Logical Framework Approach: HAI-Ghana Project

	Intervention logic	Baseline	Objectively verifiable indicator of achievement	Source and means of verification	Assumptions/risks
Objective	A reduction in morbidity, mortality and cost related to HCAIs		Number of SSIs reported in pilot surveillance system	Data from pilot surveillance system	Reduced number of HCAIs will lead to reduced morbidity, mortality and cost
			Number of health care associated neonatal and puerperal infections from hospitals in intervention arm	Peer reviewed articles / project progress report	
			Number of deaths from health care associated neonatal and puerperal infections from hospitals in intervention arm	Peer reviewed articles / project progress report	
Outcomes	Increased research capacity at Department of Medical Microbiology, Ghana Health Service and Institute of Statistical, Social and Economic Research in the fields of HCAIs by Year 2020	Limited research capacity, one paper published on HCAIs in Ghana	Number of publications in international peer reviewed journals	Pubmed	Preventive intervention turn out to be effective
	Increased academic focus on HCAIs	Limited focus, one paper published on HCAIs in Ghana	Number of new research activities at involved institutions	Institutional ethical and protocol committee reports	Preventive intervention turn out to be cost effecient
			Number of researchers with supervisory capabilities in HCAIs	University departmental records/online CVs	Results of project accepted by stakeholders and decision makers
	Increased insight into contextual and facility conditions and the perceptions, roles and practices of managers, health staff, patients and relatives that influence HCAI.	No information	Availability of research-based socio-cultural analysis to provide basis for identification and planning of suitable interventions to prevent HCAIs	Peer reviewed articles / project progress report	Decision makers pursue implementation of identified preventive interventions
	Increased knowledge about the epidemiology of HCAIs	One paper published on HCAIs in Ghana	Proportion of study sites with available prevalence of overall HCAIs	Project newsletter accessible online	Decision makers pursue implementation of identified preventive interventions
			Proportion of study sites with available incidence of Neonatal sepsis/ Puerperal infections	Project newsletter accessible online	Stakeholders interested, willing and able to use findings
	Increased priority of infection control by GHS and Teaching Hospitals	SSIs selected as indicator of patient safety by MOH Ghana	Number of functional infection control units in GHS hospitals	Reports from Institutional Care Division, GHS	Adequate commitment by participating clinical units to implement and sustain surveillance of SSIs
		One full time infection control nurse at KBTH	Number of full time infection control nurses at KBTH	Annual Reports from KBTH	Key professionals continue in their positions
		No information	Number of infection control meetings held at GHS hospitals	Reports from Institutional Care Division, GHS	
		No information	Number of SSIs diangosed from participating hospitals	Hospital annual reports / pilot surveillance system	
	Effective infection control interventions identified and implemented to prevent health care associated neonatal and puerperal infections	No information	Number of participating hospitals with infection control interventions implemented	Project progress reports	
	Improved infection control in participating hospitals with reduced number of HCAIs and improved patient safety	Information to be established with the prospective surveillance before implementing interventions	Incidence rates of health care associated Neonatal sepsis and Puerperal Infections	Hospital/GHS/MOH reports	
	Improved knowledge and use among researchers, health professionals and decision makers on societal costs, including health systems and patient costs and productivity loss, related to HCAI	No cost estimate of HCAI available for Ghana	Cost estimates available for selected HCAI	Peer reviewed articles	
		No policy guidelines available	Availability of policy guidelines for investing in prevention of HCAIs	Annual plan from Institutional Care Division, GHS	
	Improved knowledge and use of cost-effectiveness and cost-benefit analysis of selected HCAI control interventions	No economic evaluations of HCAI control interventions available for Ghana	Budgetary allocations for investments in preventing HCAIs	Annual hospital report from study sites	

Outputs	3 PhDs trained in relation to HCAIs	0 PhD students in the area of HCAIs in the Department of Medical Microbiology, Ghana Health Service and Institute of Statistical, Social and Economic Research	Number of PhD students enrolled in involved institutions	List of students enrolled at the Universities	PhDs return to home country
			Number of study plans developed and presented for admission at University of Ghana and University of Copenhagen	Annual progress report	PhDs are subsequently employed in research organisations after training
			Number of students attending PhD or doctoral courses	Project newsletter accessible online	PhD courses will equip students with tools for research in HCAIs
			Number of semester Progress reports of each student	Project progress report	The training of PhDs and Post-docs in HCAIs research will lead to interest and sustained research
	4 Post-Doctoral fellowships completed, 3 in Ghana	No Post-Doctoral fellow in the Department of Medical Microbiology, Ghana Health Service and Institute of Statistical, Social and Economic Research	Number of Post doc fellows in involved institution	Certificate of accumulated credits	Available, qualified and interested academic and administrative staff
	A local team of 10 research supervisors established	Limited research capacity, one paper published on HCAIs in Ghana	Number of new research activities at involved institutions	Institutional ethical and protocol committee reports	Adequate capacity to train at participating academic institutions
	At least 18 manuscripts published in peer reviewed international journals	One publication in HCAIs in Ghana	Number of publications in international peer reviewed journals	Pubmed	Adequate quality of reporting systems between levels of health care
	Qualitative and quantitative analyses to provide foundation for feasible interventions to prevent HCAIs	No information	Number of qualitative research reports about contextual and facility conditions, perceptions, roles and practices with respect to HCAIs	Project progress report/Pubmed	Adequate quality of hospital reports
	Analysis of the prevalence of overall HCAIs and predominant categories of HCAIs study site completed	Limited knowledge, one study conducted in 2002 with overall HCAI prevalence of 7% among all inpatients at one teaching hospital	Number of study sites with a point prevalence of HCAIs conducted	Project progress report/Pubmed	Good collaboration between partner institutions and participating clinical units
	Analysis of incidence of neonatal sepsis, puerperal infections and SSIs at study site completed	No information	Incidence rates of neonatal sepsis, puerperal infections and SSIs	Project progress report	Commitment of partner institutions to allocate adequate time and resources for project
	Associated organisms and antibiograms identified	No information		Published data in peer reviewed journal online	Adequate commitment by participating clinical units to prioritize research on neonatal and puerperal sepsis
	Assessment of factors associated with HCAI morbidity and mortality completed	No information		Hospital annual reports	Commitment by management to collaborate and empower Infection control staff
	Pilot surveillance system for SSIs in participating hospitals implemented	No existing surveillance system in place	Number of reports of SSIs within surveillance system	Project progress reports	
	Prospective surveillance methods in participating hospitals established	Information to be established with the prospective surveillance before implementing interventions			
	Cost effective interventions that prevent HCAI identified	No information	Number of interventions identified	Hospital/GHS/MOH reports	
	infection control guidelines developed that are tailored to the local context and specific needs of the health care workers	Infection control guidelines	Number of guidlines developed	Project progress reports	
	Infection control interventions implemented	No information	Proportion of health care staff complient with given intervention	Clinical audit	
	Enabling environment for infection control established at interventional hospitals	No information	Number of hospital with guidelines for infection control	Publications in peer reviewed journals	
	Infection control staff educated	No information	Number of infection control nurses trained	Project progress reports	

	Patient survey data set available and analysed w.r.t. patient cost and productivity loss	To be established			
	Health services cost data set analysed to determine health system costs	No information	Number of publications in international peer reviewed journals	Pubmed	
	Model-based estimation of costs and benefits of selected HCAI control interventions completed	No information			
	Activity	**Baseline**	**Inputs**	**N/A**	**Assumptions/risks**
Activities	Identify and enroll PhD students,	No current activities in the field of HCAI research	Qualified academic and administrative personnel		Adequate funds
	Select Post-Doc fellows		Funds and logistics for general project management		Commitment of students to complete work
	Recruit supervisors		Access to educational material and scientific journals		Adequate number of patients in hospitals to meet requirements for study sample
	Introductory workshop of PhDs, Post-Docs all supervisors and researchers		IT equipment and software for recording, management and analysis of data including statistical software packages		Cooperative and accessible health care staff, patients and relatives to willing to participate in study
	Prepare and submit study plans to University of Ghana and University of Copenhagen		Salary for administrative project personnel		Adequate access to patient records
	Attend PhD and doctoral courses in Ghana and Denmark		Salary for academic personnel		Available and functional microbiology equipment with trained personnel
	Post-Docs engage and supervise masters students		Salary for data entry staff		Acceptance of infection control interventions
	Write and publish manuscripts		Salary for research assistants		Adequate commitment by participating clinical units to implement infection control interventions
	Write thesis		Logistics for field work		Risk: Administrative hurdles
	Defence thesis		Funds and logistics for training and courses		Risk: Information bias
	Establish advisory board with involvement of stakeholders with interest in field		Traveling cost for PhD, supervisors and researchers		Risk: Cost related to health care not transparent
	Select hospitals to participate in study		Travel and training for detailed microbiology analysis in Denmark		
	Consult local stakeholders, initiate, plan and conduct the qualitative assessment through participant observation and document review at facilities and write up preliminary results for the use of other components of the study.		Consumables for culture and susceptibility tests		
	Develop tools for data collection including semi-structured interview guides and guides for foucs group discussions				
	Train study personnel				
	Conduct interviews and focus group discussions with managers, staff, patients and relatives/patient carers				
	Develop frameworks for analysis, carry out analysis and triangulation of data and adapt research tools to fully explore the field				
	Conduct point prevalence survey of overall HCAIs				

	Conduct prospective surveillance of Neonatal sepsis, Puerperal sepsis and SSIs				
	Perform culture, susceptibility and typing of bacteria				
	Conduct SSI surveillance				
	Analyse data on overall HCAIs				
	Analyse data on neonatal sepsis, puerperal sepsis and SSIs				
	Provide feedback to patients, healthcare providers and management				
	Seminar of interventional design				
	Plan intervention and endpoint measures				
	Conduct seminars and training in best practice for infection control				
	Train infection control nurses				
	Develop tools for clinical audit				
	Coordinate and manage of intervention				
	Undertake evaluation of progress				
	Conduct clinical audit on infection control				
	Develop sampling strategy for cost analyses				
	Identificate matching criteria for cost analyses				
	Conduct focus group discussions				
	Develop and pilot data collection tools (questionnaires for patients and staff, recording sheets for record review)				
	Extract data from patient records and hospital financial systems				
	Analyse patient, health system and productivity costs related to HCAI				
	Analyse costs of HCAI prevention interventions				
	Model effects of interventions based on findings from specific intervention				
	Estimate incremental cost effectiveness or net benefit ratio				