Microbial pathogen identification methods health and social care essay

I would like to build a theoretical framework and demonstrate different microbial pathogen identification method of rapid identification of pathogen in clinical sepsis patients for my Prof. Doc study. This literature review looks at papers that have a significant importance in the identification methods and the use of new technologies in the process of rapid identification method. My study will be based on Laboratory work. There are many papers that give different identification method examples through laboratory experiment and case studies. There are some theoretical papers that support and guide the building of theoretical frame for my study. Bacteria and fungi are the leading threats with high infection related mortality rate in sepsis patients because the limitation of the current blood culture systems has lack of rapidity and low sensitivity. This indicate the importance of a new method or system to detect blood stream infections . If early diagnoses, followed by prompt implementation of an appropriate treatment, improves the prognosis of these patients. The diagram below represents my fields of research by these I have organised my reading and set up my laboratory work. The annotated bibliography which follows is an initial attempt to identify, organise and critically evaluate the relevant literature in relation to my research. Paper 1N. Leggieria, A. Ridab, P. Franc¸oisc and Jacques Schrenzela, c. 2010, Molecular diagnosis of bloodstream infections: planning to(physically) reach the bedside, Infectious Diseases , 23, pp. 311–319The authors demonstrated 8 different methods and the time to identify the pathogens (p. 315) clearly in a chart. This study shows in microbiology laboratory for routine use matrix Assisted Laser Desorption Ionization Time-Of-Flight (MALDI-TOF) has emerged as a particularly powerful tool for bacterial identification . MALDI-TOF-MS is a rapid, precise, and cost-effective

method for identification directly on bacterial colonies. This study shows that the change of MALDI-TOF-MS to be a valuable to conventional blood culture for detection of microbial pathogens in blood. This method already began to use in our laboratory, but I want use in my study allows identification of bacteria directly from blood samples. If it is a success method then it will save another 5 hours to 36 hours time in the process of identification compare to current BacT/Alert blood culture method. This is an important work that formed an important stepping stone for identification of pathogen. Paper 2Päivi Tissari, Alimuddin Zumla, Eveliina Tarkka, Sointu Mero, Laura Savolainen, Martti Vaara, Anne Aittakorpi, Sanna Laakso, Merja Lindfors, Heli Piiparinen, Minna Mäki, Caroline Carder, Jim Huggett, Vanya Gant2020, Accurate and rapid identifi cation of bacterial species frompositive blood cultures with a DNA-based microarray, Lancet, 375, pp 2240-230Paivi Tissari and colleagues described a strategy combining genome amplifi cation via traditional culturewith PCR and microarray technology for simultaneous detection of many bacterial targets. Identification directly on bacterial colonies . The prove-it sepsis assay identified bacterial species with high sensitivity and specificity about 18 h before conventional culture methods. Paivi Tissari and colleagues validation studies yielded a remarkable percentage of falsepositive data, suggesting enhanced sensitivity. Whetherthese results represent contamination from the materials or regentsin laboratories, signals from dead or clinically insignificant pathogens, or true less level of sepsis is uncertain. This method is not suitable for techniques into routinedetection of pathogens in the hope of achieving a breakthrough therefore further study is needed before widespread application although the work by Tissari and co-workers is a major advance.

This study was not designed to address the Costs of the procedure. . Although additional costs are associated with this assay . This is very important to assessed in the context of the effect of early identification on total patient management. There are 3 parts of this study. In this study 2107 positive blood-culture samples of 3318 blood samples from sepsis patients were investigated for bacterial identification by both conventional culture and Prove-it in two centres. Paivi Tissari and colleagues assessed the sensitivity, specificity, and turnaround time of a new molecular sepsis Prove-it assay. I find this is a good paper to my study have an idea to design sample size , experimental method and the data presentation (p 227 table 2). Whilst this article is not one that I would expect to reference in my final dissertation, that papaer at times rocks my certainties in my research, practical experiment and is therefore a valuable moderating voice that may help me strengthen and estabilish my own belies more clearlyPaper 3This paper is particularly relevant to me in that usually it discusses septic shock infection related, hypotension related or etiological factor, epidemiologic factor related , the relationship between fluid resuscitation and improved septic shock survival rate. Until I read this article, in the back of my mind I had planned to focus my research on the rapid identification method and technologies rather than considering mixed infection, physiological measures, patients health history and status, health care facilities also play a major role to support the mortality rate reduction, however this paper indicates administration of antimicrobial therapy 1 hour delay increased 8% of mortality rate. This shows early effective antimicrobial therapy has a significantly favourable impact on survival in patients with sepsis. Of all the papers I have read, this one is most successful in addressing the method of

secondary data collection related to my study. It uses well designed and relevant tables , diagrams to understand easily (p. 1592 and1593). Paper 4

Yanagihara K, Kitagawa Y, Tomonaga M, Tsukasaki K, Kohno S, Seki M, Sugimoto H, Shimazu T, Tasaki O, Matsushima A, Ikeda Y, Okamoto S, Aikawa N, Hori S, Obara H, Ishizaka A, Hasegawa N, Takeda J, Kamihira S, Sugahara K, Asari S, Murata M, Kobayashi Y, Ginba H, Sumiyama Y, Kitajima M, 2010. Evaluation of pathogen detection from clinical samples by real-time polymerase chain reaction using a sepsis pathogen DNA detection kit, The journal of Critical Care, 14(4), pp. 151-162

This article indicates the importance of a new method or system to detect blood stream infectionsThis indicates the several potential advantages to replace or supplement traditional blood culture in diagnosis of bloodstream infection. This will improve clinical management of infection that can enhance patient care. From this paper I have consider insufficient sensitivity, presence of PCR inhibitors in blood, and the difficulty of setting up an assay in my study. At this time I am reminded to find myself reassessing the limitation of rapid identification methods in my research. The authors emphasize the adaptability of this sepftiFast method which is useful information for my study methodology improvement. The methods evaluated in this paper is more useful to gain knowledge in my laboratory work. Although I feel their research carried out in a small size samples and it is not sufficient for prove their conclusion, but their quantitative approach and method for data analysis , may have an important influence on future research in this field.