

## The words of prevention, part I: changing the model

As palavras da prevenção, parte I: mudando o modelo

*Las palabras de la prevención, parte I: cambiando el modelo*

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### Abstract

**Objective:** this part I article explores the different meanings of relevant keywords for General Practice/Family Medicine (GP/FM) in the prevention domain. The aim is to contribute to information process in GP/FM by keeping in line with the main terms used in health care organization. **Methods:** important keywords for GP/FM in the prevention domain were selected. Then, a search was carried out on the main sources in GP/FM databases, as well as in Medical Subject Heading and major terminological databases available online. **Results and Discussion:** there is discrepancy between the conceptual contents of major prevention models amongst the usual bibliographic sources of knowledge in GP/FM in particular and medicine in general. **Conclusion:** For GP/FM, distribution of preventive activities is now firmly established on a new constructivist model, privileging the doctor-patient relationships and introducing a cybernetic thinking on the health care activities with a special commitment to ethics and the positive duty of beneficence.

### Keywords:

Quaternary Prevention  
Family Practice  
Terminology as Topics  
Semantics

### Resumo

**Objetivo:** este artigo, parte I, explora os diferentes significados de palavras-chave relevantes para a Medicina Geral/Medicina de Família (MG/MF) no campo da prevenção. O objetivo é contribuir para o processo de informação para a MG/MF, mantendo-se alinhado com os principais termos utilizados na organização dos cuidados em saúde. **Métodos:** foram selecionadas palavras-chave importantes para a MG/MF no campo da prevenção. Em seguida, foi realizada uma busca nas principais fontes no âmbito da MG/MF, bem como no Medical Subject Heading e nas principais bases de dados terminológicas disponíveis online. **Resultados e Discussão:** há discrepância entre os conteúdos conceituais dos principais modelos de prevenção entre as fontes bibliográficas usuais na área do conhecimento em MG/MF, em particular, e da medicina em geral. **Conclusão:** para a MG/MF a distribuição de atividades preventivas está firmemente estabelecida em um novo modelo construtivista, privilegiando a relação médico-paciente ao introduzir um pensamento cibernético sobre as atividades de cuidados de saúde, com um especial compromisso com a ética e o dever positivo da beneficência.

### Palavras-chave:

Prevenção Quaternária  
Medicina de Família e  
Comunidade  
Terminologia como Assunto  
Semântica

### Resumen

**Objetivo:** este artículo, parte I, explora los diferentes significados de palabras clave relevantes para la Medicina General/Medicina Familiar (MG/MF) en el campo de la prevención. El objetivo es contribuir al proceso de información en MG/MF, manteniendo en línea con los principales términos utilizados en la organización sanitaria. **Métodos:** palabras clave importantes para la MG/MF fueron seleccionados en el campo de la prevención. A continuación, se realizó una búsqueda en las principales fuentes en el ámbito de la MG/MF, así como en el Medical Subject Heading y en las principales bases de datos terminológicas disponibles online. **Resultados y Discusión:** existe discrepancia entre los contenidos conceptuales de los principales modelos de prevención entre las fuentes bibliográficas habituales de conocimiento en MG/MF, en particular, y la medicina en general. **Conclusión:** para la MG/MF la distribución de las actividades preventivas se ha establecido firmemente en un nuevo modelo constructivista, que privilegia la relación médico-paciente y la introducción de un pensamiento cibernético en las actividades de atención de la salud, con un especial compromiso con la ética y el deber positivo de beneficencia.

### Palabras clave:

Prevenición Cuaternaria  
Medicina Familiar y Comunitaria  
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## Introduction

The present discussion covers a wide range of issues concerning the theme of prevention addressed through two very different methodologies and for this reason it was divided in two articles. The first article relies on usual methods, whereas the second article relies on advanced semantic web technologies. The latter will explore in detail the conceptual content of some terms specifically related to the concept of Quaternary Prevention i.e. overinformation, overdiagnosis, medically unexplained symptoms, overmedicalisation, incidentaloma, overscreening, overtreatment, shared decision making, deprescribing and disease mongering.

This part I article highlights that information is to General Practice/Family Medicine (GP/FM) what technology is to consultants and specialized care.<sup>1</sup> In this regard, the objective of this research is to contribute to information process in GP/FM by keeping in line with the main terms used in health care organization. Firstly, it presents a brief overview of the origin of the concept of clinical prevention against an existing background of important transformation in medicine and society. Studying in depth the four definitions of prevention allows for a better understanding why their use is so confusing in online terminological databases. Secondly, it addresses the prevention concept along the usual chronological way of thinking about prevention as a continuous variable. This is contrasted by the new constructivist way of thinking, which presents the stage of prevention as a discrete variable. Thirdly, it reviews the main online terminological databases used in medicine concerning prevention domain and discusses its striking differences. Finally, it highlights that health problems and patient-doctor relationship are central to the definition of quaternary prevention.

## Business and prevention

The idea of clinical prevention is rather recent in the history of medicine. Although public health based preventive quarantine first saw the light in Croatia during the 14th century, it becomes a worldwide duty at the end of the 18th century. In the face of the considerable volume of sea traffic, the English East India Company was faced with the threat of infectious diseases arriving by sea and subsequently confronted with the necessity of taking some measures against such a threat.<sup>2</sup> Protecting the business was a core challenge to establish preventive measures such as quarantine. A deep medicalization of quarantine measures only occurred during the first 30 years of the twentieth century.

In 1903, the term '*lazaretto*' (used especially for the plague) was substituted by the term 'health station', when in Europe - particularly in France and in Italy - the distinction between 'sick', 'suspected sick' and 'healthy' began to gain importance in medicine.<sup>3</sup> Until the beginning of the 20th century, prevention was an activity purely related to public health, and dealt with the understanding and control of communicable diseases.<sup>4</sup> Now, at the dawn of the 21st century, the subtle transformation of the disease in risk has converted prevention in a market as important as the health care one.<sup>5</sup> The prevention concept, although really confusing, has invaded all life, manipulated by the industry, as well by the 1930' Dr. Knock figure who stands in every doctor,<sup>6</sup> replaced at the end of the last century by Dr. House in an attempt to raise the medical anxiety of the population.<sup>7</sup>

## The surge of clinical prevention

The term prevention in clinical practice<sup>8</sup> was coined in the 1950s by Leavell and Clark.<sup>8</sup> The first intention of these authors was not to define levels of prevention, but to build an explanatory model of the natural history of disease. Quoting Perkins (1938), Gurney Clarke<sup>9</sup> in a paper published in 1954 about the natural history of syphilis says: '*The philosophy of prevention can be put into a single phrase: "to oppose or intercept a cause [of diseases] is to prevent or dissipate its effects"*' (p. 5).

Leavell and Clark<sup>8</sup> were studying disease and described in a first publication five levels of preventive measures, but soon after, they became the well-known three levels of prevention: primary, secondary and tertiary. As described by Harris in a non-published paper available on Internet,<sup>10</sup> those levels of prevention have varied a lot along the sensibility and interest of authors,<sup>11,12</sup> making confusing the distinction between the 2<sup>nd</sup> and 3<sup>rd</sup> level of prevention.<sup>13</sup> Froom et al. have proposed seven levels, making more complicated and unclear what they were claiming.<sup>14</sup> The last level proposal in this school of thinking, along the timeline and disease oriented approach, has been Jacques Bury, a Belgian psychiatrist, who proposed Quaternary Prevention for end of life and palliative care.<sup>15</sup>

However, Leavell and Clark chronological model suffers from several weaknesses:<sup>16</sup> Firstly, it relies on linearity that purely focuses on infectious diseases. Secondly, it addresses the issue only from the angle of monomorbidity (mono-disease), and finally, the authors did not take into account the semantic content implications of the term ‘secondary’, which is most often used in its temporal sense of ‘after’ and processed as a continuous variable.

## Changing the model

In a short and exceptional letter to the editor of *Public Health*, Watkins, in 1985, proposes to classify prevention as a relationship of preventive activities to the health care system<sup>17</sup> by introducing a clear cut between the three levels and announcing the use of discrete variables for them, as proposed by Last<sup>18</sup> in the Dictionary of Epidemiology:

*‘Prevention: The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress. These goals are embodied in the word “prevention”, which is easiest to define in the context of levels, customarily called primary, secondary and tertiary prevention.’ (p. 103-104)<sup>18</sup>*

Hence, the use of discrete levels was adopted in the definition proposed in the Wonca glossary in 1995, introducing clinical prevention as the management of processes over a length of time.<sup>19</sup> Additionally, McWhinney<sup>20</sup> has proposed new perspective on doctors’ activities based on the patient-centered care approach. Therefore, when these concepts are positioned in a different way, making a cross between illness and disease, it results in an interesting image. In this regard, in 1986, Jamoulle proposed crossing patients’ world with doctors’ world, as well as science and consciousness to delimit four nebulas.<sup>21</sup> The term ‘nebula’ is used due to the fact that the limits between health and illness and between health and disease are not a clear-cut definition. However, in day-to-day practice, the distinction is commonly used. For example, science determines whether or not a disease is present as a discrete variable; whereas patients make the distinction between sick and well generally as a continuous variable.<sup>22</sup> In 1994, Hellström also crossed the concepts of illness and disease in the same manner. However, in a slightly different presentation, he described four kinds of perceptions between patients and doctors and between what is sick and what is not.<sup>23</sup>

Thus, with inception of Quaternary Prevention, the distribution of preventive activities are now firmly established as a new model, privileging the patient-doctor relationships and introducing a cybernetic thinking on the health care activities with a special commitment to ethics<sup>24</sup> and the positive duty of beneficence.<sup>25</sup>

## A terminological mismatch

Health care has become an information-intensive industry worldwide and the growing dominance of the computer industry in the health care requires a standardization of the interface between man and machine, and terminologies appear to be unavoidable.<sup>26</sup> Nevertheless, the terms in terminologies can have very different meanings in the worlds of reference and computational linguists speak over universe of discourse.<sup>27,28</sup> Semantic conflict between science and culture are at the heart of terminological sciences,<sup>29</sup> but variation of meaning in some health care terms along their worlds of reference, conditioned by historical perspectives, have not been analyzed properly as far as we can understand.

Moreover, the Unified Medical Language System of the US National Library of Medicine,<sup>30</sup> followed by SNOMED-CT<sup>31</sup> of the International Health Terminology Standard Development Organization (IHTSDO) are the dominant terminologies in health care. Each of them has its history which explains some of their discrepancies.<sup>32</sup> Additionally, the historical approach of the Medical Subject Heading, a huge terminology constructed along the time,<sup>33,34</sup> explains striking particularities in information retrieval in the Medline online library. In the following analysis we explore the main keywords in General Practice/Family Medicine (GP/FM) in the domain of prevention.

## Methods

The Wonca dictionary was used as a published gold standard definition criterion.<sup>35</sup> Naturally, MeSH and MeSH definitions were also analyzed, but MeSH sometimes does not fully cover the field of GP/FM or it proposes terms whose content are historically marked. Yet in 1980, Fitzgerald argued: ‘*Family physicians cannot always rely entirely on Index Medicus and Medline to provide the information they require*’ (p.1389).<sup>36</sup> We hypothesized that this is still the current reality. We explored the French multilingual resource Hetop<sup>37</sup> and the trilingual South American terminology DeCS,<sup>25</sup> indexing the Virtual Health Library database,<sup>38</sup> supported by the Pan-American Health Organization, which has developed several thousand non-MeSH descriptors. We have also searched into the Biportal, the online repository of medical ontologies.<sup>39</sup> As family doctors are also at the interface between the health system and the patient, lay sources such as BabelNet and Wikipedia have been included into our search strategy. Table 1 summarizes the search approach into the available databases.

**Table 1.** Acronyms, description and URLs of some online terminological sources.

UMLS	Unified Medical Language System	
SNOMED-CT	Systematized Nomenclature of Medicine - Clinical terms	<a href="https://uts.nlm.nih.gov">https://uts.nlm.nih.gov</a>
NCIT	National Cancer Institute Thesaurus	
MeSH	Medical Subject Heading	<a href="http://www.nlm.nih.gov/mesh/">http://www.nlm.nih.gov/mesh/</a>
VHL	Virtual Health Library	<a href="http://bvsalud.org/en/">http://bvsalud.org/en/</a>
DeCS	Descritores em Ciências da Saúde	<a href="http://decs.bvs.br/">http://decs.bvs.br/</a>
BabelNet	Dictionnary and Semantic Network	<a href="http://babelnet.org/">http://babelnet.org/</a>
Hetop	Health Terminology/Ontology Portal	<a href="http://hetop.eu/">http://hetop.eu/</a>
BioPortal	Repository of Biomedical Ontologies	<a href="http://bioportal.bioontology.org/">http://bioportal.bioontology.org/</a>
Woncadic	Wonca dictionary 2003	<a href="http://tinyurl.com/woncadic">http://tinyurl.com/woncadic</a>
Scholar	Google scholar	<a href="http://www.scholar.google.com">www.scholar.google.com</a>
Wikipedia	Online Public Encyclopedia	<a href="http://en.wikipedia.org/">http://en.wikipedia.org/</a>

Source: elaborated by the authors.

## Results

Following the same lexical entries, the results are presented in terms of ‘definitions’ and ‘scope notes’ found in various databases. Through an iterative reading process comparing different term definitions, some interesting discrepancies or even huge differences amongst various definitions of the studied concepts were highlighted. These differences are discussed after the result tables (Table 2 and 3).

**Table 2.** Study of the conceptual content of 5 words of prevention.

Clinical prevention	
Wonca Dictionary	<b>Prevention</b> Action to avoid occurrence or development of a health problem and/or its complications. Can be divided into four categories.
MeSH	<b>Preventive Medicine</b> A medical specialty primarily concerned with prevention of disease (PRIMARY PREVENTION) and the promotion and preservation of health in the individual.
MeSH	<b>Prevention and control [Subheading]</b> Used with disease headings for increasing human or animal resistance against disease (e.g., immunization), for control of transmission agents, for prevention and control of environmental hazards, or for prevention and control of social factors leading to disease. It includes preventive measures in individual cases. Year introduced: 1966.
Clinical prevention	
MeSH	<b>Preventive Health Services</b> Services designed for HEALTH PROMOTION and prevention of disease. Year introduced: 1968.

Source: elaborated by the authors.

Table 2. Continued...

	<b>Disease Prevention</b>
DeCS	Set of actions aiming to eradicate, eliminate or reduce the impact of a disease or disability, or to restrain its spread. (Free translation from the original: Last, 2001).
BabelNet	<b>Preventive medicine - Preventive healthcare</b> The branch of medicine concerned with preventing disease.
Wikipedia	Preventive healthcare (alternately preventive medicine or prophylaxis) consists of measures taken for disease prevention, as opposed to disease treatment.
<b>Primary Prevention</b>	
	<b>Primary prevention</b>
Wonca Dictionary	Action taken to avoid or remove the cause of a health problem in an individual or a population before it arises. Includes health promotion and specific protection (e.g.immunization).
MeSH & DeCS & UMLS	<b>Primary prevention</b> Specific practices for the prevention of disease or mental disorders in susceptible individuals or populations. These include HEALTH PROMOTION, including mental health; protective procedures, such as COMMUNICABLE DISEASE CONTROL; and monitoring and regulation of ENVIRONMENTAL POLLUTANTS. Primary prevention is to be distinguished from SECONDARY PREVENTION and TERTIARY PREVENTION.
NCIT / Bioportal	<b>Primary prevention</b> Prevention of disease or mental disorders in susceptible individuals or populations through promotion of health, including mental health, and specific protection, as in immunization, as distinguished from the prevention of complications or after-effects of existing disease.
Includes also MeSH	Preventive medicine; Primary prevention ; Preventive health service; Health promotion ; Health education; Immunization; Vaccination; Premarital examination.
UMLS	<b>Primary Mental Health Prevention</b> Mental health programs designed to prevent onset or occurrence of mental illness in high risk or target populations.
SNOMED-CT	Primary prevention (procedure) ;
BabelNet	Health promotion ; Immunization; Vaccination; Education; Genetic testing;
Wikipedia	Primary prevention consists of "health promotion" and "specific protection."
<b>Secondary Prevention</b>	
	<b>Secondary prevention</b>
Wonca Dictionary	Action taken to detect a health problem at an early stage in an individual or a population, thereby facilitating cure, or reducing or preventing it spreading or its long-term effects (e.g. methods, screening, case finding and early diagnosis).
MeSH & DeCS	<b>Secondary prevention</b> The prevention of recurrences or exacerbations of a disease or complications of its therapy.
UMLS/NCI	<b>Secondary prevention</b> NCI/CDISCPT   A procedure performed to avoid a subsequent occurrence of a disease condition. NCI/PT   Procedures or treatment processes designed to prevent complications (e.g., modifying a drug or surgical procedure to prevent complications).
also MeSH	Mass screening; Early diagnosis; Genetic testing ; Early detection of cancer; Incidental finding; Neonatal screening;
SNOMED-CT	<b>Secondary prevention</b> (procedure)
BabelNet	Screening; Checkup;
<b>Secondary Prevention</b>	
Wikipedia	Secondary prevention In medicine, it is a strategy used in a population to identify an unrecognized disease in individuals without signs or symptoms.
<b>Tertiary Prevention</b>	
	<b>Tertiary prevention</b>
Wonca Dictionary	Action taken to reduce the chronic effects of a health problem in an individual or a population by minimizing the functional impairment consequent to the acute or chronic health problem (e.g. prevent complications of diabetes). Includes rehabilitation.
MeSH & DeCS	<b>Tertiary prevention</b> Measures aimed at providing appropriate supportive and rehabilitative services to minimize morbidity and maximize quality of life after a long-term disease or injury is present. Year introduced: 2009.
<b>Tertiary Prevention</b>	
Also MeSH	Complications; Rehabilitation
SNOMED-CT	<b>Tertiary prevention</b> (procedure).

Source: elaborated by the authors.

Table 2. Continued...

BabelNet	Rehabilitation. <b>Tertiary prevention</b>
Wikipedia	Attempts to reduce the damage caused by symptomatic disease by focusing on mental, physical, and social rehabilitation [...] the objective of tertiary prevention is to maximize the remaining capabilities and functions of an already disabled patient.
<b>Quaternary Prevention</b>	
Wonca Dictionary	<b>Quaternary prevention</b> Action taken to identify patient at risk of overmedicalisation, to protect him from new medical invasion, and to suggest to him interventions, which are ethically acceptable
DeCS (2015)	<b>Quaternary prevention</b> "An action taken to identify a patient at risk of over-medicalization, to protect him (sic) from new medical invasion, and to suggest to him (sic) interventions which are ethically acceptable. (From World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians WONCA. <sup>35</sup>  Debriefing, quality assurance, and improvement processes, which complete the cycle of prevention by collecting information about the processes, multi-disciplinary analysis of the data, deriving conclusions, and distributing them to all the involved bodies. ] <b>Quaternary prevention</b> Same as in Wonca Dictionary above and: Quaternary prevention is the set of health activities to mitigate or avoid the consequences of unnecessary or excessive intervention of the health system.
Wikipedia	Social credit that legitimizes medical intervention may be damaged if doctors do not prevent unnecessary medical activity and its consequences. Quaternary prevention should take precedence over any alternative preventive, diagnostic and therapeutic, as dictated by the principle of primum non nocere.

Source: elaborated by the authors.

There is no MeSH for the term 'Quaternary Prevention'; however, searching in free text in Pubmed retrieves 27 publications since the year 2000 (on Nov 12, 2014). Two are related to the chronological concepts dealing with palliative care and 25 are related to the Wonca concept. When available, the study of the indexation by MeSH descriptors specific to the concerned domain reveals the conceptual content of the concept, seen by the indexing system of Medline (Table 3).

Table 3. MeSH descriptors and qualifiers used in indexing 25 papers about Quaternary Prevention, 2014.

Communication	Mass Screening	Preventive Medicine
Early Detection of Cancer	Patient Harm	Risk Assessment
Health Services Misuse	/prevention & control	Unnecessary Procedures
Iatrogenic Disease	Preventive Health Services	

Source: elaborated by the authors.

## Discussion

Despite the four completed definitions, a careful reading of its content reveals the difficulty to understand a cluster of 'mix of idea'. Hence, using the Wonca dictionary as a gold standard we intend to clarify the following terms: clinical prevention, primary prevention, secondary prevention, tertiary prevention, and quaternary prevention. Clinical prevention refers to the activities developed by a doctor facing a patient. Clinical implies doctors' daily activities or specific processes embedded in their daily activities. From clinical point of view curative and preventive activities are often integrated during the contact with the patient. The difference between the Wonca dictionary definition and all others dictionaries of medicine lies only between health problem and disease. Wonca dictionary refers to health problem while others refer to it as disease. For a general practitioner health problem is "any concern in relation to the health of a patient as determined by the patient and/or the health care provider" (p. 70).<sup>35</sup> As can be understood by this definition, family physicians are already far from disease construct.

The difference in the concept of *primary prevention* lies also essentially in the same issue: health problem *versus* disease. MeSH and DeCS definitions are more precise regarding public health duties, whereas together with National Cancer Institute Terminology (NCIT) - cited in UMLS<sup>30</sup> - disease or mental disorders are referred as separate entities. In reality, the content of the concept of primary prevention, as developed by general practitioners, also includes numerous different MeSH referred in the above table.

The real problem arises with the *secondary prevention* concept. Firstly, there is no clear difference in MeSH between the secondary and tertiary definitions. For instance, '*prevention of recurrences or exacerbations*' is part of secondary prevention and it is not far away from "*minimize morbidity and maximize quality*" included in the tertiary prevention. In defining secondary prevention, it is evident that the term 'secondary' is used in the acception of '*after*', thus purely chronological. This explains why cardiologists are using secondary prevention as descriptors when dealing with '*after*' ischemic cardiopathy therapy,<sup>40</sup> although aspirin is used for prevention of complication, which is clearly pertaining to tertiary domain. It seems evident that this MeSH definition of secondary prevention is not related to the same definition of Wonca Dictionary, but is closely linked to the Woncadic definition of tertiary prevention. This difference is also emphasized in UMLS/NCI definition of secondary prevention, framing secondary as to '*avoid a subsequent occurrence of a disease*' or '*procedures or treatment processes designed to prevent complications*' (see Table 2).<sup>30</sup>, which are normally within the definition of tertiary preventive actions or third domain of Wonca Dictionary definition. The lay terminologies like BabelNet and Wikipedia are not following this way as they refer correctly secondary prevention to "*screening*" or "*identifying an unrecognized disease*". Thus, for the correct use of the word as descriptor in general practice we have added the MeSH corresponding to screening and analogs to the secondary definition table.

The *tertiary prevention* definition is easier to analyze. The MeSH and DeCS definitions overlap quite well with the Wonca definition, taking into account that the MeSH secondary prevention definition has to be quoted here as well. It's interesting to note that the Wonca definition of tertiary prevention includes the usual care activities. Indeed, "*minimizing the functional impairment consequent to the acute or chronic health problem*" (p. 110)<sup>35</sup> is a good definition of daily care. The SNOMED-CT is not very useful for the present discussion due to its lack in term definitions. In SNOMED-CT the meaning of a term is given by its semantic relationships, which means also that the reader of a concept could understand what he contextually wants to read.

The concept of *quaternary prevention* is a relatively new one. It has been proposed at the annual meeting of Wonca International Classification Committee in Durham, 1995<sup>41</sup> and published in the Wonca dictionary in 2003. The style and wording of the definition has been taken from the three first ones already published in the Glossary of general practice in 1995. The quaternary definition concept reflects a constructivist view as it is based on the patient-doctor relationships and deals with the organization of health care along the time and health problems. This might explain why it is not quoted in MeSH. Quaternary prevention (confirmed by Arthur Treuherz, terminologist at BIREME) will be added to the South American DeCS in 2015, jointly with another definition quoted by Gofrit, but originated in Bury's work and following the chronological approach.<sup>14</sup> The GP/FM quaternary prevention concept is well developed on Wikipedia as result of an intense networking on Twitter, Facebook and various websites.

One last remark is the fact that none of the P4 definitions mention the notion of Risk. As we know risk has been equaled to disease during the last decades, but in general practice, risk and risk addressed by patient are part and parcel of the usual health problems seen in primary care settings. Quaternary prevention functions as a conceptual umbrella for several problems addressed more intensely in recent years in the international scientific literature. This will be explored in our second paper: The words of prevention, Part II: ten terms in the realm of quaternary prevention.

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