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# Direct and indirect costs and effects in cost-effectiveness analysis of prevention

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cedures costs, hotel cost and overall costs between malnourished and normally nourished patients. **RESULTS:** A total of 1032 malnourished patients were identified. Of those, "underweight" or "severe weight loss" was the primary diagnosis for 105 patients and the secondary diagnosis for 927 patients. Therefore, only these 927 patients were included in the matched analysis. In all, 26,067 matched controls were retrieved. The overall mean cost difference per stay between malnourished and normally nourished patients averaged €1152 (95%CI: €870; €1433). Pharmaceuticals, procedures and hotel costs differences averaged €264 (€192; €336), €137 (€113; €161) and €754 (€508; €1000), respectively. The largest mean cost difference was found for APR-DRG 691-Lymphoma & non-acute leukemia: €5117 (€2544: €7691). **CONCLUSION:** The inpatient cost incurred by malnutrition is substantial and calls for routine pre- or in-hospital nutritional screening and adequate and timely initiation of nutritional support. However, we can not exclude the possibility that only severe malnutrition was reported and recognized through hospital registries. Further studies able to report from the larger spectrum of malnutrition are strongly advocated.

**PMC14**

### POPULATION KNOWLEDGE: AN APPROACH TO CLASSIFY A GENERAL POPULATION ACCORDING TO LIFESTYLE, HEALTH BEHAVIOUR AND ATTITUDE

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**OBJECTIVES:** For decision makers, epidemiological data are key information to set up a public health care policy. By definition, these quantitative data are rarely crossed with qualitative information about population trends concerning lifestyle and health behaviour. We developed a methodological approach to detect and classify groups of subjects over 26 qualitative variables. **METHODS:** A sample of 924 French subjects was included in a cross-sectional survey and answered a face to face questionnaire focusing mainly on their health perception and lifestyle. A multiple correspondence factorial analysis (MFCA) followed by Khi 2 test validations were performed to detect and to classify groups of subjects. **RESULTS:** Four subject groups (n1 = 297, n2 = 235, n3 = 241, n4 = 151) were clearly disclosed. Group n2 was removed from the other groups and was characterized by the poorest health perception, the highest number of declared diseases (more than 6), the highest number of visits to a physician (more than 5 per year), the lowest educational level, the highest compliance to prescriptions and the highest number of obese subjects. From the n2 group, we estimated the proportion of obese subjects (BMI above 30 kg/m$^2$) to be 63%. For this group, medical management and follow-up of their weight problems would be the most beneficial. **CONCLUSIONS:** This qualitative analysis is an element of population knowledge which allows us to specify usual epidemiological data. In addition, this approach is a way to target the population who would accept the public health message most easily.

**PMC15**

### DIRECT AND INDIRECT COSTS AND EFFECTS IN COST-EFFECTIVENESS ANALYSIS OF PREVENTION: A DYNAMIC MODELLING ANALYSIS

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The inclusion of indirect medical costs is a topic of ongoing discussion in the literature. Actual practice seems to be to include only medical costs of so-called related diseases. However, this criterion is not unambiguous since health gains in life years gained may also depend on unrelated medical care. **OBJECTIVE:** To compare different ways to include both direct and indirect medical costs and health affects in cost effectiveness ratios. **METHODS:** Smoking cessation interventions were evaluated using a dynamic population model, the RIVM chronic disease model. This is a multistate transition model that links prevalence of risk factors to the incidence of 28 chronic diseases. Three different cost-effectiveness ratios were compared: 1) all health effects were ascribed to the smoking cessation interventions while only costs of smoking related diseases were taken into account; 2) only the minimum gain in QALY's and life years that can be attributed to the interventions were included while only costs of smoking related diseases were taken into account; and 3) all health effects and all health care costs in life years were included. **RESULTS:** Ratio 1) equals €2650 per QALY gained. Exclusion of health effects on competing diseases increases the ratio to €3600 (ratio 2). Finally, if all costs and effects are included, ratio 3) equals €8560 per QALY gained, which demonstrates that the cost-effectiveness ratio increases enormously when health care costs of competing diseases are taken into account. **CONCLUSION:** The large differences in outcomes urges one to think about the interpretation of cost-effectiveness ratio's and what ratio to use. We argue that for the evaluation of preventive interventions in a population model, the third ratio is the best, since it seems impossible to isolate the precise effects of an intervention.

**PMC16**

### THE US NATIONAL VIOLENT DEATH REPORTING SYSTEM (NVDRS) AS A MODEL OF A NATIONAL PUBLIC HEALTH REGISTRY

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**OBJECTIVE:** The National Violent Death Reporting System (NVDRS) is a registry of violent deaths in the United States. The NVDRS aggregates data from multiple sources, including death certificates, medical examiner and coroner reports, and crime laboratories. The NVDRS currently obtains data from 17 states, but is designed to eventually be a national registry. This study evaluates how NVDRS can serve as a model for other developing national public health (PH) registries. **METHODS:** A team of PH professionals compared the NVDRS to other national registries (immunization registry, cancer registries, National Ambulatory Care Survey, National Hospital Discharge Survey etc.) in terms of data elements' design, efficiency of a hierarchical structure and data integrity, data security, etc. Comparative analysis has been conducted using a tool that aggregates questions on qualitative registries' metrics. **RESULTS:** Compared to other registries, NVDRS has a well-defined goal, sufficient for the development of a PH registry (to assist the design of PH interventions for a reduction of mortality due to violent deaths). NVDRS is a population based, confidential, incident-driven, computerized information system. NVDRS represents a new generation of systems with the highest level of data complexity because of the aggregation of multiple data sources obtained from different state agencies. NVDRS encompasses essential registry functions and attributes sufficient to accomplish the system's major goals. It has well defined core elements, which allows for many types of analysis. **CONCLUSIONS:** A comparative analysis of NVDRS demonstrates that goals, design and structure of this system promote best practices for the PH patient registries.