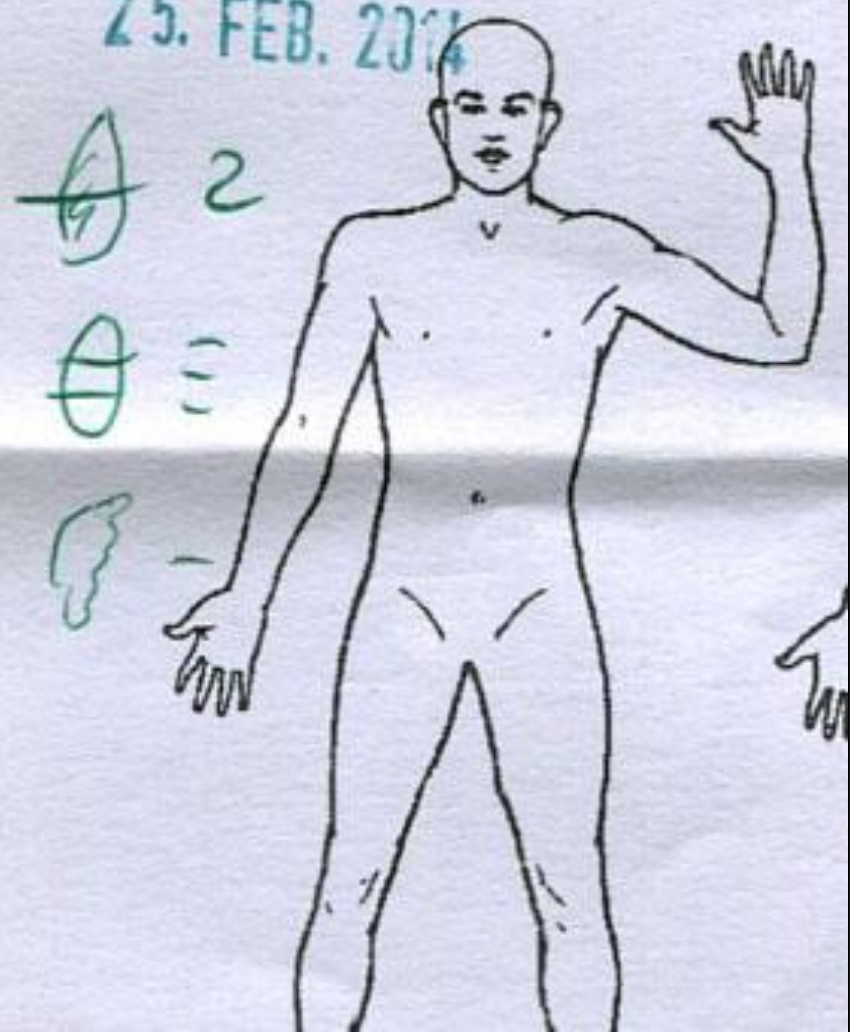
Klinische Beschreibung oder Diagnose

Hautkrebs-Screening

IGEL

Vor-Histologie? _____

25. FEB. 20[illegible]



Lokalisation

Vorbehandlung

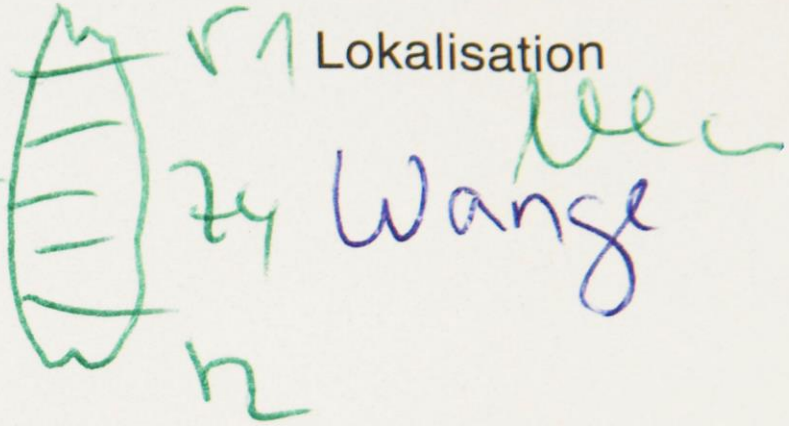
The same is true for unreadable data. If one does not know what a word means, discrepancies between clinical and histopathologic findings go unnoticed. Request forms should be filled by the surgeon him- or herself, thoroughly and readable.

Patientenname

Vor-Histologie? H200488-14

Vorbehandlung

Klinische Beschreibung oder Diagnose



Nachex

FM Sei 9 ½

Basaliom

Clues must also be provided in the laboratory in order to enable occasional mistakes to be detected in subsequent worksteps. A sketch of the specimen is important to demonstrate its size, outline, and how it has been cut.

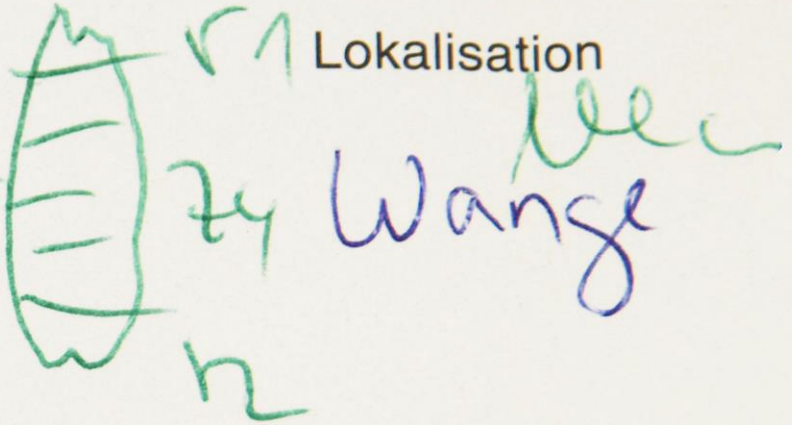
Patientenname

Vor-Histologie? H200488-14

Vorbehandlung

Klinische Beschreibung oder Diagnose

Nachex



For example, if a piece of tissue is missing or supernumerous, e.g., through a mistake during embedding of specimens, this can be noted by consulting the sketch,

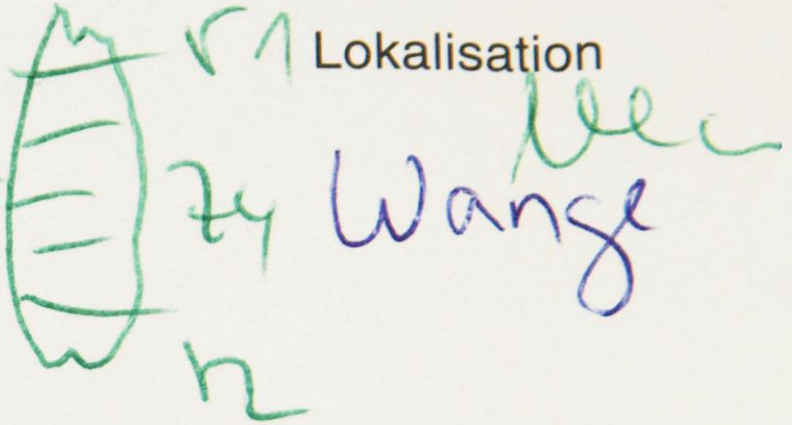
Patientenname

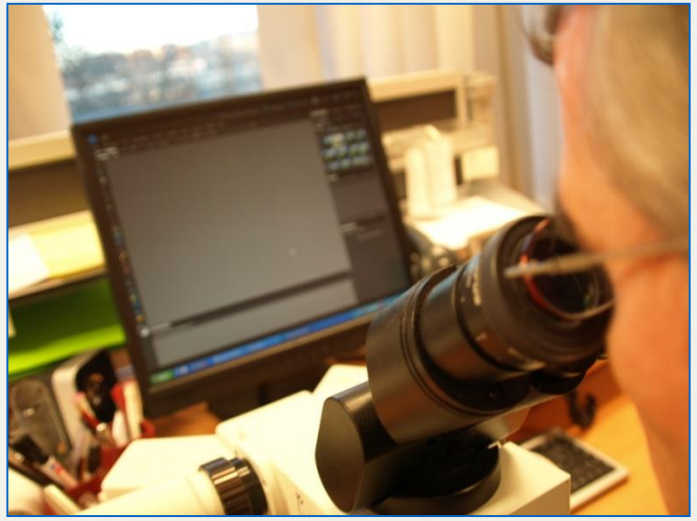
Vor-Histologie? H200488-14

Vorbehandlung

Klinische Beschreibung oder Diagnose

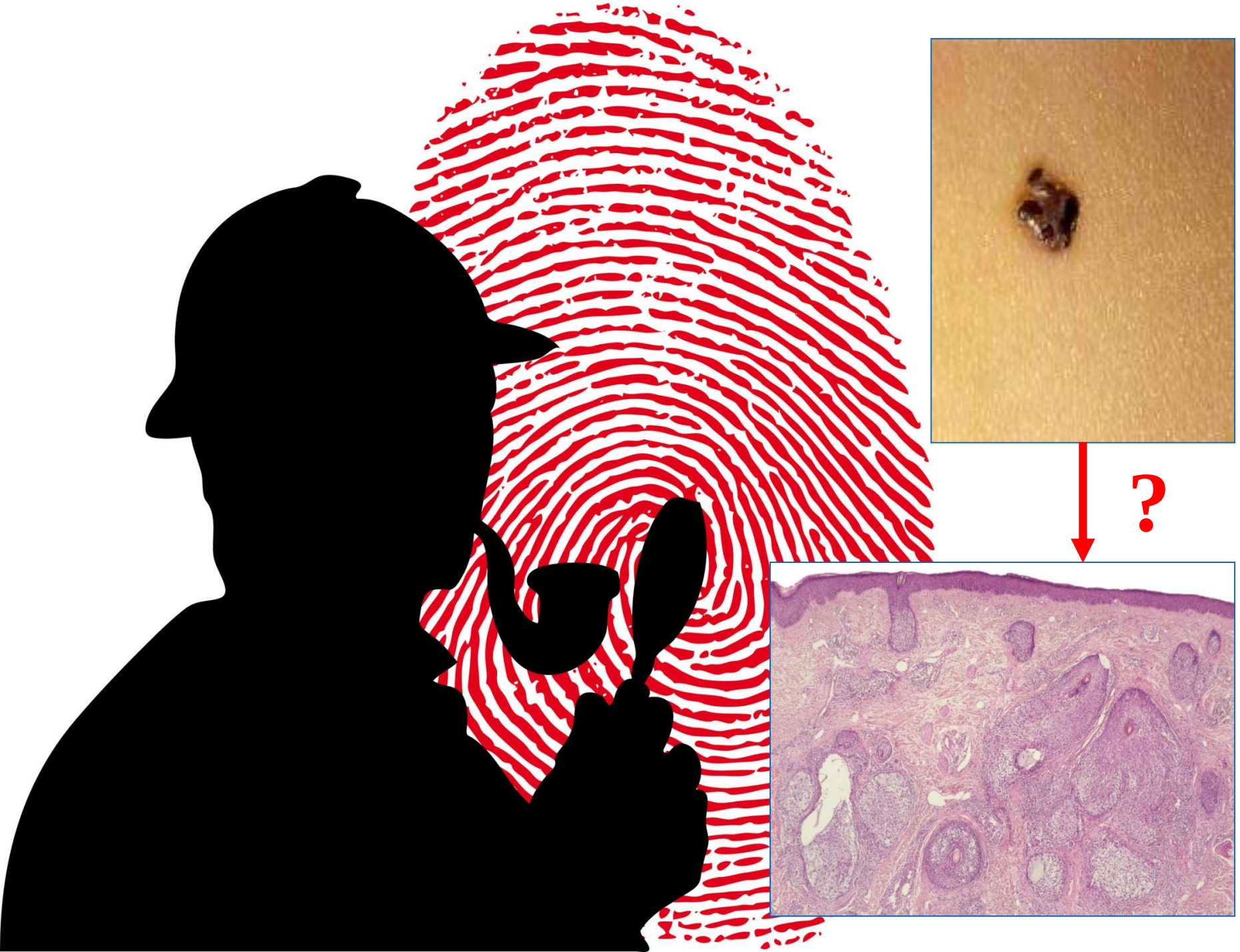
Nachex





and the latter may also help to detect a confusion of specimens when lesions are studied under the microscope. When dictating codes, one should also speak out the name of the patient in order to enable secretaries to notice occasional discrepancies between the name and the pathology number.

If no such clues are provided, the detective is helpless, and mistakes cannot be rectified. At the very end of the chain,



?

the referring physician must remain critical – profound discrepancies between clinical findings and the pathology report are an important clue to a potential mix-up of specimens.

Fehler- und Beschwerdeprotokoll / Labor	Anlage zu Verfahrensanweisung Beschwerden und Einsprüche

Lfd. Nr.	Datum	Fehler/Beschwerde/ Einspruch	Extern/ Intern (E/I)	Arzt/ Praxis/ Gesprächs-partner	Maßnahme	Mitarbeiterin	Labor-leitung	Bemerkungen z.B. Info GF	Erledigt
1	4.12.	Die Praxis hat von 2 Pat.	E	Praxis	Bei der Praxis	Zellmer			✓
		beide Präparate in 1 RÖ verschickt.		Peuc/ Hr. Hörstr.	angerufen und rücksprache mit Hr. Hörstr				
2	4.12.	Praxis Dr. hat von der Pat. Ham Sandra		mit. Praxis tel.	der fehlende Histo-zettel wurde gesucht	Zellmer			✓
		2 Histozettel einge-sandt die wurden			und gefunden und zusammen				
		getrennt bearbeitet.			bearbeitet.				
3	4.12	2 Objektträger wurden falsch im	1		bemerkt beim anschauen und	Michel			
		Wasserbad aufgezogen			somit verbessert				

Ersteller: Zellmer
Name/Unterschrift

Whenever a mistake occurs, it should not only be rectified but also documented. Documentation – with classification of errors in regard to type, site, and measures to prevent them – heightens the awareness of problems and offers the chance to resolve recurrent sources of error.

Awareness of the iceberg of mix-ups is essential. Histopathologists should know about sources of error in the operating room, just as clinicians should know about the workflow and sources of error in the pathology laboratory. If this lecture has contributed to greater awareness and care, this would be more important than sharing triumphs of research, as specimen mix-up may be responsible for more severe misdiagnoses than the obvious misinterpretation of findings.