

Additional file 4

Table S4: Reporting of the implementation intervention audit and feedback in N=32 studies

Description of “audit and feedback”	Studies			
	Bull, 2011 [34]	Cameron, 2015 [35]	Cima, 2013 [36]	Crolla, 2012 [38]
Actors	- project officer	NR	- audits: independent institutional observers - feedback: the team	- infection control nurse, infection control practitioner - multidisciplinary team: surgeons, anesthetists, head of the operating room, operating room personnel, infection control personnel
Action	- checklist accompanying each patient, allowing process compliance and outcome measures to be recorded - compliance with bundle components was overseen - focus groups to discuss progress - clinician meetings: provide updates on documentation and progress of the project, and to reiterate the aims	- audit: antibiotic prescribed and time administered was recorded - initial audit data were presented at a surgical mortality and morbidity meeting - re-audited data were analyzed - efficacy of the poster intervention was presented	- compliance audits: performance was monitored - feedback was provided	- bundle adherence data were used to feedback /development of strategies for improvement - bundle compliance was discussed in a multidisciplinary team - newsletter provided feedback was distributed (results from compliance measurements, improvement recommendations)
Action target group	- compliance overseeing: clinical staff	- surgeons and anesthetists	- compliance audits: consultant surgeons, residents, nurses, allied health - feedback: the team, staff	- newsletter: all personnel involved in surgical process
Temporality	NR	- audit: between October 2011/ January 2012 - re-audit: May 2012	NR	- adherence measurement: June 2009-October 2011
Dose	- focus groups: regular	- audit: 21 days - re-audit: 28 days (after intervention)	- feedback: on a monthly basis	- bundle adherence measurement: every three months - newsletter: every three months

Description of “audit and feedback”	Studies			
	Elia-Guedea, 2017 [40]	Forbes, 2008 [41]	Frenette, 2016 [42]	Garcell, 2017 [43]
Actors	NR	- working groups: surgeons, anesthesiologists, nurses, pharmacists from involved patient-care areas - study champions: OR nurse, nurse from same-day surgery	- annual feedback: medical director of the infection prevention and control department; nursing consultant - feedback after compliance lacking: infection prevention and control department - compliance measurement: infection prevention and control department	compliance monitoring: infection-control practitioner monitoring and presenting: pharmacist
Action	- clinical sessions in colorectal unit: information about detected problems and instruction on measures to be implemented	- practice audits - performance data were collected for comparison - three working groups to evaluate data from cohort I - performance figures were posted in the OR to provide feedback - study champions: inquired protocol implementation, provided direction, confirmed compliance	- annual feedback: individual SSI rates, overall SSI rates for each procedure, recommendations to decrease rates - measuring compliance; if compliance was lacking: feedback and recommendations - pilot audit and feedback project: feedback session, reminders to address identified deficiencies	- compliance monitoring with antibiotic prophylaxis - analysis of department quality indicators - feedback was provided and presented for analysis - monitoring and presenting of antimicrobial consumption - presentation of the antimicrobial stewardship program evaluation
Action target group	- clinical sessions: all surgeons of the colorectal unit	- performance figures: OR staff - study champions: nurses, clinicians	- annual feedback: surgeons feedback after compliance lacking: surgical team - feedback session: heads of surgical departments	- feedback: surgical team, facility infection control committee - presentation of the evaluation: the staff
Temporality	NR	- first stage: (pre-intervention) collecting data on performance - second stage: evaluate data - final stage: (post-intervention) collecting data on performance, posting performance figures in the OR - working group: meeting during a 1 year period (April 2005 - April 2006) - performance figures: monthly	- began of annual feedback: June 2011 - began of compliance measurement and feedback: January 2011 - pilot audit and feedback project: October 2013 - second audit and feedback session: January - February 2014	NR
Dose	NR	- performance figures: monthly	- feedback: annual, after compliance lacking - compliance measurement: periodically	- compliance monitoring: on an ongoing basis - analysis of department quality indicators: monthly - feedback: on monthly basis - presentation of the evaluation: annual

Description of “audit and feedback”	Studies			
	Geubbels, 2004 [44]	Hechenbleikner, 2015 [46]	Hedrick, 2007 [47]	Hedrick, 2007 [48]
Actors	NR	chart review: two clinicians	NR	NR
Action	hospital E: - monitoring of antibiotic prophylaxis and SSI incidence - results were reported	- auditing tool to assess compliance - retrospective chart review with the auditing tool - identified defects were discussed - meetings: addressing poor compliance and patient care defects	- feedback: compliance and infection rate	- monitoring outcomes measures - individual feedback - feedback: compliance and infection rate
Action target group	- result reporting: surgeons	- defect discussion: providers responsible for implementing measures	NR	- feedback: provider
Temporality	NR	NR	NR	- feedback: starts February 2005
Dose	- surveillance: ongoing - result reporting: every 6 months	- meetings addressing poor compliance: weekly	- feedback: monthly	- feedback: monthly

Description of “audit and feedback”	Studies			
	Kao, 2010 [50]	Keenan, 2014 [51]	Keenan, 2015 [52]	Kilan, 2017 [53]
Actors	- compliance measures: trained research personnel	-meetings: colorectal surgeon (program leader)	- outcome abstraction: trained surgical-clinical reviewer - overseeing implementation: colorectal surgeon - meetings: colorectal surgeon, key personnel from each discipline - colorectal surgery leadership meetings: colorectal surgery leadership, members of the multidisciplinary team	- feedback: quality improvement staff
Action	- compliance was measured - extended timeout -planned feedback	- meetings: review SSI results, address problems with bundle delivery - audits of the bundle program	- outcome abstraction from medical record, conducting chart review - obtaining compliance data from an institutional database - overseeing implementation and program progress - meetings: receive feedback on compliance, encourage compliance, review outcome data - colorectal surgery leadership meetings: reinforce program objectives, identify problems, improve program coordination	- compliance feedback was given; reports that highlighted compliance - personal reminders after non-compliance was identified
Action target group	- feedback: faculty	-meetings: designated key personnel	NR	- reminders: non-compliant providers - feedback: the team
Temporality	- second study period (March-August 2008): intervention in hospital 1 (6 month) - third study period (August 2008-November 2009): intervention in hospital 1 and 2 (6 month)	- audits: study period	NR	- feedback: implemented during April 2015 – July 2015 - reminders: implemented during April 2015 – July 2015
Dose	NR	- meetings: monthly	- meetings: monthly - colorectal surgery leadership meetings: frequently	- feedback: regular / monthly - reports: monthly

Description of “audit and feedback”	Studies			
	Larochelle, 2011 [55]	Liau, 2010 [57]	Losh, 2017 [58]	Lutfiyya, 2012 [59]
Actors	- performance monitoring: committees	- spread good results: hospital leadership	- preoperative compliance tracking: office staff member	NR
Action	- audit system with feedback - performance was monitored - compliance rates were made available	- compliance audit: tracking process measures and reporting findings - visually reporting of updates in chart format - good improvement results of the pilot population were spread	- SSI collaborative meetings compliance was tracked, presented, discussed - SSI root cause analysis: monitoring breakdown of implemented measures - OR meetings: sharing SSI rates, track and encourage compliance, discuss strategies to improve adherence and safety culture	- reviewing process measures and SSI cases, addressing gaps - calculating SSI rate, developing a run chart, establishing reports - SSI Quality Group meetings: data tracking - departmental meetings: reviewing outcomes - a report was provided if a measure was omitted - individual feedback was provided if defects were identified - posting SSI dashboards in surgeon and operating room lounges - monitored components were posted in surgical and physicians lounges - reporting performance comparison with peers
Action target group	NR	- reporting: the staff - updates in chart format: all staff in the OR, post-anesthesia care unit, wards - spread good results: to other surgical disciplines	- OR meetings: surgery staff	- SSI Quality Group meetings: all appropriate care providers - reporting of peer comparison: all involved stakeholders: administrators, surgeons, nursing staff, infection control, SSI Quality Committee - standardized report: surgeons - individual feedback: groups of providers
Temporality	- compliance rates were made available: starting in 2004	NR	NR	NR
Dose	- compliance rates were made available: quarterly	- tracking process measures: on a monthly basis - reporting: regularly - updates in chart format: frequently	- SSI collaborative meetings: monthly - OR meetings: monthly - chart reviews: quarterly	- SSI rate calculation: every month - reports: quarterly - review of SSI/process measures: on a monthly basis /regular basis - SSI Quality Group’s meetings: monthly

Description of “audit and feedback”	Studies			
	Nordin, 2018 (Epub 2017) [62]	Pastor, 2010 [63]	Pérez-Blanco, 2015 [64]	Reames, 2015 [65]
Actors	NR	recording compliance: infection control professional monitoring: multidisciplinary task force (surgeons, anesthesiologists, infection control personnel, intraoperative nurses)	NR	- compliance monitoring: operative teams
Action	- monitoring and analyzing bundle compliance - feedback was provided	- compliance was recorded - individual compliance rates and infections were collected and reviewed - meetings: compliance monitoring and addressing barriers	- collecting variables related to adherence - evaluating adherence to protocol - commitment to provide feedback on results	- outcome measurement and feedback - compliance monitoring - routine briefings and debriefings - content and coaching calls - semiannual daylong collaborative meetings
Action target group	NR	NR	NR	- content and coaching calls / collaborative meetings: operative team leaders (in each hospital: surgeon, anesthesiologist, operating room nurse) - briefings and debriefings: surgical teams
Temporality	- monitoring and analyzing bundle compliance: start in August 2014	- multidisciplinary task force: April 2006	NR	NR
Dose	- monitoring and analyzing bundle compliance: on a monthly basis - feedback: ongoing	- recording compliance: on a weekly basis - meetings: monthly - review of compliance rates and infections: monthly	- feedback: at least biannually	- content and coaching calls: monthly - collaborative meetings: semiannual daylong

Description of “audit and feedback”	Studies			
	Tanner, 2016[66]	Tillman, 2013 [67]	Vogel, 2010 [68]	Vu, 2018 (Epub 2017) [69]
Actors	- compliance measurement: project assistant - SSI measurement: surveillance team	monitoring: multidisciplinary team	NR	site visits: project leaders, committed clinicians progress discussion: members from participating hospitals
Action	- compliance with interventions and SSIs were measured - feedback: compliance data and SSI rates were posted in key areas (e.g. scrub rooms)	- monitoring and coaching - collecting and reporting compliance and outcome data	- outcomes were recorded - morbidity and mortality (M+M) conferences: discussing data, developing a new strategy and a benchmark was carried out - reporting annual results in an conference - implementation of the new strategy was reviewed	- audit and feedback system for adherence - measuring compliance and SSI rates - auditing system: providing de-identified feedback on personal SSI bundle compliance/SSI rates - assigning bundle compliance scores to hospitals - compliance tracking allows: normative performance feedback compared with other hospitals - site visits: observing perioperative care processes (process adoption real time checks) - discussing progress and refining new ideas
Action target group	NR	- monitoring and coaching: surgical teams - reporting compliance and outcome data: regulatory bodies	NR	- auditing system: all providers - feedback: surgeons, hospitals - site visits: high-and low-performers
Temporality	NR	NR	NR	NR
Dose	- feedback: monthly	NR	- M+M conferences: 1-2 monthly - conference: annual	- site visits: six over study period - progress discussion: frequently

Description of “audit and feedback”	Studies			
	Waters, 2017 [70]	Wick, 2012 [71]	Wick, 2015 [72]	Willis, 2016 [73]
Actors	- data collection: trained unbiased nurse/ physician's assistant	- meetings: Comprehensive Unit-Based Safety Program (CUSP) leadership team (representative from surgery, nursing, anesthesia; team coach; hospital executive) and the CUSP team (interested nurses, certified registered nurse anesthetists, scrub technicians, anesthesiologists; 36 people) - compliance monitoring: CUSP coach - feedback: front-line providers	- monitoring: senior leaders	NR
Action	- data collection on all procedures -surgeon-specific feedback: adherence, outcomes - individualized feedback and feedback at department level - individual results, and comparison with: other surgeons results, departmental results, historical departmental results	- conducting compliance audits - collection of SSI rates and compliance - meetings: review progress, give performance feedback, conduct defect discussions, readjust implementation strategies	- monitoring results - compliance data were reviewed - dashboard: communicating pathway process and outcomes measures	- calculating and assessing adherence rate - performance reports: overall and individual adherence
Action target group	- feedback: eight surgeons (colon and rectal)	NR	- compliance data review: providers - dashboard: senior leadership, frontline providers	- performance reports: pediatric surgeons
Temporality	NR	NR	NR	NR
Dose	- feedback: biannual	- compliance audits: every few month - meetings/feedback: monthly	- dashboard: monthly	- performance reports: monthly

Notes: NR: Not reported