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Referral of the President of the EPO
regarding the meaning of "diagnostic methods practised on the
human or animal body" within Article 52(4) EPC
amicus curiae brief by Roche Diagnostics GmbH
Our file: RDG 2004-02(A)

On behalf of

Roche Diagnostics GmbH
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we hereby submit the following statement of a third party in
accordance with Article 11(b) of the Rules of Procedure of the
Enlarged Board of Appeal.

1. Introduction

It is our understanding that the main purpose of allowing
"amicus curiae briefs" in procedures before the Enlarged Board
of Appeal (hereafter "EBA") is to provide information and

arguments which may be relevant for the respective procedure, but may not be readily available to the EBA. This may in particular include expertise and practical experience of companies or individuals working in the technical field to which a referral relates.

We therefore first briefly explain to which sector of diagnostic methods the experience of our client refers, then turn to the medical and economic significance of diagnostic methods. We further provide some insight into current development work and results thereof which may be expected within the next few years. Finally we provide arguments regarding the legal questions of the referral.

2. Experience of Roche as amicus curiae in this field of technology

Our client Roche Diagnostics GmbH (Mannheim, Germany) is an affiliate of F. Hoffmann-La Roche AG (Basel, Switzerland). Roche is traditionally known as a pharmaceutical company. It is, however, also an important supplier of a large variety of products used for the analysis of body liquids in the medical field.

It is well known that an important contribution to diagnoses performed by doctors in private practice and in the hospital is the determination of "laboratory values". Most laboratory values are concentrations of molecules or cells (including bacteria and viruses) in a body liquid (mainly blood and urine). There are now several hundreds of tests available to determine a large variety of such laboratory values (also designated "parameters"). Some of these parameters are direct indications of the presence of an infectious agent (e.g. HIV tests). Many others provide an indication that certain medical

problems may exist but the diagnosis of the disease requires additional diagnostic steps (e.g. "tumor markers").

Most tests use biochemical reagents having a sensitivity which is unbelievable to the layman (quantitative analysis of concentrations much below one part per million with a maximum error of less than 10% is not unusual). The reaction of the reagents with the analyte in the liquid sample causes a physical change (e.g. a change of color) which can be evaluated by an instrument to determine the desired analyte concentration. The reagents are provided as reagent kits or integrated into an analysis element (in the form of test strips or test chips). The reagents and the evaluation instruments have to be closely adapted to each other. Therefore it is general practice that both are supplied by the same manufacturer as "analysis systems".

Hereafter we designate this sector of diagnostic methods "medical analytics", because the results of the analyte determinations are interpreted by medical doctors, who deduce from these results decisions concerning medical treatments. Roche is the leading supplier of systems for medical analytics worldwide.

3. Applications of medical analysis systems

Evidently, any treatment of a disease can only be as good as the diagnosis thereof. It is commonplace that early detection of serious medical disorders such as cancer, hepatitis, diabetes mellitus, heart problems or infections provides the best chance for a successful cure.

Also the economic aspect of medical analytics is substantial, e.g. by reducing the recovery period and/or by allowing a

highly specific treatment which may not only be more successful but also less costly.

With respect to the following discussion of arguments concerning the referral questions it is helpful to distinguish different fields of application of medical analysis systems:

- a) Equipment for the health care professionals including (mostly biochemical) test reagent kits and (mostly automatic) evaluation instruments. This includes high throughput automatic analyzers for the centralized analytical laboratory as well as relatively small (desk top) units for "near patient testing" in the doctor's office or the hospital ward.
- b) "Self-monitoring systems" allowing a patient himself to check his status concerning an analyte parameter. The most important example is the self-monitoring of patients suffering from diabetes mellitus. There are more than about 35 million diabetics in the EU, a large proportion of them being insulin-dependent. Comprehensive studies have shown that the risk of very severe late consequences of this disease (such as blindness or the amputation of limbs) is very much reduced if the blood glucose status is controlled and the insulin administration is adapted at least four or five times a day. This must be done by the patient himself using equipment which is sufficiently simple to operate. Simple operation requires highly sophisticated design on the side of the supplier. Another important field of self-monitoring is the routine surveillance of the blood coagulation status of patients treated with anti-coagulation drugs (e.g. Marcumar®).
- c) Non-medical applications of medical analytics. A prominent example is the screening of beef for BSE. The analytical method is very much the same as with other pathogens. Nevertheless, the application is "non-medical" in the sense

that the result is not used for medical treatment. Rather it serves for the protection of consumers. Another example is the application of "medical" analytical methods in criminology. Gene-tests were originally developed for medical purposes such as early detection of pregnancy risks. Essentially the same methods are meanwhile suitable to provide proof that even an extremely small quantity of biological sample (for example a piece of single hair) is from a particular person.

Evidently, the response to the referral questions may be different for these different fields of application. Application a) provides analytical data for physicians as a basis (generally not the only basis) for a diagnosis. Home-monitoring does not serve to diagnose a disease but rather to monitor treatment of a disease which has already been recognized. It is performed by the patient himself, not by a member of the medical profession. Non-medical applications have no relationship to medical questions at all.

The methods and the equipment used for these different applications cannot be clearly distinguished. Identical gene test systems are used for medical purposes and in criminology. Home-monitoring methods in most cases are derived from laboratory methods. In some cases identical test procedures as in the doctor's office are used.

4. Developments of medical analytics relating to the referral questions

4.1 Classical "in vitro"-analysis

Medical laboratory parameters are normally determined "in vitro". The sample is mixed with the reagents in a reaction

vessel and the detectable change is evaluated by the instrument which belongs to the system. None of these steps is performed "on the body". The sample (e.g. blood or other body fluid or cells) is withdrawn before the analytical method starts and the further steps take place inside an automatic machine. In the case of home-monitoring tests the reaction takes place in or on a test strip or other analysis element but otherwise the situation is the same: no step is performed on the body.

Inventions referring to such in vitro determination of medical laboratory parameters can in most cases be protected by product claims. Even in cases where certain method steps are critical and therefore method claims are appropriate, such methods are not excluded from patentability by Article 52(4), since none of the steps takes place on the body.

4.2 Recent developments

During the last few years substantial research efforts have been devoted to new analytical methods which will lead to substantial improvements of analytical tools available to the patients and to the medical profession. Some of these recent developments, however, are of such nature that the responses to the referral questions may be critical with respect to their possible exclusion from patent protection.

a) "Integrated" home-monitoring systems

In traditional home-monitoring a drop of blood required for the analysis is normally generated by pricking the finger tip with a lancet device. Then the finger is moved towards a test strip and the drop of blood is transferred. Afterwards the analysis takes place. Thus, two separate devices are used for pricking the finger (lancet device)

and for providing the analysis (analysis system with test strips and evaluation instrument). Patent protection is possible because lancet devices can be covered by product claims and the operation of the analysis system is remote from the body.

In order to increase the ease of handling for the patient and the reliability of the results "integrated systems" are under development which combine the functions of these two devices. If a single device is used to prick the finger, take up the drop of blood and perform the analysis, the question of exclusion from patentability on the basis of Article 52(4) could arise. In particular, an invention may involve the steps (automatically performed by the instrument) of pricking and transferring the blood for analysis (sampling step). The sampling step is performed on the body.

b) Non-invasive methods

Medical analyses are normally invasive in the sense that a sample (like blood) has to be withdrawn from the body by means of a syringe or (at least) by finger pricking. A substantial amount of research has been attributed to methods avoiding such painful invasive steps.

Most of these new methods are based on irradiating light through the skin surface into the body and detecting secondary light leaving the body after interaction therewith. In principle, spectroscopic evaluation of the secondary light may be used. Alternative methods are based on detection of the intensity distribution of secondary light in the vicinity of the irradiation point.

Evidently, these methods are performed on the body and require interaction therewith as part of the method.

c) Decision support systems

Modern analytical and diagnostic tools allow collection of a large amount of data about a particular patient. The decision whether these data have to be considered as pathological is, however, currently outside the possibilities of automatic systems used in medical analyses. Rather the doctor evaluating such data has to have a comprehensive and complex knowledge to draw correct conclusions from the data before him. Thus, only the knowledge of the medical expert allows to draw from the diagnostic data conclusions which lead to a correct diagnosis and a resulting treatment.

It is becoming more and more difficult for doctors to have the constantly increasing amount of required knowledge present by the time a decision is needed. Computers are the means which can help to digest and interpret the data flood. The aim is to provide decision support systems for the medical profession which "refine" the analytical and other diagnostic data by applying up-to-date factual knowledge. This does not mean that the decision is made by the computer. Rather the data provided to the doctor are lifted to an evaluated level of decision preparation.

This can be compared to the usual practice to provide (statistical) threshold values of medical laboratory data. Knowing that the majority of people has a cholesterol value of less than 200 does not necessarily mean that treatment is required if the cholesterol of a patient is above this value. Rather the statistical thresholds are not more than an aid for the doctor in evaluating the

data. In a similar manner, but at a much higher level, computerized decision support systems can help to take into account a combination of diagnostic data and current knowledge for making a diagnostic (and resulting therapeutic) decision.

The referral questions can be critical for method claims covering the operation of such systems - even if it is completely automatic - because cases may exist where at least one step of data collection is performed on the body and the decision support system performs a plurality of steps on the path to the final diagnosis.

A common feature of these three recent developments is that all of them are highly desirable from a medical point of view. Integrated home-monitoring systems and non-invasive analytical tools will allow an easier, more reliable or even painless determination of control parameters for millions of patients. Chances of patients suffering from diabetes to maintain a good status of health without the above-mentioned severe late consequences (including e.g. loss of eyesight) are improved by such analytical tools. Decision support systems may be suitable to improve the reliability of diagnosis and thereby avoid damage which can be caused by diagnostic errors.

5. Arguments for a narrow understanding of the exclusion of diagnostic methods

Amicus curiae Roche supports a narrow understanding of the exclusion of diagnostic methods. Taking into account the facts submitted supra we ask the EBA to consider the following arguments when preparing a response to the referral questions.

5.1 Patentability exceptions should be interpreted narrowly.

5.1.1

In its decision concerning the "second medical indication" the EBA discussed Article 52(4) EPC in the context of therapeutic methods. The Reasons contain the following statement (G 5/83, section 22; OJ 1985, 64, 66):

"The intention of Article 52(4) EPC ... is only to free from restraint non-commercial and non-industrial medical and veterinary activities. To prevent the exclusion from going beyond its proper limits, it seems appropriate to take a special view of the concept of the "state of the art" defined in Article 54(2) EPC."

Thus:

- Article 52(4) has no other purpose than to avoid restraint on non-commercial and non-industrial medical and veterinary activities.
- Care must be taken that the exclusion does not extend beyond these limits. This principle was even considered important enough to "take a special view on other provisions of the EPC".

5.1.2

The rule that exceptions in legal texts should be construed narrowly seems to be generally accepted. The commentary "Patentgesetz mit EPÜ" by Schulte, 6th edition, contains the following statement (§ 5 No 21 with reference to G 5/83 and three decisions of Technical Boards of Appeal of the EPO:

"Ausnahmeregelung: § 5(2) und Art 52(4) EPÜ sind Ausnahmeregelungen und daher eng auszulegen".

If a legislator gave a general rule (like Article 52(1): to grant patents for inventions which are new, non-obvious and industrially applicable) it seems reasonable that any exceptions should be limited to narrow boundaries. Thus, an exception should only be applied if it is necessary in view of the rationale behind it.

5.1.3

Research for new methods of medical analytics takes place almost exclusively in companies, i.e. in the private sector. Privately financed research is practically impossible without patent protection. Therefore, any partial sector which is exempt from patent protection will have only very limited financial funds for further research.

Occasionally, concerns are voiced in the public that patents have to be considered as obstacles to the health care sector. Such statements are for example made in the context of supplying third world countries with badly needed AIDS medication. This concern is wrong, because without patents the AIDS medication in question would not exist. It was privately financed because patent protection was available.

In the field of diagnostics patent protection is of particular importance for small start-up companies developing new technologies. These developments in general take place under patent protection, i.e. key patents covering the novel technology. The results of this research are frequently offered by the start-up companies to large companies having the potential to further develop the new technology into a commercial product. The funds paid by the large companies (which can be very substantial, up to several hundred million Euro) are the ultimate driving factor for the research of many start-up companies. The main reason for a large company to pay

such a high price is access to patent-protected new technologies.

Our client has made a substantial number of such acquisitions. They are for the benefit of all parties concerned. For the start-up companies they are the well-deserved reward for difficult and risky research and an incentive for starting new projects. For the large company they are a very important basis of future business. As a result of such acquisition, new and/or improved diagnostic tests are made available for the public.

In our opinion, in the field of diagnostics patent protection is even more important for the smaller companies than for the big enterprises. A big company can also compete on the basis of other factors such as its resources (for example its own production of genetically engineered biochemicals), its know-how or its market penetration. A smaller company can compete (either alone or in cooperation with a major partner) only if its research results are protected by patents.

5.1.4

A counterargument which is occasionally voiced against a narrow interpretation of the diagnostic method exception is that most inventions in this field can be covered by product claims and that diagnostic products are clearly patentable in view of the last sentence of Article 52(4). We do not agree to this argument.

Product protection is not always possible. There are cases where the nucleus of the invention refers to typical method features such as a particular sequence of steps or a particular timing. This may refer to the interaction between

the device and the body. In such cases it may not be possible to draft product claims.

Inventions which can better or only be expressed with method claims can be just as valuable as apparatus inventions. There is no reason to assume that the benefit for the health care sector is better for one as compared to the other. On the contrary, some of the new and - from a medical point of view - highly interesting developments of medical analytics discussed supra (section 4.2) include interaction of body and instrument which will typically be expressed by method claims.

5.1.5

Thus, in summary, both the legal tradition and strong practical arguments speak in favor of a narrow interpretation of the patentability exception of Article 52(4).

5.2 Ratio legis

5.2.1

As summarized in the first paragraph of section III of the referral, each of the contradicting TBA-decisions "worked on the assumption that the policy behind the exclusion of the methods referred to in Article 52(4) EPC from patent protection was that those who carry out such methods as part of the medical treatment of humans or animals should not be inhibited by patents (see T 385/86, Reasons 3.2; T 964/99, Reasons 3.1)".

This statement is similar but not identical to the citation from G 5/83 reproduced in section 5.1.1 above. In G 5/83 the EBA used a more narrow definition for those who should be free

from restraint by mentioning that only non-commercial and non-industrial medical activities need to be protected. It can be assumed, however, that there is no difference in substance, since no reason is apparent to extend the exemption to commercial and industrial activities.

Many other TBA-decisions confirm the same ratio legis. Thus it seems safe to say that this is undisputed.

The critical question is: How can the goal of the legislator be fulfilled without hampering more than unavoidable the general patent granting rule of Article 52(1)? In more practical terms: How can the non-commercial activities of physicians (and other members of the medical profession) be protected from limitations by patents, while simultaneously maintaining the incentive provided by patent protection for future diagnostic inventions which may be valuable for the general public?

5.2.2

It is interesting to note how the same goal was fulfilled in the case of pharmaceutical compounds (medicaments). Patent protection for substances or compositions used (inter alia) for the treatment of diseases is specifically available according to Article 52(4), last sentence. The EPC legislator even considered patent protection for medicaments so important that Article 54(5) establishes a novelty fiction for substances or compositions which were known before but are used for the first time in the medical context (first medical use). As a logical consequence, the EBA allowed claims directed to a second medical use by its decision G 5/83.

Inhibition of the medical profession by these provisions is limited only by national law and (when enacted) by Article 27

CPC according to which the patent rights shall not extend to "the extemporaneous preparation for individual cases in a pharmacy of a medicine in accordance with a medical prescription or acts concerning the medicine so prepared". Evidently, this is a very narrow exception allowing only what is needed: To protect the non-commercial activity of a physician.

With respect to methods of treatment and diagnostic methods the EPC legislator chose a different approach by introducing an exception from the general patenting obligation of Article 52(1). The comparison with the case of drugs confirms, however, that this provision should be interpreted in such a manner that the effect is limited to what is mandatory for the required protection of non-commercial activities of the medical profession.

6. Disclaimer solution

The ratio legis can, in the opinion of amicus curiae Roche, best be fulfilled by allowing to disclaim non-commercial and non-industrial medical and veterinary activities from the scope of protection.

In borderline cases it seems practically impossible to positively define which method claims relating to diagnostics and involving steps performed on the body should be allowed. In order to avoid that - as stated by the EBA in G 5/83 - "the exclusion goes beyond its proper limits" the best solution is to allow a language in patent claims of borderline cases which corresponds as closely as possible to the ratio legis of Article 54(2). In G 5/83 the EBA ruled that this ratio legis is only to free from restraint non-commercial and non-industrial medical and veterinary activities. A disclaimer

achieves exactly this result while avoiding undesired effects such as excluding from patentability method claims covering medically desirable new diagnostics developments as for example those discussed in section 4.2 above.

Such a disclaimer solution relating to Article 52(4) is favorably discussed in the literature. The citation from the German commentary Schulte mentioned in section 5.1.2 refers to Article 52(4) EPC and continues as follows:

"Vom Patentschutz werden nur Verfahren ausgenommen, die *ausschließlich* zu Heilzwecken in einem nicht gewerblichen Bereich angewendet werden. Ist das Verfahren auch im gewerblichen Bereich durchführbar, ist es insoweit patentfähig, wenn die mögliche gewerbliche Anwendbarkeit von dem Heilverfahren iSd ... Art 52(4) EPÜ klar und objektiv abgrenzbar ist. Das kann durch die Aufnahme eines *disclaimers* erreicht werden, wenn dieser die Erfindung eindeutig auf den gewerblichen Bereich beschränkt."

Schulte refers inter alia to two TBA-decisions. While the statement refers to therapeutic methods the same should be true for diagnostic methods. The proposed disclaimer language is both clear and unambiguous. Its main advantage is that it avoids taking away the incentive of patent protection from valuable diagnostic developments.

7. Arguments of T 964/99

The main reasons why in T 964/99 the TBA came to conclusions deviating from T 385/86 are summarized in sections 3.5 and 3.6 of the Reasons of that decision.

7.1 Semantic interpretation of "diagnostic methods"

7.1.1

According to T 964/99 the earlier decision was wrong in examining the meaning of the noun "diagnosis" in place of the adjective "diagnostic" used in the legal term "diagnostic method". It seems that the Board deciding in T 964/99 accepts that "diagnosis" refers to a process which includes all steps leading to diagnosis of a disease. However, the adjective "diagnostic" has (as discussed in section 4.2 of the Reasons of T 964/99) a broader meaning, namely "of or pertaining to diagnosis" or "of value for the purpose of diagnosis".

In this context T 964/99 cites several dictionary definitions of "diagnostic" which, however, seem not to be unambiguous. In particular, the citation from the French dictionary "Le Petit Robert" is "action de déterminer une maladie d'après ses symptômes" which seems to be in favor of the position taken in 385/86.

The conclusion of T 964/99 is the following statement:

"Although the term "diagnostic" as such may be interpreted as encompassing all steps required for reaching a medical diagnosis, it appears that it can also define an individual step of a diagnostic examination when used in the expression 'méthodes de diagnostic'." (emphasis added).

Thus, even according to T 964/99 there is not a clear semantic interpretation of "diagnostic method" supporting either of the two possibilities ("all steps" or "one step"). In this situation further conclusions should not be based on any one of the possible interpretations of the legal wording. Rather, it seems appropriate to refer to other means of interpretation of the law, in particular the ratio legis which - as noted

supra - does not support a broad interpretation of the patentability exception.

7.1.2

In this context it may be of interest to note how a major dictionary uses the term "diagnostic". In the appendix we enclose a collection of definitions given in the 2003 edition of Webster's Collegiate Dictionary. The definitions of "diagnosis" and "diagnostic" essentially correspond to the Oxford English Dictionary cited in T 964/99 (Reasons 4.2).

The electronic edition of a dictionary, however, also allows looking for the use of terms such as "diagnostic" in definitions of other "entry words". For example, the entry "scintigraphy" is defined as "a *diagnostic* technique" and "ultrasound" refers to "the *diagnostic* or therapeutic use of ultrasound and especially a non-invasive technique...". An "endoscope" is defined as instrument "for *diagnostic* or therapeutic purposes" and the verb "explore" is defined as "to examine especially for *diagnostic* purposes". Finally, "HIV" is defined as an infect "causing the marked reduction of helper T cells in their number that is *diagnostic* of AIDS". None of these citations support the broad understanding of the term "diagnostic methods". Wherever "diagnostic" is used in the sense of "relating to, or used in diagnosis" it is combined with nouns other than "method", such as "technique", "use" or "purposes".

As can be seen from this, a narrow understanding of "diagnostic method", as adopted by T 385/86, finds at least as much support in the dictionary as a broad understanding.

7.2 Manual procedures

In T 964/99 the Board states:

"... a strict adoption of the principles set out in T 385/86 would lead to the conclusion that typical diagnostic procedures practised on the human body, like percussion, auscultation or palpation could, in principle, be patentable because they do not constitute a complete diagnosis and certainly do not fall within the further medical categories of surgery and therapy referred to in Article 52(4) EPC."

We agree that this "... would go against the spirit of Article 52(4) EPC".

We do not agree, however, with the conclusion derived therefrom, including the broad definition of the exclusion from patentability as given in the second headnote of T 964/99:

- The mentioned manual procedures (percussion, auscultation or palpation) are clearly not susceptible of industrial application and therefore are not inventions as defined by Articles 52(1) and 57. Patent protection for these typical manual techniques used by physicians is therefore excluded by other provisions of law.
- If, in borderline cases, it is necessary to make sure that a method claim in diagnostic context does not extend to activities of the medical profession, this can be achieved by a disclaimer as suggested.
- The solution chosen by T 964/99 involves a strong risk to exclude inventions from patent protection which - in their nucleus - refer to the automatic operation of a machine but include steps which - at least theoretically - could be performed by a physician on the body of a patient. This result is undesirable in view of the importance of patent protection as incentive for new developments in all fields of art including medicine.

7.3 Different standard compared to methods of surgery or therapy

In section 3.6 of the Reasons of T 964/99 the concern is expressed that the narrow interpretation of the diagnostic method exception adopted by T 385/86 amounts to setting a different standard for diagnostic methods as compared to methods of surgery or therapy. The latter are excluded from patent protection even if they only comprise a single step of surgical or therapeutic nature, whereas T 385/86 applies the patentability exclusion only, if all steps of a diagnostic process are included in the patent claims.

In this context we note that the language of the legal provision is not identical. Surgical and therapeutic methods are excluded, if "*for treatment of the human or animal body*". Diagnostic methods are excluded only if "*practised on the human or animal body*". This seems to indicate that the legislator took special care to avoid an overly broad exception in the case of diagnostics where the probability that the exception from patentability could extend beyond its proper limits may be higher than in the field of therapy and surgery (where - on the other hand - the risk to hamper the activities of the medical profession may be higher).

Furthermore it should be noted that in the field of therapy by far the most important commercial and industrial activity is the development and production of medicaments for which patent protection is available on the basis of special legal provisions discussed supra (section 5.2.2). Patent protection for medicaments could, in practice, be considered as a substantial limitation to the "freedom of therapy". This limitation was, however, accepted by the legislator in view of the substantial benefit of patent protection as incentive of

privately financed research. For exactly the same reason great care should be taken when interpreting the legal provision concerning the exception of diagnostic methods.

Finally, even if there should remain a minor difference of standards, it seems not appropriate to close this gap by applying the diagnostic method exclusion beyond its proper limits. Rather reconsideration of the corresponding standards in the case of therapeutic and surgical methods may be appropriate in some cases. This may, for example, apply to the integrated home-monitoring systems discussed supra (section 4.2a). The operating method of an automatic device handled by the patient himself and including the step of pricking the finger is in danger of being excluded from patentability as a surgical or as a diagnostic method. No matter what the basis of exception from patent protection is, in effect such exception would reduce the chances of further development of such medically desirable systems. In any case the exclusion is not required to protect the activities of the medical profession and therefore extends beyond its proper limits.

8. Summary

Amicus curiae Roche endorses the interpretation of Article 52(4) by T 385/86 and confirmed by many later TBA-decisions.

Any exception from patentability which extends beyond its proper limits is detrimental to the research and development in the field of diagnostics because it takes away the incentive for privately financed research provided by patent protection. In particular some currently ongoing developments may suffer from a broad interpretation of the patentability exception, but are highly desirable from a medical point of view.

The goal to draw the proper borderline seems to be best achieved by adopting the reasoning of T 385/86.

In case the enlarged Board of Appeal should arrive at the conclusion that the "all steps requirement" (referral question 1a) cannot be accepted in view of any remaining risk to hamper activities of physicians or other members of the medical profession, this problem can be solved by a suitable disclaimer.



Dr. Pfeifer
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Appendix:

Summary of definitions from Webster's Collegiate Dictionary
(2 pages)

Main Entry: di-ag-no-sis
Pronunciation: ,di-ig-'nō-səs, -əg-
Function: *noun*
Inflected Form: *plural* di-ag-no-ses \-,sēz\
Etymology: New Latin, from Greek *diagnōsis*, from *diagignōskein* to distinguish, from *dia-* + *gignōskein* to know — more at KNOW
Date: 1655

1 a : the art or act of identifying a disease from its signs and symptoms **b :** the decision reached by diagnosis
2 : a concise technical description of a taxon
3 a : investigation or analysis of the cause or nature of a condition, situation, or problem < *diagnosis* of engine trouble > **b :** a statement or conclusion from such an analysis

Main Entry: idi-ag-nos-tic
Pronunciation: -'nās-tik
Variant: *also* di-ag-nos-ti-cal \-ti-kəl\
Function: *adjective*
Date: 1625

1 a : of, relating to, or used in diagnosis < a *diagnostic* tool > **b :** using the methods of or yielding a diagnosis < *diagnostic* tests >
2 : serving to distinguish or identify < a *diagnostic* feature >
 -di-ag-nos-ti-cal-ly \-ti-k(ə-)lə\ *adverb*

Main Entry: scin-tig-ra-phy
Pronunciation: sin-'ti-grə-fē
Function: *noun*
Etymology: *scintillation* + *-graphy*; from the scintillation counter used to record radiation on the picture
Date: 1958

: a diagnostic technique in which a two-dimensional picture of internal body tissue is produced through the detection of radiation emitted by a radioactive substance administered into the body
 -scin-ti-graph-ic \sin-tə-'gra-fik\ *adjective*

Main Entry: **ul-tra-sound**
Pronunciation: 'ɔl-trə-ˌsaʊnd
Function: *noun*
Date: 1923

1 : vibrations of the same physical nature as sound but with frequencies above the range of human hearing
2 : the diagnostic or therapeutic use of ultrasound and especially a noninvasive technique involving the formation of a two-dimensional image used for the examination and measurement of internal body structures and the detection of bodily abnormalities — called also *sonography*
3 : a diagnostic examination using ultrasound

Main Entry: **en-do-scope**
Pronunciation: 'en-də-ˌskɒp
Function: *noun*
Etymology: International Scientific Vocabulary
Date: 1861

: an illuminated usually fiber-optic flexible or rigid tubular instrument for visualizing the interior of a hollow organ or part (as the bladder or esophagus) for diagnostic or therapeutic purposes that typically has one or more channels to enable passage of instruments (as forceps or scissors)

-en-dos-co-py \en-'däs-kə-pē\ *noun*

Main Entry: **ex-plore**
Pronunciation: ik-'splɔr
Function: *verb*
Inflected Form: **ex-plored ; ex-plo-ri-ng**
Etymology: Latin *explorare*, from *ex-* + *plorare* to cry out
Date: 1585

transitive verb

1 a : to investigate, study, or analyze : look into <explore the relationship between social class and learning ability> — sometimes used with indirect questions <to explore where ethical issues arise — R. T. Blackburn> **b :** to become familiar with by testing or experimenting <explore new cuisines>

2 : to travel over (new territory) for adventure or discovery

3 : to examine especially for diagnostic purposes <explore the wound>

intransitive verb : to make or conduct a systematic search <explore for oil>

Main Entry: **HIV**
Pronunciation: ˌhæç-ˌi-ˈvē
Function: *noun*
Date: 1986

: any of various strains, serotypes, or clades of HIV-1 and HIV-2 that infect and destroy helper T cells of the immune system causing the marked reduction in their numbers that is diagnostic of AIDS — called also *AIDS virus*, *human immunodeficiency virus*