Abstract

The Development of a Simulation Model to Analyze Clinical Outcomes of the Dental Health Aide Program in Alaska

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Health managers need richer decision-making information about the potential impacts of program changes on clinical outcomes. To help address significant oral health disparities experienced within the Native community a new dental program was recently implemented in rural Alaska. A simulation model is a useful tool to analyze the potential effect of changing program variables on measures of program outcomes, and informs managers of the potential impact of decisions. This thesis describes the clinical impact model, methodology, data sources and decision rules developed to simulate the effects of outreach, prevention and clinical health activities of village-level dental health aides. As background for the model, scope of practice, supervision, and training requirements of dental personnel were compared for Alaska and four countries (Australia, Canada, New Zealand, UK) with extensive experience utilizing standardized protocols to control uncertainties associated with delivering dental services in rural areas. Evidence-based outcomes were associated with dental health aide activities and projected

indicators (DMFT, F+ST, T-health, SiC, ECC, CPI) were proxy for health outcomes. The model was programmed as a discrete event computer simulation, including 70 variable parameters at the village level. Three model runs using different parameter values, representing the planned program implementation, a more intensive staffing scenario, and a more robust prevention scenario, generated 20-year projections of clinical indicators. Graphs and tallies were used to compare the evidence-based outcomes associated with the alternative strategies, and they suggest there is potential for substantial improvement in clinical outcomes with modest program changes at the village level.