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# **NONPROPRIETARY NAMES FOR PHARMACEUTICAL SUBSTANCES**

**Twentieth Report of the  
WHO Expert Committee**

WORLD HEALTH ORGANIZATION

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WHO EXPERT COMMITTEE ON NONPROPRIETARY NAMES  
FOR PHARMACEUTICAL SUBSTANCES

Geneva, 28 April-3 May 1975

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# NONPROPRIETARY NAMES FOR PHARMACEUTICAL SUBSTANCES

Twentieth Report of the WHO Expert Committee

## INTRODUCTION

The WHO Expert Committee on Nonproprietary Names for Pharmaceutical Substances met in Geneva from 28 April to 3 May 1975. Dr V. Fattorusso, Director of the Division of Prophylactic, Diagnostic, and Therapeutic Substances, opened the meeting on behalf of the Director-General.

The selection of international nonproprietary names (INN) is carried out in accordance with the "Procedure for the Selection of Recommended International Nonproprietary Names for Pharmaceutical Substances" (see Annex 1), and a short account of the development of the programme is given in Annex 5.

## REVIEW OF GENERAL PRINCIPLES

The Committee reviewed the "General Principles for Guidance in Devising International Nonproprietary Names for Pharmaceutical Substances"<sup>a</sup> in the light of developments in the pharmaceutical field in recent years as well as changes in the procedure for devising new names.

The most significant change in procedure has been the extension, to naming synthetic chemical substances, of the practice normally used for substances originating in or derived from natural products. This practice involves employing a characteristic stem indicative of a common property of the members of the group for which the stem is selected.

Formerly the INN of synthetic chemical substances were devised mainly by modifying the systematic chemical definition, a procedure that became more and more difficult as the complexity of the compounds increased and as the need for short memorable names became more and more accepted as being of first importance for the safety of the patient

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<sup>a</sup> WORLD HEALTH ORGANIZATION. International nonproprietary names for pharmaceutical substances. Cumulative list No. 3. Geneva, 1971, pp. 142-143.

and the guidance of the health professions. Side by side with this procedure, the practice of using stems associated with pharmacological activity was also used for certain chemical substances. Neither system by itself produced fully satisfactory names. Those based on chemical nomenclature yielded names that conveyed little information to the physician except when, by chance rather than design, a pseudo-chemical syllable became associated with a particular type of therapeutic action. The pharmacological basis of INN, on the other hand, grouped together many substances of diverse chemical structure and often only of ill-defined pharmacological action.

The chief development in recent years has been a combination of both procedures. The result has been to produce INN that are short but at the same time more indicative of the nature and properties of the substance. This trend is one that the Committee approves and wishes to see developed. It depends on the selection of a stem whose purpose is to indicate pharmacological action and either source or structure and which must either be a strong signal or so placed in the name that it can be immediately recognized for what it is. The selection of a stem is thus of great importance and it may originate from a source such as the biological name, the pharmacological action, or the chemical definition. Once the stem has been chosen the procedure is completed by the addition of letters to either one or both ends solely with the object of achieving a distinctive INN.

The increasing application of the system will result in more and more substances being given INN showing that they belong to existing families of drugs. This should be of particular benefit to the prescriber, for example, as the trade-mark names seldom indicate relationships between drugs. This advantage is lessened somewhat by the fact that INN devised under this system will not be totally distinctive. Such is the value of the system to many users, however, that objections to proposed INN that are based largely on grounds of similarity arising from the use of the appropriate stem should not be entertained. The Committee does, however, consider that care must be exercised in avoiding names so similar that they can be readily confused in speech or writing, even though the substance concerned fall into the same "stem" group.

The bringing together of indications of both pharmacological action and chemical structure, through the medium of a stem, has created a need for several stems for substances of similar action. This allows greater discrimination in the information that may be conveyed in a name and future INN should endeavour to avoid the use of the older omnibus pharmacological groupings. The list of recommended stems,

which forms part of the published guiding principles, was reviewed with the object of promoting the adoption of the new procedure, and a number of older stems, including several with purely chemical connotations, were deleted. In their place the Committee inserted stems that have become well established and give both pharmacological and chemical indications. The definitions of other stems have been changed to achieve the same object.

In addition to the list of published stems, the programme of devising and selecting INN has made use of further word stems not considered to be currently in sufficient demand to justify publication. In the opinion of the Committee it would be of great value to all involved in devising names for pharmaceutical substances if some of the additional stems were available. These are published as Annex 3 together with the definitions applied to them and examples of their application. This Annex also contains the stems that are published as part of the "General Principles".

The observation made in the nineteenth report of the Expert Committee on Nonproprietary Names for Pharmaceutical Substances<sup>a</sup> that the INN can no longer be expected to indicate the structure of a chemical substance has become even more appropriate with the emphasis on the use of stems in creating new INN. For some groups, the stem may be selected using the chemical definition and the modifying letters may be selected in the same way, but these are tenuous links and the Committee accordingly wishes to emphasize that INN are not intended to reflect chemical structure, and that it would be unproductive to attempt to deduce chemical structure from them. To fulfil the needs of those requiring this information, systematic chemical definitions and graphic and molecular formulae are provided in the published lists of INN.

The earlier system of paying most regard to the chemical structure as the basis of naming led almost inevitably to the choice of names beginning with prefixes commonly occurring in chemical definitions, such as methoxy- and chlor-. It is considered that this procedure may have been encouraged by the advice in the "General Principles" on the shortening of such syllables, and the relevant section has accordingly been removed. It is also considered that the new system, with its emphasis on a characteristic stem, allows greater freedom in selecting the prefixing letters and hence enables the choice of an INN with a distinctive beginning, a feature that is an important contribution to the deciphering of handwritten instructions. A further aid to the selection of distinctive

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<sup>a</sup> Unpublished document WHO/PHARM/70.458.

beginnings is the information presented to the Committee on the most frequently used groups of initial letters in INN; this information is therefore reproduced in Annex 4.

The successful operation of the system depends greatly on the continuing availability of the chosen stems for use with the groups of substances for which they are selected. The indiscriminate use of the stems in either nonproprietary names or in trade-mark names, especially for substances and preparations of substances that do not fall into the prescribed group, could have hazardous consequences for the patient. The procedure for the selection of INN requires the Director-General of WHO to request Member States to take the necessary steps to prevent the acquisition of proprietary rights in INN. The Committee invites the Director-General to study possible means of extending this request to the protection of the stems.

The Committee noted that requests had frequently been received for INN for salts, esters, or combination products of substances for which INN already exist. It is the view of the Committee that the names for simple salts and esters should be devised from the INN in conformity with normal chemical practice. Some of the radicals and groups involved may be of a complex composition that makes it inconvenient to use the systematic chemical nomenclature and when this applies, shorter non-proprietary names are selected; these are included with the published lists of INN under the title "Names for Radicals and Groups". Combination products should be named using the INN, or if no INN exists the established chemical name of the components, for example, phenylbutazone piperazine. Names for salts, esters, and combination products derived by these procedures do not, in the view of the Committee, need to be published; if they contain an INN they may be referred to as International Nonproprietary Names (Modified) or INN.M.

The Committee endorses the principle that isolated letters and numbers should be avoided. It appreciates that the names of the members of groups of polymers, such as the macrogols, must be indicated by an appropriate terminal number, but this is regarded as a justified exception. The principle concerning ease of pronunciation and translation has been extended to recommend omission of the letters "h" and "k" from INN because of the difficulties they cause in some languages.

The revised "General Principles" are contained in Annex 2.

## **SELECTION OF NEW INTERNATIONAL NONPROPRIETARY NAMES**

The Committee considered 112 requests for international nonproprietary names for pharmaceutical substances in the light of comments received from the members of the Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations designated to deal with the selection of nonproprietary names: 93 names were selected and are to be issued in List 34 of proposed international nonproprietary names. In accordance with the "Procedure for the Selection of Recommended International Nonproprietary Names for Pharmaceutical Substances" (see Annex 1) this list will be sent to Member States of WHO with a letter asking that the names should be examined for possible conflict with proprietary rights in their country and also requesting protection for these names. The list will also be published in the *WHO Chronicle*.

## **POLYMER NOMENCLATURE**

The former practice of naming individual members of polymeric series was unsatisfactory and the Committee decided to replace the present individual INN whenever possible by a single name with a general definition covering all substances belonging to the series and instructions as to how individual members of the series should be distinguished.

This has already been done in the case of "sorbimacrogol esters" in List 32 of proposed INN, and will now be extended to the "macrogols", "macrogol esters", "dextrans", "dimeticones", and "non-oxinols". "Octoxinol", with a general definition, was selected as the INN for a new group of polymers. All the new definitions will appear in List 34 of proposed INN.

## **APPLICATIONS FOR INTERNATIONAL NONPROPRIETARY NAMES**

The majority of applications for INN are received through national nomenclature bodies. In countries where no such body exists, applications may be sent direct to the World Health Organization. INN are selected by members of an Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations that is designated to

deal with the selection of nonproprietary names in accordance with the "Procedure for The Selection of Recommended International Nonproprietary Names for Pharmaceutical Substances" and the "General Principles for Guidance in Devising International Nonproprietary Names for Pharmaceutical Substances". These documents are reproduced in Annexes 1 and 2 of this report and together with the other parts of the report are intended to provide guidance for those engaged in preparing applications for INN.

The Committee wishes to stress the importance of providing in the applications adequate information on the pharmacological action and therapeutic uses, together with full details of biological source or chemical structure, including as much stereochemical information as possible with details of configuration (chirality) and rotatory activity. Omission of such information has in the past necessitated changes in published INN or in their definitions and may delay the selection of an appropriate INN.

It should be noted that the "Procedure for the Selection of Recommended International Nonproprietary Names for Pharmaceutical Substances" requires the proposals for INN to be submitted on a special form available from WHO (Annex 7).

Lists of proposed INN are published regularly twice a year in the March and September issues of the *WHO Chronicle*. Consequently the time that elapses between receipt of the application and appearance of the name in the *WHO Chronicle* normally varies between 5 and 10 months. Lists of recommended INN are published once a year in the October issue of the *WHO Chronicle*.

#### CUMULATIVE LISTS AND COMPUTER PRINTOUTS

The last cumulative list of INN (List No. 3) was published in 1971 and contained all the names published in the Lists 1 to 25 of proposed INN and Lists 1 to 11 of recommended INN.

Since that time the INN and information relating to them have been computerized and up-to-date computer printouts containing all INN in Latin, English, and French, with references to the numbers of the lists in which they appeared, are made available once a year to national nomenclature authorities and other interested bodies. These printouts also contain references to national nonproprietary names and pharmacopoeia monographs. Part of the printout is an up-to-date index of molecular formulae.

The Committee took note that a cumulative list in the form of a computer printout including all INN in Latin, English, French, Spanish, and Russian, together with their molecular formulae and chemical definitions, is in the course of preparation. The chemical names will be in accordance with the nomenclature rules of the International Union of Pure and Applied Chemistry (IUPAC) as interpreted by the Chemical Abstracts Service (8th collective period); the new Chemical Abstracts Index names (9th collective period) may also be included as additional information as well as the Chemical Abstracts Service (CAS) registry number for each compound. It is intended that this part should eventually be completed with CAS numbers for salts and esters. In addition, the list will have an annex with an index of molecular formulae. The Committee recommended that the list should also have an annex with structural formulae.

#### NATIONAL NOMENCLATURE AUTHORITIES AND USE OF INTERNATIONAL NONPROPRIETARY NAMES

The Committee was informed that a questionnaire had been sent to WHO Member States in September 1973 in order to obtain information on the use of INN in their countries, for example for regulatory, pharmacopoeial, labelling, and other purposes. The three main questions were, whether (1) the country had a national body dealing with nonproprietary names, and if so, published its own national nonproprietary names; (2) INN were published officially, and (3) there were legal provisions enforcing the use of national and international nonproprietary names.

More than 60 of the 138 Member States (at that time) returned the questionnaire, 28 replying in the negative to all questions. The remaining replies revealed that the following countries had their own national nomenclature body, or a government office (ministry of health) through which INN requests were forwarded to WHO; the ones marked with an asterisk also published their own national nonproprietary names:

|                |                            |                              |
|----------------|----------------------------|------------------------------|
| Argentina      | German Democratic Republic | Republic of South Viet-Nam * |
| Australia *    | Hungary                    | Sweden *                     |
| Belgium        | Iceland *                  | Switzerland                  |
| Bulgaria       | Italy *                    | Union of Soviet              |
| Canada *       | Japan *                    | Socialist Republics          |
| Czechoslovakia | Netherlands                | United Kingdom of            |
| Denmark *      | Norway *                   | Great Britain and            |
| Finland *      | Pakistan *                 | Northern Ireland *           |
| France *       | Poland                     | United States of America *   |
|                | Republic of Korea *        |                              |

Many of the national nomenclature bodies work in close collaboration with WHO and greatly facilitate the work of WHO by examining requests for INN emanating from their countries before submission to WHO and by ensuring, as far as possible, that the proposals are in accordance with the most recent version of the "General Principles for Guidance in Devising International Nonproprietary Names for Pharmaceutical Substances" and are free of conflict with trade-mark names in their country. The majority of the national nonproprietary names published by these bodies are identical to the INN.

In reply to question (2) the following countries confirmed that they published INN officially :

|           |                              |             |
|-----------|------------------------------|-------------|
| Argentina | German Democratic Republic   | Portugal    |
| Finland   | Germany, Federal Republic of | Romania     |
| France    | Norway                       | Switzerland |

In reply to question (3) the following countries reported that they have adopted or are about to adopt legal provisions enforcing the use of

(a) international and national nonproprietary names :

|           |        |        |
|-----------|--------|--------|
| Australia | France | Poland |
| Denmark   | Norway | Sweden |
| Finland   |        |        |

(b) international nonproprietary names :

|           |                              |             |
|-----------|------------------------------|-------------|
| Argentina | German Democratic Republic   | Netherlands |
| Belgium   | Germany, Federal Republic of | New Zealand |
|           | Hungary                      |             |
|           | India                        |             |

(c) national nonproprietary names :

|                |                   |                          |
|----------------|-------------------|--------------------------|
| Canada         | Republic of Korea | United Kingdom of        |
| Czechoslovakia | Pakistan          | Great Britain and        |
| Japan          | Romania           | Northern Ireland         |
|                |                   | United States of America |

A number of countries that do not have official legal provisions for nonproprietary names and also some of the countries that replied in the negative to all these questions have stated that in practice they are using INN for regulatory and labelling purposes.

International nonproprietary names are also in official use for narcotic drugs under international control in the schedules attached to

the 1971 Convention on Psychotropic Substances (not yet ratified). INN are also used in the drug information sheets sent to WHO Member States pursuant to Resolution WHA16.36 of the Sixteenth World Health Assembly on clinical and pharmacological evaluation of drugs, and in connexion with the WHO programme on international monitoring of adverse reactions to drugs.

Furthermore, the Council of the European Community in its Council Directive of 26 January 1965 on the approximation of provisions laid down by law, regulation or administrative action relating to proprietary medicinal products prescribes the use of international nonproprietary names recommended by WHO. INN are also the preferred names in the European Pharmacopoeia and in many other national pharmacopoeias.

The Committee was encouraged by the results of the survey of the practices in WHO Member States demonstrating the increasing use of INN and recommends that all possible means should be taken to promote the even wider use of INN, especially in the field of medical and pharmaceutical education.

#### **WITHDRAWAL OF INTERNATIONAL NONPROPRIETARY NAMES**

It has long been recognized that one of the disadvantages of the policy, essential in many other respects, of publishing INN as early as possible is that many names have been issued for substances that did not eventually become available or rapidly fell out of use. Successive Expert Committees, faced with the continuing problem of inventing new names, have examined the possibility of withdrawing INN that have no further practical use in order that similar names (not the INN themselves) might be allocated to other substances. However, the use of a closely similar name for a substance differing in therapeutic action from the substance to which the INN was originally applied might cause confusion and be a hazard to the patient and it is emphasized that a name should be deleted from the published lists only after thorough investigation of its current status.

Consideration has been given to a procedure that might be followed to establish whether an INN may safely be abandoned. A useful starting point might be the compilation of a comprehensive list of trade-names in use for all preparations containing the substances for which INN have been issued. The absence of any indication of commercial use against

an INN issued more than ten years previously should then be taken to indicate that the substances concerned may not have emerged from the development stage and that the names allocated to them should be subjected to further investigation, which should take into account the following considerations :

(a) A number of INN were issued at the request of national and international authorities concerned with the legal control of drugs. Although many of these substances never came into use, the names appear in statutory documents in many countries and must therefore be retained.

A corollary to this is that substances at present free from legal restriction may be found at some future date to have undesirable properties demanding control, and hence an INN.

(b) Substances that have fallen into disuse may be found to be of value for conditions other than those for which they were originally introduced.

(c) The extent to which an INN has become disseminated in technical journals, textbooks, and reference books. Most reference books reproduce INN as a matter of course and textbooks and articles in scientific journals dealing with groups of substances will take into account all known members of the group irrespective of their value in medicine.

(d) Substances no longer used in medicine may have been found to be of value in other fields of application.

A satisfactory solution to all these questions may not be possible for many of the INN that may at first sight appear superfluous, but the advantages of freeing a number of names for further use in the way indicated, and their consequent elimination from the published lists, are considered to be sufficient for the Committee to recommend the pursuance of the necessary enquiries. National nomenclature commissions and manufacturers should also be invited to inform WHO when plans for marketing a substance for which an INN has been provided are cancelled.

#### **COOPERATION WITH OTHER INTERNATIONAL ORGANIZATIONS**

The Committee was informed of the increasing cooperation in nomenclature matters between WHO and other international organizations, including the International Union of Pure and Applied Chemistry

(IUPAC) and the International Organization for Standardization (ISO), and expressed the hope that the exchange of information with these bodies would continue in the future.

#### ACKNOWLEDGEMENTS

The Committee wishes to record its appreciation of the contribution to the preparation of lists of international nonproprietary names made by Chemical Abstracts Service, Columbus, OH, USA; Madeleine Girard, Member of the Committee on Nomenclature of the French National Pharmacopoeia Commission, Paris, France; K. L. Loening, Director of Nomenclature, Chemical Abstracts Service, OH, USA, and Member of the International Union of Pure and Applied Chemistry Commissions on Macromolecular Nomenclature and on Nomenclature of Organic Chemistry; M. Negwer, Berlin; E. Sellés, Faculty of Pharmacy, University of Madrid, Member of the Spanish Pharmacopoeia Commission; C. T. Van Meter, formerly, Institute of Co-operative Research, University of Philadelphia, PA, USA.

**PROCEDURE FOR THE SELECTION OF RECOMMENDED  
INTERNATIONAL NONPROPRIETARY NAMES FOR  
PHARMACEUTICAL SUBSTANCES<sup>a</sup>**

The following procedure shall be followed by the World Health Organization in the selection of recommended international nonproprietary names for pharmaceutical substances, in accordance with the World Health Assembly resolution WHA3.11 :

1. Proposals for recommended international nonproprietary names shall be submitted to the World Health Organization on the form provided therefor.
2. Such proposals shall be submitted by the Director-General of the World Health Organization to the members of the Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations designated for this purpose, for consideration in accordance with the "General principles for guidance in devising International Nonproprietary Names", appended to this procedure. The name used by the person discovering or first developing and marketing a pharmaceutical substance shall be accepted, unless there are compelling reasons to the contrary.
3. Subsequent to the examination provided for in article 2, the Director-General of the World Health Organization shall give notice that a proposed international nonproprietary name is being considered.

A. Such notice shall be given by publication in the *Chronicle of the World Health Organization*<sup>b</sup> and by letter to Member States and to national pharmacopoeia commissions or other bodies designated by Member States.

- (i) Notice may also be sent to specific persons known to be concerned with a name under consideration.

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<sup>a</sup> Text adopted by the Executive Board of WHO in resolution EB15.R7 (*Off. Rec. Wld Hlth Org.*, 1955, 60, 3) and amended by the Board in resolution EB43.R9 (*Off. Rec. Wld Hlth Org.*, 1969, 173, 10).

<sup>b</sup> The title of this publication was changed to *WHO Chronicle* in January 1959.

B. Such notice shall :

- (i) set forth the name under consideration ;
- (ii) identify the person who submitted a proposal for naming the substance, if so requested by such person ;
- (iii) identify the substance for which a name is being considered ;
- (iv) set forth the time within which comments and objections will be received and the person and place to whom they should be directed ;
- (v) state the authority under which the World Health Organization is acting and refer to these rules of procedure.

C. In forwarding the notice, the Director-General of the World Health Organization shall request that Member States take such steps as are necessary to prevent the acquisition of proprietary rights in the proposed name during the period it is under consideration by the World Health Organization.

4. Comments on the proposed name may be forwarded by any person to the World Health Organization within four months of the date of publication, under article 3, of the name in the *Chronicle of the World Health Organization*.

5. A formal objection to a proposed name may be filed by any interested person within four months of the date of publication, under article 3, of the name in the *Chronicle of the World Health Organization*.

A. Such objection shall :

- (i) identify the person objecting ;
- (ii) state his interest in the name ;
- (iii) set forth the reasons for his objection to the name proposed.

6. Where there is a formal objection under article 5, the World Health Organization may either reconsider the proposed name or use its good offices to attempt to obtain withdrawal of the objection. Without prejudice to the consideration by the World Health Organization of a substitute name or names, a name shall not be selected by the World Health Organization as a recommended international nonproprietary name while there exists a formal objection thereto filed under article 5 which has not been withdrawn.

7. Where no objection has been filed under article 5, or all objections previously filed have been withdrawn, the Director-General of the World Health Organization shall give notice in accordance with subsection A of article 3 that the name has been selected by the World Health Organization as a recommended international nonproprietary name.

8. In forwarding a recommended international nonproprietary name to Member States under article 7, the Director-General of the World Health Organization shall :

A. request that it be recognized as the nonproprietary name for the substance ; and

B. request that Member States take such steps as are necessary to prevent the acquisition of proprietary rights in the name, including prohibiting registration of the name as a trade-mark or trade-name.

**GENERAL PRINCIPLES FOR GUIDANCE IN DEVISING  
INTERNATIONAL NONPROPRIETARY NAMES FOR  
PHARMACEUTICAL SUBSTANCES**

1. International Nonproprietary Names (INN) should be distinctive in sound and spelling. They should not be inconveniently long and should not be liable to confusion with names in common use.
2. The INN for a substance belonging to a group of pharmacologically related substances should, where appropriate, show this relationship. Names that are likely to convey to a patient an anatomical, physiological, pathological or therapeutic suggestion should be avoided.

*These primary principles are to be implemented by using the following secondary principles*

3. In devising the INN of the first substance in a new pharmacological group, consideration should be given to the possibility of devising suitable INN for related substances belonging to the new group.
4. In devising INN for acids, one-word names are preferred ; their salts should be named without modifying the acid name, e.g., "oxacillin" and "oxacillin sodium", "ibufenac" and "ibufenac sodium".
5. INN for substances that are used as salts should in general apply to the active base or the active acid. Names for different salts or esters of the same active substance should differ only in respect of the name of the inactive acid or the inactive base.  
For quaternary ammonium substances, the cation and anion should be named appropriately as separate components of a quaternary substance and not in the amine-salt style.
6. The use of an isolated letter or number should be avoided ; hyphenated construction is also undesirable.
7. To facilitate the translation and pronunciation of INN, "f" should be used instead of "ph", "t" instead of "th", "e" instead of "ae" or "oe", and "i" instead of "y"; the use of the letters "h" and "k" should be avoided.

8. Provided that the names suggested are in accordance with these principles, names proposed by the person discovering or first developing and marketing a pharmaceutical preparation, or names already officially in use in any country, should receive preferential consideration.

9. Group relationship in INN (see Guiding Principle 2) should if possible be shown by using a stem from the following list. The stem should only be used for substances of the appropriate group. Where a stem is shown without any hyphens it may be used anywhere in the name.

Subsidiary group relationships should be shown by devising INN that show similarities to and are analogous with a previously named substance.

| Latin     | English  | French   |  |
|-----------|----------|----------|--|
| -actidum  | -actide  | -actide  | synthetic polypeptides with a corticotrophin-like action |
| andr      | andr     | andr     | steroids, androgens                                      |
| -arolum   | -arol    | -arol    | anticoagulants of the dicoumarol group                   |
| -azepamum | -azepam  | -azepam  | substances of the diazepam group                         |
| bol       | bol      | bol      | steroids, anabolic                                       |
| -buzonum  | -buzone  | -buzone  | anti-inflammatory analgesics of the phenylbutazone group |
| -cainum   | -caine   | -caine   | local anaesthetics                                       |
| cef-      | cef-     | céf-     | antibiotics, derivatives of cefalosporanic acid          |
| -cillinum | -cillin  | -cilline | antibiotics, derivatives of 6-aminopenicillanic acid     |
| cort      | cort     | cort     | corticosteroids, except those of the prednisolone group  |
| -cyclinum | -cycline | -cycline | antibiotics of the tetracycline group                    |
| estr      | estr     | estr     | estrogenic substances                                    |
| -fibratum | -fibrate | -fibrate | substances of the clofibrate group                       |
| -forminum | -formin  | -formine | hypoglycemics of the phenformin group                    |
| gest      | gest     | gest     | steroids, progestogens                                   |
| gli-      | gli-     | gli-     | sulfonamide hypoglycemics                                |
| io-       | io-      | io-      | iodine-containing contrast media                         |

| Latin       | English   | French    |  |
|-------------|-----------|-----------|--|
| -ium        | -ium      | -ium      | quaternary ammonium compounds                                |
| -metacinum  | -metacin  | -métacine | anti-inflammatory substances of the indometacin group        |
| -mycinum    | -mycin    | -mycine   | antibiotics produced by <i>Streptomyces</i> strains          |
| -nidazolium | -nidazole | -nidazole | antiprotozoal substances of the metronidazole group          |
| -ololum     | -olol     | -olol     | $\beta$ -adrenergic blocking agents of the propranolol group |
| -onidum     | -onide    | -onide    | steroids for topical use, containing an acetal group         |
| -orexum     | -orex     | -orex     | anorexigenic agents, phenethylamine derivatives              |
| -praminum   | -pramine  | -pramine  | substances of the imipramine group                           |
| -profenum   | -profen   | -profène  | anti-inflammatory substances of the ibuprofen group          |
| prost       | prost     | prost     | prostaglandins   |
| -relinum    | -relin    | -réline   | hypophyseal hormone release-stimulating peptides             |
| sulfa-      | sulfa-    | sulfa-    | sulfonamides, anti-infective                                 |
| -terolum    | -terol    | -térol    | bronchodilators, phenethylamine derivatives                  |
| -tizidum    | -tizide   | -tizide   | diuretics of the chlorothiazide group                        |
| -verinum    | -verine   | -vérine   | spasmolytics with a papaverine-like action                   |

**EXAMPLES OF INTERNATIONAL NONPROPRIETARY NAMES  
INCORPORATING SELECTED STEMS**

International nonproprietary names from Lists 1 to 33 of proposed INN are given as examples for the :

- stems contained in the “ General Principles for Guidance in Devising International Nonproprietary Names for Pharmaceutical Substances ” (see Annex 2 to this report)
- stems no longer included in the “ General Principles ”, and
- other well established or new stems.

Syllables contained in the “ General Principles ” are followed by (a). Syllables which have recently been deleted from the General Principles are followed by (d).

The number in parenthesis following the name indicates the list in which the name was first published. A more complete listing of INN utilizing these stems, contained in unpublished document WHO/PHARM S/NOM 15 Rev.10, is available from the Chief Pharmaceutical Officer, Pharmaceuticals, WHO, Geneva.

|             |  |
|-------------|--|
| -ac         | anti-inflammatory agents of the ibufenac group<br>alclofenac (23), ibufenac (14)                     |
| -actide (a) | synthetic polypeptides with a corticotrophin-like action<br>codactide (24), tetracosactide (18)      |
| andr (a)    | steroids, androgens<br>androstanolone (4), nandrolone (22), norethandrolone (6)                      |
| -antel      | anthelmintics that are not members of a defined group<br>pyrantel (17), zilantel (33)                |
| -arol (a)   | anticoagulants of the dicoumarol group<br>coumetarol (13), dicoumarol (23)                           |
| -azepam (a) | substances of the diazepam group<br>diazepam (12), nitrazepam (16)                                   |
| -azocine    | narcotic antagonists/agonists related to 6,7-benzomorphan<br>cyclazocine (14), pentazocine (14)      |
| -azoline    | antihistaminics or local vasoconstrictors of the antazoline group<br>antazoline (1), naphazoline (1) |
| -bamate (d) | tranquilizers of the propanediol and pentanediol series<br>pentabamate (13), tybamate (14)           |

|              |  |
|--------------|--|
| barb (d)     | barbituric acids, hypnotic activity<br>barbital (4), heptabarb (14), phenobarbital (4)                       |
| -bendazole   | anthelmintics of the tiabendazole group<br>mebendazole (24), tiabendazole (13)                               |
| bol (a)      | steroids, anabolic<br>boldenone (20), clostebol (22), mebolazine (21)  |
| -buzone (a)  | anti-inflammatory analgesics of the phenylbutazone group<br>feclobuzone (27), suxibuzone (24)                |
| -caine (a)   | local anaesthetics<br>lidocaine (1), procaine (10)   |
| cef- (a)     | antibiotics, derivatives of cephalosporanic acid<br>cefaloridine (15), cefalotin (14)                        |
| -cillin (a)  | antibiotics, derivatives of 6-aminopenicillanic acid<br>ampicillin (13), oxacillin (15)                      |
| cort (a)     | corticosteroids, except those of the prednisolone group<br>cortisone (1), desoxycortone (4), fluazacort (29) |
| -crine (d)   | acridine derivatives<br>mepacrine (4), tacrine (8)   |
| -curium (d)  | curare-like drugs<br>truxicorium iodide (22)   |
| -cycline (a) | antibiotics of the tetracycline group<br>minocycline (14), tetracycline (4)                                  |
| dil          | vasodilators<br>burodilone (26), dilazep (23), trapidil (29)   |
| -drine       | sympathomimetics, phenethylamine derivatives<br>octodrine (19), ritodrine (22)                               |
| estr (a)     | estrogenic substances<br>dienestrol (1), estradiol (4)   |
| -fibrate (a) | substances of the clofibrate group<br>clofibrate (13), simfibrate (22)                                       |
| -flurane     | general inhalation anaesthetics, halogenated alkane derivatives<br>enflurane (25), methoxyflurane (11)       |
| -formin (a)  | hypoglycemics of the phenformin group<br>buformin (17), metformin (21)                                       |
| -fungin      | antifungal antibiotics<br>kalafungin (20)  |
| -fylline     | theophylline derivatives<br>pentifylline (29), visnafylline (24)   |
| gest (a)     | steroids, progestogens<br>gestonorone (16), metogest (33), norgestrel (17)                                   |
| gli- (a)     | sulfonamide hypoglycemics<br>glibenclamide (18), glipizide (27)  |

|               |  |
|---------------|--|
| -ine (d)      | alkaloids and organic bases<br>chlorpromazine (1), reserpine (4)   |
| io- (a)       | iodine-containing contrast media<br>iocetamic acid (18), iopanoic acid (1)                                       |
| -ium (a)      | quaternary ammonium compounds<br>clidinium bromide (6), cetylalcohol (15)  |
| -kacin        | antibiotics related to kanamycin and bekanamycin<br>amikacin (30), dibekacin (31)                                |
| metacin (a)   | anti-inflammatory substances of the indometacin group<br>indometacin (13), niometacin (33)                       |
| -moxin (d)    | monoamine oxidase inhibitors<br>domoxin (14), octamoxin (15)   |
| -mustine      | antineoplastic, alkylating agents, ( $\beta$ -chloroethyl)amino derivatives<br>mannomustine (8), uramustine (13) |
| -mycin (a)    | antibiotics, produced by <i>Streptomyces</i> strains<br>josamycin (23), rifamycin (13), streptomycin (1)         |
| nal-          | narcotic antagonists/agonists related to normorphine<br>nalorphine (1), naloxone (13)                            |
| -nidazole (a) | antiprotozoal substances of the metronidazole group<br>metronidazole (11), secnidazole (30)                      |
| nifur- (d)    | 5-nitrofur derivatives<br>nifuradene (16), nifurtimox (21)   |
| -nixin        | anti-inflammatory substances, anilonicotinic acid derivatives<br>flunixin (31), metanixin (31)                   |
| -olol (a)     | $\beta$ -adrenergic blocking agents of the propranolol group<br>propranolol (15), timolol (29)                   |
| -one (d)      | ketones<br>metyrapone (13), triaziquone (14)   |
| -onide (a)    | steroids for topical use, containing an acetal group<br>desonide (24), tralonide (27)                            |
| -orex (a)     | anorexigenic agents, phenethylamine derivatives<br>cloforex (16), pentorex (16)                                  |
| orphan        | narcotic antagonists/agonists related to morphinan<br>dextrorphan (1), levorphanol (4)                           |
| -perone       | 4'-fluoro-4-piperidinobutyrophenone derivatives<br>moperone (14), spiperone (17)                                 |
| -pramine (a)  | substances of the imipramine group<br>desipramine (13), imipramine (8)   |
| pred          | prednisone and prednisolone derivatives<br>clprednol (31), prednisone (6), oxisopred (29)                        |
| -pressin      | vasoconstrictors, vasopressin derivatives<br>argipressin (13), desmopressin (33), vasopressin (16)               |

|              |  |
|--------------|--|
| -profen (a)  | anti-inflammatory agents of the ibuprofen group<br>ibuprofen (16), mexoprofen (33)     |
| prost (a)    | prostaglandins<br>deprostil (32), dinoprost (26)                                       |
| -relin (a)   | hypophyseal hormone release-stimulating peptides<br>gonadorelin (32), protirelin (31)  |
| -serpine (d) | derivatives of <i>Rauwolfia</i> alkaloids<br>bietaserpine (14), reserpine (4)          |
| sulfa- (a)   | sulfonamides, anti-infective<br>sulfabenz (17), sulfamethoxazole (14)                  |
| -sulfan      | antineoplastic, alkylating agents, methanesulfonates<br>busulfan (6), ritrosulfan (33) |
| -terol (a)   | bronchodilators, phenethylamine derivatives<br>ibuterol (31), rimiterol (26)           |
| -tizide (a)  | diuretics of the chlorothiazide group<br>butizide (13), sumetizide (20)                |
| -toin (d)    | anti-epileptics which are hydantoin derivatives<br>albutoin (13), phenytoin (4)        |
| -triptyline  | substances of the amitriptyline group<br>amitriptyline (11), nortriptyline (12)        |
| -verine (a)  | spasmolytics with a papaverine-like action<br>camiverine (29), rociverine (33)         |

Annex 4

**MOST FREQUENTLY USED INITIAL GROUPS OF LETTERS  
IN INTERNATIONAL NONPROPRIETARY NAMES FOR  
PHARMACEUTICAL SUBSTANCES**

The following data are derived from the examination of Lists 1 to 33 of proposed INN, which contain altogether about 3400 names.

| Category and % of total | Group           | Category and % of total | Group                                   |
|-------------------------|-----------------|-------------------------|---|
| A (6%)                  | am<br>al        | N (5%)                  | ni                                      |
| B (7%)                  | ben<br>bu       | O (3%)                  | ox                                      |
| C (13%)                 | cl (clo)<br>ca  | P (12%)                 | pr (pro)<br>pe<br>ph <sup>a</sup><br>pi |
| D (8%)                  | di (dim)<br>de  | Q (1%)                  | quin                                    |
| E (3%)                  | et              | R (2%)                  | ri<br>ro                                |
| F (6%)                  | fe<br>fl        | S (7%)                  | su (sul)<br>so (sod)                    |
| G (2%)                  | gl<br>gua       | T (7%)                  | tr (tri)<br>to<br>th <sup>a</sup><br>te |
| H (3%)                  | he<br>hy (hydr) | V (1%)                  | vi                                      |
| I (2%)                  | io<br>in<br>iso | X (1%)                  | xa<br>xy                                |
| L (2%)                  | le (lev)        | Z (<1%)                 | zol                                     |
| M (9%)                  | me (met)        |                         |   |

<sup>a</sup> In recent years "f" has been used instead of "ph" and "t" instead of "th" in the majority of new INN.

**HISTORICAL REVIEW OF THE PROGRAMME ON THE  
SELECTION OF INTERNATIONAL NONPROPRIETARY NAMES**

The need for identification of each pharmaceutical substance by a unique and universally available nonproprietary name was first officially recognized by the International Pharmaceutical Federation, which established a committee on international pharmaceutical nomenclature in 1915. This committee was followed by another, created in 1922. In 1924 a first list of names was established and these were made use of by certain pharmacopoeias. Some standardization of nomenclature was also proposed for a number of pharmaceutical preparations in the first and second international agreements for the unification of potent drugs resulting from the Brussels conferences of 1906 and 1925.

The WHO programme on the selection of international nonproprietary names for pharmaceutical substances commenced with a meeting of an Expert Committee on the Unification of Pharmacopoeias in 1949. By the time WHO was requested to deal with the selection of international nonproprietary names, national programmes on the unification of drug nomenclature had already been started in a number of countries, such as those carried out under the Comité de Nomenclature of the Commission permanente de la Pharmacopée française, the Nomenclature Committee of the British Pharmacopoeia Commission, the Council of Drugs of the American Medical Association in the USA, and the Nomenclature Committee of the Nordic Pharmacopoeia in the Scandinavian countries.

The first approach by WHO was to coordinate the activities of such existing national nomenclature programmes. The WHO Expert Committee in 1949 studied the preparation of general rules for nomenclature, and drew up a plan that was adopted in 1950 by a resolution of the World Health Assembly.<sup>a</sup>

The rules on which the current INN programme is based were adopted by the WHO Executive Board in 1955,<sup>b</sup> and are set out in the "Procedure for the Selection of Recommended International Non-proprietary Names for Pharmaceutical Substances", and "General

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<sup>a</sup> WHO Official Records, No. 28, 1950, p. 19.

<sup>b</sup> WHO Official Records, No. 60, 1955, p. 3.

Principles for Guidance in Devising International Nonproprietary Names for Pharmaceutical Substances” (see Annexes 1 and 2). The latter are regularly revised by the members of the Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations designated to deal with the selection of nonproprietary names.

Since publication of the first list of INN in 1953 almost 3400 names have been published in the *WHO Chronicle* in 33 lists of proposed international nonproprietary names, and more than 86% of these have been published in 14 lists of recommended INN.

## LITERATURE REFERENCES

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*International nonproprietary names for pharmaceutical preparations. Cumulative list No. 3.* Geneva, World Health Organization, 1971 (English and French editions).

Lists 26 to 33 of Proposed International Nonproprietary Names, for Pharmaceutical Substances in *WHO Chronicle*, **25**: 415 (1971); **21**: 121, 414 (1972); **27**: 120, 330 (1973); **28**: 133 (1974); supplement to *WHO Chronicle*, vol. 28, No. 9 (1974); vol. 29, No. 3 (1975).

Lists 1 to 14 of Recommended International Nonproprietary Names for Pharmaceutical Substances in *Chron. Wld Hlth Org.*, **9**: 185 (1955); *WHO Chronicle*, **13**: 106, 463 (1959); **16**: 101 (1962); **19**: 165, 206, 249 (1965); **20**: 421 (1966); **21**: 538 (1967); **22**: 463 (1968); **23**: 490 (1969); **24**: 526 (1970); **25**: 476 (1971); **27**: 453 (1973); supplement to *WHO Chronicle*, vol. 28, No. 10 (1974).

**National nonproprietary names**

BAN—British Approved Names: *Approved names 1973*, obtainable from H.M. Stationery Office, P.O. Box 569, London SE1 9NH or Government bookshops; Supplements 1, 2, 3, 4 obtainable from British Pharmacopoeia Commission, 8 Bulstrode Street, London W1M 5FT.

DCF—Dénominations Communes Françaises: *Pharmacopée française*, 9th edition, vol. 2, p. 17: Liste de dénominations communes et scientifiques de médicaments. Supplements Nos. 1, 2, 3, 5, et 6 to the *Pharmacopée française*, 9th edition.

DCIT—Denominazioni Comuni Italiane: *Farmacopea ufficiale della Repubblica italiana*, 8th edition, vol. 1, p. 13: Denominazioni comuni italiane dei principi attivi contenuti nei medicinali.

JAN—Japanese Accepted Names. Cumulative List 1974; Addendum 1, published in *Iyakuhin Kenkyu*, vol. 6, No. 2 (1975); obtainable from The Society of Japanese Pharmacopoeia, 2-12-15, Shibuya, Shibuya-Ku, Tokyo 150, Japan.

NFN Names—*Nordiska farmakopénämnden : NFN-navne*, 4th edition, Stockholm, 1974. Obtainable from the Nordic Pharmacopoeia Council, Socialstyrelsen, Läkemedelsavdelningen, Industrivägen 5, 171 48 Solna, Sweden.

*USAN 10 and the USP dictionary of drug names*, and its 1974 supplement constitute a compilation of the United States Adopted Names (USAN) selected and released between 15 June 1961 and 31 December 1973; obtainable from United States Pharmacopoeial Convention Inc., 12601, Twinbrook Parkway, Rockville, MD 20852, USA. Lists of new USAN are published monthly in the *Journal of the American Medical Association*.

#### Reference books on pharmaceutical substances

*Dénominations communes des médicaments—dénominations françaises et dénominations internationales recommandées*, Paris, Doin, 1972.

Published with the assistance of the national syndicate of the pharmaceutical industry under the scientific direction of Professor P. Lechat. Substances are listed alphabetically under international nonproprietary names with structural formulae, chemical names, and French trade-marks as well as indications on action and use.

*Index nominum*, Swiss Society of Pharmacy, 1975/76.

Contains about 3600 substances, with about 21 000 synonyms: substances are listed alphabetically under nonproprietary names with graphic formulae, chemical names, synonyms, and trade-marks as well as indications on action and use.

Ippen, H. *Index pharmacorum—Synonyma, Struktur und Wirkung der organisch-chemischen Arzneistoffe*, Stuttgart, G. Thieme, 1970.

Substances are listed under nonproprietary names in groups of pharmacologically, therapeutically, and chemically related substances, together with structural and molecular formulae, chemical names, synonyms, and trade-marks.

*Lexikon chemischer Kurzbezeichnungen von Arzneistoffen, nationale und internationale Kurznamen*. Compiled, with comments, by the Medicines Bureau of the ABDA under the direction of Dr K. Schriever, Frankfurt/Main, Govi-Verlag, 1968, with supplement in 1970.

Substances are listed alphabetically under international nonproprietary names with structural and molecular formulae, chemical names, and trade-mark references for the Federal Republic of Germany.

Negwer, M. *Organisch-chemische Arzneimittel und ihre Synonyma—eine internationale Übersicht*. Berlin, Akademie-Verlag, 1971.

Contains 40 000 synonyms of 5228 substances from all countries. The main entry for each drug is arranged according to the concept of incremental molecular formulae; the book also contains structural formulae, nonproprietary names, chemical names, synonyms, and trade-marks as well as indications on action and use.

Marler E. E. J. *Pharmacological and chemical synonyms*. 5th edition, Amsterdam, Excerpta Medica Foundation, 1973.

Alphabetical cross-indexed collection of names of drugs including nonproprietary names, chemical names, synonyms, and trade-marks. Main entries under nonproprietary names.

*Pharmazeutische Stoffliste*. Frankfurt, Arzneibüro der Arbeitsgemeinschaft der Berufsvertretungen Deutscher Apotheker: Werbe- und Vertriebsgesellschaft Deutscher Apotheker.

Contains in alphabetical order, under nonproprietary names, drugs of chemical, vegetable, and animal origin. Gives structural and molecular formulae, chemical names, synonyms, and trade marks as well as indications on action and use. The *Stoffliste* is a regularly updated loose-leaved system of several volumes.

*Repertorio terapeutico, — monografie delle sostanze farmaceutiche e loro sinonimi*, 4th edition. Milan, Organizzazione Editoriale, Medico-farmaceutica, 1972.

Contains 1300 monographs of pharmaceutical substances with pharmacological and therapeutic indications, adverse reactions, toxicity, and posology. The monographs are entered alphabetically under nonproprietary names with structural and molecular formulae and their molecular weights, synonyms, and trade-marks.

#### Articles on nonproprietary names published since 1970

JEROME, J. B. & LUBACK, P. M. International nonproprietary names—a World Health Organization activity. *J. Am. med. Women's Ass.*, vol. 27, No. 10 (1972).

JEROME, J. B. & SAGAN, P. The USAN nomenclature system. *J. Am. med. Ass.*, **232** (3): 294–299 (1975).

MARCONI, M. & SABATINI SORDI, A. Problemi connessi all'introduzione delle denominazioni comuni. *In*: Rendiconti del Convegno su Farmacopoea ufficiale — riflessi della sua applicazione sulla ricerca farmaceutica e sulla produzione dei medicinali. Rome, December, 1973.

**Unpublished documents**

Syllables and use of syllables in international nonproprietary names (Document WHO/PHARM S/Nom 15, Rev.10).

International nonproprietary names (INN) for pharmaceutical substances : computer printout 1974 (Document WHO/PHARM/74.2.).

**Other documents**

ISO Recommendation R 1750 and Addenda Nos. 1-9, *Common names for pest control chemicals and plant growth regulators*, published in English, French, and Russian by the International Organization for Standardization, copies to be obtained through national standards organizations.

Annex 7

REQUEST FORM FOR INTERNATIONAL NONPROPRIETARY NAMES

|  |  |   |   |
|--|--|---|---|
| <p><b>WORLD HEALTH ORGANIZATION</b><br/>Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations<br/><b>ORGANISATION MONDIALE DE LA SANTÉ</b><br/>Tableau d'Experts de la Pharmacopée Internationale et des Préparations Pharmaceutiques</p>   |  | <p><b>Request for an international non-proprietary name (I. N. N.)</b><br/><b>Demande de dénomination commune internationale (D. C. I.)</b></p> |   |
| <p>Date</p> <p>(To be filled in by WHO. - A remplir par l'OMS.)</p>  |  | <p>N°</p>   |   |
| <p>Submitted by<br/>Présentée par<br/>Address<br/>Adresse</p>  |  | <p>Copies forwarded to</p> <p>..... 19 .....</p>  |   |
| <p>I (we) request the World Health Organization to establish a free and unrestricted international nonproprietary name for the pharmaceutical substance described herein.<br/>L'Organisation Mondiale de la Santé est priée de bien vouloir établir une dénomination commune internationale d'usage libre pour la substance pharmaceutique dont la description suit.</p>   |  | <p>Acknowledged</p> <p>..... 19 .....</p>   |   |
| <p>SUGGESTED NAMES (in order of preference) 1 .....</p> <p>DÉNOMINATIONS SUGGÉRÉES (par ordre de préférence) 2 .....</p> <p>3 .....</p> <p>CHEMICAL NAME OR DESCRIPTION *<br/>NOM CHIMIQUE OU DESCRIPTION *</p> <p>GRAPHIC FORMULA (if known) *<br/>FORMULE DÉVELOPPÉE (si elle est connue) *</p> <p><b>Molecular formula:</b><br/><b>Formule brute:</b></p> <p>TRADE NAMES, known or contemplated,<br/>and name of manufacturer<br/>NOMS COMMERCIAUX, connus ou envisagés,<br/>et nom du fabricant</p> <p>PRINCIPAL THERAPEUTIC USES AND POSOLOGY; PHARMACOLOGIC ACTION*<br/>PRINCIPALES INDICATIONS THÉRAPEUTIQUES ET POSOLOGIE; ACTION PHARMACOLOGIQUE*</p> |  |   |   |
| <p>COMMENTS<br/>REMARQUES</p>  |  | <p>The name as indicated above has been accepted by</p> <p>Member<br/>Membre</p>  | <p>La dénomination indiquée ci-dessus a été acceptée par</p> <p>Reference<br/>Référence</p> |
| <p>* Please give references to published literature. - Veuillez donner des références aux publications éventuelles.<br/>Additional information may be given on an attached sheet. - Tous renseignements complémentaires pourront être fournis sur une autre feuille.</p> <p>This proposal is made with the understanding that insofar as is known none of the suggested names is registered or the subject of pending registration.<br/>En présentant cette proposition, le signataire déclare qu'à sa connaissance aucune des dénominations suggérées n'a été déposée ou n'est sur le point de l'être.</p>  |  |   |   |
| <p>Date</p>  |  | <p>Signature</p> <p>(To be filled by WHO. - A remplir par l'OMS.)</p>   |   |

**WORLD HEALTH ORGANIZATION  
TECHNICAL REPORT SERIES**

*Recent reports :*

| No. |   | Sw. fr. |
|-----|---|---------|
| 531 | (1973) <b>The Use of Viruses for the Control of Insect Pests and Disease Vectors</b><br>Report of a Joint FAO/WHO Meeting on Insect Viruses (48 pages) . . .  | 4.—     |
| 532 | (1973) <b>Trace Elements in Human Nutrition</b><br>Report of a WHO Expert Committee (65 pages) . . . . .  | 5.—     |
| 533 | (1973) <b>Postgraduate Education and Training in Public Health</b><br>Report of a WHO Expert Committee (68 pages) . . . . .   | 5.—     |
| 534 | (1973) <b>Continuing Education for Physicians</b><br>Report of a WHO Expert Committee (32 pages) . . . . .  | 5.—     |
| 535 | (1973) <b>Environmental and Health Monitoring in Occupational Health</b><br>Report of a WHO Expert Committee (48 pages) . . . . .   | 5.—     |
| 536 | (1974) <b>Bioavailability of Drugs : Principles and Problems</b><br>Report of a WHO Scientific Group (17 pages) . . . . .   | 4.—     |
| 537 | (1974) <b>Malaria Control in Countries where Time-Limited Eradication is Impracticable at Present</b><br>Report of a WHO Interregional Conference (66 pages) . . . . .  | 6.—     |
| 538 | (1974) <b>The Selection of Teaching/Learning Materials in Health Sciences Education</b><br>Report of a WHO Study Group (27 pages) . . . . .   | 4.—     |
| 539 | (1974) <b>Toxicological Evaluation of Certain Food Additives with a Review of General Principles and of Specifications</b><br>Seventeenth Report of the Joint FAO/WHO Expert Committee on Food Additives (40 pages) . . . . . | 5.—     |
| 540 | (1974) <b>Maturation of Fetal Body Systems</b><br>Report of a WHO Scientific Group (33 pages) . . . . .   | 5.—     |
| 541 | (1974) <b>Disposal of Community Wastewater</b><br>Report of a WHO Expert Committee (72 pages) . . . . .   | 6.—     |
| 542 | (1974) <b>Filariasis</b><br>Third Report of the WHO Expert Committee (54 pages) . . . . .   | 5.—     |
| 543 | (1974) <b>Food-Borne Disease : Methods of Sampling and Examination in Surveillance Programmes</b><br>Report of a WHO Study Group (50 pages) . . . . .   | 5.—     |
| 544 | (1974) <b>Uses of Epidemiology in Housing Programmes and in Planning Human Settlements</b><br>Report of a WHO Expert Committee on Housing and Health (64 pages) .   | 6.—     |
| 545 | (1974) <b>Pesticide Residues in Food</b><br>Report of the 1973 Joint FAO/WHO Meeting (42 pages) . . . . .   | 5.—     |
| 546 | (1974) <b>Assessment of the Carcinogenicity and Mutagenicity of Chemicals</b><br>Report of a WHO Scientific Group (19 pages) . . . . .  | 4.—     |
| 547 | (1974) <b>The Planning of Medical Education Programmes</b><br>Report of a WHO Expert Committee (25 pages) . . . . .   | 4.—     |
| 548 | (1974) <b>Planning and Organization of Geriatric Services</b><br>Report of a WHO Expert Committee (46 pages) . . . . .  | 5.—     |
| 549 | (1974) <b>WHO Expert Committee on Malaria Eradication</b><br>Sixteenth Report (89 pages) . . . . .  | 7.—     |

| No. |   | Sw. fr. |
|-----|---|---------|
| 549 | (1974) <b>Fish and Shellfish Hygiene</b><br>Report of a WHO Expert Committee convened in cooperation with FAO<br>(62 pages) . . . . .   | 6.—     |
| 551 | (1974) <b>WHO Expert Committee on Drug Dependence</b><br>Twentieth Report (89 pages) . . . . .  | 7.—     |
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