LEADING ARTICLE

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Defining 'Surveillance' in Drug Safety

Jeffrey K. Aronson,[1] *Manfred Hauben*[2,3,4,5] and *Andrew Bate*[2,3,5]

1 Department of Primary Health Care, University of Oxford, Oxford, UK
2 Worldwide Safety Strategy, Pfizer Inc., New York, NY, USA
3 Department of Medicine, Division of Clinical Pharmacology, New York University School of Medicine, New York, NY, USA
4 Department of Family and Community Medicine, New York Medical College, Valhalla, NY, USA
5 School of Information Systems, Computing, and Mathematics, Brunel University, West London, UK

Abstract

The concept of surveillance in pharmacovigilance and pharmacoepidemiology has evolved from the concept of surveillance in epidemiology, particularly of infectious diseases. We have surveyed the etymology, usages, and previous definitions of 'surveillance' and its modifiers, such as 'active' and 'passive'.

The following essential definitional features of surveillance emerge: (i) surveillance and monitoring are different – surveillance involves populations, while monitoring involves individuals; (ii) surveillance can be performed repeatedly and at any time during the lifetime of a medicinal product or device; (iii) although itself non-interventional, it can adduce any types of evidence (interventional, observational, or anecdotal, potentially at different times); (iv) it encompasses data collection, management, analysis, and interpretation; (v) it includes actions to be taken after signal detection, including initial evaluation and communication; and (vi) it should contribute to the classification of adverse reactions and their prevention or mitigation and/or to the harnessing of beneficial effects.

We conclude that qualifiers add ambiguity and uncertainty without enhancing the idea of surveillance. We propose the following definition of surveillance of health-care products, which embraces all the surveyed ideas and reflects real-world pharmacovigilance processes: 'a form of non-interventional public health research, consisting of a set of processes for the continued systematic collection, compilation, interrogation, analysis, and interpretation of data on benefits and harms (including relevant spontaneous reports, electronic medical records, and experimental data).' As a codicil, we note that the purposes of surveillance are to identify, evaluate, understand, and communicate previously unknown effects of health-care products, or new aspects of known effects, in order to harness such effects (if beneficial) or prevent or mitigate them (if harmful).

Surveillance systems in drug safety have often been described, but the term 'surveillance' has rarely been defined. Current usage entails illogical distinctions between different sources of surveillance information, creating the potential to degrade scientific communication and also implicitly discounting the contributions of some sources of information relative to others.

As a general principle, it is important to pay detailed attention to defining terms that are in common use. Clarity in definition improves communication of ideas and encourages data analyses that are coherent across individuals and institutions. In addition, surveillance of adverse drug reactions crosses international boundaries, with English as the language of trade, and the specialized use of any language is fraught with difficulty, even for native speakers. It is therefore important to investigate and formulate definitions that encourage clear, consistent, and objective terminology, so that patients, prescribers, manufacturers, regulators, and researchers can all understand each other.

Specifically, clarity about what pharmacovigilance experts mean by 'surveillance', and particularly the terms 'active surveillance' and 'passive surveillance', has potentially profound implications that may have practical effects on patient safety. Lack of clarity about what 'active surveillance' is leads to different interpretations: some see it as rapid routine use of observational databases for confirmatory analyses, others as the use of observational databases for signal detection and refining. This leads to unrealistic expectations, as well as lack of clarity on what novel active surveillance approaches can provide, and about what is novel rather than just extended. Confusion and lack of consensus on the novel elements of 'active surveillance' can also make it less clear where attention and focus is most needed in developing and validating systems. This causes inefficiencies and may adversely affect the direction of scientific decision making, with potential detriment to patient safety, owing to inappropriate emphasis on or discounting of some methods and the information they provide relative to others (for example, 'passive surveillance' vs 'active surveillance'). The term 'active surveillance' has been used recently to denote novel aspects in the use of observational databases (electronic medical records [EMRs] and claims); this potentially creates confusion with the more traditional uses of the term.

Here, therefore, we examine what 'surveillance' means, compare and contrast so-called 'active' and 'passive' surveillance, and suggest that terminological clarity would help developments in the area of the safety of medicinal products (medicines, vaccines, cellular elements) and devices. Specifically, we propose that qualifying terms such as 'active' and 'passive' play no important role in defining 'surveillance' and merely obfuscate the meaning of the word, by introducing ambiguities and uncertainties.

In this analysis, we take a four-pronged approach, based on an analysis of etymology, usage, previous definitions, and the processes of surveillance.[1] We shall refer throughout mostly to drugs, recognizing that similar principles apply to other health-care products (such as vaccines, cellular elements, and devices).

1. Etymology

Here we give a brief summary. For a detailed discussion see the online Appendix (Supplemental Digital Content, http://links.adisonline.com/DSZ/A67).

1.1 'Surveillance'

'Vigilance' and 'surveillance' have the same etymology; their origins imply both watchfulness and speedy action. 'Surveillance' has an associated transitive verb 'to surveil', attested to in the *Oxford English Dictionary*, with UK and US examples dating from the 1960s.

1.2 'Active' and 'Passive'

Driving and guiding are essential aspects of being active. In contrast, waiting is an essential part of being passive. In the phrase 'watchful waiting', 'watchful' implies activity and 'waiting' implies passivity.[2] If surveillance is in any sense watchful waiting, it combines both active and passive elements, making these qualifiers redundant.

2. Usage

Etymology need not dictate usage. However, the usages of these words closely reflect their etymologies and have changed little over the centuries. Here we give the important details. For a

more detailed discussion see the Appendix (online SDC).

2.1 'Surveillance'

The meaning of 'surveillance', "watch or guard kept over a person; supervision for the purpose of direction or control, superintendence", has not changed since the end of the 18th century. In section 3.1.1 we discuss the distinction between monitoring and surveillance.

2.2 'Active'

Shakespeare used the term 'active' to mean "abounding in action; energetic, lively, agile, nimble; diligent, busy, brisk". Its meanings have hardly changed since then, apart from some technical usages, such as in grammar and physics.

2.3 'Passive'

Since the end of the 14th century, 'passive' has been used to refer to something "that is acted upon or is capable of being acted upon from outside". In the 19th century it came to mean "not acting, working, or operating on anything else; not exerting force or influence; inert, quiescent" and "that makes no response or offers no resistance; yielding readily to external force or influence, or to the will of another; submissive". Later, it acquired the meaning "of movement or motion of (part of) the body: produced by an external agency" (for example, passive movements).

2.4 'Active Surveillance'

2.4.1 'Active Surveillance' in Epidemiology and Pharmacovigilance

Active surveillance of infectious diseases dates from the 1890s.[3-5] However, the term 'surveillance' was not used in drug safety until the 1950s and 1960s, with different nuances of meaning.[6-8] The term 'active surveillance' first appeared in the 1970s in relation to surveillance for infection. Active surveillance for drug effects was mentioned in a review of the beneficial effects of antiepileptic drugs in 1986,[9] and active surveillance for adverse effects in a Bulgarian paper in 1987.[10] The first occasion on which the term was used in relation to a specific therapeutic drug was in 1994, in a description of adverse events in elderly patients taking digitalis.[11]

Active surveillance for adverse reactions to vaccines was first reported in 1995,[12] again illustrating the importance of infectious diseases in the history of the adoption of this term in describing the detection of adverse drug reactions.

However, despite increasing numbers of papers in which the term 'active surveillance' is mentioned, relatively few have been devoted to drug or vaccine safety (figure 1). Of about 2000 papers retrieved by a search for 'active surveillance' in PubMed, about 50% concern infections and about 15% prostate cancer.

2.5 'Passive Surveillance'

The term 'passive surveillance' was first used in the context of drug therapy or vaccines in the 1980s.[13] Most of the papers that feature the term are about infectious diseases; about 18% deal with surveillance of adverse reactions to vaccines.

2.6 Postmarketing Surveillance

The term 'postmarketing surveillance' first appeared in the 1960s. It refers to analysis of data accumulated typically for the purpose of detecting adverse reactions after a medicinal product

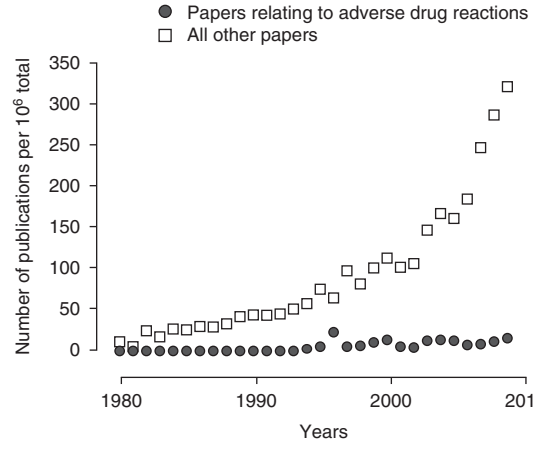

Fig. 1. The number of publications returned by searching for 'active surveillance' on PubMed, 1980–2009, corrected for the total number of publications in each year.

has been given a marketing authorization by a regulatory body.[14,15] The term normally refers to the processes of signal detection and signal evaluation, but it may be confused with the term 'pharmacovigilance', which is defined by the WHO as the ''science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other possible drug-related problems''.

Postmarketing surveillance studies have also been described as one form of phase IV studies, which have been primarily formal observational studies of drugs after marketing authorization, and more recently have included large simple trials in which the element of randomization is introduced into an observational cohort of patients. The term was introduced to reflect the need for continued surveillance after drug approval, for continued reassurance of the public about the safety of medical products and to capture unexpected effects.

Postmarketing surveillance has been separated into 'passive surveillance', generally taken to represent spontaneous reporting systems, and 'active surveillance', which includes studies in which complete case ascertainment is attempted and thus refers to observational data sets. However, there are different views about whether the isolated term 'surveillance' refers to the method of screening a certain type of data, such as spontaneous reports, or, as the US FDA has used it,[16] as a synonym for the overall spontaneous reporting system, i.e. data collection, processing, analysis, and feedback/communication to stakeholders. 'Active surveillance' has been used to imply a method of active screening of existing data sets, such as electronic health records, but not including spontaneous reports,[12] rather than the overall process of data collection, structuring, and analysis, of which a novel method for analysis is clearly just one component.

2.6.1 Spontaneous Reporting in Postmarketing Surveillance

'Spontaneous reporting' is accepted as referring to adverse events or suspected adverse drug reactions submitted voluntarily by a reporter to a centralized organization that focuses on receipt, data cleaning and structuring, analysis, follow up of reports with the aim of maximizing the value of the enclosed data, and further dissemination of the data or the results of analysis. While efforts are made to increase the number of reports received, the responsibility for reporting lies with the reporter; spontaneous reporting can never generate complete case ascertainment.[17]

Thus, in spontaneous reporting systems one has information on some patients who have been exposed to a medicinal product with which a given outcome was associated. But many potential reports will not be submitted, introducing bias.[18] Furthermore, some reports will not represent true cases, because of erroneous suspicion of a medicinal product. The perceived need to distinguish spontaneous reporting from other drug safety initiatives that can reasonably attempt complete case ascertainment in defined populations has led to the use of the term 'passive surveillance', referring to spontaneous reporting, despite the many active elements involved in collecting such data. Other terms, such as 'stimulated surveillance' and 'enhanced passive surveillance'[19,20] and 'solicited reactions',[21] which imply more active collection of data, have been introduced to cover other forms of postmarketing surveillance, but the outputs may nevertheless end up in various postmarketing surveillance systems, including spontaneous reporting databases.

However, the primary role of all of these types of reporting is hypothesis generation,[22] and in a modern IT environment the distinction between passive and active surveillance is misleading. For example, the collection of data from electronic medical records, in which the data are not exclusively or primarily collected for the purposes of safety monitoring, cannot be regarded as either wholly passive or wholly active.

3. Previous Definitions

3.1 Surveillance in Epidemiology

The WHO's definition of surveillance includes a wide range of activities: ''systematic ongoing collection, collation and analysis of data and the timely dissemination of information to those who need to know so that action can be taken''.[23]

Others likewise. For example, Eylenbosch and Noah[24] defined surveillance as "continuous analysis and feedback of systematically collected data generally using methods distinguished by their practicality, uniformity, and rapidity rather than by accuracy or completeness". And public health surveillance is defined by the Centers for Disease Control and Prevention[25] as "the ongoing, systematic collection, analysis, and interpretation of data (e.g. regarding agent/hazard, risk factor, exposure, health event) essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control".

3.1.1 Surveillance versus Monitoring

In the early days of drug surveillance the term 'monitoring' was used instead, for example in many of Finney's publications.[26] Indeed, Cobert and Biron[27] have described 'surveillance of patients receiving pharmacotherapy' as "therapeutic monitoring", and "surveillance of drug safety profiles" as 'pharmacovigilance'. They also say that "drug monitoring … is synonymous with pharmacovigilance, drug surveillance, and drug safety surveillance[;] it comprises the duties of collection, processing, analysis, and communication of adverse events and adverse drug reactions", and they assert that pharmacovigilance is synonymous with drug surveillance. However, elsewhere they write that pharmacovigilance includes "surveillance, evaluation, and signaling". All this compounds the confusion.

Last[28] has distinguished surveillance from monitoring as follows: "[surveillance] is continuous and ongoing, whereas monitoring is intermittent or episodic". However, this distinction is problematic. The word 'continuous' means "going on without interruption", i.e. during every moment of every day, as opposed to 'continual', which means "kept up at stated times or intervals" (although the distinction is not as clear as that – consider, for example, 'continuous assessment'). In fact, the distinction that Last[28] draws is one of differing frequency of effort along a continuous time scale. It would be more relevant to regard surveillance as applying to populations and monitoring to individuals, however frequently the processes occur. It is, for example, possible to monitor an individual continuously and to surveil a population intermittently (i.e. continually).

3.2 Active Surveillance in Epidemiology

3.2.1 Monitoring Individuals

In the early 1960s, Langmuir[29] suggested that when referring to individuals, active surveillance implied close non-interventional observation for the early detection of disease, and meant "maintaining a responsible alertness, making systematic observations and taking appropriate action when indicated". Note the juxtaposition of alertness and action (see section 1). Since this applies to individuals, we prefer to call it monitoring rather than surveillance.

In a mathematical analysis of the processes required for continuous fetal surveillance (i.e. monitoring) during labour, Frisén and De Maré[30] defined active surveillance as occurring when actions at an earlier time point affect the mathematical distributions of later actions. In other words, they introduced the concept that passive surveillance does not affect the thing being surveilled, while active surveillance causes a change or induces a remedying action. This is not a useful distinction in pharmacovigilance.

'Active surveillance' has also been used to refer to a management strategy. For example, in oncology it is used to describe a detailed form of expectant management of patients with some types of cancer;[31] there may be eventual curative or palliative intent, but the cancer is monitored and treatment deferred until symptoms or biomarkers indicate cancer progression and/or potential spread. However, there appears to be some disagreement about whether 'watchful waiting' and 'active surveillance' are synonyms, although etymologically they are not (see section 1.2 and Appendix [online SDC]). It is therefore appropriate that the concept of 'watchful waiting' as practised in the past (i.e. observation until the patient becomes symptomatic, followed by the introduction of therapy) has evolved into a more proactive strategy called 'expectant management with curative intent' (EMCI) or 'active

surveillance'.[32] Again, this is better described as monitoring.

3.2.2 Active Surveillance of Populations

In terms of population surveillance, the specific terms 'active surveillance' and 'passive surveillance' have been used in disease epidemiology for many years. Langmuir[29] defined active surveillance of diseases as "continued watchfulness over the distribution and trends of incidence through systematic collection, consolidation, and evaluation of morbidity and mortality reports and other relevant data". He noted that elements of the concept of surveillance were apparent in early non-systematic field studies of plague, poliomyelitis, influenza, and other communicable diseases, as we have already seen (section 2.4.1).

According to Colbourne,[33] passive surveillance of malaria required the reporting of solicited cases (i.e. reports that were sought by advertisement rather than by, say, direct questioning), while in active surveillance cases were actively sought. Others have defined 'active surveillance' as the "identification of health care-associated infections by trained personnel".[34,35] This suggests a focus on case collection, but it is perhaps implicit that the case ascertainment is done in a closed population and that other relevant information can be obtained. Active surveillance in disease epidemiology seems, in general, to refer to studies in which all diseased individuals in a well-defined population are determined.

3.2.3 Syndromic Surveillance

'Syndromic surveillance' has been defined as "surveillance using health-related data that precede diagnosis and signal a sufficient probability of a case or an outbreak to warrant further public health response".[36] It is therefore an epidemiological technique akin to surveillance in pharmacovigilance, in that it is designed to detect signals, particularly of infectious diseases, but is also used predictively.

3.3 Surveillance as a Component of Pharmacovigilance

There have been few previous definitions of surveillance, as opposed to active, passive, or other forms of surveillance.

The US Institute of Medicine of the National Academies has defined active surveillance as "the regular, periodic collection of case reports [i.e. spontaneous reports] from health care providers or facilities".[37] In this definition, the word 'periodic' raises a similar difficulty to that posed by the word 'continuous' in Last's[28] definition (section 3.1.1). Others have used this definition, sometimes in slightly modified form (for example, "the regular periodic collection of case reports from health care data systems"[38]). This definition suggests that data analysts need to contact health-care providers in order to ensure complete systematic reporting. However, in practice, current technology allows health-care providers or facilities to submit case reports regularly (to both specific programmes and spontaneous reporting systems) for centralized analysis, irrespective of the number of reports received during a specific time. In many countries consumers can report through the internet, for example in the USA using the Medwatch scheme and in the UK via the Yellow Card scheme. It is unclear from this definition whether active surveillance is being distinguished from the analysis of spontaneous reports, whether stimulated reporting or otherwise, in that most spontaneous reporting systems regularly and periodically call for reports in a general way – it is just that the act of submitting reports is (often) voluntary. Furthermore, the Institute of Medicine's definition might be taken to imply that complete case ascertainment is a prerequisite for active surveillance, but there is no reference to a defined population in order to determine the precise amount of exposure and the size of the control population.

In discussing the adverse effects of vaccines, Davis et al.[39] did not define active surveillance explicitly, but they did refer to "three challenges facing active surveillance: outcome definition, data management (rapid and routine creation of analytic datasets based on automated data), and statistical analysis of signal detection using methods that account for multiple testing of accumulating data". They also implied a focus, at least in their application of the Vaccine Safety Data Link, on evaluating a signal or at least refining it, rather than detecting it, by suggesting that "this active surveillance project would be

flexible enough to quickly assess new signals (that might arise from VAERS [the Vaccine Adverse Event Reporting System]), because of the availability of denominator datasets and statistical programs''. In contrast, they later stated that ''active and prospective surveillance analysis of Vaccine Safety Datalink data provides a valuable, population-based early warning system to complement VAERS in the US immunization safety system.'' This seems to imply the use of the tool for signal detection and clarification.

CIOMS VIII[40] defined active surveillance as ''a surveillance method that ascertains the number of all adverse events (numerators) in patient populations exposed and unexposed to a medicinal product (denominators) followed by the use of observational epidemiological methods for the purposes of signal detection.'' This definition makes it clear that active surveillance refers to signal detection, rather than evaluation, and that spontaneous reporting is not regarded as active surveillance. It also clearly refers to the process of determining precise counts of cases and controls in exposed patients, and implicitly refers to a defined population. CIOMS VIII defined passive surveillance as ''a surveillance method that relies on healthcare providers (and consumers in some countries) to take the initiative in communicating suspicions of adverse drug reactions that may have occurred in individual patients to a spontaneous reporting system''. Neither of these definitions defines 'surveillance'.

However, elsewhere in the report, it appears that the concept of active surveillance is not focused solely on signal detection: ''Thus, the scope of the CIOMS VIII Working Group concentrates on providing practical, focused, and timely information about the application of these proactive approaches to passive surveillance systems of spontaneous case reports. While this report is not intended to provide an equal amount of attention to signal detection, prioritization and evaluation using active surveillance methods applied to other non-spontaneous sources of post-approval data (including large linked databases of claims data, electronic medical records databases, patient registry data, prescription-event monitoring studies, case-control surveillance studies, and cumulative post-approval meta-analyses of randomized clinical trial data), new developments in this area are summarized.'' The CIOMS report also uses the term 'passive surveillance' to refer to spontaneous reporting, distinguishing between data submitted as solicited reports in active surveillance systems and unsolicited (spontaneous) reports in passive surveillance systems.

Although surveillance is referred to in the websites of organizations such as the FDA, the Medicines and Healthcare products Regulatory Agency (MHRA), and the European Medicines Agency (EMA), we have found no formal definitions of 'surveillance' there.

The discussion around active surveillance in drug safety in some ways parallels the discussion around what is meant by a signal and the need to reconsider its definition in line with recent developments in drug safety.[1,41] The WHO definition of a signal is ''Reported information on a possible causal relationship between an adverse event and a drug, the relationship being unknown or incompletely documented previously''.[42] This definition could be construed to focus solely on analysis of spontaneous reports, although the term 'reporting' has also been used in the context of active surveillance. Some other proposed definitions of signal are more general.[1,43] The possibility and probability that signals will no longer be sought exclusively/predominantly in spontaneous reports prompted the need for a definition of signal that was not exclusive to any one type of data. Thus, in CIOMS VIII[37] a new definition was proposed, adapted from Hauben and Aronson:[1] ''Information that arises from one or multiple sources (including observations and experiments), which suggests a new potentially causal association, or a new aspect of a known association, between an intervention and an event or set of related events, either adverse or beneficial, that is judged to be of sufficient likelihood to justify verificatory action.''

Stang[44] distinguishes surveillance and research. He suggests that surveillance is a process of watchful waiting, mostly used for hypothesis generation, while research is a hypothesis testing exercise, with a focus on providing results that can be generalized to a wider population. We

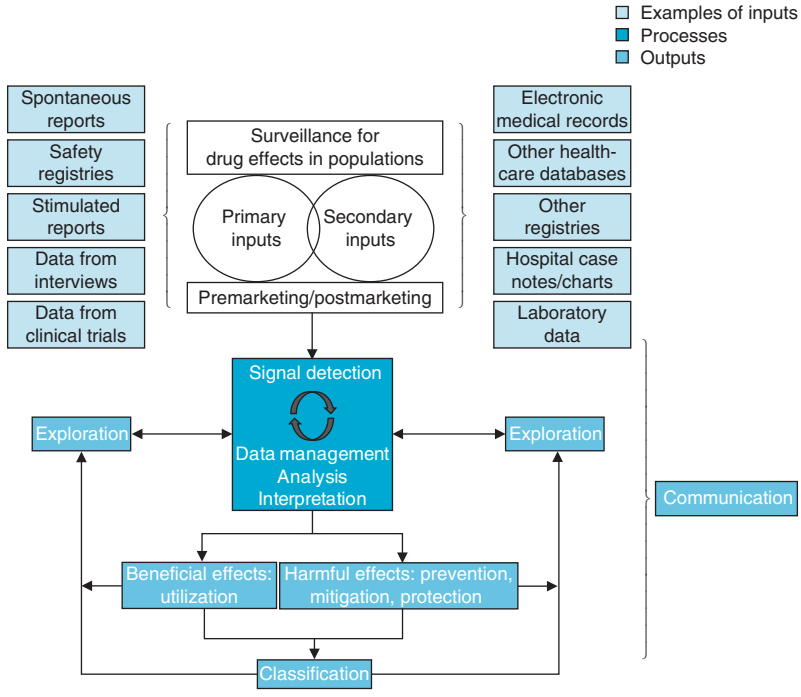

Fig. 2. The general features of surveillance programmes as components of pharmacovigilance.

have commented above on the difference between 'watchful waiting' and 'active surveillance'. Furthermore, not all research involves hypothesis testing, and we regard surveillance as a form of research.

4. The Processes of Surveillance

Figure 2 shows the general features of surveillance programmes in pharmacovigilance. Note that although the information accrued during surveillance may come from interventional studies (e.g. clinical trials), the overall surveillance process is non-interventional. Many surveillance programmes have at least some elements of active surveillance in them, even if the term itself is not explicitly used when referring to all such programmes. Examples include Prescription Event Monitoring in the UK[45] and comparable systems elsewhere,[46] the Boston Collaborative Drug Surveillance Program,[47,48] and Case Control Surveillance.[49]

The term 'active surveillance' has also been used to refer to *de novo* studies designed to capture all cases associated with a specific exposure and outcome, often with a safety focus. For example, the European Active Surveillance study (EURAS)[50] was a multinational, prospective, non-interventional cohort study designed to follow new users of drospirenone, levonorgestrel, and other progestin-containing oral contraceptives.

Finally, we note that surveillance can yield signals of beneficial effects as well as harmful ones.

5. Defining 'Surveillance' in Pharmacovigilance

All of this suggests that it would be best, when defining 'surveillance', to avoid qualifying terms, such as 'active', 'passive', 'enhanced passive', and 'stimulated', since all contemporary surveillance approaches used to detect adverse reactions to medicinal products entail active interrogative interventions, and the use of such terms may inappropriately alter the import of some forms of surveillance relative to others. Instead of using such qualifiers, in any description of a surveil-

lance system the precise surveillance method used should be detailed. This would improve clarity of communication about the precise method of surveillance that is being used, rather than leaving readers to wonder about the precise meanings of words such as 'active' and 'passive'.

5.1 Necessary Features of a Definition

From the above analysis we conclude that a definition of surveillance for the effects of health-care products should take into account the following features:

- surveillance should be distinguished from monitoring, in that it involves populations while monitoring involves individuals;
- surveillance can be performed at any time during the lifetime of a health-care product (a medicinal product or device) and is not restricted to a single period of time;
- although itself non-interventional, it can adduce any types of evidence (interventional, observational, or anecdotal, potentially at different times); note that we distinguish here between the processes of surveillance and the sources of evidence that it taps;
- it encompasses data collection, management, analysis, and interpretation (including the evaluation of signals, although not all evaluation studies are necessarily part of surveillance);
- it includes the planning of actions to be taken after signal detection, including initial evaluation of signals and communication;
- it should contribute to the classification of adverse reactions and their prevention or mitigation and/or to the harnessing of beneficial effects.

We note that the following do not need to be taken into account:

- the time scale during which the surveillance occurs;
- the supposedly passive and active elements that are involved.

In table I we list these features and show the extent to which previous definitions have included or implied them.

5.2 A Proposed Definition of 'Surveillance' of Health-care Products

Based on this analysis, we propose that surveillance should be defined as 'a form of non-interventional public health research, consisting of a set of processes for the continued systematic collection, compilation, interrogation, analysis, and interpretation of data on benefits and harms (including relevant spontaneous reports, electronic medical records, and experimental data)'. As a codicil we note that the purposes of surveillance are to identify, evaluate, understand, and communicate previously unknown effects of health-care products, or new aspects of known effects, with the aim of harnessing such effects (if beneficial) or preventing or mitigating them (if harmful).

Note that evaluation in surveillance does not necessarily imply that in particular cases the putative association will be definitively verified or refuted.[1] We have not specified in this definition those who should be involved in surveillance (for

Table I. Proposed necessary features to include in a definition of surveillance of a health-care product, with notes on their inclusion in previous definitions; definitions of surveillance in epidemiology are included for comparison

Feature of surveillance	Previous definitions [references]							
	Pharmacovigilance					Epidemiology		
	[28]	[37]	[38]	[39]	[40]	[23]	[24]	[25]
Involves populations (monitoring involves individuals)	–	–	–	–	–	±	±	✓
Can be performed at any time	–	±	±	±	±	±	✓	✓
Can involve any types of evidence	–	–	–	±	±	–	–	–
Encompasses data collection, data management, analysis, and interpretation	✓	–	–	±	±	✓	–	✓
Includes the planning of actions to be taken after signal detection (including dissemination of information)	–	–	–	–	–	✓	–	✓
Should contribute to classification and prevention of harms or harnessing of benefits	–	–	–	–	–	–	–	–

✓ indicates stated; ± indicates partly stated or implied; – indicates not stated.

example, reporters, data analysts), nor do we think it necessary to do so.

6. Conclusions

The concept of surveillance as a component of pharmacoepidemiology and pharmacovigilance has evolved from the concept of surveillance in epidemiology, particularly surveillance of infectious diseases. Since the introduction of the concept in the 1960s, the term 'surveillance' has acquired qualifying terms, such as 'active', 'passive', 'enhanced passive', and 'stimulated'. However, we believe that these qualifiers do not enhance the basic idea of surveillance and merely add ambiguity and uncertainty. We have proposed a definition of surveillance of health-care products that takes account of the etymology and usage of the relevant words, previous definitions, and the main features of systems of surveillance in pharmacovigilance.

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Correspondence: Dr *Jeffrey K Aronson*, Department of Primary Health Care, University of Oxford, 23-38 Hythe Bridge Street, Oxford OX1 2ET, UK.
E-mail: jeffrey.aronson@phc.ox.ac.uk

