ARHAI Scotland
Antimicrobial Resistance and Healthcare Associated Infection

NHS National Services Scotland

Evidence table – SICPs - literature identified January – March 2020

Titles and abstracts are reviewed for subject relevance. Additional exclusion criteria are also applied i.e. exclusion of laboratory focussed studies such as molecular typing etc.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
Placement and Cohorting	Time-Series Analysis of Health Care-Associated Infections in a New Hospital With All Private Rooms. McDonald EG, Dendukuri N, Frenette C, Lee TC. JAMA Internal Medicine 179(11): 1501-1506, 2019.	This study used a time-series analysis to investigate the reduction in colonisation and infection of VRE, MRSA, and infection of C. difficile associated the move from multi-bed wards to single bed rooms in a hospital setting. There was an immediate and sustained reduction in VRE (Incidence Rate Ratio of 0.25; 95% CI, 0.19-0.34) and MRSA colonisation (IRR 0.57; 95% CI, 0.33-0.96%), and VRE infection (IRR, 0.30; 95% CI, 0.12-0.75). However, rates of CDI and MRSA infection did not decrease with this move. The findings of this study support the recommendations on transitioning to single-bed rooms in newly built healthcare facilities through the evidence of reduction in colonisation and infection of certain common multidrug-resistant organisms.	None. Adds to Evidence Base.
Hand Hygiene – Products **Indications**	Situations Leading to Reduced Effectiveness of Current Hand Hygiene against Infectious Mucus from Influenza Virus-Infected Patients. Hirose R, Nakaya T, Naito Y, Daidoji T, Bandou R, Inoue K,	This study investigated the underlying situations and mechanisms leading to the reduced efficacy of ethanol-based disinfectants (EBDs) against seasonal influenza A virus (IAV) in infectious mucus compared to saline. Additionally, antiseptic hand rubbing (AHR) and antiseptic hand	None. Adds to Evidence Base.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
	Dohi O, Yoshida N, Konishi H, Itoh Y. *Msphere.* 4(5), 2019.	washing (AHW) effectiveness against infectious mucus adhering to hands and fingers in 10 volunteers were also evaluated. Results indicated that EBD effectiveness against IAV mucus was extremely reduced compared to saline and IAV inactivation was 8 times longer in mucus than in saline. This was due to the physical properties of mucus as a hydrogel. IAV inactivation with AHR was achieved within 30s when the mucus has completely dried. AHW rapidly inactivated IAV. Since AHW is effective against both dry and non-dry infectious mucus, the authors recommend medical staff adopt AHW when fingers/hands are contaminated with infectious mucus to compensate for these weaknesses in AHR.	
HH – Hand washing	Cleansing-induced changes in skin measured by in vivo confocal raman spectroscopy. Davies M.A. *Skin Research and Technology.* 26 (1): 30-38, 2020.	It is established that frequent hand washing, required in certain occupations, can lead to skin dryness, chapping and itching. This study used in vivo confocal Raman spectroscopy on 6 volunteers to evaluate short-term effects of hand washing on product deposition, lipid acyl chain structural disordering and extraction of important skin components and changes in skin hydration. The effects of products were compared at two water temperatures (37C & 25C). Results show significant	None. Adds to Evidence Base.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
		decreases in relative amounts of all skin components with skin dehydration observed for use of soap at 37C. The data suggests that workers can reduce the effects of water and soap products by using tepid or not too warm water combined with mild cleansers if possible.	
HH – Skincare	Does Adherence to World Health Organization Hand Hygiene Protocols in the Operating Room Have the Potential to Produce Irritant Contact Dermatitis in Anesthesia Providers? Birnbach DJ, Mckenty NT, Rosen LF, Arheart KL, Everett-Thomas R, Lindsey SF. *Anesthesia and Analgesia* 129(6): E182-E184, 2019.	This study investigated whether frequent alcohol-based hand rub (ABHR) use leads to skin changes or irritant contact dermatitis. 17 volunteer students were asked to clean their hands with ABHR every 15minutes for 8 hours for 5 sequential days. Their hands were examined by a dermatologist before and after and asked about subjective skin changes. Results suggest an increase in irritant contact dermatitis scores and subjective complaints. The study has several limitations: the frequency of ABHR application is not reflective of required frequency in the operating room (OR) setting, study is underpowered with a small sample size; there was no control group; other ABHR products may yield different results. Further research on ABHR in real OR environment would be beneficial.	None.
HH – Indications	Contamination of health-care workers' hands with *Escherichia coli* and *Klebsiella* species after routine	This was a prospective observational study carried out at 2 tertiary care centres investigating frequency of healthcare	None. Adds to evidence base.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
	patient care: a prospective observational study. Puig-Asensio M, Diekema DJ, Boyken GS, Clore GS, Salinas JL, Perencevich EN. *Clinical Microbiology and Infection*, 2019	worker (HCW) hand contamination by *E. coli* vs *Klebsiella* spp after patient care and to determine activities associated with contamination. 466 HCW observations were performed: 290 from patients with *E. coli*, 149 with *Klebsiella*, and 27 with both species. 87% of observations (404/464) occurred in patients who received chlorhexidine bath within 2 days. HCW hand contamination rates were similar between *E. coli* and *Klebsiell*a (6.2% vs 7.4%). High-risk activities independently associated with contamination were: toilet assistance, contact with moist secretions and hygiene/bed-bathing. The authors concluded that hand hygiene should be reinforced after high-risk activities.	
HH – ABHR	Simplifying the World Health Organization Protocol: 3 Steps Versus 6 Steps for Performance of Hand Hygiene in a Cluster-randomized Trial. Tschudin-Sutter S, Sepulcri D, Dangel M, Ulrich A, Frei R, Widmer AF. *Clin Infect Dis* 1;69(4):614-62, 2019.	This cluster-randomized trial compared a 3-step hand hygiene technique with the World Health Organization's (WHO) 6-step technique in terms of healthcare worker (HCW) compliance with the assigned technique and reduction of bacterial counts on the hands of health-care workers.12 wards were randomly assigned to either the 3-step technique or conventional 6-step technique of hand rubbing. 2923 hand hygiene indications were observed and compliance was 70.7% (2066/2923). Compliance and indications was 51.7%	None.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
		and 75.9% respectively on wards assigned to the 3-step technique while on wards assigned to 6-step technique they were 12.7% and 65.0%. There was no significant difference in the reduction factor between the two techniques. The authors recognise that further trials in other clinical settings are required to externally validate their findings. Measures of compliance may have been overestimated as HCWs were directly observed and behaviours affected (Hawthorne effect). The study also did not assess the impact of hand hygiene on healthcare associated infection rates therefore results from the study are limited.	
PPE – Aprons/ Gowns **Gloves**	Bacterial burden is associated with increased transmission to health care workers from patients colonized with vancomycin-resistant *Enterococcus*. Jackson SS, Harris AD, Magder LS, Stafford KA, Johnson JK, Miller LG, Calfee DP, Thom KA, CDC Prevention Epicenters Program. *Am J Infect Control* 47(1):13-17, 2019.	This prospective cohort study assessed 96 ICU patients on contact precautions colonised with vancomycin-resistant Enterococcus (VRE) on whether bacterial burden is associated with transmission to healthcare workers' (HCW) (n=5) gloves or gowns. Samples were obtained from patient's perianal area, skin and stool to assess bacterial burden and HCW's gowns and gloves were cultured for VRE after patient care. Results showed 71 of 479 (15%) of HCW-patient interactions led to contamination of HCW's gloves or gowns with VRE which was associated with VRE burden on perianal swab, skin swabs and	None.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
		in stool. Colonisation with *E. faecium* was associated with higher bacterial burden and higher odds of transmission to HCWs compared to *E. faecalis*. The authors conclude their findings have implications for VRE decolonisation and other infection control interventions.	
PPE – Gloves	Four steps to clean hospitals: LOOK, PLAN, CLEAN and DRY. Dancer SJ, Kramer A. *Journal of Hospital Infection* 103(1):e1-e8, 2019.	This review examined cleaning and decontamination practices in more detail and is aimed primarily at domestic staff prioritising bed-space items and furniture. A literature search for practical guidance for cleaning bed-space environment showed no relevant articles therefore the authors developed a 4-step guide for daily cleaning of the occupied bed space: LOOK, PLAN, CLEAN and DRY system. "Step 1 (LOOK) describes a visual assessment of the area to be cleaned; Step 2 (PLAN) argues why the bed space needs preparation before cleaning; Step 3 (CLEAN) covers surface cleaning/decontamination; and Step 4 (DRY) is the final stage whereby surfaces are allowed to dry." The authors concluded that a step-by-step cost-effective cleaning protocol would be an effective addition to all other established cleaning activities carried out in hospitals to reduce healthcare associated infections.	None.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
	Targeted Use of Alcohol-Based Hand Rub on Gloves During Task Dense periods: One Step closer to Pathogen Containment by Anesthesia Providers in the Operating Room. Birnbach DJ, Thiesen TC, Mckenty NT, Rosen LF, Arheart KL, Fitzpatrick M, Everett-Thomas R. *Anesthesia and Analgesia* 129(6): 1557-1560, 2019.	This study looked at evaluating the impact of alcohol-based hand rub (ABHR) on gloves when it may be difficult to either change gloves or clean hands for example anaesthetic induction and extubation. Perforation rates were estimated on 50 pairs of nitrile gloves worn by volunteers for 2 hours at a time; ABHR were applied to gloves every 15minutes for total of 8 ABRH applications. 50 new unused not exposed to ABHR gloves were used as control. Results showed no micro-perforations were identified on the 50 gloves applied with ABHR and all volunteers demonstrated tactile competence suggesting that ABHR does not compromise glove integrity or hamper some tactile functions e.g. grip function test. Study has important limitations, gloves assessor may be biased as gloves with ABHR applications showed signs of discoloration; gloves were not stressed in the same way as during routine anaesthesia care; gloves were not tested for microbial contamination nor how well ABHR decontaminates gloves; study was conducted in a non-clinical setting and finally tactile competence tests were subjective. The WHO does not recommend the use of ABHR on gloves as this would	None.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
		damage the material integrity of gloves and impair their protective function.	
	Can Nonsterile Gloves for Dermatologic Procedures Be Cost-Effective without Compromising Infection Rates? Kemp DM, Weingarten S, Chervoneva I, Marley W. *SKINmed* 17(3):155-159, 2019.	This study compared the use of sterile gloves (SGs) versus nonsterile gloves (NSGs) on surgical site infection (SSI) rates in Mohs micrographic surgery (MMS), a dermatological surgical procedure for removing certain types of skin cancer. SSI rates and data were collected before and after employment of NSGs from January 2009 to December 2015. Results indicate similar SSI rates for MMS procedures using chlorhexidine as antiseptic: 3.39% with SGs vs 3.06% with NSGs. For surgical excisions, the SSI rate was 3.02% with SGs and 4.17% with NSGs. Study concludes that using NSGs for certain dermatological procedures can provide cost savings without adversely affecting SSI rates.	None. Adds to Evidence Base.
Cleaning of the Environment	A prospective study of transmission of Multidrug-Resistant Organisms (MDROs) between environmental sites and hospitalized patients-the TransFER study. Chen LF, Knelson LP, Gergen MF, Better OM, Nicholson BP, Woods CW, Rutala WA, Weber DJ, Sexton DJ, Anderson DJ, CDC Prevention Epicenters Program. *Infection*	This prospective cohort study investigated the nature of multidrug-resistant organism (MDRO) transmission between the hospital environment and patients using standard microbiological and molecular techniques. Hospital rooms selected were those previously occupied by patients with 1 of 4 'marker' MDRs: methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *enterococci*, *Clostridium difficile*,	None. Adds to evidence base

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
	Control & Hospital Epidemiology 40(1):47-52, 2019	and MDR *Acinetobacter baumannii*. Samples were obtained from patients (n=80) taken from swabs of 4 body sites and fecal sample if available on day of visit. Environment samples were obtained from 7 high frequency touch surfaces in the hospital room. Results show that at study entry 9 (11.3%) patients were asymptomatically colonised with MDROs and 44 (55%) hospital room surfaces were contaminated with MDROs despite terminal disinfection. Microbiological bacterial transfer events either to the patient, environment or both occurred in 12 patient encounters (18.5%). This study shows that microbial transmission occurs early, readily and frequently between patients and environment suggesting that standard 'terminal clean/disinfection' procedures may be inadequate to prevent the acquisition of MDROs through the environment.	
	'Off the rails': hospital bed rail design, contamination, and the evaluation of their microbial ecology. Boyle MA, Kearney A, Carling PC, Humphreys H. *Journal Hospital Infection* 103(1): e16-e22, 2019.	This review article reports the evolving structure of hospital beds and bed rails design in relation to microbial contamination and their role in pathogen transmission. Their findings support the need for clear and standardised assessment protocols for assessing bed rail and patient zone surface levels of	None.

Literature review	Papers identified	Summary of Findings	Impact on Recommendations
		contamination during environmental hygiene investigations.	
	The hospital environment and its microbial burden: challenges and solutions. Chirca I. *Future Microbiol* 14:1007-1010, 2019	This editorial review discusses the role of environmental contamination in transmission of nosocomial pathogens and development of hospital-acquired infections (HAI), the challenges posed by microorganisms and currently available solutions. It stated that microbial burden present in the hospital environment appears to significantly affect colonisation and subsequent infection status of patients therefore having a role in HAI development. Along with CDC cleaning guidance, the author also mentioned use of novel disinfecting agents and techniques such as hydrogen peroxide vapour (HPV), ultraviolet light (UV), multijet cold-plasma units, copper-surfaced objects, antimicrobial surfaces, etc. These strategies have been shown to improve the cleaning and disinfection of the hospital environment however challenges remain stemming from human factors, availability and cost effectiveness of certain strategies, emerging pathogens and antimicrobial resistance.	None.

Evidence table – TBPs - literature identified January – March 2020

Literature review	Papers identified	Abstract	Summary of scientific findings
Placement and Cohorting	Active Surveillance of Carbapenemase-Producing Organisms (CPO) Colonization with Xpert Carba-R Assay Plus Positive Patient Isolation Proves to be Effective in CPO Containment. Zhou M, Kudinha T, Du B, Peng J, Ma X, Yang Y, Zhang G, Zhang J, Yang Q, Xu YC. *Frontiers in Cellular and Infection Microbiology* 9(162), 2019.	In this study the performance of the Xpert Carba-R assay in detecting carbapenemase-producing organisms (CPO) was evaluated, along with the effectiveness of patient isolation in controlling the spread of CPO infections. The Xpert Carba-R assay was found to take the least time processing samples when compared to other phenotypic identification methods, and had 94.5% sensitivity and specificity in almost all carbapenemase detection. Results from the assessment of isolation found that isolating CPO positive patients significantly ($p < 0.05$) reduced both colonisation (28.6 to 5.6%) and infection rates (35.7 to 2.8%). The authors conclude that active surveillance and the implementation of patient isolation proved to be an effective strategy in limiting the spread of CPO within the healthcare setting.	None. Adds to Evidence Base.
	Examining the association between hospital-onset *Clostridium difficile* infection and multiple-bed room exposure: a case control study. Vaisman A, Jula M, Wagner J,	The objective of this case-control study was to determine whether assignment to a multiple-bed room increased the risk of hospital-onset *C. difficile* diarrhoea (HO-CDI).	None. Adds to Evidence Base.

Literature review	Papers identified	Abstract	Summary of scientific findings
	Winston LG. *Infection Control and Hospital Epidemiology* 39: 1068-1073, 2018.	Consecutive cases of HO-CDI in adult general medical and surgical inpatients were identified between Jan 2010 and Dec 2015. 2 sets of controls were selected to investigate exposure at admission and at the time of symptom onset. 187 cases were identified. The adjusted rate ratio (RR) associated with the development HO-CDI associated with multiple-bed room exposure during the 7 and 14 days immediately prior to HO-CDI diagnosis were 1.08 (95% confidence interval [CI], 0.93–1.25; P= .31) and 0.96 (95% CI, 0.93–1.18; P=.12), respectively. Furthermore, no significant association was detected in the analysis of the first 7 and 14 days after case admission or among patients with Charlson comorbidity scores ≥4 in either period. Assignment of patients to multiple-bed rooms on general medical and surgical wards was not associated with an increased risk in the development of HO-CDI.	
	Effect of isolation practice on the transmission of middle east respiratory syndrome coronavirus among hemodialysis patients: A 2-year prospective cohort study.	This 2-year prospective cohort study focusses on the isolation of 116 patients undergoing hemodialysis (HD) as a method of prevention of secondary transmission of MERS-CoV after exposure. The study was	None.

Literature review	Papers identified	Abstract	Summary of scientific findings
	Park HC, Lee SH, Kim J,Kim DH, Cho AC, Jeon HJ, Oh J, Noh JW, Jeong DW,Kim YG, Lee CH, Yoo KD, Lee YK. *Medicine* 99:3, 2020.	conducted across three hospitals/medical centres, with patients who tested positive for MERS-CoV all being sent to a designated hospital with single occupancy negative pressure isolation rooms. Any exposed patients were isolated using different methods; single room isolation, cohort isolation, and self-imposed quarantine. After serological tests, 3 patients were positive for anti-MERS-CoV IgG. Further testing showed no further cases of secondary transmission across all facilities in the study. These findings suggest that single-room isolation, cohort isolation, and self-imposed quarantine are all effective in preventing secondary transmission of MERS-CoV in patients undergoing HD. The authors conclude that the best and most effective isolation for each case should be selected according to availability and hospital specific strategy. The sample size of this study was small and the study was not randomised, making the results difficult to translate to wider patient populations.	
	Enhanced disinfection leads to reduction of microbial contamination	In this prospective cluster-randomised trial, 4 epidemiologically important pathogens	None.

Literature review	Papers identified	Abstract	Summary of scientific findings
Environmental Decontamination	and a decrease in patient colonization and infection. Rutala WA, Kanamori H, Gergen MF, Knelson LP, Sickbert-Bennett EE, Chen LF, Anderson DJ, Sexton DJ, Weber DJ, CDC Prevention Epicentres Program. *Infection Control & Hospital Epidemiology* 39: 1118-1121, 2018.	(EIPs) were monitored to assess the effectiveness of 3 enhanced disinfection strategies for terminal room disinfection against standard practice. The EIPs were; methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), Clostridium difficile, and multidrug-resistant (MDR) Acinetobacter. The three disinfection methods compared to standard practice (quaternary ammonium manual disinfection) alone were; ultraviolet light (UV), bleach, and UV and bleach together, all following standard disinfection with quaternary ammonium. Mean cfu for each EIP and disinfection method were recorded. It was found that standard disinfection with UV resulted in a significantly greater reduction in EIPs than standard disinfection alone. The other enhanced disinfection methods both resulted in greater reductions in EIPs than standard disinfection alone, however this was not found to be significant. The authors also provided insight into the relationship between microbial reduction and reduction in colonisation/infection rates. The findings demonstrated that a decrease in room contamination with EIPs of 94% was associated with a 35% decrease in	UV is not a recommended decontamination method in NHS Scotland.

Literature review	Papers identified	Abstract	Summary of scientific findings
		subsequent patient colonisation and/or infection. This study was part of the Benefits of Enhanced Terminal Room (BETR) Disinfection Study.	
	Norovirus recovery from floors and air after various decontamination protocols. Ciofi-Silva CL, Bruna CQM, Carmona RCC, Almeida AGCS, Santos FCP, Inada NM, Bagnato VS, Graziano KU. *Journal of Hospital Infection* 103: 328-334, 2019.	This study investigated the levels of norovirus that are recovered after different methods of disinfection. Two types of flooring (vinyl and granite) were contaminated with 10% human faeces, positive for NoV-GII. Ten minutes after contamination, one of two cleaning and decontamination protocols were used on the flooring. The first was cleaning followed by decontamination with 1% sodium hypochlorite, and the second was cleaning followed by decontamination with manual ultraviolet C (UV-C) light device. Swabs were taken from the floor and air samples from the area of contamination before contamination (negative control), after contamination (positive control), after cleaning and after decontamination. NoV was not recovered from negative control samples from the floor and air, while positive control samples contained on average $14.27x10^6$ genome copies/sample. There was a significant difference between viral genome copies found after only	None. Adds to evidence base. UV-C devices are not recommended in NHS Scotland.

Literature review	Papers identified	Abstract	Summary of scientific findings
		cleaning (5.04 x10^3 average), and after cleaning and disinfecting (7.65 x10^1) ($p<0.001$). The disinfecting protocol that used 1% sodium hypochlorite was found to be significantly more effective than the protocol using UV-C ($p<0.001$). 1% sodium hypochlorite was also found to be equally efficient on both of the tested floor types and removed all viral particles remaining on the floor after cleaning for all samples. Disinfection with UV-C was found to only be effective in removing viral particles in 46.15% of samples. This protocol was also found to be more effective on vinyl flooring (28.1 genome copies/sample average) than on granite flooring (278.28 genome copies/sample average). It was also found that viral particles became aerosolised during the cleaning process on both flooring types with 8.3% of air samples being positive for viral particles after contamination compared to 75% after cleaning. Presence of viral particles was higher after cleaning but reduced after disinfection with both methods. There was no significant difference in airborne particles between the two floor types in the study.	

Evidence table – Healthcare Infection Incidents, Outbreaks and Data Exceedance - literature identified January – March 2020

Literature review	Papers identified	Abstract	Summary of scientific findings
Management of incidents and outbreaks in a neonatal unit (NNU).	Rotavirus Gastroenteritis Outbreaks in a neonate intermediate care unit: Direct detection of rotavirus from a computer keyboard and mouse. Tsai HC, Tsai MT, Sheng WH, Wang JT, Tsao PN, Chou HC, Chen CY, Chang LY, Lu CY, Huang LM. *Journal of Microbiology, Immunology and Infection* 52(6): 888-892, 2019.	This article describes the investigation of a rotavirus gastroenteritis infection outbreak of a neonate intermediate care unit. Hand hygiene and contact isolation measures by healthcare staff and family members reviewed. The rotavirus was detected on a computer keyboard and mouse in the ward. It was established that hygiene precautions and use of isolation gowns by healthcare workers were inadequate. Following intensification of infection control measures, no further cases of infection were reported.	None. Adds to evidence base
	An outbreak of meticillin-resistant Staphylococcus aureus colonization in a neonatal intensive care unit: use of a case-control study to investigate and control it and lessons learnt. Brown NM, Reacher M, Rice W, Roddick I, Reeve L, Verlander NQ, Broster S, Ogilvy-Stuart AL, D'Amore A, Ahluwalia J, Robinson S, Thaxter R, Moody C, Kearns A, Greatorex J, Martin H, Torok ME, Enoch DA. *Journal of Hospital Infection* 103(1): 35-43, 2019.	This was an outbreak report and case-control study describing the investigation and management of methicillin-resistant *Staphylococcus aureus* (MRSA) on a neonatal intensive care unit. Screening showed 8 infants were colonised with MRSA spa type t2068. Staff screening identified a healthcare worker colonised with the same MRSA strain however identification was difficult due to inaccurate record keeping. This study highlights the benefit of using a case-control study showing most healthcare workers had no association with colonised infants.	None. Adds to evidence base

Literature review	Papers identified	Abstract	Summary of scientific findings
	Serratia marcescens outbreak in a neonatology unit of a Spanish tertiary hospital: Risk factors and control measures. Redondo-Bravo L, Gutierrez-Gonzalez E, San Juan-Sanz I, Fernandez-Jimenez I, Ruiz-Carrascoso G, Gallego-Lombardo S, Sanchez-Garcia L, Elorza-Fernandez D, Pellicer-Martinez A, Omenaca F, Robustillo-Rodela A. *American Journal of Infection Control* 47(3): 271-279, 2019.	This article describes the investigation and measures undertaken to control a *Serratia marcescens* outbreak in a neonatology unit. An unmatched case-control study was carried out to investigate risk factors for infection/colonisation which suggests that transmission was from contaminated hands of healthcare workers (HCW) based on the inconclusive results of the environmental investigation and the high number of HCWs and procedures performed in the unit.	None. Adds to evidence base.
	Successful control of an extended-spectrum beta-lactamase-producing Klebsiella pneumoniae ST307 outbreak in a neonatal intensive care unit. Baek EH, Kim SE, Kim S, Lee S, Cho OH, In Hong S, Shin JH, Hwang I. *BMC infectious diseases* 20(1): 166, 2020.	This study describes the investigation & control of an extended-spectrum beta-lactamase-producing *Klebsiella pneumonia* (ESBL-KPN) outbreak in NICU in August 2017. Surveillance cultures were set up and monitored for neonates, healthcare workers (HCWs) and NICU environments. Molecular analyses were performed for the isolated KPN strains. Samples from neonates (n = 11/15, 73.3%), medical personnel (n = 1/41, 2.4%), and medical devices and the environments (6/181, 3.3%) tested positive for ESBL-KPN in the surveillance cultures in December 2017; a further 23 of 72 neonates (31.9%) screened were colonised with ESBL-KPN between January-March 2018. Results suggest source of contamination was from	None. Adds to Evidence Base.

Literature review	Papers identified	Abstract	Summary of scientific findings
		NICU environments (e.g. incubators) and transmission by HCWs. Enhanced infection control (IC) measures were implemented which included hand hygiene, contact precautions, more frequent and thorough disinfection and cleaning of medical devices, incubators and surroundings, cohorting of neonates and HCWs and requirement to wear gown and glove for medical services. The outbreak was controlled 3 months after implementation of the enhanced IC practices.	