USES OF EPIDEMIOLOGY pdf

1: Epidemiology News, Articles | The Scientist MagazineÂ®

There were seven uses of epidemiology in the British Medical Journal paper and there remained seven uses in the third edition of the book in 8 (although the order of the fifth and sixth uses switched between the second 9 and third 8 editions).

Jonathon Bradshaw defines four ways in which need is perceived: It is important to distinguish between the need for health, and the need for health care. The former term includes health problems where there is no realistic or available treatment, and which do not inform the planning of health care services The epidemiological approach to health care needs assessment. For the purposes of health needs assessment, need is assumed to exist when there is an effective and acceptable intervention, or the potential for health gain. The ability to benefit from health care can be influenced by several factors including the epidemiology of the disease and the effectiveness of interventions Need for redefining needs. Health and Quality of Life Outcomes , 1: Therefore, a comprehensive needs assessment should also include an assessment of evidence of effectiveness. Need should also be distinguished from demand and use. Demand Broadly speaking, demand for health care services is the expression of felt need, i. Demand is influenced by a range of factors including: Illness behaviour itself influenced by age, gender, education, socioeconomic class Knowledge of services Influences from the media. Demand is also influenced by the supply of services, which is itself influenced by the use of guidelines, and evidence of clinical and cost-effectiveness. As with the laws of supply and demand, demand for health care increases with supply or accessibility, making demand a generally poor proxy for need. Need, supply and demand all overlap to a degree Figure 1. Need, supply and demand Service utilisation may be measured in different ways, for example by: Service-based activity, such as GP referral rates, bed occupancy, intervention rates Population-based activity such as prescriptions, immunisation coverage, surgical rates Variations in utilisation may be due to a number of factors including: Figure 1 The Dahlgren and Whitehead model The statutory duty of Joint Strategic Needs Assessment, which will be undertaken by local authorities and clinical commissioning groups CCGs , through the health and wellbeing board, is an opportunity to examine these wider determinants of health as part of a broad assessment of local needs. This approach considers the epidemiology of the condition, current service provision, and the effectiveness and cost-effectiveness of interventions and services. This approach compares service provision between different populations. Large variations in service use may be influenced by a number of factors, and not just differing needs. This approach is based on eliciting the views of stakeholders - which may include professionals, patients and service-users, the public and politicians - on what services are needed. Elements of the corporate approach i. The epidemiological approach to health care needs assessment. Services may need to change for a number of reasons, including: Inequalities in outcomes Changing demographic patterns or disease trends Availability of new treatments Changing expectations Ensuring the commitment of senior managers to the HNA is most likely to ensure implementation of the recommendations. There is no single approach to undertaking a health needs assessment, and the approach used may vary according to local circumstance including available time and resources. A Practical Guide identifies a number of steps or stages below. Whilst these are presented in a sequential manner, many of these stages overlap or can be carried out in parallel. The five modified steps are: Getting started HNA is often a multidisciplinary task. Early stakeholder involvement is crucial in identifying who will carry out which elements of the assessment, and ensuring engagement of all parties. This stage should include: Identifying the population of interest - is it defined by geography, illness, social experience i. Identifying the key stakeholders Identifying what resources are available Step 2: Identify health priorities This stage involves gathering data describing the population of interest. This may involve collection of both quantitative and qualitative data, which are then analysed to give a detailed picture of health needs. This stage may involve collecting data on similar localities to allow comparisons of need. Identify priorities for change. This stage should identify which of the issues identified are most important, leading to priorities for action. Priorities may be decided on the basis of: Size and severity impact Availability of effective and acceptable interventions and actions Local commissioning priorities and partnership

arrangements Steps 4 and 5: These steps involve implementing the changes, developing a monitoring and evaluation strategy, and measuring the impact of the changes in services.

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2: uses of 'Uses of Epidemiology' | International Journal of Epidemiology | Oxford Academic

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Uses Epidemiology and the information generated by epidemiologic methods have been used in many ways. To assess the health of a population or community, relevant sources of data must be identified and analyzed by person, place, and time descriptive epidemiology. What are the actual and potential health problems in the community? Where are they occurring? Which populations are at increased risk? Which problems have declined over time? Which ones are increasing or have the potential to increase? How do these patterns relate to the level and distribution of public health services available? More detailed data may need to be collected and analyzed to determine whether health services are available, accessible, effective, and efficient. For example, public health officials used epidemiologic data and methods to identify baselines, to set health goals for the nation in and , and to monitor progress toward these goals. Since World War II, epidemiologists have provided information related to all those decisions. In the s, epidemiologists reported the increased risk of lung cancer among smokers. In the s, epidemiologists documented the role of exercise and proper diet in reducing the risk of heart disease. In the mids, epidemiologists identified the increased risk of HIV infection associated with certain sexual and drug-related behaviors. These and hundreds of other epidemiologic findings are directly relevant to the choices people make every day, choices that affect their health over a lifetime. Completing the clinical picture When investigating a disease outbreak, epidemiologists rely on health-care providers and laboratorians to establish the proper diagnosis of individual patients. For example, in late , a physician saw three patients with unexplained eosinophilia an increase in the number of a specific type of white blood cell called an eosinophil and myalgias severe muscle pains. Although the physician could not make a definitive diagnosis, he notified public health authorities. Within weeks, epidemiologists had identified enough other cases to characterize the spectrum and course of the illness that came to be known as eosinophilia-myalgia syndrome. Ideally, the goal is to identify a cause so that appropriate public health action might be taken. One can argue that epidemiology can never prove a causal relationship between an exposure and a disease, since much of epidemiology is based on ecologic reasoning. Nevertheless, epidemiology often provides enough information to support effective action. Examples date from the removal of the handle from the Broad St. West Nile virus infection, transmitted by mosquitoes, had never before been identified in North America. Describe how this information might be used for each of the following: Tracking healthy people L-tryptophan and eosinophilia-myalgia syndrome in New Mexico. Kamps BS, Hoffmann C, editors. SARS Reference, 3rd ed. Intussusception among infants given an oral rotavirus vaccine. N Eng J Med ; New Engl J Med ;

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3: Uses of Epidemiology by Jeremy Noah Morris

Use of epidemilogy in day to day practice Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising. If you continue browsing the site, you agree to the use of cookies on this website.

Causal inference Although epidemiology is sometimes viewed as a collection of statistical tools used to elucidate the associations of exposures to health outcomes, a deeper understanding of this science is that of discovering causal relationships. For epidemiologists, the key is in the term inference. Correlation, or at least association between two variables, is a necessary but not sufficient criteria for inference that one variable causes the other. Epidemiologists use gathered data and a broad range of biomedical and psychosocial theories in an iterative way to generate or expand theory, to test hypotheses, and to make educated, informed assertions about which relationships are causal, and about exactly how they are causal. Epidemiologists emphasize that the "one cause â€" one effect" understanding is a simplistic mis-belief. If a necessary condition can be identified and controlled e. Bradford Hill criteria[edit] Main article: Bradford Hill criteria In , Austin Bradford Hill proposed a series of considerations to help assess evidence of causation, [39] which have come to be commonly known as the " Bradford Hill criteria ". A small association does not mean that there is not a causal effect, though the larger the association, the more likely that it is causal. Consistent findings observed by different persons in different places with different samples strengthens the likelihood of an effect. Causation is likely if a very specific population at a specific site and disease with no other likely explanation. The more specific an association between a factor and an effect is, the bigger the probability of a causal relationship. The effect has to occur after the cause and if there is an expected delay between the cause and expected effect, then the effect must occur after that delay. Greater exposure should generally lead to greater incidence of the effect. However, in some cases, the mere presence of the factor can trigger the effect. In other cases, an inverse proportion is observed: A plausible mechanism between cause and effect is helpful but Hill noted that knowledge of the mechanism is limited by current knowledge. Coherence between epidemiological and laboratory findings increases the likelihood of an effect. However, Hill noted that " The effect of similar factors may be considered. This question, sometimes referred to as specific causation, is beyond the domain of the science of epidemiology. Conversely, it can be and is in some circumstances taken by US courts, in an individual case, to justify an inference that a causal association does exist, based upon a balance of probability. The subdiscipline of forensic epidemiology is directed at the investigation of specific causation of disease or injury in individuals or groups of individuals in instances in which causation is disputed or is unclear, for presentation in legal settings. Population-based health management[edit] Epidemiological practice and the results of epidemiological analysis make a significant contribution to emerging population-based health management frameworks. Population-based health management encompasses the ability to: Modern population-based health management is complex, requiring a multiple set of skills medical, political, technological, mathematical etc. This task requires the forward looking ability of modern risk management approaches that transform health risk factors, incidence, prevalence and mortality statistics derived from epidemiological analysis into management metrics that not only guide how a health system responds to current population health issues, but also how a health system can be managed to better respond to future potential population health issues. Population Life Impacts Simulations: Measurement of the future potential impact of disease upon the population with respect to new disease cases, prevalence, premature death as well as potential years of life lost from disability and death; Labour Force Life Impacts Simulations: Measurement of the future potential impact of disease upon the labour force with respect to new disease cases, prevalence, premature death and potential years of life lost from disability and death; Economic Impacts of Disease Simulations: Measurement of the future potential impact of disease upon private sector disposable income impacts wages, corporate profits, private health care costs and public sector disposable income impacts personal income tax, corporate income tax, consumption taxes, publicly funded health care costs. Applied field epidemiology[edit] Applied epidemiology is the practice of using epidemiological methods to protect or improve the health of a population. Applied field epidemiology can include investigating communicable and non-communicable

disease outbreaks, mortality and morbidity rates, and nutritional status, among other indicators of health, with the purpose of communicating the results to those who can implement appropriate policies or disease control measures. Humanitarian context[edit] As the surveillance and reporting of diseases and other health factors becomes increasingly difficult in humanitarian crisis situations, the methodologies used to report the data are compromised. One study found that less than half Among the mortality surveys, only 3. As nutritional status and mortality rates help indicate the severity of a crisis, the tracking and reporting of these health factors is crucial. Vital registries are usually the most effective ways to collect data, but in humanitarian contexts these registries can be non-existent, unreliable, or inaccessible. As such, mortality is often inaccurately measured using either prospective demographic surveillance or retrospective mortality surveys. Prospective demographic surveillance requires lots of manpower and is difficult to implement in a spread-out population. Retrospective morality surveys are prone to selection and reporting biases. Other methods are being developed, but are not common practice yet. One way to assess the validity of findings is the ratio of false-positives claimed effects that are not correct to false-negatives studies which fail to support a true effect. To take the field of genetic epidemiology, candidate-gene studies produced over false-positive findings for each false-negative. By contrast genome-wide association appear close to the reverse, with only one false positive for every or more false-negatives. By contrast other epidemiological fields have not required such rigorous reporting and are much less reliable as a result. Random error is just that: It can occur during data collection, coding, transfer, or analysis. Examples of random error include: Random error affects measurement in a transient, inconsistent manner and it is impossible to correct for random error. There is random error in all sampling procedures. This is called sampling error. Precision in epidemiological variables is a measure of random error. Precision is also inversely related to random error, so that to reduce random error is to increase precision. Confidence intervals are computed to demonstrate the precision of relative risk estimates. The narrower the confidence interval, the more precise the relative risk estimate. There are two basic ways to reduce random error in an epidemiological study. The first is to increase the sample size of the study. In other words, add more subjects to your study. The second is to reduce the variability in measurement in the study. This might be accomplished by using a more precise measuring device or by increasing the number of measurements. Note, that if sample size or number of measurements are increased, or a more precise measuring tool is purchased, the costs of the study are usually increased. There is usually an uneasy balance between the need for adequate precision and the practical issue of study cost. Systematic error[edit] A systematic error or bias occurs when there is a difference between the true value in the population and the observed value in the study from any cause other than sampling variability. An example of systematic error is if, unknown to you, the pulse oximeter you are using is set incorrectly and adds two points to the true value each time a measurement is taken. The measuring device could be precise but not accurate. Because the error happens in every instance, it is systematic. Conclusions you draw based on that data will still be incorrect. But the error can be reproduced in the future e. A mistake in coding that affects all responses for that particular question is another example of a systematic error. The validity of a study is dependent on the degree of systematic error. Validity is usually separated into two components: Internal validity is dependent on the amount of error in measurements, including exposure, disease, and the associations between these variables. Good internal validity implies a lack of error in measurement and suggests that inferences may be drawn at least as they pertain to the subjects under study. External validity pertains to the process of generalizing the findings of the study to the population from which the sample was drawn or even beyond that population to a more universal statement. This requires an understanding of which conditions are relevant or irrelevant to the generalization. Internal validity is clearly a prerequisite for external validity. Selection bias[edit] Selection bias occurs when study subjects are selected or become part of the study as a result of a third, unmeasured variable which is associated with both the exposure and outcome of interest. Sackett D cites the example of Seltzer et al. Information bias[edit] Information bias is bias arising from systematic error in the assessment of a variable. A typical example is again provided by Sackett in his discussion of a study examining the effect of specific exposures on fetal health: Confounding[edit] Confounding has traditionally been defined as bias arising from the co-occurrence or mixing of effects of extraneous factors, referred to as confounders, with the

main effect s of interest. The counterfactual or unobserved risk RA0 corresponds to the risk which would have been observed if these same individuals had been unexposed i. The true effect of exposure therefore is: Since the counterfactual risk RA0 is unobservable we approximate it using a second population B and we actually measure the following relations: Example assumes binary outcome and exposure variables. Some epidemiologists prefer to think of confounding separately from common categorizations of bias since, unlike selection and information bias, confounding stems from real causal effects. One notable undergraduate program exists at Johns Hopkins University , where students who major in public health can take graduate level courses, including epidemiology, their senior year at the Bloomberg School of Public Health. Many other graduate programs, e. Reflecting the strong historical tie between epidemiology and medicine, formal training programs may be set in either schools of public health and medical schools. Epidemiologists can also work in for-profit organizations such as pharmaceutical and medical device companies in groups such as market research or clinical development.

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4: Principles of Epidemiology | Lesson 1 - Section 1

Figure 1 a and b illustrate one use of epidemiology in historical study. But first let me explain that what I am speaking of is the study of health and disease of populations and groups, the.

Mortality rates for both men and women began to fall, and they continued to fall fairly sharply until the s. Female mortality maintained its downward course; but the reduction of male mortality slackened and almost stopped. As we now know, many strange things were happening, and are reflected, in the vital statistics of the inter-war years. The most important was the emergence from obscurity of three diseases, particularly affecting males, and very common in middle age: The first of these is mainly important as a cause of morbidity; the other two are now major causes of death, killing annually over 20 middle-aged men. Figure 1 b shows the figures for â€”53, and the contribution of these two diseases to the course of mortality: Figure 1 a Mortality in middle age during the last years in England and Wales. But first let me explain that what I am speaking of is the study of health and disease of populations and groups, the epidemiology of which Farr, Snow and Goldberger are the masters. In contrast with clinical medicine, the unit of study in epidemiology is the group, not the individual: The clinician deals with cases. The epidemiologist deals with cases in their population. He may start with a population and seek out the cases in it; or start with cases and refer them back to a population, or what can be taken to represent a population. In consequence he can sometimes ask questions that the clinician may also ask, and get better or different information in reply. Sometimes he can ask questions that cannot be asked in clinical work at all. He can, for example, calculate the rates of occurrence, or frequency, of phenomena in the populationâ€”such as the deaths, from all and from particular causes, per aged 55â€”64, a hundred years ago and now, to make possible the kind of comparison shown in Figure 1 a and b. In this article I am considering epidemiology as a procedure for finding things out, of asking questions, and of getting answers that raise further questionsâ€”that is, as a methodâ€”and I will have less time to consider the results, the information, obtained in reply. I shall confine myself to the non-infectious diseases, and try to illustrate them mostly from investigations carried out from the Social Medicine Research Unit, or with material worked up in that unit. Historical Historical statements made in medicine are of two broad kinds. The first describes the decline of infections, for example, and of nutritional deficiencies, and the main trends are usually very obvious. The other raises problems about the possible increase of various disorders, which is quite another matter. In such problems as the frequency of psychoneuroses, historical questions, which are often asked, are hopeless of direct answer; but even in disorders like leukaemia, urinary cancer or cerebral tumour, sub-arachnoid haemorrhage, dissecting aneurysm and the collagen diseases, it is exceedingly difficult to estimate how much a recent apparent increase reflects a true increase of disease, and how much it is the product merely of better recognition and greater availability of diagnostic services, etc. Such questions are clearly important because the role of environmental factors in aetiology, and of recent social change which may be associated with the increase, arises. As a result of a great deal of work, the increase of duodenal ulcer, cancer of the bronchus and coronary heart disease must now be accepted as a working hypothesis and guide to environmental study. History in the making Epidemiology may further be defined as the study of health and disease of populations in relation to their environment and ways of living. In a society that is changing as rapidly as our own, epidemiology has an important duty to observe contemporary social movements for their impact on the health of the population, and to try to assess where we are making progress and where falling backâ€”an activity in line with the classic descriptions of famine and pestilence, of the relations of health and disease to social dislocations, wars and crises. What are the public health implications of the extra motor vehicles a day? Some of these questions are being studied, some cannot yet be framed in scientific terms; but parts, at least, of some could be better tackled than they are. And there are even more fundamental problems in our society; perhaps epidemiology with its concern for woods rather than trees, its special ability to isolate major characteristics for study, can simplify the issues and usefully raise some bold questions about these, too. Looking ahead For many the main interest of history is the light it can throw on the future. Vital statistics is better placed than most disciplines to forecastâ€”for example, the whole population of old people of the

second half of the century are already born and are leading their lives under the conditions we know. Figure 1 a can therefore be projected ahead, if only with wide margins of confidence. If the infectious diseases begin to reach some minimum before the modern epidemics are brought under control, or if their decline is halted, and if the large group of conditions that are relatively static cancer of the stomach, cerebrovascular disease, etc. One consequence of this would be that the population of old people in the future will consist more and more of solitary old women whatever the increasing popularity of marriage during recent years. The current trend of mortality in middle-aged males is the most striking feature of Western vital statistics. Very interestinglyâ€”another kind of epidemiological comparisonâ€”the situation is better in Scandinavia than in the English-speaking world, as illustrated by figures like these: Mortality per aged 55â€”64 from all causes. Mean of rates for separate countries.

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5: Uses of epidemiologyâ€ | International Journal of Epidemiology | Oxford Academic

Epidemiology uses a number of more "upstream" indicators to assess the health of a population beyond mortality and morbidity such as self-rated health, psychological well-being, activity limitation, life expectancy and potential years of life lost.

The preface to the pamphlets in this series said that they were intended to be used by discussion circles concerned with the social, economic and political problems that arose from the Second World War. The central problem the pamphlet dealt with was that of health as a social function: By way of a conclusion readers were exhorted to involve themselves in understandingâ€"and through this improvingâ€"the health of the communities in which they lived Box 1. How many doctors and dentists? How are they distributed? How many clinics, how many hospitals? What is it like to be an out-patient? How many factories have medical officers? How many children are immunized against diphtheria or smallpox? How much of the milk is pasteurized or tuberculin tested? What does your council spend on health services? What has it done with its permissive powers? How much smoke in the air? How many parks, swimming pools, playing fields? How many factories and shops give holidays with pay? What are the local death-ratesâ€"infant mortality, tuberculosis in young persons, diphtheria, etc? In all these respects how does your community compare with neighbouring districts, with the whole country, with the best area? Why are there such differences? Taken from Morris JN, Health. The book appeared at a time when epidemiology was undergoing a fundamental change. While exemplars of non-communicable disease epidemiology could, of course, be citedâ€"the work of Goldberger and Sydenstricker on pellagra is the classic exampleâ€"no systematic approach to the population aspects of non-communicable disease existed at the end of the Second World War. The area of concern of Uses of Epidemiology was similar to that of the Handbook for Discussion Groups, although the presentation was more attuned to an academic audience. There were seven uses of epidemiology in the British Medical Journal paper and there remained seven uses in the third edition of the book in 8 although the order of the fifth and sixth uses switched between the second 9 and third 8 editions. Epidemiology was seen as contributing to understanding the burden of disease in the community, changes in this over time and perhaps projections of future burdens of disease , the characteristics of the health problems involved their cause, their course, their nature and their responseâ€"or non-responseâ€"to health care and the implications of this understanding for the health prospects of individuals. For community diagnosis of the presence, nature and distribution of health and disease among the population, and the dimensions of these in incidence, prevalence, and mortality; taking into account that society is changing and health problems are changing. To study the workings of health services. This begins with the determination of needs and resources, proceeds to analysis of services in action and, finally, attempts to appraise. Such studies can be comparative between various populations. To help complete the clinical picture by including all types of cases in proportion; by relating clinical disease to the subclinical; by observing secular changes in the character of disease, and its picture in other countries. In identifying syndromes from the distribution of clinical phenomena among sections of the population. In the search for causes of health and disease, starting with the discovery of groups with high and low rates, studying these differences in relation to differences in ways of living; and, where possible, testing these notions in the actual practice among populations. These various uses, it may be said, all stem from the fact that in epidemiology the group is studied and not merely particular individuals or cases in the group. The definition of groups involves accounting for all members; and this has immediate uses in the study of the natural history of disease. Describing group experience of health, disease and their circumstances is useful in itself, and it permits manifold comparisons in time, place and society. Epidemiology is today the cinderella of the medical sciences. Nevertheless, there have been advances during recent years in the study of lung and other cancers, dental caries, pneumoconiosis, of atherosclerosis, ischaemic heart disease, hypertension, of rheumatism, schizophrenia, the congenital malformationsâ€"to mention some examples. New ground is being broken in the investigation of health, in the determination of physiological norms, in studies of morbidity, in family studies, in application to genetics, in the study of psychological aspects. There have been improvements in techniques

of sampling and surveys, diagnostic and screening devices, methods of prediction, in the estimation of observer validity and reliability, the treatment of qualitative data. The prospective study of cohorts, the combination of survey with case studies, international comparisons and field experiments are being increasingly used. The proposition might be advanced that Public Health needs more epidemiology; so does medicine in general; and, it may be said, society at large. Public Health needs more epidemiologyâ€”this cannot be doubted since epidemiology is the most likely basis for its further intellectual growth. Medicine as a whole needs more epidemiology because it is a social science as well as human biology and the epidemiological is the main method of studying the social aspects of health and disease. Moreover, epidemiology is rich with suggestions for clinical and laboratory research and it offers many possibilities for testing hypotheses emerging from these. The main relations of epidemiology with clinical medicine may be restated thus: Epidemiology is the study of populations and all cases that can be defined in them. These cases will often include, and in their due proportion, cases differing in type from those presenting to particular clinical attention early disease, minor, the symptom-less cases, the somehow peculiar. The epidemiological method can also be used to identify subclinical manifestations and again in proper proportion to the clinical. Epidemiology thus helps to complete the clinical picture and natural history of disease. Epidemiology supplements the clinical picture by asking questions that cannot be asked in clinical medicine about the health of the community and of sections of it, present and past: Clinical problems are set in community perspective; health problems are revealed and indication may be given where among the population they might best be studied. Measurements can be made of the need for clinical services and how the needs are being met, thus providing an indicator of the quality of medical care. Finally, epidemiology by identifying harmful ways of living, and by pointing the road to healthier ways, helps to abolish the clinical picture. This is the main field today for the use of epidemiology. The book was certainly well received, as the quotes from the reviews in several journals including Nature and the British Medical Journal on the paper cover of the second edition 9 attest. It was said that if read by clinicians the book would provide a new and fresh outlook on clinical problems, that it was one of the most significant contributions to the progress of preventive medicine in recent years, approached the stature of a minor classic, made exciting reading for the epidemiologist or any medical graduate and was a gold mine to the post-graduate research worker looking for a subject or a cause. Discussion of many of these ideas has been expanded greatly length-wise by others subsequently, although perhaps the profundity of the ideas has sometimes not increased in the process. While depth of thinking in epidemiology may not have increased greatly since the Uses first appeared, the nature of epidemiology textbooks has generally been transformed. The concern of most recent books is almost exclusively methodological 10â€” 14 â€”the health of populations has become a footnote to a detailed exposition of how to calculate a multivariably adjusted effect estimate from a study with appropriate sampling, and then how to apply a billiard-ball view of causation to your study results. Research in this tradition existed before the mid-centuryâ€”for example in RA Bolt published a study relating public health expenditure to infant mortality rates across cities in the US. The potential impact of medical therapies was illustrated with data on the changing social class distribution of diabetes deaths at age 20â€”34 years, when most cases would be type 1 or insulin-dependent diabetes Table 1. Over the subsequent decade, mortality rates fell in all social classes, but to a much greater extent for social classes I and II than for social classes IV and V, leading to a cross-over in social class patterning of diabetes mortality. The suggestion here is that the more privileged social groups benefit at an earlier stage from the introduction of insulin, and that while insulin had a dramatic effect on diabetes mortality, some benefit much more than others. Differences in the quality of medical care were examined through case-fatality rates Table 2 , which were considerably lower in teaching hospitals than non-teaching hospitals for several important health problems where treatment manifestly could affect outcome. While differences in characteristics of the patients and their diseases could account for much of this, it suggested that differences in medical care resources and procedures also produced differences in health outcomes. Gross variation in medical practice was utilized as a way of indicating that, in at least some places, optimal care was not being delivered. Thus Morris suggested that the substantial variation in tonsillectomy rates Table 3 indicated over-treatment in some places, which could be contributing to wasted health service expenditure. Morris considered that it was important to quantify

the need for health care in the population. Prescient ideas Woven throughout Uses are a myriad of examples of insightful thinking about epidemiology which have been incorporated in the later development of the discipline. Here there is room for just a few examples. Population approach The great potential of population-based approaches to disease preventionâ€"as opposed to interventions targeting the relatively small number of high-risk individualsâ€"has been given considerable emphasis in recent public health policy. Individual and group risks There has been considerable recent interest in the concept that groups possess properties over and above the sum of the properties of individuals, and that these may influence disease risk. But this figure postulates a function of the group as a whole, in this instance psychological morale. In the first edition, the chapter on aetiology covered about a third of the book, which had increased to about a half by the third edition. Furthermore, much of the material in the chapters regarding the other uses of epidemiology refers to how they can contribute to understanding the causes of disease. One concern of the Uses of Epidemiology that has tended to atrophy in more recent epidemiological textbooks is with the history and geography of disease. The book starts out with a lively summation of disease trends in Britain. It was particularly concerned with the increasing male-female disparity in death rates, Figure 2 with little indication of any improvement in male death rates from the s through to the s, a period during which female death rates declined consistently. The important contribution of ischaemic heart disease and lung cancer to this increasing disparity was made clear. These two conditionsâ€"together with peptic ulcerâ€"were causes of an increasing proportion of deaths from the mid-century onwards, and therefore received much attention in the book and influenced its thinking. Regarding the causes of disease, the large-scale historical changes and differences between countries were considered key indicators of whether factors were plausible aetiological agents: Addressing the data on male and female mortality Figure 2 Morris rhetorically asked: Lifecourse epidemiology While many of the problems facing epidemiology in the mid-century have been solved, some remain resolutely intractable. One of the striking findings reported in Uses related to the changing prevalence of coronary atheroma during the period when deaths from ischaemic heart disease increased dramatically. If anything, there was a decrease in the level of atheroma over this period. This led to the hypothesis that factors relating to blood clotting were of importance. Table 4 presents data from autopsies of young men dying in the Korean war early s and Vietnam war late s. These data have been frequently cited as demonstrating the high prevalence of atherosclerosis in early adulthood, and the importance of early intervention. It has less often been noted that there was a substantial decline in prevalence between the early s and late s. The data suggest that the recent decline in adult ischaemic heart disease mortality could have been influenced by changes in onset of the early stages of the disease in childhood. This notion was discussed in several places in Uses. Therefore continuity between childhood and adulthood social circumstances is unlikely to account for the association. Furthermore, other socially patterned causes of death do not show the same association as cardiovascular disease, suggesting that lifestyle and socioeconomic factors in adulthoodâ€"which influence other causes of death in addition to cardiovascular diseaseâ€"do not generate this association. For some of these associations we have a reasonable basis for judging why the findings are as they are. For example, in this study smoking was more strongly associated with adulthood social circumstances than childhood circumstances, 34 and as smoking is the major determinant of lung cancer risk, the disease would be expected to be strongly socially patterned by adulthood social class. Conversely, stomach cancer is related to Helicobacter pylori infection, an infection generally acquired in childhood and related to overcrowded housing, large family size, absence of running water or an indoor toilet, and the inability to maintain adequate hygiene practices. Thus childhood social circumstances would be expected to influence the risk of stomach cancer in adulthood, as was found. The associations seen at an individual level in prospective epidemiological studies can be considered with respect to the historical and geographical trends in disease, as advocated by Jerry Morris. It is noteworthy that stomach cancer and strokeâ€"both diseases related to deprivation in childhoodâ€"have shown markedly declining rates over the century in Britain, in tandem with improving material circumstances, falling family size and reduced overcrowding. The risk of mortality from these diseases declines as cohorts who experienced improved conditions in their childhood become older adults.

USES OF EPIDEMIOLOGY pdf

6: What Is Epidemiology in Public Health? â€” Northwest Center for Public Health Practice

Epidemiology is the study and analysis of the distribution (who, when, and where) and determinants of health and disease conditions in defined populations.. It is the cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare.

The same is true in characterizing epidemiologic events, whether it be an outbreak of norovirus among cruise ship passengers or the use of mammograms to detect early breast cancer. The word epidemiology comes from the Greek words epi, meaning on or upon, demos, meaning people, and logos, meaning the study of. In other words, the word epidemiology has its roots in the study of what befalls a population. Many definitions have been proposed, but the following definition captures the underlying principles and public health spirit of epidemiology: Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems 1. Key terms in this definition reflect some of the important principles of epidemiology. Study Epidemiology is a scientific discipline with sound methods of scientific inquiry at its foundation. Epidemiology is data-driven and relies on a systematic and unbiased approach to the collection, analysis, and interpretation of data. Basic epidemiologic methods tend to rely on careful observation and use of valid comparison groups to assess whether what was observed, such as the number of cases of disease in a particular area during a particular time period or the frequency of an exposure among persons with disease, differs from what might be expected. However, epidemiology also draws on methods from other scientific fields, including biostatistics and informatics, with biologic, economic, social, and behavioral sciences. In fact, epidemiology is often described as the basic science of public health, and for good reason. First, epidemiology is a quantitative discipline that relies on a working knowledge of probability, statistics, and sound research methods. Second, epidemiology is a method of causal reasoning based on developing and testing hypotheses grounded in such scientific fields as biology, behavioral sciences, physics, and ergonomics to explain health-related behaviors, states, and events. However, epidemiology is not just a research activity but an integral component of public health, providing the foundation for directing practical and appropriate public health action based on this science and causal reasoning. Frequency refers not only to the number of health events such as the number of cases of meningitis or diabetes in a population, but also to the relationship of that number to the size of the population. The resulting rate allows epidemiologists to compare disease occurrence across different populations. Pattern refers to the occurrence of health-related events by time, place, and person. Time patterns may be annual, seasonal, weekly, daily, hourly, weekday versus weekend, or any other breakdown of time that may influence disease or injury occurrence. Personal characteristics include demographic factors which may be related to risk of illness, injury, or disability such as age, sex, marital status, and socioeconomic status, as well as behaviors and environmental exposures. Characterizing health events by time, place, and person are activities of descriptive epidemiology, discussed in more detail later in this lesson. Epidemiology is also used to search for determinants, which are the causes and other factors that influence the occurrence of disease and other health-related events. Epidemiologists assume that illness does not occur randomly in a population, but happens only when the right accumulation of risk factors or determinants exists in an individual. They assess whether groups with different rates of disease differ in their demographic characteristics, genetic or immunologic make-up, behaviors, environmental exposures, or other so-called potential risk factors. Ideally, the findings provide sufficient evidence to direct prompt and effective public health control and prevention measures. Health-related states or events Epidemiology was originally focused exclusively on epidemics of communicable diseases 3 but was subsequently expanded to address endemic communicable diseases and non-communicable infectious diseases. By the middle of the 20th Century, additional epidemiologic methods had been developed and applied to chronic diseases, injuries, birth defects, maternal-child health, occupational health, and environmental health. Then epidemiologists began to look at behaviors related to health and well-being, such as amount of exercise and seat belt use. Now, with the recent explosion in molecular methods, epidemiologists can make important strides in examining genetic markers of disease risk. Indeed, the

term health-related states or events may be seen as anything that affects the well-being of a population. Therefore, the clinician and the epidemiologist have different responsibilities when faced with a person with illness. For example, when a patient with diarrheal disease presents, both are interested in establishing the correct diagnosis. However, while the clinician usually focuses on treating and caring for the individual, the epidemiologist focuses on identifying the exposure or source that caused the illness; the number of other persons who may have been similarly exposed; the potential for further spread in the community; and interventions to prevent additional cases or recurrences. Like the practice of medicine, the practice of epidemiology is both a science and an art. To make the proper diagnosis and prescribe appropriate treatment for a patient, the clinician combines medical scientific knowledge with experience, clinical judgment, and understanding of the patient. Summary Epidemiology is the study scientific, systematic, data-driven of the distribution frequency, pattern and determinants causes, risk factors of health-related states and events not just diseases in specified populations patient is community, individuals viewed collectively , and the application of since epidemiology is a discipline within public health this study to the control of health problems. Match the term to the activity that best describes it. You should match only one term per activity.

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7: Using Epidemiology in Public Health

4 History, Philosophy, and Uses of Epidemiology Exhibit What Is Epidemiology About? The Example of Violence in Schools An episode of violence on a school or university campus represents a tragic event that all too frequently rivets the attention.

Jerry Morris In , Dr. Jerry Morris, a prominent British epidemiologist, set out a list of seven uses of epidemiology. These uses are still widely accepted today. They demonstrate the wide-ranging application of epidemiology to a variety of sectors of the health system. The uses of epidemiology, as determined by Dr. Morris Morris, , are as follows: Is community health improving or declining? What actual and potential health problems are there? Individual Risks and Chances: What can be expected to occur? Completing the Clinical Picture: Different presentations of a disease Identification of Syndromes: Adapted from Morris, , and Maxcy-Rosenau-Last, Epidemiology can also be used to monitor disease trends and therefore identify epidemics. In this section, we will discuss each of the uses of epidemiology. As we look more closely at each one, think about whether and how they are relevant to your work as a public health practitioner. How could they inform the work that you do? Epidemiology is a key science that underpins public health. It is most useful when the scientific evidence is presented in ways that lead to effective public health action e. Other examples include describing disease and the associated burden on society, predicting trends in health events and evaluating the effectiveness of interventions. Historical Study Diseases and health events and behaviours can wax and wane over time in populations. For example, new diseases appear AIDS, SARS , some are eradicated smallpox, polio in the Americas and still others are reduced to very low levels mastoiditis, rheumatic fever. How is community health changing over time? Is it improving or declining? This can be decided only by selecting indicators and measuring disease and health over time. This is one of the basic responsibilities of any health system. Epidemiology has an important role to play in this process by taking an historical perspective, documenting progression over time, looking at trends, and being alert to new developments. The graph below is an example of historical study. If this graph represented your community, how could it impact your work? How healthy is the population? Is its health getting better or worse? Are some areas or subgroups much healthier than others? How can we quantify these differences? What is the impact of ill health on society? How can we measure this? What risks does it face? What explains the differences in health? Spasoff, This activity has many dimensions. Mortality death , is a readily available indicator of the health of a community but this is a "downstream" measure of population health. Morbidity sickness , is another measure of the "health" of a population but again, it has its limitations. Epidemiology uses a number of more "upstream" indicators to assess the health of a population beyond mortality and morbidity such as self-rated health, psychological well-being, activity limitation, life expectancy and potential years of life lost. The potential years of life lost PYLL indicator will be examined in detail in a future lesson. Jot down some of the "upstream" indicators for your community. What percentage of the contacts of a case of multi-drug resistant tuberculosis have been located and assessed? How many of the eligible children in a community are adequately immunized by school entry? How many are immunized on time, according to the recommended schedule? What proportion of restaurant workers has received adequate training in food handling? Are all women who become pregnant receiving antenatal care in the first trimester of their pregnancy? Below is an example of the provision of a health service, Pap Smear Tests, by income level. From this graph, what can we infer about the accessibility, effectiveness and efficiency of this service? If this were your community, what might be your next course of action? Toward a Healthy Future, Individual Risks and Chances You may not realize it but you consider individual risks and chances in almost everything you do - epidemiology is used everywhere, all of the time. What are the chances you will be alive five years from now? Are you going to start that exercise programme today? I really should have an influenza shot again this year. What is my prognosis now that I have been diagnosed with breast cancer? Should this group of newborns be followed closely because their birth weight was below grams? These daily health-related decisions are informed by the studies epidemiologists have undertaken in populations to provide an assessment of the risk or chance of the

occurrence of an event or illness. Jot down some examples from your own work. Certain courses and educational resources may be under another type of CC license.

8: Epidemiology - Wikipedia

'Uses of Epidemiology'in the British Medical Journal.3 This article was expanded into a book 4 which, on publication in , became one of the pioneering texts of 20th century epidemiology.

9: Principles of Epidemiology | Lesson 1 - Section 3

Epidemiology is the study of health in populations to understand the causes and patterns of health and illness. The Epidemiology Program, a research division of VA's Office of Patient Care Services, conducts research studies and surveillance (the collection and analysis of data) on the health of Veterans.

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