Appendix Methods. Search strategies used for electronic databases

NOTE: Searches were run October 2016

MEDLINE (Ovid)
1946 to October Week 2 2016

1	hospitals, general/
2	hospitals, community/
3	((nonteaching or non-teaching) adj1 hospital*).mp.
4	exp secondary care centers/ or (secondary adj care center*).mp.
5	(regional adj ((medical adj center*) or hospital*)).mp.
6	((nontertiary or non-tertiary) adj hospital*).mp.
7	minor teaching hospital*.mp.
8	(nonchild* or non-child*).mp.
9	(nonuniversity or non-university).mp.
10	exp "Quality of Health Care"/
11	((healthcare or health care) adj2 quality).mp.
12	effectiveness.mp.
13	efficiency.mp.
14	Time Factors/ or timeliness.mp.
15	patient centered*.mp.
16	Healthcare Disparities/ or disparit?.mp.
17	exp Medication Errors/ or medication error*.mp.
18	exp Cross Infection/ or healthcare associated infection*.mp. or vap.mp. or ventilator associated pneumonia.mp.
19	(cauti or catheter associated urinary tract infection*).mp.
20	(central line associated bloodstream infection* or clabsi).mp.
21	(catheter adj2 infection*).mp.
22	Catheter-Related Infections/
23	Accidental Falls/
24	fall*.mp.
25	thromboembolism/ or venous thromboembolism/
26	(vte or venous thromboembolism).mp.
27	(venous adj1 thromboembol*).mp.
28	Medical Errors/
29	wrong site surgery.mp.
30	nsqip.mp.
31	National Surgical Quality Improvement Program.mp.
32	patient harm/ or patient safety/ or safety management/
33	exp Pediatrics/
34	p?ediatric*.mp.
35	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
36	10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32
37	33 or 34
38	35 and 36 and 37
39	limit 38 to (english language and yr="1989 -Current")

MEDLINE In-Process & Other Non-Indexed Citations (Ovid)
October 20, 2016

1	general hospital*.mp.
2	community hospital*.mp.
3	((nonteaching or non-teaching) adj1 hospital*).mp.

4	(secondary adj care center*).mp.
5	(regional adj ((medical adj center*) or hospital*)).mp.
6	((nontertiary or non-tertiary) adj hospital*).mp.
7	minor teaching hospital*.mp.
8	(nonchild* or non-child*).mp.
9	(nonuniversity or non-university).mp.
10	((healthcare or health care) adj2 quality).mp.
11	effectiveness.mp.
12	efficiency.mp.
13	timeliness.mp.
14	patient centered*.mp.
15	disparit*.mp.
16	medication error*.mp.
17	(cross infection* or healthcare associated infection* or vap or ventilator associated pneumonia).mp.
18	(cauti or catheter associated urinary tract infection*).mp.
19	(central line associated bloodstream infection* or clabsi).mp.
20	(catheter adj2 related infection).mp.
21	fall*.mp.
22	(vte or venous thromboembol* or thromboembol*).mp.
23	medical error*.mp.
24	wrong site surgery.mp.
25	nsqip.mp.
26	National Surgical Quality Improvement Program.mp.
27	(patient adj1 (harm or safety)).mp.
28	p?ediatric*.mp.
29	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
30	10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27
31	28 and 29 and 30
32	limit 31 to (english language and yr="1989 -Current")

EBM Reviews - Cochrane Database of Systematic Reviews (Ovid)
2005 to October 19, 2016

1	((general or community or nonteaching or non-teaching or nontertiary or non-tertiary or "minor teaching") adj hospital*).ab. or ((general or community or nonteaching or non-teaching or nontertiary or non-tertiary or "minor teaching") adj hospital*).kw.
2	(regional adj ((medical adj center*) or hospital*)).af.
3	("secondary care" adj center*).af.
4	1 or 2 or 3
5	((healthcare or health care) adj2 quality).af.
6	(patient centered? or healthcare disp* or efficiency or effectiveness or timeli*).af.
7	(("healthcare associated" adj infection*) or vap or "ventilator associated pneumonia").af.
8	("central line associated bloodstream infection" or clabsi).af.
9	(cauti or "catheter associated urinary tract infection").af.
10	Catheter-Related Infections.af.
11	fall*.ab. or fall*.af
12	("venous thromboembolism" or VTE).af.
13	((medical or medication) adj error*).af.
14	"wrong site surgery".af.
15	(nsqip or "national surgical quality improvement program").af.

16 (Pediatric* or paediatric*).ab. or (Pediatric* or paediatric*).kw.
17 ("secondary care" adj hospital*).af.
18 ((nonuniversity or non-university or nonchild* or non-child*) adj hospital*).af.
19 4 or 17 or 18
20 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15
21 16 and 19 and 20

Embase (Elsevier)
October 25, 2016

1 'general hospital'/exp
2 'community hospital'/exp
3 (nonteaching or 'non teaching') NEXT/1 hospital*
4 secondary care' NEXT/1 (center* or hospital*)
5 regional NEXT/1 medical NEXT/1 center*
6 regional NEXT/1 hospital*
7 (nontertiary or 'non tertiary') NEXT/1 hospital*
8 minor NEXT/1 teaching NEXT/1 hospital*
9 (nonchild* or 'non child*') NEXT/1 hospital*
10 (nonuniversity or 'non university') NEXT/1 hospital*
11 'health care quality'/exp
12 (healthcare or 'health care') near/2 quality
13 'clinical effectiveness'/exp
14 effectiveness
15 efficiency
16 time'/exp or 'timeliness'
17 patient NEXT/1 centered*
18 health care disparity'/exp or disparit*
19 'medication error'/exp
20 medication* near/2 error*
21 'healthcare associated infection'/exp
22 healthcare or 'health care' or health*care near/2 (associated or acquired) near/2 infection*
23 ventilator near/3 pneumonia
24 vap
25 'catheter infection'/exp
26 catheter NEXT/1 associated near/2 urinary NEXT/2 infection*
27 catheter NEXT/1 associated near/2 infection*
28 cauti
29 clabsi
30 central line' NEXT/2 bloodstream near/2 infection*
31 central line' near/2 infection*
32 falling'/exp or accidental* near/1 fall*
33 thromboembolism'/exp or vte or venous NEXT/1 thromboembol*
34 'surgical error'/exp
35 'wrong site surgery'
36 nsqip
37 'national surgical quality improvement program'
38 'patient safety'/exp
39 patient near/2 (harm or safety)
40 'pediatrics'/exp
41 paediatric* or pediatric*
42 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
43 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39
44 #40 or #41

45 #42 and #43 and #44
46 #42 and #43 and #44 and [embase]/lim
47 #42 and #43 and #44 and [embase]/lim and [1989-2016]/py
48 #42 and #43 and #44 and [embase]/lim and [1989-2016]/py and ([newborn]/lim or [infant]/lim or [child]/lim or [preschool]/lim or [school]/lim or [adolescent]/lim)

CINAHL (EBSCOhost)
October 25, 2016

1 MH(Pediatrics+)
2 "TX (general or community or ""minor teaching"" or non-teaching or nonteaching or non-tertiary ornontertiary or regional or ""secondary care"" or nonuniversity or nonchild* or non-university or non-child*) N1 hospital* "
3 TX "secondary care" N1 (center* or hospital*)
4 TX "regional medical" N1 (center* or hospital*)
5 (MH "Quality of Health Care+") or (MH "Patient Centered Care")
6 (MH "Healthcare Disparities")
7 TX(effectiveness or efficiency or timel*)
8 TX(patient N1 centered*)
9 TX(healthcare or health-care) N1 dispar*)
10 TX("quality of care" or ((healthcare or health-care) N1 quality)
11 (MH "Patient Safety+") or TX("patient safety" or "patient harm" or "safety management")
12 (MH "Accidental Falls") or TX fall*
13 "(MH ""Pneumonia, Ventilator-Associated"") or TX(""ventilator-associated pneumonia"") or TX(vap) or TX(ventilator N3 pneumonia) "
14 (MH "Health Care Errors+") or TX("medication error" or "medical error" or "wrong site surgery")
15 "(MH ""Catheter-Related Infections+"") or TX((catheter-associated N3 infection*) or ((central-line-associated) N3 infection*) or clabsi or cauti "
16 (MH "Venous Thromboembolism") or TX(venous-thromboembol* or VTE)
17 TX healthcare-associated-infection*
18 TX NSQIP or "National Surgical Quality Improvement Program"
19 S2 or S3 or S4
20 S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18
21 S1 and S19 and S20
22 "S1 and S19 and S20 Narrow by Language: - English Published Date: 19890101-20161231"

PsycINFO (ProQuest)
October 25, 2016

((((SU.EXACT.EXPLODE("Safety") or SU.EXACT.EXPLODE("Patient Safety")) or (SU.EXACT.EXPLODE("Accidents") or SU.EXACT.EXPLODE("Falls")) or (nsqip or "National Surgical Quality Improvement Program") or (AB(medication-error*) or (AB(healthcare-associated-infection*) or AB(ventilator-associated-pneumonia or vap)) or (AB(catheter-associated-urinary-tract-infection* or cauti) or AB(central-line-associated-bloodstream-infection* or Central-line NEAR/3 infection* or clabsi)) or (AB(catheter NEAR/2 infection*) or AB.exact(medical error)) or (AB(venous-thromboembol* or vte) or AB(wrong-site-surgery)) or AB(patient-harm or patient-safety or safety-management))) or (SU.EXACT.EXPLODE("Quality of Care") or (AB((healthcare or "health care") NEAR/2 quality) or (AB(effectiveness) or AB(efficiency)) or (AB(timeli*) or AB(patient-centered*))) or AB(healthcare-disparit*)))
and ((p*diatric* or SU.EXACT.EXPLODE("Pediatrics"))
and (AB(general-hospital* or community-hospital* or non-teaching-hospital* or nonteaching-hospital* or nontertiary-hospital* or non-tertiary-hospital* or minor-teaching-hospital*) or AB(secondary-care-center*) or AB(regional-medical-center* or regional-hospital* or

nonuniversity-hospital* or non-university-hospital* or nonchild* NEAR/1 hospital* or non-child* NEAR/1 hospital))))
and pd(19890101-20161231)
and limit to English language

Scopus (Elsevier)
October 25, 2016

((TITLE-ABS-KEY ("patient safety" or fall* or "patient harm" or "safety management" or (nsqip or {national surgical quality improvement program}) or "healthcare associated infection" or {ventilator associated pneumonia} or vap or ("catheter associated infection") or "catheter associated urinary tract infection" or cauti or "medication error" or "wrong site surgery" or "medical error" or "central line associated bloodstream infection" or clabsi or "venous thromboembolism" or vte)
or TITLE-ABS-KEY ({quality of care} or ((healthcare or {health care}) PRE/1 quality) or ((effectiveness or efficiency or timel*) or (patient PRE/1 centered*) or (healthcare PRE/1 disparit*)))))
and ((TITLE-ABS-KEY(pediatric* or paediatric*))
and ((TITLE-ABS-KEY(({secondary care center}) or ({regional medical center} or {regional hospital}))) or (TITLE-ABS-KEY({general hospital} or {community hospital} or {nonteaching hospital} or {non-teaching hospital} or {minor teaching hospital} or {nontertiary hospital} or {non-tertiary hospital} or {nonchild*} or {non-child*} or {nonuniversity} or {non-university})
and SUBJAREA(MULT or MEDI or NURS or VETE or DENT or HEAL or MULT or ARTS or BUSI or DECI or ECON or PSYC or SOCI) and PUBYEAR > 1988)))
and (LIMIT-TO(SUBJAREA,"MEDI") or LIMIT-TO(SUBJAREA,"NURS") or LIMIT-TO(SUBJAREA,"HEAL") or LIMIT-TO(SUBJAREA,"SOCI") or LIMIT-TO(SUBJAREA,"NEUR")
or LIMIT-TO(SUBJAREA,"PSYC"))
and (LIMIT-TO(LANGUAGE,"English"))

Appendix Table 1. IOM aims of quality healthcare

IOM aim	**IOM definition and description**
Safe	**Avoiding harm, injuries and errors.** Avoiding medication errors, avoiding human factors for error. Providing seamless care/transitions.
Effective	**Providing service based on best scientific knowledge.** Avoiding underuse of effective care and overuse of ineffective care.
Patient-centered	**Providing care that is responsive to individual patient values and needs** through: (1) respect for patients' values, preferences, and expressed needs; (2) coordination and integration of care; (3) information, communication, and education; (4) physical comfort; (5) emotional support; and (6) involvement of family and friends.
Timely	**Reducing waits and harmful delays for patients and caregivers.**
Efficient	**Reducing waste i.e. of equipment, supplies, ideas, energy.** (1) reduce quality waste, and (2) reduce administrative or production costs.
Equitable	**Providing care that does not vary based on patient personal characteristics.**

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
Neonatal Medicine								
Cifuentes (2002)	Retrospective cohort	California birth-infant death cohort file linked with Office of Statewide Health Planning and Development (OSHPD) discharge abstracts	16,732 singleton births with birthweight <2000g	159 hospitals with no NICU, 68 community NICUs	Neonatal-related mortality	Compared with infants born at a regional NICU, infants <2000g born at a hospital with no NICU, an intermediate NICU of any census, or a community NICU with average census <15 patients, had significantly higher odds of mortality (see Effect Size)	Compared with infants born at a regional NICU (reference): Mortality-hospital with no NICU OR 2.38[1.81-3.13], p<0.001 Mortality-hospital with intermediate NICU of any census OR 1.92[1.44-2.54], p<0.001 Mortality-community NICU with average census <15 patients OR 1.42[1.14-1.76], p<0.001	Negative
Donohue (2009)	Prospective cohort	Chart review, parent interviews, hospital administrative records	255 VLBW infants who received care at 2 regional referral NICUs (148 transferred to community hospitals for convalescent care, 105 discharged home from the NICU)	15	Readmission within 2 weeks of discharge, completion of preventative health measures and screening examinations, parent satisfaction, hospital charges	After risk-adjustment, infants transferred to community hospitals were significantly more likely to be readmitted within 2 weeks (see Effect Size); in unadjusted analyses comparing with infants discharged directly from the NICU, infants transferred to community hospitals were less likely to have hearing screens (85% vs. 95%, p<0.01), less likely to have metabolic screening (61% vs. 73%, p<0.05), and less likely to be given the hepatitis B vaccine (77% vs. 90%, p<0.01), and parent satisfaction scores were lower (mean 4.25±0.58 vs. 4.42±0.53, p=0.027); total hospital charges did not differ significantly (community hospital $135,035±126,582 vs. NICU	Comparing infants discharged from community hospitals with those discharged directly from the regional NICU (reference): Readmission within 2 weeks OR 3.55[1.05-11.97]	Negative

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First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
						$144,032±88,221, no p-value provided)		
Izatt (1997)	Prospective cohort	Maternal survey	111 mother-infant dyads attempting to breastfeed at 24 hours after birth	1	% mothers receiving advice regarding breastfeeding from health care providers during postpartum hospital stay	Of first-time breastfeeding mothers, 45 (92%) received advice from their nurse, while only 18 (37%) and 18 (37%) received advice from the pediatrician and obstetrician, respectively. Of experienced breastfeeding mothers, 48 (83%) received advice from their nurse, while only 17 (29%) and 11 (19%) received advice from the pediatrician and obstetrician, respectively.	NA	Not applicable-no comparison group
Kuo (2012)	Retrospective cohort (retrospective chart review[a])	Chart review	394 neonates with gestational age ≤ 28 weeks admitted at one large academic center NICU (349 inborn at academic center and 45 transported from community hospitals)	Not provided - multisite	Morbid clinical outcomes (IVH, BPD, NEC, severe ROP), survival rates	Likelihood of severe ROP higher when transported from a community hospital compared to inborn at the academic center (see effect size), but no difference in likelihood of IVH, BPD, or NEC; survival rates did not differ between transported and inborn neonates (75.6% vs. 75.1%, respectively, p=1.0)	Comparing transported (birth at a community hospital) to inborn neonate (reference): <u>Severe ROP</u> OR 2.85 [1.15-7.07], p=0.02	Negative
Maisels (2002)	Retrospective cohort (retrospective review of medical records[a])	Chart review	Group 1: 158 infants (>33wk gestation) who received phototherapy in the nursery after birth; Group 2: 144 infants (>33wks) who did not receive phototherapy during birth hospitalization but were readmitted for phototherapy	1	% infants in each group with rebound bilirubin measured after termination of phototherapy, % infants in each group who required repeated phototherapy	Group 1: 119 infants (75.3%) had rebound bilirubin measured but only 13 (8.2%) required repeat phototherapy; Group 2: 115 infants (79%) had rebound bilirubin measured but only 1 (0.7%) required repeat phototherapy	NA	Not applicable-no comparison group
Meadow (1996)	Retrospective cohort	Chart review	142 neonates born at one	1	% infants requiring home	No significant difference in % infants requiring home	Not provided	Neutral (although risk-adjustment limited: birthdate

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
	(retrospective 2:1 case control[a])		community hospital who required mechanical ventilation (104 cared for exclusively at the community hospital), matched by birthweight with 284 infants born at a tertiary center		oxygen, duration of mechanical ventilation	oyxgen between those born at the community hospital versus those born at the tertiary center (5.8% vs. 6.6%, respectively, no p-value provided); stratified by birthweight, no significant difference in duration of ventilation between VLBW or non-LBW infants born at the community hospital versus the tertiary center (duration in days represented in bar graph form, exact values not provided, no p-value provided)		and birthweight)
Phibbs (1992)	Retrospective cohort	Chart review and administrative records	90 neonates backtransported from a tertiary NICU to a community hospital for recovery care	29	Hospital charges for recovery care	Comparing the itemized bill per case at the community hospital compared to projected charges for the same patient at the tertiary NICU, mean charges were less at the community hospitals $13,401 (sd $11,398) vs. $19,599 (sd $15,611, no p-value provided), mean net savings per case $4595 (sd $5865); when stratified patients by LOS, net savings for care at a community hospital only occurred for patients with LOS > 7 days	Not provided	Positive
Wall (2004)	Retrospective cohort	State birth certificates, American Hospital Association's Annual Survey of Hospitals, and the Illinois Health Care Cost Containment Council	2,904 infants born at nontertiary hospitals (levels 1, 2, or 2+) with birthweight 500-1249g	Not provided - multisite	Nontransfer of infants <1250g, which by Department of Public Health guidelines should be transferred to a tertiary facility	After risk-adjustment, compared to birth in a level 1 hospital, birth in a level 2 hospital was not associated with nontransfer in any birthweight strata, but birth in a level 2+ hospital was significantly associated with nontransfer, with risk increased over increasing birthweight strata (see	Comparing level 2+ hospitals with level 1 hospitals (reference): Nontransfer of infants 500-1249g OR 4.48[2.84-7.08] Nontransfer of infants 500-749g OR 2.11[1.50-2.96] Nontransfer of infants 750-999g	Negative (for level 2+ community hospitals)

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
		Research-Oriented Dataset				Effect Size)	OR 5.09[2.2-11.79] Nontransfer of infants 1000-1249g OR 6.19[3.14-12.22]	
Pediatric Medicine								
Alexander (2009)	Cross-sectional	US Pharmacopeia MEDMARX database	821 cardiovascular medication error reports for patients aged <18 years	104	Cardiovascular medication errors	Community hospitals accounted for fewer cardiovascular medication error reports while university and children's hospitals submitted more reports than expected on the basis of their representation in the group: community hospitals 451 (56%) reports in 104 (70.7%) hospitals, university hospitals 269 (33.0%) reports in 27 (19.4%) hospitals, children's hospitals 64 (8.0%) reports in 6 (4.1%) hospitals, p=0.03; harmful errors did not differ between institution types (stated but data not shown)	Not provided	Indeterminate-comparison group but not risk-adjusted
Balch (2015)	Retrospective cohort	Chart review	4,983 children aged ≤18 years who received ≥ 2 doses of vancomycin	16	Rate of vancomycin therapeutic drug monitoring, physician response to abnormal vancomycin concentrations	Rate of therapeutic drug monitoring was significantly lower in community hospitals (68%) compared with the quaternary care pediatric hospital (85%, p<0.0001); pediatric hospitals were more likely to increase the dose in response to low trough concentrations when compared with community hospitals (exact proportions not provided but stated p<0.0001)	Not provided	Negative (although risk-adjustment limited to age and high vs. low drug concentration)
Conway (2006)	Cross-sectional	National survey	565 pediatricians (213 hospitalists and 352 community pediatricians)	Not provided - multisite	Compliance with evidence-based practices and adherence to American	For both hospitalists and community pediatricians combined, physicians who practiced in an academic center were more likely	Comparing physicians who practice in academic hospital to those who practice in a community hospital (reference):	Indeterminate-comparison group but not risk adjusted

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
					Academy of Pediatrics guidelines for common inpatient pediatric illnesses	than physicians who practiced in a community hospital to report often or almost always using 3 of 5 evidence based therapies and recommended tests, and more likely to report never or rarely using 4 of 7 tests/therapies of unproven benefit	**Reported often or almost always use of:** Renal ultrasound for first UTI OR 3.17[1.06-9.51] VCUG for first UTI OR 2.12[1.04-4.32] Albuterol for asthma OR 2.25[1.04-4.89] **Reported never or rare use of**: Levelabuterol for bronchiolitis OR 2.75[1.79-4.23] Inhaled steroids for bronchiolitis OR 2.62[1.64-4.16] Oral steroids for bronchiolitis OR 2.68[1.75-4.12] Stool culture for gastroenteritis OR 1.72[1.09-2.73]	
Frank (1992)	Retrospective cohort	Chart review	681 pediatric patients (exact age range not provided but excluded adults) admitted to a community hospital PICU	1	Mortality	23 deaths (3.4%) in the community PICU versus 32.6 deaths (4.8%) predicted by the Pediatric Risk of Mortality (PRISM) score, validated and shown to successfully predict mortality adjusted for age and severity of illness in tertiary center PICUs (p>0.2)	Not provided	Neutral
Leyenaar (2014)	Retrospective cohort	Perspective Database Warehouse	17,299 children aged 1-17 years hospitalized with community acquired pneumonia (12,013 at community hospitals, 5286 at children's hospitals)	104	Use of diagnostic tests and narrow-spectrum antibiotic use	Rates of use of chest radiographs, blood cultures, and viral respiratory testing was similar between community hospitals and children's hospitals, but children admitted at children's hospitals were significantly more likely to have acute phase reactants checked:	Not provided	Indeterminate-comparison group but not risk-adjusted

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
						ESR 13.5% vs. 4.6%, p<0.001, CRP 25.9% vs.18.8%, p<0.001; ampicillin or penicillin G monotherapy was rare (0.17%) and did not differ significantly between hospital types, 3rd generation cephalosporin combined with antistaphylococcal therapy used significantly more often in children's hospitals (p<0.01)		
Leyenaar (2016)	Retrospective cohort	Chart review, the Pediatric Health Information System (for children's hospitals) and administrative records (for community hospitals)	927 hospitalized patients aged 2 months-18 years (624 at children's hospitals, 303 at community hospitals)	2	Quality of hospital-to home transition record content and timeliness of discharge communication between inpatient and outpatient providers (combined into a hospital-to-home transition summary score)	Community hospitals had lower mean hospital-to-home transition summary scores compared to the mean of all other hospitals: Community Hospital D 7.7 below the mean (p<0.001), Community Hospital E 22.5 below the mean (p<0.001)	Not provided	Indeterminate-comparison group but not risk-adjusted
Meurer (1998)	Retrospective cohort (historical cross-sectional[a])	Healthcare Cost and Utilization Project Nationwide Inpatient Sample (NIS)	28,545 patients aged ≤ 18 years with principle diagnosis of asthma	109	Hospital charges	After risk adjustment, mean total charges were significantly lower (p<0.001) at rural nonteaching hospitals ($2,910, 95% CI $2,818-3,005) compared with urban nonteaching hospitals ($3,424, 95% CI $3,304-3,548) and urban teaching hospitals ($4,230, 95%CI $3,929-4,555)	Not provided	Positive
Myers (2014)	Retrospective cohort	Kids' Inpatient Database	28,777 children hospitalized with burn injuries	Not provided - multisite	Hospital charges	After risk adjustment (different risk adjustment technique than article above), total charges did not differ significantly by hospital type; compared to non-pediatric non-teaching	Not provided	Neutral

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
						hospitals, charges at pediatric hospitals were $2,857 higher, p=0.383, charges at nonpediatric teaching hospitals were $878.51 higher, p=0.818		
Myers (2015)	Retrospective cohort	Kids' Inpatient Database	28,777 children hospitalized with burn injuries	Not provided - multisite	Hospital charges	After risk adjustment including transfer status, total charges did not differ significantly by hospital type; compared to non-pediatric non-teaching hospitals, charges at pediatric hospitals were $1,804 higher, p=0.489, charges at non-pediatric teaching hospitals were $912 higher, p=0.745	Not provided	Neutral
Odetola (2007)	Retrospective cohort	Kids' Inpatient Database	12,604 children aged <19 years hospitalized with severe sepsis and organ dysfunction	Not provided - multisite	In-hospital mortality, hospital charges	After risk-adjustment, in-hospital mortality did not differ significantly by hospital type (see Effect Size), hospital charges were significantly higher at children's hospitals and nonchildren's teaching hospitals compared with nonchildren's nonteaching hospitals (see Effect Size)	Compared with nonchildren's nonteaching hospitals (reference): In-hospital mortality-Children's hospital OR 1.48[1.00-2.19], p=0.05 In-hospital mortality-Nonchildren's teaching hospital OR 1.40[0.91-2.15], p=0.12 Hospital charges-Children's hospital Charge ratio 1.49[1.32-1.70], p<0.01 Hospital charges-Nonchildren's teaching hospital Charge ratio 1.19[1.06-1.35], p<0.01	Positive
Scherb (2007)	Retrospective cohort (retrospective descriptive design[a])	Chart review	29 patients aged <18 years, hospitalized with a primary diagnosis of mild or severe	1	Difference in nursing-sensitive patient outcome ratings from admission with	Statistically significant (p<0.05) improvement in patient's admission rating to discharge rating for seven of eight outcomes	NA	Not applicable-no comparison group

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
			dehydration		dehydration to discharge using the Nursing Outcomes Classification (NOC) system	tracked on the standard pediatric dehydration care plan (reported as mean ± sd): Nutritional status 3.44 ± 0.751 to 4.37 ± 0.629; Fluid balance 3.48 ± 0.586 to 4.60 ± 0.500; Knowledge status 3.40 ± 1.15 to 4.48 ± 0.653; child adaption to hospitalization 3.50 ± 0.780 to 4.54 ± 0.588; Electrolyte and acid/base balance 3.54 ± 0.671 to 4.73 ± 0.456; Tissue integrity 3.79 ± 0.787 to 4.79 ± 0.419; pain control 3.14 ± 1.34 to 4.71 ± 0.488		
Van Winkle (2008)	Retrospective cohort	Chart review	34 hospitalized children aged ≤13 years with peripherally inserted central catheters (PICCs, 39 total PICCs) placed at a community hospital for IV antibiotics	1	Rate of successful completion of IV antibiotics as an outpatient, rate of complications, costs of home care relative to estimated hospitalization costs	33/34 (97%) patients completed antibiotic therapy as an outpatient, 82.3% competed therapy with a single PICC; 13/39 (33.3%) PICCs had a complication requiring removal; $115/day cost for home health treatment compared to estimated $1185/day for inpatient care (cost savings of $1070/day)	Not provided, but reported no statistically significant difference between % completion of therapy as outpatient, % completion of therapy with a single PICC, or % with complications compared to previously published literature from pediatric centers (p=0.5258, p=0.1015, p=0.3510, respectively)	Indeterminate-comparison group but not risk-adjusted
Surgery								
Beaty (2003)	Prospective cohort	Chart review and in-hospital follow-up	201 pediatric patients aged 0-17 years hospitalized after traumatic injury	1	Missed injuries identified after admission to hospital	37 patients (18.4%) had missed injuries identified after admission, incidence of missed injury was higher when a trauma surgeon alone performed the primary evaluation compared with a pediatric ER doctor alone (39% vs. 11%, respectively, p<0.001)	NA	Not applicable-no comparison group
Kelley-Quon (2012)	Retrospective cohort[a]	California Patient Discharge Linked Birth	8,379 infants who underwent pyloromyotomy for pyloric	Not provided - multisite	Surgical complications, 30-day readmission	After risk-adjustment, community hospitals had significantly higher odds of surgical complications	Comparing community hospitals with children's hospitals (reference):	Negative

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
		Cohort Database	stenosis			compared with children's hospitals (see Effect Size); 30-day readmission did not differ significantly by hospital type (see Effect Size)	Surgical complications OR 2.09[1.09-4.01], p=0.027 30-day readmission OR 0.84[0.59-1.18], p=0.303	
Kelley-Quon (2013)	Retrospective cohort	California Patient Discharge Dataset (CaPDD)	107,727 children aged 2-18 years with appendicitis	286	Appendiceal perforation (AP)	Hispanic and Asian children (compared with white) treated at community hospitals had higher odds of AP (see Effect Size), while black children did not have higher odds of AP; when comparing hospital types, black children had higher odds of AP at children's and county hospitals compared with community hospitals (see Effect Size)	In community hospitals, compared with white children (reference): AP for Hispanic children OR 1.23[1.16-1.32] AP for Asian children OR 1.34[1.19-1.52] Compared with community hospitals: AP for Black children treated at county hospitals OR 1.12[0.90-1.38] AP for Black children treated at children's hospitals OR 2.01[1.18-3.42]	Positive
Pokala (2007)	Retrospective cohort (retrospective comparative study[a])	Chart review	104 patients requiring appendectomy for complicated appendicitis (24 pediatric patients, 15 laparoscopic, 9 open appendectomy)	1	For pediatric patients specifically: postoperative intra-abdominal abscess, other postoperative complications (such as ileus, small bowel obstruction, wound infection, pulmonary or cardiac complications)	For pediatric patients specifically: no statistically significant difference in rate of postoperative intra-abdominal abscess between those with laparascopic versus open appendectomies (13% vs. 0%, respectively, p=0.5) or rate of other postoperative complications (33% vs. 23%, respectively, p=0.6)	NA	Not applicable-no comparison group
Smith (1999)	Retrospective cohort	Intermountain Health Care (IHC) system casemix database	397 children hospitalized with orthopedic injuries (334 closed femoral shaft fractures and 63	24	Hospital charges	With patients matched by age and injury severity, average hospital charges for closed femoral shaft fractures were higher at community hospitals	Not provided	Negative

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
			slipped capital femoral epiphyses (SCFE)			without orthopedic subspecialists versus the children's hospital with pediatric orthopedists ($9,031 versus $4,943, p<0.01); average hospital charges for SCFE were also higher at community hospitals versus the children's hospital ($3,544 versus $2,823, p<0.01)		
Radiology								
Calvert (2012)	Cross-sectional	Chart review	150 children who had abdominal/pelvic CTs performed in community hospitals during trauma evaluation	40	Volume weighted CT dose index (CTDIvol)	75 patients (50%) received effective radiation doses greater than the normal effective dose for their age	NA	Not applicable-no comparison group
Marin (2015)	Cross-sectional (retrospective analysis of pediatric c-spine CT examinations[a])	American College of Radiology Dose Index Registry	12,218 noncontrast c-spine CTs performed on patients aged <19 years	216 (53 community trauma centers, 163 community nontrauma centers)	Volume CT dose index (CTDIvol)	Pediatric hospitals had the lowest CTDIvol and the least variability in dose estimates (reported as median[IQR]: pediatric trauma centers 6[4-9], pediatric nontrauma centers 3[2-4], community trauma centers 16[9-24], community nontrauma centers 16[11-23]	Not provided	Indeterminate-comparison group but not risk-adjusted
Reich (2000)	Retrospective cohort	Chart review, CT scan review	46 pediatric patients aged < 18 years, treated for appendicitis	1	Utilization of pre-operative CT scan, sensitivity of CT scan, false-negative CT scans and associated morbidity, delay in surgical management	CT scan utilized for 17/46 (37%) patients; of those with CT scans performed, CT predicted appendicitis for 9 (sensitivity 53%), 8 (47%) had false-negative CT scans, two of which went on to perforate and the remaining six had delay in definitive surgical management (quantification not provided)	NA	Not applicable-no comparison group
Saito (2013)	Retrospective cohort	Chart review	423 children aged 1 month -18 years who underwent an operation for pre-	Not provided –multisite	Utilization of pre-operative imaging, imaging accuracy	Compared with no preoperative imaging, use of ultrasound alone was less likely and use of CT	Comparing community hospitals with children's hospitals (reference):	Negative

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
			operative diagnosis of appendicitis at one children's hospital			scan alone was more likely when initial evaluation was performed at a community hospital compared with the children's hospital (see effect size); when CT scan was performed at a community hospital versus the children's hospital, sensitivity for any appendicitis trended lower (93.4% vs. 98.8%, respectively, p=0.07), sensitivity for perforated appendicitis was significantly lower (49.0% vs. 75.0%, respectively, p=0.045); when ultrasound was performed at a community hospital versus the children's hospital, sensitivity for any appendicitis was significantly lower (38.5% vs. 74.7%, respectively, p=0.01)	Preoperative use of ultrasound alone OR 0.20 [0.07-0.58] Preoperative use of CT scan alone OR 4.37 [1.70-11.19]	
York (2005)	Retrospective cohort (retrospective review of medical records[a])	Chart review	197 pediatric patients aged 2-17 years with pre-operative diagnosis of appendicitis (106 imaged, 91 nonimaged)	1	Time to definitive treatment (surgery), perforation rates, negative appendectomy rates, hospital charges, time on antibiotics, complication rates	Time to definitive treatment significantly longer for imaged versus nonimaged (12.1 vs. 5.4 hours, respectively, p<0.0001), no significant difference (p>0.05) between imaged an nonimaged in terms of perforation rates (15.1% vs. 14.6%, respectively), negative appendectomy rates (10.4% vs. 4.4%, respectively), days on IV antibiotics (mean 1.62 vs. 1.79, respectively), or rates of postoperative complications (11.3% vs. 12.1%, respectively); mean charges significantly higher for imaged versus nonimaged ($11,791 vs.	NA	Not applicable-no comparison group

Appendix Table 2. Detailed findings of included observational studies

First Author (Year)	Study Design	Data Source	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Main Findings	Effect Size (OR [95% CI])	Community Hospital Effect on Quality (positive, negative, neutral, indeterminate-comparison group but not risk-adjusted, or not applicable-no comparison group)
						$9,360, respectively, p=0.001)		

[a] Authors' own words

AP: appendiceal perforation; BPD: bronchopulmonary dysplasia; CT: computed tomography; CTDIvol: Volume weighted CT dose index; ER: emergency room; IV: intravenous; IVH: intraventricular hemorrhage; LOS: length of stay; NAS: neonatal abstinence syndrome; NEC: necrotizing enterocolitis; NICU: neonatal intensive care unit; OR: odds ratio; PICC: peripherally inserted central catheter; PICU: pediatric intensive care unit; ROP: retinopathy of prematurity; SCFE: slipped capital femoral epiphysis; SCN: special care nursery; UTI: urinary tract infection; VCUG: voiding cystourethrogram; VLBW: very low birth weight

Appendix Table 3. Detailed findings of included interventional studies

First Author (Year)	Study Design	Intervention Description	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Intervention Effect
Neonatal Medicine						
Altman (2011)	Pre-post cohort (before/after study design[a])	Led by maternity nurses during postpartum hospitalization; program consisted of a leaflet explaining abusive head trauma and how to prevent it, followed by an 8-minute video, and a brief self-administered questionnaire containing the statement "I know that shaking a baby is dangerous and I agree to share this knowledge with others."	76,108 births (parent/infant dyads) during the 3-year intervention period (number of births in the 5-year control period not provided, but stated annual birth rate virtually identical over the 8 years in study)	19	Number of children treated for abusive head injury resulting from shaking during a given 12-month period at the single tertiary care children's hospital in the region	Decrease in abusive head injuries from 2.8 injuries per year (14 cases in the 5-year historical control period) to 0.7 injuries per year (2 cases in the 3-year intervention period), while the annual birth rate in the region remained virtually identical during the 8-year period, a 75% reduction in abusive head injuries (p=0.03)
Clemens (2002)	Retrospective cohort	Development and implementation of a local policy for prevention of early onset group B strep (EOGBS) disease in response to the ACOG/AAP joint committee statement, including (1) creation of a pre-printed physician order set and (2) an educational program presented to all obstetrical community regarding importance of the new GBS guidelines and proper implementation of the new policy	1,023 GBS positive or unknown mothers with infants ≥37wks in a one year post-implementation period	1	Compliance with the new GBS policy as measured by % GBS positive or unknown mothers receiving antepartum antibiotics, and hospital's incidence of EOGBS disease pre- and post-issuance of guidelines (exact sample sizes not provided for the pre-post- analysis)	91.1% GBS positive or unknown mothers received antepartum antibiotics in the post-implementation period (no data provided for pre-implementation comparison), hospital's incidence of EOGBS disease declined from an average of 1.93/1000 births over 7 years pre-issuance of guidelines to 0.4/1000 births over 5 years post-issuance of guidelines (p=0.002)
Hall (2010)	Pre-post cohort	Leveraging of an established rural telemedicine network connecting community hospitals to a large academic neonatal practice to implement "Telenursery": consisting of an educational program, Peds PLACE (Pediatric Physician Learning and Collaborative Education), with weekly conferences to establish guidelines for obstetrical, neonatal, and pediatric care including appropriate transfer of high risk pregnancies to regional perinatal centers; PedsPLACE was also coordinated with an obstetrical program, ANGELS (Antenatal Neonatal Guidelines and Educational Learning System)	12,258 liveborn LBW (500-2499g) infants	15	Proportion of VLBW (<1500g) and ELBW (<1000g) infants delivered in the academic center vs. community hospitals	Medicaid deliveries at the regional perinatal center increased from 23.8% to 33% for neonates between 500-999g (p<0.05) but was unchanged for neonates between 2001-2500g. After adjusting for risk factors and case mix, the largest increase in academic medical center deliveries occurred among the smallest infants (500-999g) born to mothers residing more than 80 miles from the center (from 27.6% to 34.5%, p<0.01)
Hulsey (1991)	Retrospective cohort	Implementation of a structured neonatal transport program:	681 VLBW births (551 born at academic	11	Percentage of "outborn" VLBW infants born at	Significantly increased percentage of "outborn" VLBW infants transported as neonates to the academic

Appendix Table 3. Detailed findings of included interventional studies

First Author (Year)	Study Design	Intervention Description	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Intervention Effect
		Phase 1--ambulance transport with private provider but staffed by the academic center's transport team, Phase 2--dedicated helicopter and ambulance service, Phase 3--initiation of 24hr/day in-hospital coverage by the neonatal transport team	center, and 130 born at community hospitals)		community hospitals and transported to the academic center, survivorship for neonatal transports vs. in utero transports vs. "inborn" at the academic center, percentage of VLBW neonatal transports requested within the first hour of life	center: 34% pre-intervention, and 45%, 75% and 79% for intervention phases 1-3, respectively, p<0.025. Over the total interventional period, survivorship for neonates weighing 750-1499g was higher when delivered at the academic center (81.7% if inborn at academic center, 83.1% if transported to academic center in-utero, vs. 79.9% if "outborn" at a community hospital and transported as neonate, no p-value provided). Percentage of neonatal transports requested within the first hour of life increased from 50% during first phase of program to 62% after the 3rd phase of the program (no p-value provided)
Sable (2002)	Prospective cohort	Pediatric tele-echocardiography performed at community hospitals, guided and interpreted by a pediatric cardiologist at a tertiary care center	500 telemedicine transmissions for 364 neonates requiring cardiac echocardiograms (exact number of echocardiograms performed pre-intervention not provided)	2	Accuracy of telemedicine cardiac diagnoses, number of transmissions that altered immediate patient care, number of patient transports prevented, and total echocardiogram utilization per 1000 live births pre-and post-telemedicine (exact sample sizes not provided for the pre-post- analysis)	Of 209 transmissions with a cardiac diagnosis, final videotape review altered the initial telemedicine diagnosis for only 1 (<1%). Telemedicine encounter altered immediate patient care in 151 (30%) transmisisons (i.e., indomethacin for PDA, prostaglandin infusion, etc.). Speculated that immediate availability of tele-echocardiographic diagnosis prevented unnecessary transport for 14 (4%) patients. Telemedicine did not alter overall echocardiogram utilization: the total number of pediatric echocardiograms (telemedicine and conventional) per 1000 live births performed at the referring community hospitals was 35 pre-telemedicine and 33-43 post-telemedicine (p-value reported as nonsignificant, exact value not provided).
Wexelblatt (2015)	Retrospective cohort study[a]	Implementation of universal maternal drug screening	2,995 maternal admissions for labor and delivery, 2,979 live-born infants	1	% of mothers with positive urine drug tests via universal screening that would have been missed using only traditional risk-based screening guidelines, and proportion of associated infants requiring admission to SCN and treatment of NAS	19 of 96 mothers (20%) with opioid-positive urine tests were negative for any screening risk factors and would have been missed using the previous risk-based screening approach. Of the associated infants, 7 of 19 (37%) required admission to SCN for worsening signs of NAS and one required pharmacologic treatment (no statistical comparisons to a pre-intervention period provided)
Pediatric Medicine						
Dayal (2015)	Pre-post cohort (pre-post- study design[a])	Implementation of standardized evidence-based order sets for common pediatric respiratory illnesses including asthma, bronchiolitis and pneumonia, and implementation of a standardized clinical care pathway for asthma	1,558 pediatric patients (870 in two year pre-intervention period and 688 in two year post-intervention period) aged 1 month-17 years hospitalized with either asthma, bronchiolitis, or pneumonia	1	For asthma specifically: hospitalization cost per patient; For asthma, bronchiolitis, and pneumonia: bronchodilator utilization, 30-day readmission rate	For asthma, decrease in average total hospitalization cost per patient from $2010 to $1174, a 41% reduction per patient, p<0.05 For all respiratory illnesses combined, reduction in average albuterol and levalbuterol treatments per patient from 10.7 and 1.99, respectively, to 5.14 and 0.19, respectively (no p-value provided) 30-day readmission rates remained unchanged pre-compared with post-intervention for all respiratory

Appendix Table 3. Detailed findings of included interventional studies

First Author (Year)	Study Design	Intervention Description	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Intervention Effect
						illnesses combined: 3% vs. 2.2%, p=0.344; for asthma individually: 0.03% vs. 0.02%, p=0.571; for bronchiolitis individually: 4.8% vs. 2.8%, p=0.420; and pneumonia individually: 2.5% vs. 2.2%, p=0.807
Krugman (2007)	Pre-post cohort	Consolidation of all pediatric care on one unit (combining pediatric inpatient and pediatric ED care), staffed by a pediatric service attending who rounds on the inpatients in the morning, and one pediatrician who provides emergency care to all children and coverage for inpatients while the service attending is away from the hospital, double coverage provided for pediatric ED patients by an emergency medicine trained physician	1,362 pediatric admissions (650 pre-intervention, 712 post-intervention)	1	Overall inpatient satisfaction ratings from the Press Ganey survey, inpatient speed of admission	Mean inpatient satisfaction score did not change significantly (from 75.7 to 79.0, p=0.432); mean score for inpatient speed of admission increased from 62.5 to 74.7, but did not reach statistical significance, p=0.153
Kuhlmann (2013)	Interrupted time-series[a]	2 PDSA cycles with interventions including (1) redesign of the Home Management Plan of Care (HMPC) form to be more user friendly and address all of the Children's Asthma Care core measure 3 (CAC-3) elements, concurrent with extensive physician and nursing staff education, and (2) development and implementation of an electronic version of the HMPC form, auto-populated by the discharge medication reconciliation form and supplemented with nursing documentation of asthma triggers	336 pediatric patients aged 2-17 years hospitalized with primary diagnosis of asthma	1	% compliance with the Children's Asthma Care core measure 3 (CAC-3, Home Management Plan of Care)	Improved average quarterly compliance with CAC-3 from 43% to 97% (no further statistical analysis or p-value provided), with sustained compliance >90% to the time of publication
Labarbera (2013)	Retrospective cohort (Retrospective chart review[a])	(1) Implementation of a telemedicine program: pediatric intensivist at one tertiary hospital consulted via telephone or real-time two way audio-visual conferencing and (2) initiation of a pediatric hospitalist program at the community hospital	Community hospital pediatric patients requiring critical care consultation; Cohort 1: 41 prior to telemedicine or community hospitalist program interventions; Cohort 2: 56 post-telemedicine but prior to community hospitalist program;	1	Transfer rates to the tertiary hospital after intensivist consultation, proportion of transferred patients diverted to the tertiary ward from the PICU	Decreased transfer rates to the tertiary hospital after telemedicine program (100%, 85.7%, and 87.5% in cohorts 1-3 respectively, p=0.04), of patients transferred, rate of diversion to the tertiary ward rather than ICU decreased after implementation of both telemedicine and community hospitalist programs (19.5%, 14.5%, and 6.1% in cohorts 1-3 respectively, p=0.003), rates of transfer to the tertiary hospital and diversion to the tertiary ward were lower for those receiving telemedicine consultation vs. phone consultation (72% vs. 100% transferred, respectively, p<0.001, and 7.5% vs. 12.3% diverted, respectively, p=0.15)

Appendix Table 3. Detailed findings of included interventional studies

First Author (Year)	Study Design	Intervention Description	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Intervention Effect
			Cohort 3: 56 post- both telemedicine program and community hospitalist program			
Nkoy (2015)	Pre-post cohort (quality improvement study[a])	Implementation of an evidence-based care practice model (EB-CPM) for asthma, including standardized order sets, standardized criteria for weaning and escalation of care, specialist consultation, ICU transfer, and discharge, and a standardized template and checklist to facilitate care transition to primary care provider	1,721 pediatric patients (1,279 in the 8.5 year pre-intervention period and 442 in the 2.5 year post-intervention period) aged 2-17 years hospitalized with asthma	7	Compliance with the EB-CPM measured using a composite score (CS) for 8 quality measures, asthma readmission rate, hospitalization costs, hospital resource use measured by hospital relative resource units (RRUs), ICU transfers, deaths	Improved composite score from 25-58% to 80-99%, with sustained improvement in this range for 2-years of follow-up; there was a statistically insignificant trend towards reduced asthma readmission rate from 13.8% to 11.5%, OR 0.76, p=0.119; significantly reduced hospitalization costs from median $1556.9 to $1484.7, β = -0.05, p=0.053; significantly increased hospital resource use from median RRU 22.3 to 22.9, β=0.05, p=0.032; no change in PICU transfers or deaths (data not shown)
Walia (2016)	Pre-post cohort	Phase 1: pre-intervention; Phase 2: all residents participated in a 90-minute educational session focused on training to organize handoffs using the mnemonic "I-PASS", teaching the importance of handoffs, ideal handoff content, and consequences of poor handoffs; Phase 3: implementation of an electronic handoff tool with a template of the I-PASS mnemonic in the EMR	600 patient handoffs between pediatric residents in the newborn nursery or pediatric floor (100 handoffs per setting in each of 3 implementation phases)	1	Quality of patient handoffs by residents determined by survey of attending physicians who observed the handoffs	Effect of I-PASS educational session (Comparing phase 1 with phase 2): improved situational awareness with contingency planning (nursery: from 12% to 83%, p=0.001; pediatric floor: from 21% to 84%, p=0.001), decreased incidence of tangential or unrelated conversation (nursery: from 100% to 23%, p=0.001; pediatric floor: from 84% to 11%, p=0.001), but decrease in statement of illness severity in the nursery (from 100% to 62%, p=0.001) and increased omission of important information on the pediatric floor (from 19% to 33%, p=0.010); Effect of the electronic handoff tool (Comparing phase 2 with phase 3): improved identification of illness severity (nursery: from 62% to 99%, p=0.001; pediatric floor: from 41% to 64%, p=0.001), reduced omission of important information (nursery: from 14% to 0%, p=0.001; pediatric floor: from 33% to 17%, p=0.007), reduced tangential conversation in the nursery (from 23% to 2%, p=0.001) but decreased situational awareness and contingency planning on the pediatric floor (from 84% to 55%, p=0.001)
Yang (2016)	Randomized controlled trial[a]	Pediatric critical care consultation via videoconference (intervention) or telephone (control)	30 high fidelity simulation scenarios of critically ill children presenting to a community hospital and progressing to cardiopulmonary arrest (15 intervention and 15 control), code teams comprised of community inpatient and ED providers and led by a pediatric	1	Proportion of teams who successfully defibrillated within 180 seconds from presentation of pulseless ventricular tachycardia (PVT), proportion of teams adhering to resuscitation guidelines and best resuscitation practices	Only 37% of teams defibrillated within 180 seconds of PVT and there was no difference between intervention and control groups (33% and 40%, respectively, p=0.7); a higher proportion of teams in the intervention group vs. control group requested or used a backboard during resuscitation (100% vs. 60%, respectively, p=0.006) and requested or used a stepstool (33% vs. 7%, respectively, p=0.07)

Appendix Table 3. Detailed findings of included interventional studies

First Author (Year)	Study Design	Intervention Description	Population/ Sample Size	Number of Community Hospitals	Quality Outcome Measure(s)	Intervention Effect
			hospitalist			
Surgery						
Kelley-Quon (2015)	Pre-post cohort (retrospective cohort study[a])	Partnering of a community hospital with an urban academic medical center and designation as a Level II pediatric trauma center (PTC), dual appointments for pediatric surgeons at the community hospital and children's hospital, allowing for pediatric specialty care in the community (prior to partnership, injured children were cared for by adult trauma surgeons entirely)	975 injured children aged <15 years (294 pre-intervention period, 681 post-intervention period)	1	% injured children receiving CT scans for trauma evaluation, rate of transfers to other acute care facilities, in-hospital mortality	Decrease in proportion of injured children receiving CT scans pre- compared to post-intervention. CT scans overall: from 81.3% to 50.9%, p<0.01, head CTs: from 68.7% to 45.7%, p<0.01, abdominal CTs: from 26.5% to 13.2%, p<0.01, c-spine CTs: from 2% to 0.06%, p<0.01, CTs of the orbit, face, neck, chest, pelvis, and extremities did not differ significantly; after adjusting for demographics and injury severity, post-PTC designation was the most important independent factor predicting decreased likelihood of receiving a CT scan (OR 0.18, 95% CI 0.08-0.37); significant decline in the rate of transfers to other acute care facilities from 8.5% to 2.5%, p<0.01; significant decrease in in-hospital mortality from 2.0% to 0.4%, p=0.02

[a] Authors' own words

AAP: American Academy of Pediatrics; ACOG: American College of Obstetricians and Gynecologists; CAC-3: Children's Asthma Care core measure 3; CT: computed tomography; EB-CPM: evidence-based care practice model; ED: emergency department; EOGBS: early onset group B strep; GBS: group B strep; ICU: intensive care unit; NAS: neonatal abstinence syndrome; PDA: patent ductus arteriosus; PDSA: plan-do-study-act; PICU: pediatric intensive care unit; PTC: pediatric trauma center; PVT: pulseless ventricular tachycardia; RRU: relative resource unit; VLBW: very low birth weight; SCN: special care nursery

Appendix Table 4. Risk of bias for quality outcomes reported in cohort studies

	Selection (max score 3)			Comparability (max score 2)	Outcome (max score 1)	Total (max score 6)	Risk of bias
	Representative-ness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Comparability of cohorts	Assessment of outcome		
Observational Studies							
Neonatal Medicine							
Cifuentes (2002)	1	1	1	2	1	6	Low
Donohue (2009)	0	1	1	0	0	2	High
Izatt (1997)	0	0	0	0	0	0	High
Kuo (2012)	1	1	1	0	1	4	Moderate
Maisels (2002)	1	1	1	0	1	4	Moderate
Meadow (1996)	1	1	1	1	1	5	Low
Phibbs (1992)	0	1	1	2	1	5	Low
Wall (2004)	1	1	1	2	1	6	Low
Pediatric Medicine							
Balch (2015)	1	1	1	0	1	4	Moderate
Frank (1992)	1	0	1	2	0	4	Moderate
Leyenaar (2014)	1	1	1	0	1	4	Moderate
Leyenaar (2016)	1	1	1	0	1	4	Moderate
Meurer (1998)	1	1	1	2	1	6	Low
Myers (2014)	1	1	1	2	1	6	Low
Myers (2015)	1	1	1	2	1	6	Low
Odetola (2007)	1	1	1	2	1	6	Low
Scherb (2007)	0	0	1	0	1	2	High
Van Winkle (2008)	1	0	1	0	0	2	High
Surgery							
Beaty (2003)	1	0	0	0	0	1	High
Kelley-Quon (2012)	1	1	1	2	1	6	Low
Kelley-Quon (2013)	1	1	1	2	1	6	Low
Pokala (2007)	1	1	1	0	1	4	Moderate
Smith (1999)	1	1	1	0	1	4	Moderate
Radiology							
Reich (2000)	1	1	1	0	0	3	Moderate
Saito (2013)	0	1	0	2	0	3	Moderate
York (2005)	1	1	1	0	1	4	Moderate
Interventional Studies							
Neonatal Medicine							
Altman (2011)	1	1	1	0	1	4	Moderate
Clemens (2002)	1	1	1	0	1	4	Moderate
Hall (2010)	1	1	1	2	1	6	Low
Hulsey (1991)	1	1	1	0	1	4	Moderate
Sable (2002)	1	0	1	0	0	2	High
Wexelblatt (2015)	1	0	1	0	1	3	Moderate
Pediatric Medicine							
Dayal (2015)	1	1	1	0	1	4	Moderate
Krugman (2007)	1	1	1	0	0	3	Moderate
Kuhlmann (2013)	1	1	1	0	1	4	Moderate
Labarbera (2013)	1	1	1	0	1	4	Moderate
Nkoy (2015)	1	1	1	2	1	6	Low
Walia (2016)	0	0	1	0	0	1	High
Surgery							
Kelley-Quon (2015)	1	1	1	0	1	4	Moderate

Appendix Table 5. Risk of bias for quality outcomes reported in cross-sectional studies

	Selection (max score 4)			Comparability (max score 2)	Outcome (max score 3)		Total (max score 9)	Risk of bias
	Representativeness of the sample	Sample size	Ascertainment of the exposure	Comparability of subjects in different outcome groups	Assessment of the outcome	Statistical test		
Observational studies								
Pediatric Medicine								
Alexander (2009)	1	0	1	0	1	0	3	High
Conway (2006)	0	1	1	2	1	1	6	Moderate
Radiology								
Calvert (2012)	1	0	1	0	2	0	4	High
Marin (2015)	1	0	1	0	2	0	4	High