**Evidence Table F1. Data abstraction of observational studies**

| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| --- | --- | --- | --- | --- |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | Cross-sectional  Patients registered "during a 3- week period (15 working days) between 1 November 2001  and 31 January 2002." | Acute sinusitis: provider  recorded "suspected focus of infection," and for included patients this was  "the paranasal sinuses." No further diagnostic criteria given. | Danish general  practitioners (GPs) who used CRP rapid tests. Access to CRP testing was a practice characteristic, suggesting it was availability of test rather than provider choice that defined this group, but selection criteria were not clearly reported. Participating GPs (10% of all Danish GPs) "participated on a voluntary basis" in audit registration. | Type: Clinical - POC: CRP  Target: Practice/Provider  Description: C-reactive protein (CRP) rapid test. No intervention to promote its use. One GP per practice participated, and access to/use of CRP tests varied by provider/practice. |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | Pre/post, with control group  for second time period only Patients registered "in a 3- week period during 3 winter months (December to February)" before (2002/2003) and after (2004/2005) intervention. | patients with RTI, no further  diagnostic criteria given. | 17 general practitioners  (GPs) registering patients before (2002/2003) and after (2004/2005) receiving intervention. | Type: Clinical - POC: Multifaceted  Target: providers  Description: Courses in RTI management following local guidelines, use of two rapid diagnostic tests (rapid strep and CRP). |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | Danish GPs who  did not use CRP rapid tests (see provider population criteria). | Type of RTI: of 17,792 total patients  with URIs, 1,444 (8%) had sinusitis and were the focus of the analysis of prescribing outcomes.  Signs and symptoms, duration: NR | Patients with sinusitis:  Median age: 40 years in CRP practices,  41 years in others  % female: 69 overall  Other characteristics: NR | All were general practitioners  Other characteristics: NR |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | 35 GPs not  exposed to intervention registered patients in 2004/2005 | Type of RTI (focus of infection as  judged by provider): ears (5.7%), tonsils (5.6%), pharynx/larynx/ trachea (23%), sinuses (2.8%), Bronchi/lungs (31%), diffuse/ multiple foci (28%), unknown/ missing (3.8%)  Signs, symptoms and duration: NR | NR | Specialty/type of clinic:  general practice  Years in practice, population served: NR  Geographical region: rural  and urban areas of Catalonia, Spain |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | Time of year: November 1 through January  31  Other factors NR | Not explicitly defined, but background  discussion states that symptoms of  bacterial and viral sinusitis overlap and that raised CRP can identify bacterial sinusitis, for which antibiotics presumably appropriate. Outcome measured is overall antibiotic prescribing rate for sinusitis. | Logistic regression analysis with antibiotic  prescribing rate as a function of access to CRP testing, "adjusted for patient sex, age, number of listed patients and workload in practice" as well as solo vs. group practice. |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | Time of year: December to February of two  consecutive years  Pattern of disease activity, local tailoring, system-level characteristics: NR | Antibiotics for bacterial infections only.  "Particularly relevant for reducing antibiotic prescribing are colds, upper RTIs, and bronchitis, because the vast majority of these illnesses have a viral cause and do not benefit from antibiotic treatment." Outcomes reported: overall antibiotic prescribing, prescribing by narrow- vs. broad-spectrum classes. | "we used 95% confidence intervals (CI)  adjusted for clustering of data according to practices." Methods not further described. Antibiotic prescribing outcomes also reported stratified by site of infection. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | Adjusted odds ratio for prescription of antibiotics as a function of access to CRP testing:  OR=0.43; 95% CI, 0.33 to 0.58 | NR |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | Percent (95% CI) of all consultations with antibiotic prescribed:  After intervention: 24% (20%-29%) Before intervention: 36% (29%-44%) Control: 32% (27%-38%)  Also reported by infection site, with difference most pronounced for sinusitis and lower  RTI.  Antibiotic type: use of narrow-spectrum penicillin increased after intervention, and use of macrolides and cephalosporins decreased. | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | NR | NR |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Ashe, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |
| Bjerrum, 2004  Denmark  Patient N = 1,444  Provider N = 367  Practice N = NR | NR | NR |  |
| Bjerrum, 2006  Spain  Patient N = 5,250 consultations before and after intervention Provider N = 52  Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | Pre/post  Time frame: patients registered during 3 weeks in the winter months of 2008 and  2009, with intervention "shortly after" first registration. | All patients with RTI, no  further diagnostic criteria given. | General practitioners  (GPs) registering patients after intervention (2009). | Type: Clinical - POC: Multifaceted  Target: providers and patients  Description: prescriber feedback; training on antibiotic use; clinical guidelines on RTI management; patient posters, brochures and handouts on antibiotic use; access to and training in Strep A and CRP POC tests. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | GPs registering  patients before intervention (2008) | Type of RTI: Upper vs. lower reported  only in Figure 1  Types of signs and symptoms: NR Duration of signs and symptoms: 3 days (median)  When counting started: days before first consultation with GP | Median age: 32 in 2008, 31 in 2009  % female: 57  Other characteristics: NR | Specialty/type of clinic:  general practice  Years in practice as GP: 15 (median)  Population served: NR Geographical region: Denmark, Sweden, Lithuania, Russia, Spain, and Argentina |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | Time of year: two consecutive winter  seasons  Other factors: NR | "The majority of RTIs (90%) are caused by  virus and in these cases antibiotics are unlikely to have any clinical benefit...Even if the etiology is bacterial, antibiotics only slightly modify RTIs, particular in patients with upper RTIs." Outcomes reported: antibiotic use for upper and lower RTIs, choice of antibiotic (Penicillin-V, amoxicillin, amoxicillin-clavulanic acid, macrolides, quinolones, tetracycline, cephalosporins). | "we used 95% confidence intervals (CI)  adjusted for clustering to GPs." Methods not further described. Antibiotic prescribing outcomes also reported stratified by country. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | Change in antibiotic prescribing rate:  Lower RTIs: decrease ranged from about 2% (Denmark; estimated from figure) to 42% (95% CI, 36% to 47%; Lithuania)  Upper RTIs: decrease ranged from <1% (Denmark; estimated from figure) to 20% (95% CI, 17% to 23%; Lithuania)  Change in use of Penicillin-V\*:  Lower RTIs: ranged from a decrease of 0.9% (Argentina) to an increase of 31.2% (Lithuania)  Upper RTIs: ranged from a decrease of 2.2% (Sweden) to an increase of 44.3% (Lithuania)  \*Use of multiple broad-spectrum antibiotics also reported | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Bjerrum, 2011  Denmark, Sweden, Lithuania, Russia, Spain, and Argentina Patient N = 47,011 before and after intervention  Provider N = 440  Practice N = NR | NR | NR | Happy Audit study |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | Study design: cross-sectional;  no intervention, data pooled rather than compared across time, comparison groups defined based on testing and diagnosis with outcomes from concurrent encounter  Time frame: three flu seasons  (2007-2009). | "We only included visits at  which influenza was diagnosed by ICD-9-CM code and/or Rapid influenza diagnostic test (RIDT) was performed." (RIDT test results were not available, only whether test performed.) Adults and children included. 3 groups defined based on "certainty for the diagnosis of influenza," with two groups less likely to have flu: those where RIDT was not performed but flu was diagnosed ("intermediate certainty," RIDT-/INF+); and those where RIDT was performed and flu was not diagnosed ("lowest certainty," RIDT+/INF-). | NR | Type: Clinical - POC: Rapid Influenza  Target: provider orders rapid flu test, though no intervention to promote its use  Description: Rapid influenza diagnostic test  (RIDT). No intervention to promote its use. |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | Group most likely to  have flu was patients with RIDT performed and flu diagnosed ("highest certainty," RIDT+/INF+), and this was used as  the reference group. | Type of RTI (primary diagnosis,  weighted %): Influenza (20%), acute RTI (43%), unspecified viral infection (9%), fever (9%; listed under diagnoses), other respiratory  diagnosis (4%), other diagnosis (15%) Signs and symptoms: temperature ≥  100.4F (39%, weighted) Duration: NR | Age group: 0-5 (33%), 6-17 (20%), 18+  (47%)  % female: 54  Other characteristics: NR | Type of clinic: hospital  emergency departments Geographical region/population served: sampling from all 50 US states and DC, but Federal (VA, military) hospitals excluded.  Other provider characteristics: NR |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | Time of year/patterns of disease activity:  flu seasons defined as October through April (inclusive), with patient visits from May through September excluded. Local tailoring: NR  System-level characteristics: National Hospital Ambulatory Medical Care Survey (NHAMCS) samples visits to hospital EDs throughout the US, excluding Federal hospitals. | Reduced antibiotic prescribing for influenza  (viral etiology, versus other respiratory illnesses like bacterial pneumonia), especially when diagnosis supported by RIDT. | NHAMCS uses "4-stage probability based  sampling process" with sampling units based  on geographic region, hospital, ED, and patient visits, and assigns weight accounting for sampling. Paper reports "differences in the percentage usage of each of the 3 clinical measures" across the 3 groups defined by RIDT use and flu diagnosis; it does not report any adjustment of these percent differences for factors likely affecting outcomes, though weights based on sampling design appear to  be used in calculating CIs. |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | Rate difference (95% CI) for weighted proportion of visits in which antibiotics were  prescribed, compared with RIDT+/INF+:  RIDT-/INF+: 12% (0% to 23%) RIDT+/INF-: 36% (25% to 46%)  (RIDT + or - refers to whether test was conducted, not its result) | NR |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | NR | Rate difference (95% CI) for weighted proportion of visits in  which ancillary testing was performed (chest radiography, blood culture, urinalysis,  and complete blood count), compared with RIDT+/INF+:  RIDT-/INF+: 8% (-8% to 24%) RIDT+/INF-: 15% (0% to 30%)  Rate difference (95% CI) for weighted proportion of visits in which antivirals were prescribed, compared with RIDT+/INF+:  RIDT-/INF+: -37% (-52% to  -22%)  RIDT+/INF-: -54% (-68% to  -40%)  (RIDT + or - refers to whether test was conducted, not its result) |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Blaschke, 2014  United States  Patient N = 1,166 sampled visits, extrapolated to 4.9 million estimated ED visits  Provider N = NR Practice N = NR | NR | NR |  |
| Bush, 1979  (Please refer to Boonacker, 2010 systematic review) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | Pre/post  Retrospective baseline survey, with followup 3-4 months after intervention (dates NR). | Acute respiratory infections,  no further criteria specified but WHO guidelines discussed which differentiate "pneumonia from cough and cold and malaria." Antibiotic prescribing outcome  reported for "under five children" only. | "THCs doctors who were  involved in prescribing at the outpatient departments." | Types: Multifaceted (Educational/Behavioral,  Clinical and System-level) Target: providers  Group I (STG + audit): WHO standard treatment guidelines (STG), describing signs and  symptoms of pneumonia and how to differentiate from other diagnoses, "explained to the doctors  in the THCs once" by a visiting pediatrician/clinician; auditing performed by providers and their colleagues, using WHO form to score prescriptions vs. STG (i.e. whether antibiotic prescribed in nonpneumonia patient.) Group II: STG only  Group III: control |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | Control THCs  received no intervention. | NR | Age: antibiotic prescribing reported for  under five children only (mean age NR) Other characteristics: NR | Specialty and years in  practice: NR  Type of clinic: outpatient departments of THCs Geographic region: Dhaka division, a large, central division, one of seven in Bangladesh. |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | Time of year: NR  Patterns of disease activity: NR Locally tailored: NR  System-level characteristics: "government Thana health complexes (THCs), the primary health care centres of Bangladesh." A Thana is a subdistrict of  one of the seven administrative divisions of  Bangladesh. | Followed WHO guidelines (WHO/ARI/94,  31 January) for treatment of pneumonia vs. cough, cold, and other infections, where appropriateness defined by "whether antibiotic prescribed in non pneumonia patient." Unclear whether ARI definition includes pneumonia, and whether antibiotic prescribing outcome represents all  antibiotic prescriptions or only inappropriate prescriptions. | Baseline antibiotic use only: study restricted to  clinics with high (≥72%) baseline use, with further matching of intervention and control groups by baseline use, though methods for matching clinics and allocating to study group not described. |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | "Antibiotic prescribing for ARI in under five children:" (post- vs. pre-intervention):  STG + Audit: 67% vs. 90%, p<0.05 for 6/8 sites, p=NR overall STG only: 71% vs. 86%, p<0.05 for 3/8 sites, p=NR overall Control: 81% vs. 89%, p<0.05 for 4/8 sites, p=NR overall | NR |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | NR | NR |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Chowdhury, 2007  Bangladesh  Patient N = NR for study population  Provider N = NR Practice N = 24 | NR | NR |  |
| Francis, 2006  (Please refer to Vodicka, 2013 systematic review) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | Prospective nonrandomized  controlled trial  November 1996 - February  1997 (baseline) and  November 1997 - February  1998 (study period). | Adults 18 years of age and  older with an office visit for acute bronchitis, sinusitis, or URI during the baseline and study periods. | All clinicians caring for  patients diagnosed as having the aforementioned conditions. Clinicians included board-certified internal medicine and  family practice physicians, nurse practitioners, physician assistants, and registered nurses. | Type: Multifaceted  Target: Providers and Patients  Description: The full intervention site received household and office-based patient educational materials, as well as a clinician intervention consisting of education, practice-profiling, and academic detailing. Household educational materials included refrigerator magnets, CDC pamphlet "Your Child and Antibiotics - Sometimes Antibiotics Can Be Harmful", "Operation Clean Hands" pamphlet by Bayer Pharmaceutical Division, and letter describing study. Office-based educational materials included posters and information sheets. A limited intervention site received only office- based educational materials, and control sites provided usual care. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | Full intervention vs.  Limited intervention vs. Control | Type of RTI: Uncomplicated acute  bronchitis, sinusitis or URI  Types of Signs and Symptoms: NR Duration of Signs and Symptoms: NR When counting started for duration: NR | Age Range: 49% 18 - 44 y  % female: 54.3  Ethnicity: NR SES: NR  Educational level: NR Frailty: NR Comorbidities: NR Prior RTIs: NR  Prior use of antibiotics: NR | Specialty: Family medicine  and internal medicine Number of years in practice: NR  Type of Clinic: Primary care Geographical region: Denver- Boulder, Colorado  Population served: 350,000 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | Time of year: November 1996 - February  1997 and November 1997 - February 1998  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Practices belonged to Kaiser Permanente, a nonprofit, group-model health maintenance organization | NR | Mixed-effects model, using PROC MIXED  macro in SAS statistical application program, to control for potential clustering (random effects) of clinicians by site. Within-site analyses included month, patient age and sex, and clinician type and specialty as fixed effects. Between site analyses also included site as a fixed effect. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | Antibiotic Prescribing Rates  Uncomplicated Acute Bronchitis  Control vs. Limited Intervention vs. Full Intervention  Study Period (rate¹, p for change) Full intervention: 74 vs. 48, 0.003  Limited intervention: 82 vs. 77, 0.68  Control: 78 vs. 76, 0.81  Between-site analysis confirms rate of change in monthly antibiotic prescription rates for uncomplicated acute bronchitis was greater at intervention site than at control and limited intervention sites (p=0.02)  Uncomplicated URIs  Antibiotic prescribing for uncomplicated URIs declined at all sites, between baseline and study periods, but to a similar extent at all sites (p>0.05 for all comparisons)  Uncomplicated sinusitis  Baseline vs. Study Period (rate¹) Control: 88 vs. 88  Limited Intervention: 85 vs. 91  Full Intervention: 87 vs. 89 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | NR | Incident Office Visit Rates²\*  Control vs. Limited Intervention vs. Full Intervention  Uncomplicated Acute Bronchitis  Baseline Period: 17 vs. 28 vs. 18  Study Period: 15 vs. 18 vs. 15  Uncomplicated URIs  Baseline Period: 50 vs. 46 vs. 60  Study Period: 49 vs. 40 vs. 58  Uncomplicated Sinusitis  Baseline Period: 32 vs. 50 vs. 50  Study Period: 28 vs. 40 vs. 40  Nonantibiotic Medication Prescriptions for Patients with Acute  Bronchitis  (Absolute Change from Baseline to Study Period, %) Control vs. Limited Intervention vs. Full Intervention Bronchodilators: 11.0 vs. 9.8 vs. 15.3  Cough suppressants: 8.8 vs. 0.7 vs. 8.3  Analgesics: -0.2 vs. -1.6 vs. 0.2  Patients Returning for Care within 30 Days by Diagnosis (Absolute Change from Baseline to Study Period, %) Control vs. Limited Intervention vs. Full Intervention Acute bronchitis: -0.2 vs. 0.1 vs. -0.7  Pneumonia: 1.0 vs. 0.4 vs. -0.2 (p=0.08 compared with control) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Gonzales, 1999  United States  Patient N = 4,489 (2,462 at baseline, 2,027 in study period) Provider N = 93  Practice N = 4 | NR | NR | ¹Antibiotic prescription rate was  defined as the proportion (%) of incident office visits where the patient received an antibiotic prescription.  ²Incident office visit rate was per 1000 members per period and was defined as the first visit per patient per period for a given condition divided by the average total adult health plan membership during each period.  \*Data obtained from graphs only and are approximate values. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | Cross-sectional  January 1 to April 30, 1999. | Consecutive adult patients in  whom acute bronchitis was diagnosed at family practice or internal medicine departments. | Clinicians practicing in the  Denver, Colorado metropolitan area in practices belonging to Kaiser Permanente of Colorado. | Type: Multifaceted  Target: Patients and Providers Description: Full-intervention practice households were mailed educational packets (refrigerator magnets outlining prevention, self-  care, when-to-seek-care strategies for ARI, CDC- developed educational brochures on careful antibiotic use, proper hand-washing techniques developed by Bayer Pharmaceuticals, Inc., and  a letter from practice director announcing campaign). Office-level patient education included examination room posters and fact sheets on appropriate management of acute bronchitis. Clinician education consisted of 1- hour presentation covering management of acute bronchitis, current rates of antibiotic treatment of acute bronchitis, description of patient educational efforts, and practice tips on "how to say no" when patients request antibiotics. Limited-intervention group received only office-based educational materials. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | Full- vs. limited-  intervention practices | Type of RTI: Acute bronchitis  Types of Signs and Symptoms: NR Duration of Signs and Symptoms: < 4 days (33.7%), 4 to 7 days (34.6%), >  7 days (31.7%)  When counting started for duration: NR | Age Range: Intervention clinic 41% 18 to  44 y, control clinic 37% 45 to 64 y  % female: 59.6  Ethnicity: NR SES: NR  Educational level: NR Frailty: NR Comorbidities: NR Prior RTIs: 57.0%  Prior use of antibiotics: NR | Specialty: Mixed  Number of years in practice: NR  Type of clinic: Family practice or internal medicine departments  Geographical region: Denver, Colorado metropolitan area Population served: NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | Time of year: January 1 to April 30, 1999  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Medical office practices belonging to Kaiser Permanente of Colorado (a group-model managed care organization) | NR | Adjusted for patient-reported  duration of illness before the office visit, previous illness experience, most important reason for visits (illness severity vs. to get an antibiotic vs. other), age, sex, and clinician specialty in multivariate logistic regression analyses. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | NR | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | NR | Overall Patient Satisfaction with Visit\*  Control Clinic vs. Intervention Clinic (% of respondents) Poor: 3 vs. 3  Fair: 5 vs. 3  Good: 29 vs. 25  Very Good: 42 vs. 40  Excellent: 19 vs. 26  Participants Reporting High Satisfaction: "My overall satisfaction with my visit was 'very good' or 'excellent'" Control Clinic vs. Intervention Clinic: 63% vs. 69%  Predictors of High Patient Satisfaction\*\* with an Office Visit for  Acute Bronchitis  Treatment at intervention clinic: Adjusted¹ RR=1.1; 95% Cl,  0.81 to 1.3 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Gonzales, 2001  United States  Patient N = 266  Provider N = NR  Practice N = 2 (1 full-intervention clinic, 1 limited-intervention clinic [control]) | NR | NR | \*Proportions were obtained from bar  graphs only and are approximate values  \*\*Defined as patients reporting "very good" or "excellent" satisfaction  ¹Adjusted for patient-reported duration of illness before the office visit, previous illness experience, reason for seeking care, age, sex, and clinician specialty |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | Prospective, nonrandomized  controlled trial  Winter 2000/2001 and  2001/2002. | Consecutive patients  enrolled in a Medicare managed care program that were diagnosed with ARIs. | Primary care providers  working in ambulatory office practices in Denver metropolitan area. | Type: Multifaceted  Target: Patients and Physicians Description: Appropriate antibiotic use and antibiotic resistance educational materials were mailed to intervention practice households. Waiting and examination room posters were provided to intervention office practices. Patient educational intervention was added to an ongoing physician-centered quality improvement project -- the Colorado Medical Society Joint Data Project on Careful Antibiotic Use. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | Control practices | Type: Bronchitis, sinusitis, upper  respiratory tract infection, pneumonia, pharyngitis  Types of Signs and Symptoms: NR Duration of Signs and Symptoms: NR When counting started for duration: NR | Age Range: 56% aged 65 - 74 y  % female: 62  Ethnicity: NR SES: NR Frailty: NR  Comorbidities: 4.1% had chronic lung disease  Prior RTIs: NR  Prior use of antibiotics: NR | Specialty: Primary care  Years in practice: NR Clinic: Ambulatory office practices  Geographical region: Denver metropolitan area  Population served: Participants of a Medicare managed care program |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | Time of year: November 2001 to February  2002  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Medicare managed care program | NR | Chi-square and multivariate logistic regression  analyses were performed to examine unadjusted and adjusted associations between patient characteristics and antibiotic prescription rates. Clustering adjustment was only performed at the practice level. Controlled for secular changes measured among control practices. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | Antibiotic Prescription Rates (%) Before and After Intervention  Control Practices: Baseline Period vs. Study Period  Bronchitis: 59 vs. 56  Pharyngitis: 51 vs. 39  Pneumonia: 35 vs. 37  Sinusitis: 69 vs. 67  Upper respiratory tract infection: 26 vs. 27  Intervention Practices: Baseline Period vs. Study Period  Bronchitis: 52 vs. 44  Pharyngitis: NR\* vs. NR\* Pneumonia: NR\* vs. 30  Sinusitis: 76 vs. 67  Upper respiratory tract infection: 26 vs. 27 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Gonzales, 2004  United States  Patient N = 4,270 patient visits (341 patient visits in intervention practices)  Provider N = NR  Practice N = 55 (4 intervention, 51 control) | NR | NR | \*NR due to fewer than 20 visits |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | Nonrandomized controlled trial  November 1, 2000 to February  28, 2001. | Children with pharyngitis  and adults with acute bronchitis. | Primary care physicians  including those providing care to children. | Type: Multifaceted  Target: Patients and Providers  Description: Campaign packets were mailed to households identified by participating practices. Household packets included bilingual introductory letter for Colorado Department of Public Health and Environment explaining Be S.M.A.R.T. campaign, CDC brochures on antibiotic resistance, refrigerator magnet, and reference card providing easy-to-read facts  about symptoms and treatments for ARIs. Office- based materials, produced in English and Spanish, consisted of waiting room materials (CDC posters and patient reference cards) and examination room posters (containing "talking points" for providers to use in discussing appropriate antibiotic use for pharyngitis in children and bronchitis in adults). Intervention practices (prespecified geographical area in Denver metropolitan area) were compared with local and distant control practices. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | Local and distant  control practices (outside prespecified geographical area in Denver metropolitan area) | Type of RTI: Pharyngitis (in children)  and acute bronchitis (in adults) Signs and Symptoms: NR Duration: NR | Age Range: 51-55% (baseline) and 50-  51% (study period) aged 6-12 y in pediatric population, 57-60% (baseline) and 51-56% (study period) aged 18-44 y in adult population  % female: 51-54% (baseline) and 53-  55% (study period) in pediatric population, 54-62% (baseline) and 60-  62% (study period) in adult population  Ethnicity: NR SES: NR Frailty: NR  Comorbidities: 0 - 1% chronic lung disease in adult population  Prior RTIs: NR  Prior use of antibiotics: NR | Specialty: Family practice,  pediatrics, other  Years in practice: NR  Clinic: Private office practices Geographical region: Colorado  Population served: NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | Time of year: Winter 2000-2002  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Managed care organizations | NR | Adjusted for time period, practice site, patient  age, and physician specialty. Also included variable indicating whether the physician had received an individual antibiotic prescribing profile as part of Colorado's ongoing quality improvement program. Controlled for secular changes measured among control practices. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | Adjusted\* Antibiotic Prescription Rates for Children with Acute Pharyngitis Compared  between Sites\*\*  (Baseline vs. Intervention Period Antibiotic Prescription Rates) Distant Control: 40 vs. 41  Local Control: 41 vs. 39  Intervention: 38 vs. 30  p (intervention vs. distant control)=0.18 p (intervention vs. local control)=0.48  p (local control vs. distant control)=0.18  Adjusted\* Antibiotic Prescription Rates for Adults with Acute Bronchitis Compared between Sites\*\*  (Baseline vs. Intervention Period Antibiotic Prescription Rates) Distant Control: 51 vs. 45  Local Control: 55 vs. 49  Intervention: 60 vs. 35  p (intervention vs. distant control)=0.002 p (intervention vs. local control)=0.006  p (local control vs. distant control)=0.22 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Gonzales, 2005  United States  Patient Nⱡ = 16,686 patient visits at baseline, 14,648 patient visits during study period  Provider Nⱡ = 1,629 at baseline,  1,193 during study period  Practice Nⱡ = 709 at baseline, 592 during study period | NR | NR | ⱡPediatric and adult population N's combined (separated by baseline and study period)  \*Adjusted for patient age, gender, physician specialty, and clustering by office practice, physician, and managed care organization  \*\*Antibiotic prescription rates are from bar graphs only and are approximately values |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | Nonrandomized controlled trial  November 2002 to February  2003. | General public and  managed care enrollees residing in the mass media (2.2 million people) and comparison (0.53 million people) communities. | Physicians residing in the  mass media (2.2 million people) and comparison (0.53 million people) communities. | Type: Educational  Target: Mothers of patients (young children) and providers (primary care physicians)  Description: Mass media campaign included purchased advertising (billboards, bus tails, bus stop posters, interior bus signs, and national Public Radio spots) and earned media. Spanish language public service announcement aired on local Spanish network. Physician advocacy activities enhanced advertising campaign by getting logos, messages, and materials into providers' offices. Office materials mailed to requesting physicians included waiting and examination room posters on appropriate antibiotic use for pharyngitis and bronchitis, patient brochures relating to appropriate antibiotic use and antibiotic resistance, and stethoscope clips with Get Smart logo. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | Colorado Springs  (comparison)  community | NR | NR | Specialty: Mix (primary care  physicians were targeted) Years in practice: NR  Clinic: Ambulatory physician offices  Geographical region: Colorado  Population served: 2.2 million people in mass media communities and 0.53 million people in comparison communities |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | Time of year: Winter 2002 to 2003  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Managed care organization | NR | Multivariable logistic regression analysis was  used to analyze results from the telephone surveys adjusting for Spanish language, age, race, comorbidities, education, income, internet access at home, and children ≤ 5 at home. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | Antibiotic Prescriptions Dispensed by Retail Pharmacies  Mass media vs. comparison community in 2002: 1.08 million vs. 0.28 million  P for decline in antibiotic prescribing in general population vs. MCO population after mass media campaign: p=0.30 vs. p=0.03  Net Differences and Statistical Significance of Differences in Antibiotic Prescribing Rates  Before vs. After Mass Media Campaign  General population: no difference¹, 0.30  MCO population: net decline², 0.02  Pediatric MCO members: net decline³, 0.01  Adult MCO members: no difference ⁴, 0.09 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | Office and ED Visits for Potential Complications of Acute RTIs Among  Pediatric MCO Members  (Rate per 1000)  Comparison Community: Baseline Period (November 2001 to October  2002) vs. Intervention Period (November 2002 to October 2003) Pneumonia: 16.2 vs. 17.2  Orbital abscess: 0.1 vs. 0.5  Meningitis: 0.2 vs. 0  Peritonsillar abscess: 0.1 vs. 0.1  Brain abscess: 0 vs. 0  Sepsis: 0 vs. 0  Retropharyngeal abscess: 0 vs. 0  Epiglottitis: 0 vs. 0  Mass Media Community: Baseline Period (November 2001 to October  2002) vs. Intervention Period (November 2002 to October 2003) Pneumonia: 17.3 vs. 16.2  Orbital abscess: 0.5 vs. 0.6  Meningitis: 0.1 vs. 0.3  Peritonsillar abscess: 0.3 vs. 0.2  Brain abscess: 0 vs. 0.2  Sepsis: < 0.1 vs. < 0.1  Retropharyngeal abscess: < 0.1 vs. < 0.1  Epiglottitis: < 0.1 vs. 0  ∆ Mass Media - ∆ Comparison (95% CI) Per 1000  Pneumonia: -2.1 (-6.1 to 1.9) Orbital abscess: -0.3 (-0.8 to 0.3) Meningitis: 0.4 (-0.2 to 0.6) Peritonsillar abscess: -0.1 (-0.5 to 0.2) Brain abscess: 0.2 (-0.2 to 0.4)  Sepsis: 0 (-0.4 to 0.3)  Retropharyngeal abscess: 0 (-0.3 to 0.3) Epiglottitis: < -0.1 (-0.3 to 0.3) | Net Differences and Statistical Significance of Differences in  Monthly Pediatric Office Visit Rates between Mass Media and  Comparison Communities  Pediatric MCO Members: net decline⁵, 0.01  Emergency Department Utilization  Comparison Community: Baseline Period (November 2001 to October 2002) vs. Intervention Period (November 2002 to October 2003)  ARI visits: 23.9 vs. 32.1 non ARI visits: 309 vs. 355  Mass Media Community: Baseline Period (November 2001 to October 2002) vs. Intervention Period (November 2002 to October 2003)  ARI visits: 37.7 vs. 32.8 non ARI visits: 477 vs. 472  ∆ Mass Media - ∆ Comparison (95% CI) Per 1000  ARI visits: -13.1 (-18.4 to -7.9) -16% net decrease non ARI visits: -51.0 (-65.4 to 35.7) -15.9% net decrease |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Gonzales, 2008  United States  Patient N = 2,158,288 (in 2002) and  2,176,687 (in 2003) estimated population of campaign community;  528,383 (in 2002) and 535,117 (in  2003) estimated population of comparison community Provider N = 1,167  Practice N = NR | NR | NR | ¹No difference, mass media  community received fewer antibiotic prescriptions before and after the campaign compared with comparison community  ²Net decline, mass media community received fewer antibiotic prescriptions after the campaign compared with comparison community  ³Net decline, mass media community received fewer antibiotic prescriptions after the campaign compared with comparison community  ⁴No difference, mass media  community received more antibiotic prescriptions before and after the campaign compared with comparison community  ⁵Net decline, mass media community  received fewer office visits after the campaign compared with comparison community |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | Prospective nonrandomized  controlled trial  October 2000 to April 2001. | All English- or Spanish-  speaking adults 18 y of age and older who presented to the Walk-in Clinic with symptoms of an ARI (cough, sore throat, nasal congestion, ear ache). | All physicians and nurse  practitioners who cared for patients diagnosed with ARIs in the baseline and study periods were included in the analysis. | Type: Educational  Target: Patients and Providers  Description: Intervention was composed of three components: (1) provider educational session based on recommendations for appropriate antibiotic use published by the Center for  Disease Control and Prevention, (2) examination room posters were directed a providers, (3) computer-based, audio-visual, bilingual (English and Spanish) ICE module that communicated a likely illness diagnosis, self-care strategies, and the role of antibiotics (or lack thereof) in the management of their illness. Study period patients who completed the ICE module were classified as being exposed to the full intervention. Study period patients who did not complete the ICE module were classified as being exposed to the limited intervention. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | Baseline vs.  Limited Intervention vs. Full Intervention | Type of RTI: URI/viral illness (50.1%),  pharyngitis (23.4%), sinusitis < 7 days of illness (4.4%), sinusitis ≥ 7 days of illness (8.4%), bronchitis/cough (13.6%)  Types of Signs and Symptoms: Cough, sore throat, nasal congestion, ear ache  Duration of Signs and Symptoms: < 7 days (58.8%)  When counting started for duration: NR | Age: 18-30 y (43.1%)  % female: 59.7  Ethnicity: White (37.4%), Hispanic (44.5%), African American (12.5%), Other (5.6%)  SES: NR  Educational level: NR Frailty: NR Comorbidities: NR Prior RTIs: NR  Prior use of antibiotics: NR | Specialty: Internist (59.5%),  nurse practitioner (40.5%) Number of years in practice: NR  Type of clinic: Walk-in Clinic (WIC) at Denver Health Medical Center (DHMC) Geographical region: Denver, Colorado  Population served: 50% Hispanic, 25% Caucasian,  15% African American, 1% Native American. 71 % of patient charges at DHMC are for Medicaid, medically indigent, or self-paying patients who lack health insurance. Approximately  21% of all visits to the WIC are by patients who are monolingual Spanish. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | Time of year: October 2000 to April 2001  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Walk-in Clinic at Denver Health Medical Center | Based on Centers for Disease  Control and Prevention recommendations/guidelines | Multivariable analyses were adjusted for  race/ethnicity, tobacco use, provider type, and specific ARI diagnosis |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | Proportion of patients receiving antibiotics (%, p for intervention groups vs. baseline, p  for intervention vs. intervention)  Baseline vs. Limited Intervention vs. Full Intervention Bronchitis: 58 vs. 30 vs. 24, p< 0.001, NS Nonspecific URI: 14 vs. 3 vs. 1, p< 0.001, NS Pharyngitis\*: 76 vs. 71 vs. 78, p=NS, NS  Sinusitis < 7 days\*: 85 vs. 62 vs. 82, 0.06 (limited intervention vs. baseline), p=NS Sinusitis ≥ 7 days\*: 89 vs. 89 s. 97, p=NS, NS  All ARI\*: 45 vs. 31 vs. 35, p< 0.001, < 0.001 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Harris, 2003  United States  Patient N = 1,518 (554 at baseline and 964 in study period)  Provider N = 42 (17 nurse practitioners and 25 physicians) Practice N = NR | NR | NR | \*Proportions were obtained from bar  graph only and  are approximate values |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | Prospective observational  study  November 2004 - February  2006. | Pediatric population (< 18 y)  of an HMO (Maccabi  Healthcare Services). | NR | Type: Educational  Target: Parents of patients (children) Description: The HMO conducted a comprehensive mass media campaign to increase public awareness of the misuse of antibiotics among the general public, focusing mainly on the inappropriate use of antibiotics in the treatment of influenza and upper respiratory infection (URI). The campaign consisted of radio and television advertisements in conjunction with a concurrent 4-part television series. The advertisements projected the general message that antibiotics are not an appropriate treatment for colds and other viral URIs. The television series presented the serious implications of misusing antibiotics. |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | Precampaign  (baseline) vs. Postcampaign (study period) | Type of RTI: URI (57.1% baseline  winter, 53.2% study winter), otitis media (6.7% baseline winter, 7.6% study winter), pharyngitis (36.1% baseline winter, 39.2% study winter) Signs and Symptoms: NR  Duration: NR | NR | Specialty: NR  Years in practice: NR Clinic: NR  Geographical region: Israel Population served: 1.7 million (approximately 25% of the Israeli population) |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | Time of year: Winter  Patterns of disease activity: Peak antibiotic use during January and February of every year  Locally tailored: Yes  System-level characteristics: Maccabi Healthcare Services (Israel's second largest HMO) | Antibiotics are not appropriate  treatment for colds and other viral URIs | Used a binary logistic regression models  adjusted for demographic factors (age, sex, religion, and immigration status) to compare rates of antibiotic purchase in the preintervention and postintervention periods of the study winter with the parallel periods in the preceding winter. |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | Antibiotic Purchasing Rates, OR; 95% CI  URI  Precampaign vs. Baseline Winter: OR=0.962; 95% Cl, 0.891 to 1.039  Postcampaign vs. Baseline Winter: OR=0.749; 95% Cl, 0.694 to 0.808  Otitis Media  Precampaign vs. Baseline Winter: OR=0.970; 95% Cl, 0.874 to 1.076  Postcampaign vs. Baseline Winter: OR=0.652; 95% Cl, 0.591 to 0.718  Pharyngitis  Precampaign vs. Baseline Winter: OR=0.968; 95% Cl, 0.929 to 1.009  Postcampaign vs. Baseline Winter: OR=0.931; 95% Cl, 0.890 to 0.973 | NR |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | NR | NR |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Hemo, 2009  Israel  Patient N = 186,380 (101,401 in baseline winter, 84,979 in study winter)  Provider N = NR Practice N = NR | Parental Awareness of Appropriate Antibiotic Use (reported  as mean score\* (SD), F, p)  Exposed vs. Unexposed to Media Campaign: 6.65 (1.6) vs.  6.29 (1.6), 4.18, 0.04 | NR | \*Mean of composite score reflecting  agreement with  standards of appropriate antibiotic use (scale of 1-9 with 9 being high level of agreement) |
| Herman, 2009  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | Pre/post  Intervention in mid-2003; indicators measured November/December 2002 and December 2003/January  2004 (winters). | Children under five with ARI  in previous 2 weeks. Questions to caregivers on symptoms validated in baseline study against  health workers' diagnoses of mild ARI ("common cold, runny nose, cough and cold" with no or mild fever) and severe ARI ("pneumonia, bronchopneumonia, severe chest infection, severe bronchitis and bronchiolitis"). | No criteria specified.  Districts remote with limited access to health workers. Study recruited local female community health volunteers (FCHVs) as educators,  and interventions targeted private drug retailers among others. | Type: Educational  Targets: Patients/children, mothers/families, drug retailers, other community members Description: "Training the trainers:" ten study team staff trained 419 others (district health staff, teachers, community members, students);  child to child education administered by teachers in schools; street theater performances by children to mothers/community followed by  group discussions with mothers led by local  FCHVs; posters communicating ARI messages. |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | Control districts did  not receive intervention | Type of RTI: Baseline 196 severe  ARI, 1317 mild ARI (all 4 districts) Signs and symptoms: NR in study population  Duration: NR | NR | Provider characteristics: drug  retailers (selling drugs mostly without prescriptions) and traditional healers are the main providers in study area. Health posts staffed by paramedical personnel with ≤  1 year's training; "a doctor should be present at a district hospital," but if not, paramedical personnel prescribe.  Geographical region: four remote, mostly roadless hill districts of Eastern Nepal Population served: rural, agricultural, "most households have no electricity or ventilation and use kerosene lamps and pine wood for lighting." |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | Time of year, patterns of disease activity:  winter  Locally tailored: local community leaders, drug retailers and others developed action plans; local FCHVs recruited as educators; local teachers helped conduct surveys; local terms used for ARI and treatment in surveys; locally available safe home remedies recommended for mild ARI. System-level characteristics: districts are remote with government health facilities several hours' walk away; each district has a hospital and 9-10 health posts, but less than a third of the population visits health facilities. | Antibiotics for severe ARI/pneumonia, not  for mild ARI (see Patient Population  Criteria) | Yes: analyses using stratification or logistic  regression models included ARI severity, time  (pre/post), and intervention status |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | Intervention impact, percent of each treatment indicator,  intervention - control: (Post-Pre)I - (Post-Pre)C  Antibiotic Rx (any class): Severe ARI: +21.4% Mild ARI +1.1% | NR |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | NR | Intervention impact:  (Post-Pre)I - (Post-Pre)C  Consultation at a health post: Severe ARI: +12.6%  Mild ARI: -9.5% |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Holloway, 2009  Nepal  Patient N = 2,883 (pre+post) Provider N = NR  Practice N = NR | NR | NR | Excluded several outcomes specific to  setting: antibiotics from drug retailers without a prescription, consultation with FCHVs, treatment with locally- available home remedies |
| Isaacman, 1992  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | Prospective cohort | Sore throat as main  symptom or pharynx abnormal on exam; duration  ≤ 14 days; age ≥ 16. | General practitioners who  prescribed immediate antibiotics to ≤ 50% for tonsillitis. | Type: Clinical  Target: Patient  Description: Prescribing strategies (immediate, delayed, no prescription) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | Immediate,  delayed, or no prescription | Mean severity of sore throat and  difficulty in swallowing on a 4-point  Likert scale=3  Previous duration in days=4.7 (when counting started NR)  60% fever in past 24 hours  Mean temperature (°C): 36.8  35.2% pus on tonsils  12.6% severely inflamed tonsils | Mean Age: 33.6  % female: 68% Ethnicity: NR SES: NR  Educational level: NR Frailty: NR Comorbidities: NR Prior RTIs: NR  Prior use of antibiotics: NR | Specialty and years in  practice: NR  Type of clinic: General practice  Geographic region: Dhaka division, a large, central division, one of seven in Bangladesh |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | Time of year: 11/10/06-6/1/09  Patterns of disease activity: NR Locally tailored: NA  System-level characteristics: General practitioners in England and Wales | NR | Compared 3 models: (1) Multivariate analysis  controlling for clustering and all covariates: number of medical problems, previous duration of illness (<3 days), very inflamed tonsils, the absence of cough or coryza, age, cervical glands, severity of sore throat, pus, fever in the past 24 h, muscle aches, headache, sex, smoker, feeling generally unwell, diarrhea, and disturbed sleep;  (2) multivariate analysis controlling for clustering and only significant variables: inflamed tonsils, fever in the past 24 h, generally unwell, and disturbed sleep;  (3) Multivariate analysis by stratified propensity score. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | NR | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | Developed complications: No antibiotic=45% vs immediate=46% vs  delayed=14%  Risk ratios (95% CI) for models 1-3:  Immediate vs no: (1) RR=0.64; 95% Cl, 0.43 to 0.97; (2) RR=0.62; 95% Cl, 0.43 to 0.91; (3) RR=0.66; 95% Cl, 0.43 to 1.03  Delayed vs no: (1) RR=0.58; 95% Cl, 0.33 to 1.00; (2) RR=0.58; 95% Cl, 0.34 to 0.98; (3) RR=0.61; 95% Cl, 0.34 to 1.10 | Reconsultation with new or nonresolving symptoms in month  after the index consultation for models 1-3  Immediate vs no: (1) RR=0.76; 95% Cl, 0.66 to 0.87; (2) RR=0.83; 95% Cl, 0.73 to 0.94; (3) RR=0.76; 95% Cl, 0.67 to  0.86  Delayed vs no: (1) RR=0.58; 95% Cl, 0.47 to 0.70; (2) RR=0.61; 95%, 0.50 to 0.74; (3) RR=0.57; 95%, 0.47 to 0.68 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Little, 2014  United Kingdom  Patient N = 12,829  Provider N = 616  Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | Time series  Phase 1: 1/1/2010 to 3/31/11, Phase 2: 7/1/2011 to  3/31/2012. | Patients presenting with ARI  symptoms and given one of the following respiratory diagnoses: allergic rhinitis, asthma, bronchitis or bronchiolitis, COPD exacerbation, influenza, laryngitis or tracheitis, otitis media, pharyngitis or tonsillitis, pneumonia, sinusitis, and URI.  ARI encounter defined as encounter at which CDSS used and at least one respiratory diagnosis made. | Physicians, nurse  practitioners, and physicians' assistants working in primary care practices in the Practice Partner Research Network (PPRNet). | Type: Multifaceted (Educational, Clinical, System-  level)  Target: Providers were primary target, with some patient education materials also made available Description: CDSS was an EHR-integrated progress note template available at point of care. Reflected CDC "Get Smart" guidelines with recommendations based on patient symptoms/duration, age, and exam findings.  ARI diagnostic criteria (e.g. Centor criteria for streptococcal pharyngitis) and treatment recommendations provided including antibiotics when appropriate. Links to patient education materials. Multi-method intervention to encourage CDSS adoption included introductory meetings, site visits for education and CDSS training, EHR-based audit and feedback, and study-practice liaison personnel. Delayed prescribing strategy presented. Second phase included final site visit or webinar with practice performance review and evidence reviews. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | None (longitudinal) | Type of RTI: all those listed in Patient  Population Criteria.  Most common for adults: URI (27% of all respiratory diagnoses), acute sinusitis (25%), acute bronchitis or bronchiolitis (15%)  Most common for children: URI  (40%), suppurative otitis media (19%), streptococcal pharyngitis (11%) Signs/symptoms and duration: NR for study population | Characteristics: NR  Adults (≥18y): 64% of encounters  Children: 36% | Specialty:  Internal medicine and pediatrics: 1/9 (11%) of practices, 3/39 (7.7%) of providers, 14% of ARI encounters  Remainder family practice  Years in practice: NR  Type of clinic: primary care Geographical region: one practice each in states of NC, KY, WA, AK, AZ, MS, UT, GA, IL  Population: NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | Time of year: January to March and July  through March  Patterns of disease activity: CDSS use peaked in winter (highest in February of each year)  Locally tailored: NR  System-level characteristics: primary care practice research network | Following CDC guidelines, inappropriate  use includes (1) use for "diagnoses for which antibiotics are rarely appropriate (URI, acute bronchitis or bronchiolitis, acute nonstrep pharyngitis, laryngitis or tracheitis, influenza, nonsuppurative otitis media, asthma or allergic rhinitis)," and (2) use of any or broad-spectrum antibiotics for acute adult sinusitis or bronchitis | Yes: General linear mixed models for  longitudinal analyses included time and "random practice effects". Practice-level observations weighted by "practices' numbers of ARI encounters during the quarter." |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | Percent change; 95% CI over entire study period:  Inappropriate antibiotic use: Adults: +1.6%; 95% Cl, -5.4 to 8.5  Children: -1.9%; 95% Cl, -9.0 to 5.3  Delayed prescription:  Adults: -1.1%; 95% Cl,-3.9 to 1.6  Children: -2.9%; 95% Cl, -4.6 to -1.1  Acute sinusitis in adults: Any antibiotic: +0.52%  (-4.3 to 5.3)  Broad spectrum: -20% (-31 to -8.6)  Acute bronchitis in adults:  Any antibiotic: +9.2% (-2.2 to 21) Broad spectrum: -12%  (-26 to 2.7) | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Litvin, 2013  United States  Patient N = 38,592 encounters over  27 months  Provider N = 39  Practice N = 9 | NR | NR | "For all of these measures, use of  antibiotics was calculated as the percentage of encounters at which  any antibiotic was prescribed out of all encounters. Use of broad spectrum antibiotic was calculated as the percentage of encounters at which a broad spectrum antibiotic was prescribed out of all encounters at which any antibiotic was prescribed. Use of delayed prescriptions was calculated as the percentage of encounters at which a delayed prescription was prescribed out of all encounters at which any antibiotic was prescribed." |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | Pre/post (FIG and PIG groups)  with post-intervention control group  Time frame: first registry January/February 2008, second January/February  2009, each 3 weeks/15 working days. | Patients with pharyngitis, no  further diagnostic criteria given. | General practitioners  (GPs) from 8 autonomous communities participated in full intervention.  Another group of GP's from Catalonia, another autonomous community, assigned to partial intervention. Selection criteria NR. | Type: Multifaceted  Target: Providers and patients Description: Full intervention group (FIG): prescriber feedback; training on antibiotic use; clinical guidelines on RTI management; patient handouts on antibiotic use; access to and training in Strep A and CRP POC tests. Partial intervention group (PIG): FIG interventions other than workshop on diagnosis and use of RADTs; no access to RADT tests. |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | Pre/post (FIG and PIG groups)  with post-intervention control group  Time frame: first registry January/February 2008, second January/February  2009. | Rhinosinusitis, no further  diagnostic criteria given. | Not reported in this  publication, but same groups and numbers of providers recruited as in earlier Happy Audit publications (see above). Those who registered patients with sinusitis included here. | Type: Multifaceted  Target: Providers and patients Description: Full intervention group (FIG): prescriber feedback; training on antibiotic use; clinical guidelines on RTI management; patient handouts on antibiotic use; access to and training in CRP POC test. Partial intervention group (PIG): FIG interventions other than workshop on diagnosis and use of RADTs; no access to CRP. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | "Another group of  professionals (control group) from another two Autonomous Communities only did the registry in  2009 with no previous intervention." | NR (all with pharyngitis) | NR | Specialty: general practice  Years in practice, population: NR  Type of clinic: primary care  Geographical region: Spain |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | Not reported in this  publication, but same groups and numbers of providers recruited as in earlier Happy Audit publications (see above). Those who registered patients with sinusitis included here. | Type of RTI: all with rhinosinusitis  Signs and symptoms: Fever (33%), cough (76%), odynophagia (20%), purulent rhinorrhea (18%)  Duration of signs and symptoms: 7.4 days average  When counting started: before first consultation | Age: 40 years  % female: 65  Other characteristics NR | Specialty: general practice  Years in practice, population: NR  Type of clinic: primary care  Geographical region: Spain |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | Time of year: two consecutive winter  seasons  Other factors NR | Antibiotics for bacterial but not viral  pharyngitis. Outcome reported: antibiotic prescription for an episode of pharyngitis. | Yes: multilevel logistic regression model  adjusted for use of RADTs, age, gender, presenting signs, diagnosis, and patient demand for antibiotics. |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | Time of year: two consecutive winter  seasons  Other factors NR | No antibiotics for viral rhinosinusitis, and  less use for bacterial ("despite the fact that bacteria are present in 60% of acute rhinosinusitis, most cases resolve spontaneously")  Outcome: antibiotic prescription for rhinosinusitis | Yes: multilevel logistic regression model  adjusted for use/results of CRP, age, gender, presenting symptoms/ signs, diagnosis, radiography, and patient demand for antibiotics. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | Adjusted odds ratio; 95% CI for prescription of antibiotics in intervention versus control  groups:  PIG before intervention: OR=0.62; 95% Cl, 0.28 to 1.4  PIG after: OR=0.53; 95% Cl, 0.23 to 1.2  FIG before: OR=0.54; 95% Cl, 0.27 to 1.1  FIG after: OR=0.23; 95% Cl, 0.11 to 0.47 | NR |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | Adjusted odds ratio; 95% CI for prescription of antibiotics in intervention versus control  groups:  PIG before intervention: OR=0.91; 95% Cl, 0.61 to 1.4  PIG after: OR=0.65; 95% Cl, 0.21 to 1.1  FIG before: OR=1.0; 95% Cl, 0.66 to 1.6  FIG after: OR=0.12; 95% Cl, 0.01 to 0.32 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | NR | NR |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Llor, 2011  Spain  Patient N = 6,849  Provider N = 339  Practice N = NR | NR | NR | Happy Audit study |
| Llor, 2012  Spain  Patient N = 836  Provider N = 267  Practice N = NR | NR | NR | Happy Audit study |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | Pre/post (FIG and PIG groups)  with post-intervention control group  Time frame: first registry winter of 2008, second winter of 2009, each 3 weeks/15 working days. | LRTI patients, no further  diagnostic criteria given. | General practitioners  (GPs) from 8 autonomous communities participated in full intervention.  Another group of GP's from Catalonia, another autonomous community, assigned to partial intervention. Selection criteria NR. | Type: Multifaceted  Target: Providers and patients Description: Full intervention group (FIG): prescriber feedback; training on antibiotic use; clinical guidelines on RTI management; patient handouts on antibiotic use; access to and training in CRP POC test. Partial intervention group (PIG): FIG interventions other than workshop on diagnosis and use of CRP; no access to CRP. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | As above: providers  from two other autonomous communities registering patients in 2009 with no previous intervention. | Type of RTI: acute bronchitis (67%),  acute exacerbations of CB/COPD (24%), pneumonia (8.5%) | NR | Specialty: general practice  Years in practice, population: NR  Type of clinic: primary care  Geographical region: Spain |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | Time of year: two consecutive winter  seasons  Other factors NR | Antibiotics for bacterial but not viral lower  respiratory tract infections (LRTI). Outcome: antibiotic prescription for LRTI. | Yes: multilevel logistic regression model  adjusted for use/results of CRP, age, gender, comorbidity, presenting signs, duration of symptoms, diagnosis, radiography, and patient demand for antibiotics. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | Adjusted odds ratio; 95% CI for prescription of antibiotics in intervention versus control  groups:  PIG before intervention: OR=0.57; 95% Cl, 0.30 to 1.1  PIG after: OR=0.42; 95% Cl, 0.22 to 0.82  FIG before: OR=0.81; 95% Cl, 0.46 to 1.4  FIG after: OR=0.22; 95% Cl, 0.12 to 0.38 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Llor, 2012  Spain  Patient N = 5,385  Provider N = 338  Practice N = NR | NR | NR | Happy Audit study |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | Pre/post  Time frame: patients registered during 3 weeks in  the winter months of 2008 (pre- intervention) and in early 2009 (post-intervention) | All patients with RTI, no  further diagnostic criteria given. | Family physicians/GPs  from 8 autonomous communities participated in full intervention. Another group of GP's from Catalonia, another autonomous community, assigned to partial intervention. Selection criteria NR. | Type: Multifaceted  Target: Providers and patients Description: Full intervention group (FIG): prescriber feedback; training on clinical guidelines for RTI management; patient brochures; access to and training in Strep A and CRP POC tests. Partial intervention group (PIG): FIG interventions other than workshop on diagnosis and use of RADTs; no access to  RADT tests. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | For both full and  partial intervention groups, antibiotic prescribing after intervention was compared to prescribing before. | Type of RTI: common cold 40%, otitis  media 2.3%, sinusitis  2.8%,pharyngitis 15%, tonsillitis 6.9%, acute bronchitis 12%, CB/COPD exacerbation 4.2%, pneumonia 1.5%, influenza 8.9%, other RTI 4.9%, not specified 1.6%  Types of signs and symptoms: fever  32%, cough 75%, purulent ear discharge 1.9%, odynophagia 43%, tonsillar exudate 5.3%, tender cervical glands 5.9%, dyspnea 9.3%, increased expectoration 20%,  purulent sputum 8.9% Duration: NR | NR | Specialty: family/general  practice  Years in practice, population: NR  Type of clinic: primary care  Geographical region: Spain |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | Time of year: winter 2008, "early 2009"  Other factors NR | Appropriate use not defined. Outcome:  antibiotic use, reported by respiratory diagnosis. | Yes: logistic regression model adjusted for age,  gender, signs and symptoms, referral, antibiotic demand, and "burden of GPs." |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | Adjusted odds ratio (95% CI) for prescription of antibiotics after vs. before intervention:  Partial intervention group: Overall: 0.99 (0.89-1.1) Common cold: **4.6 (2.4-8.9)** Otitis: 1.3 (0.39-4.3) Sinusitis: 0.43 (0.14-1.3) Pharyngitis: 1.0 (0.68-1.6) Tonsillitis: 1.0 (0.58-1.9)  Acute bronchitis: **0.61 (0.42-0.88)** CB/COPD exacerbation: 1.2 (0.61-2.2) Pneumonia: 1.2 (0.25-5.7)  Influenza: 2.0 (0.60-6.5)  Other RTI: 0.76 (0.37-1.6)  Full intervention group: Overall: **0.50 (0.44-0.57)** Common cold: **0.03 (0.01-0.06)** Otitis: 0.48 (0.12-2.0)  Sinusitis: 0.57 (0.18-1.8)  Pharyngitis: **0.15 (0.09-0.25)**  Tonsillitis: **0.18 (0.09-0.37)**  Acute bronchitis: **0.31 (0.20-0.47)** CB/COPD exacerbation: **0.42 (0.19-0.90)** Pneumonia: 0.31 (0.04-2.6)  Influenza: **0.01 (0.00-0.07)**  Other RTI: **0.39 (0.17-0.93)** | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Llor, 2014  Spain  Patient N=27,833 RTIs Provider N=309; 281 analyzed Practice N=NR | NR | NR | Happy Audit study |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | Time series  3 months before to 15 months after intervention (October  2009 through March 2011). | Acute respiratory infections,  including diagnoses for which antibiotics are inappropriate and those for which antibiotics are indicated (see appropriateness definition). | Physicians, nurse  practitioners, and physicians' assistants working in primary care practices in the Practice Partner Research Network (PPRNet). | Type: Multifaceted (Educational, Clinical, System-  level)  Target: Providers  Description: CDSS was an EHR-integrated progress note template available at point of care. (Provider could choose to use CDSS or bypass it). Reflected CDC "Get Smart" guidelines with recommendations based on patient symptoms/duration, age, and exam findings.  ARI diagnostic criteria, scoring strategies (e.g. Centor criteria for streptococcal pharyngitis) and treatment recommendations provided including antibiotics when appropriate. Multi-method intervention to encourage CDSS adoption included EHR-based audit and feedback, site visits for academic detailing (education), performance review, and training, and liaison personnel communicating between study and practices. |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | Control practices  were unaware of the intervention; they received no information on the intervention or the CDSS and no educational materials. | NR | NR | Practice characteristics:  Specialty: 89% family medicine  Years in practice: NR  Type of clinic: primary care Geographical region: 30% South, 30% Northeast, 24% Midwest, 16% West (overall; varies for intervention vs. control)  Population served: NR |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | Time of year: 4th quarter 2009 through 1st  quarter 2011  Patterns of disease activity: seasonal; months 9 through 11 September- November 2010) were "immediately before the second ARI season."  Locally tailored: NR  System-level characteristics: primary care practice research network | Following CDC guidelines, diagnoses for  which antibiotics are  inappropriate comprise nonspecific upper respiratory  infections, acute bronchitis, acute nonstreptococcal pharyngitis,  and otitis media with effusion. Diagnoses for which  antibiotics are indicated comprise acute sinusitis, streptococcal  pharyngitis, pneumonia, acute otitis media, and chronic  obstructive pulmonary exacerbations (in adults only). | Control practices matched to intervention  practices by number of providers and baseline  ARIs.  Practice-level outcome observations weighted for number of ARI episodes in the quarter observed.  Linear mixed models for longitudinal analyses adjusted for time, practice specialty, number of providers, region, and baseline ARIs, with an interaction term for time and intervention/control status. |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | Intervention vs. control practices (See Comments for definitions):  Change in inappropriate prescribing: Adults: -0.6% vs. +4.2% (p=0.03) Children: +1.4% vs. +4.2% (p=0.34) Use of broad-spectrum antibiotics: Adults: -17% vs. +1.2% (p<0.0001) Children: -20% vs. +0.9% (p<0.0001) | NR |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | NR | NR |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Mainous, 2013  United States  Patient N = 35,417 at baseline  (calc)a  Provider N = 280 (calc)b  Practice N = 70 (9 intervention, 61 control) | NR | NR | Inappropriate prescribing "calculated  by dividing the number of ARI  episodes with diagnoses in the  ‘inappropriate’ category that included an antibiotic  prescription by the total number of ARI episodes with diagnoses for which antibiotics are ‘inappropriate’."  Broad-spectrum antibiotic use "calculated by dividing the number of all ARI episodes (episodes considered either inappropriate or appropriate for antibiotics) with a broad-spectrum antibiotic prescription by the total number of ARI episodes with  an antibiotic prescription." Adjusted weighted mean change across practices between 12/2009 and 3/2011 reported. |
| Maor, 2011  (Please refer to Andrews, 2012 systematic review) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | Ecological study  September 1, 2005 to August  30, 2009. | Children in daycare (2 to 5  y) and their parents, grade 2 students (7 y) and their parents, older adults in assisted-living facilities and the general public of British Columbia. | Physicians and  pharmacists in  British Columbia. | Type: Educational  Target: General public and health care professionals  Description: Public education component included annual media campaigns, print material distribution, and audience-specific education curricula. Print material included signs, posters, stickers, activity placemats and a parent's guide to managing common infections. Media campaigns were aired on television and radio, and advertising appeared on transit routes and vehicles. Health care professional education arm offered accredited courses to physicians and pharmacists, with a focus on antibiotic use, resistance and strategies to prescribe appropriately. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | Preparticipation vs.  postparticipation | NR | NR | Specialty: Physicians and  pharmacists  Number of years in practice: NR  Type of clinic: NR Geographical region: British Columbia, Canada Population served: General public |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | Time of year: September 2005 to August  2009  Patterns of disease activity: NR  Locally tailored: Yes, local adaptation of  'Do Bugs Need Drugs?' intervention originally implemented in Alberta, Canada System-level characteristics: NR | Outlined in the 'Bugs & Drugs' book,  a 'Do Bugs Need Drugs?'-endorsed antimicrobial reference guide | Descriptive statistical results are  presented |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | Mean Proportion of Antibiotic Use by RTI  Preparticipation vs. Postparticipation (%, p) Acute Bronchitis: 34.6 vs. 21.4, p=0.023  All Indications: 45.6 vs. 39.2, p=0.019 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| McKay, 2011  Canada  Patient N = 43,559  Provider N = 7,808  Practice N = NR | Mean percentage of correct responses to quizzes by  physicians before and after participating in the 2008 'Do Bugs  Need Drugs?' Mainpro-C course  Preparticipation (%) vs. Postparticipation (%) by Quiz Topic  Bronchitis: 70.35 vs. 81.43  Otitis Media: 66.84 vs. 85.15  Sinusitis: 67.46 vs. 70.85  Pharyngitis: 73.33 vs. 90.16  Assessment of General Knowledge about Antibiotics and  Resistance  Percent improvement in correct responses after course, p:  11.2, p=0.013  Proportion of pharmacists who felt comfortable contacting a prescriber to suggest a change to an antibiotic prescription\* Preparticipation vs. Postparticipation, p: 25.8 vs. 53.2, p<  0.001 | NR | \*Indication of improved shared  decisionmaking  between pharmacists and physicians or dissemination of improved knowledge? |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | Before and after study  January 2008 - January 2009. | Adults (aged ≥ 15 y) in either  England or Scotland. | NR | Type: Educational  Target: Adult patients  Description: The English public antibiotics media campaign featured three posters displayed in magazines and newspapers. The key message of the posters was: 'The best way to treat most  colds, coughs, and sore throats is plenty of fluids and rest. For advice talk to your pharmacist or doctor.' Copies of an A5 patient advice leaflet were given to patients instead of an antibiotic prescription upon visiting participating general practice surgeries and independent pharmacies. Extra copies were offered free of charge via phone, fax, or from the order line web site. A copy of the letter was also sent electronically to acute hospital trusts and health promotion units. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | Scottish survey  respondents  (control) | NR | NR | Specialty: Mix (general  practice and pharmacy) Years in practice: NR Clinic: General practice surgeries and independent pharmacies  Geographical region: UK Population served: General public |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | Time of year: January 2008 to January  2009  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: National  Health Service (NHS)-endorsed campaign | NR | Sampling weights provided by Ipsos MORI and  based on the National Readership Survey to correct for known selection biases. Weights were defined by sex, household tenure, and white ethnicity and, within sex, by age, social grade, region and working status. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | Reported Antibiotic Use by Respondents and Behavior of GPs  (% Respondents, p)  England 2008 vs. 2009; Scotland 2008 vs. 2009; England vs. Scotland 2009  Prescribed an antibiotic: 34 vs. 35, p=0.7; 29 vs. 35, p=0.4; p=1.0  Kept any leftover antibiotic: 2.2 vs. 7.0, p< 0.001; 0 vs. 4, p=0.04; p=0.4  Taken antibiotics without being told to do so: 8.3 vs. 7.8, p=0.8; 3 vs. 3, p=0.8; p=0.04  Asked GP or nurse for antibiotics in the past year: 28 vs. 29, p=0.7; 26 vs. 34, p=0.2;  p=0.3  If respondent asked, prescribed antibiotic after some discussion: 82 vs. 73, p=0.07; 93 vs. 80, p=0.11; p=0.5  If respondent asked, prescribed antibiotic without discussion: 14 vs. 21, p=0.09; 7 vs.  12, p=0.47; p=0.3  If respondent asked, GP/nurse refused to prescribe antibiotic: 4 vs. 5, p=0.3; 0 vs. 8, p=0.2; p=0.7  Offered an antibiotic prescription to be cashed in at the pharmacy only if you felt no better, or felt worse, after several days: 11 vs. 13, p=0.4; 6 vs. 5, p=0.8; p=0.02  Offered the opportunity to return to surgery to pick up an antibiotic prescription only if you felt no better, or felt worse, after several days: 6 vs. 7, p=0.3; 6 vs. 3, p=0.3; p=0.1  Offered any type of delayed antibiotic prescription: 16 vs. 19, p=0.3; 12 vs. 8, p=0.4;  p=0.01 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | NR | Reported Antibiotic Use by Respondents and Behavior of GPs  (% Respondents, p)  England 2008 vs. 2009; Scotland 2008 vs. 2009; England vs. Scotland 2009  Advised about other remedies for cough and cold symptoms instead of being given an antibiotic prescription: 7.4 vs. 12.7, <  0.001; 7 vs. 8, 0.7; 0.3 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| McNulty, 2010  United Kingdom  Patient N = 3,718 (1,888 precampaign and 1,830 postcampaign)  Provider N = NR Practice N = NR | Reported Knowledge and Attitudes of Respondents to  Antibiotics and Their Use (correct response in parentheses) (% Respondents incorrect/don’t know, p)  England 2008 vs. 2009; Scotland 2008 vs. 2009; England vs. Scotland 2009  Antibiotics work on most coughs and colds (disagree): 40 vs.  37, 0.3; 40 vs. 44, 0.6; 0.3  Antibiotics can kill bacteria (agree): 28 vs. 28, 0.8; 39 vs. 21,  0.004; 0.1  Antibiotics can kill viruses (disagree): 53 vs. 52, 0.7; 54 vs.  47, 0.5; 0.4  A course of antibiotics should be stopped when a person feels better (disagree): 30 vs. 26, 0.2; 29 vs. 18, 0.2; 0.2  If taken too often antibiotics are less likely to work in the future (agree): 15 vs. 16, 0.8; 10 vs. 10, 1.0; 0.1  It is OK to keep leftover antibiotics and use them later without advice from a doctor, nurse or pharmacist (disagree): 16 vs.  14, 0.4; 9 vs. 4, 0.3; 0.01  Antibiotics can kill the bacteria that normally live on the skin and in the gut (agree): 42 vs. 41, 0.8; 53 vs. 46, 0.3; 0.3  Bacteria that normally live on the skin and in the gut are good for your health (agree): 35 vs. 36, 0.6; 39 vs. 31, 0.4; 0.5  Resistance to antibiotics is a problem in British hospitals  (agree): 30 vs. 37, 0.03; 32 vs. 29, 0.6; 0.2  Antibiotic-resistant bacteria could infect me and my family  (agree): 32 vs. 33, 0.6; 27 vs. 29, 0.8; 0.5 | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | Time series, though antibiotic  use reported pre-post only  12-month periods before (May  1996 through April 1997), during (1997/98) and after (1998/99) the intervention. | Children younger than 15  years who were residents of four Tennessee counties  and enrolled in the TennCare expanded Medicaid program. Children "not designated as either white or black" (4%) were excluded, as was person- time as a hospital inpatient. Respiratory illnesses included: outpatient diagnoses of otitis media, common cold, sinusitis, pharyngitis, tonsillitis, laryngitis/tracheitis, bronchitis, pneumonia and influenza, and unspecified ARI. | "250 key health care  providers (e.g., pediatricians and family physicians) who provided most routine health care services to Knox County children." Not clear how these were identified. Newsletter sent to all county physicians. | Type: Educational  Target: Providers, parents of young children, and the general public  Description: Lectures by CDC physician to key providers; presentations at hospital events and clinics; prescribing guidelines distributed to key providers; newsletter articles to all county physicians; pamphlets to parents of newborns and children in daycare and grades Kindergarten through 3rd grade, to hospitals, clinics, dental offices and pharmacies, and to families receiving flu vaccines; patient education materials to key providers; media coverage and public service announcements. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | "Tennessee's 3  other urbanized counties" acted as controls; geographically distant from intervention county, with no similar community-wide intervention. | NR | Mean age NR; 8-9% <1 y, 30% 1 to <5y,  61-62% 5 to <15y  % female: NR ("study populations similar with regard to age and sex")  Ethnicity: 27% black in intervention county, 54 to 90% in 3 control counties SES: NR, but Medicaid an inclusion criterion  Other patient characteristics: NR | Provider characteristics: NR  overall (specialty included family practice and pediatrics for "key providers" in Knox county)  Geographical region: four urban Tennessee counties Population: children on Medicaid |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | Time of year: May through April, three  successive years  Patterns of disease activity: NR Locally tailored: NR  System-level characteristics: TennCare managed care system extended health insurance coverage to more people than were eligible for Medicaid and shifted care to physicians in private practice | Not defined in outcomes measured, as  individual antibiotic prescriptions not linked to diagnosis/indication. Messages of educational campaigns were that  antibiotics should be used for bacterial infections only, that colds and most coughs and sore throats are caused by viruses and should not be treated with antibiotics, and that when used antibiotics should be  narrow spectrum. | Yes: regression models for prescription rates  adjusted for county, age, race, study year; antibiotic resistance stratified by study year and antibiotic category. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | Intervention-attributable change in antibiotic prescription rates (excess % reduction in  prescription rates in Knox vs. control counties, by age and race; 95% CI):  <1y, White: +2%; 95% Cl, -5 to 8  <1y, Black: -16%; 95% Cl, -20 to -12  1 to <5y, White: -8%; 95% Cl, -13 to -4  1 to <5y, Black: -18%; 95% Cl, -23 to -14  5 to <15y, White: -3%; 95% Cl, -9 to 3  5 to <15y, Black: -20%; 95% Cl, -25 to -15  All: -11%; 95% Cl, -14 to -8  Intervention-attributable declines seen for all antibiotic categories except cephalosporins in white children (+11%; 95% CI, 5 to 16%; declines greater in control counties);  declines statistically significant for penicillins and cephalosporins in black children and  TMP-SMX in all children  Ratio of antibiotic prescriptions to respiratory illness visits: White: -8% (-16 to 0)  Black: -13% (-19 to 8) | Antibiotic resistance (proportion resistant  among cases of invasive *Streptococcus pneumoniae* identified by ongoing surveillance in Knox county):  Year 1 (n=20): Penicillin: 60% Cefotaxime: 55% TMP-SMX: 60% Erythromycin: 55%  Year 3 (n=34): Penicillin: 71% Cefotaxime: 59% TMP-SMX: 65% Erythromycin: 50% |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Perz, 2002  United States  Patient N = 464,200 person-years over 3-year study  Provider N = NR overall; 250 "key providers" and 1,500 physicians overall in intervention county Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | Pre/post  January 2002 to December  2006; intervention began January 2003 and continued through end of study period. | "Outpatients visits flagged  by an ARI case-finding algorithm...if providers either assigned an ARI-related diagnostic code or  prescribed a cough suppressant, and if the clinical note documented at least two ARI symptoms, as assessed by automated text analysis." | NR | Type: System-level  Target: Providers  Description: Intervention site: Veterans Affairs (VA) Maryland Health Care System. Clinical decision support system (CDSS) targeting gatifloxacin (fluoroquinolone) and azithromycin at the time of electronic prescription, with "drug-  specific guideline recommendations as clickable choices during order entry". Cite 2001 publication describing guidelines developed by CDC. CDSS included treatment paths for pneumonia, bronchitis, sinusitis and nonspecific URI with diagnostic criteria and symptoms/signs suggesting antibiotic use appropriate. Providers could override CDSS recommendations. |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | Time series  Outcomes measured at baseline and after each stage of intervention (dates NR). | "ARI was defined as the  presence of at least three of the following symptoms: runny nose, cough, malaise, fever, and/or sore throat for less than 2 weeks." | 8 IMSS family medicine  clinics, with 106 family physicians who agreed to participate. | Type: Multifaceted (Educational, Clinical, System-  level)  Target: Providers  Description: Guideline development with algorithms based on clinical data and prognostic factors; training of clinical tutors; three-part educational intervention with interactive workshop sessions to discuss guidelines, individual tutorial with clinical tutor advising physician during patient visit, and peer review discussion of physicians' clinical cases. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | VA Salt Lake City  Health Care System | Type of RTI (one or more diagnosis  per patient): pneumonia 14%, bronchitis 77%, pharyngitis 41%, sinusitis 19%, nonspecific ARI 4% Signs and symptoms and duration: NR | Mean age: 57 years  % female: 7.7  % nonwhite: 66  SES, education, frailty, comorbidities, prior RTIs, prior antibiotics: NR | NR |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | 4/8 clinics with  58/106 physicians | NR | NR | Specialty: Family medicine  51.6% in intervention group,  57.8% in control  Years of practice (median): 20 intervention, 21 control  Type of clinic: NR Geographical region: 2 clinics in Mexico City, 4 in 2 northern states, two in one southern state |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | Time of year: January 2002 to December  2006  Patterns of disease activity, local tailoring: NR  System-level characteristics: Veterans  Affairs Health Care Systems | Visits "reviewed for congruence with the  guidelines" developed by the CDC. Antibiotics always appropriate for pneumonia, never for acute bronchitis or nonspecific URI, and sometimes for pharyngitis sinusitis if specific criteria met. | "Multivariable logistic regression and difference-  in-difference regression analyses…were developed to estimate the impact of the CDSS intervention on overall antibiotics prescribing congruence." Regression models adjusted for age, marital status, sex, and race/ethnicity. |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | Time of year, patterns of disease activity,  and local tailoring: NR  System-level characteristics: the Mexican Institute of Social Security (IMSS) is the largest public health care system in Mexico providing care to 45% of Mexican population | Appropriate if physician applied clinical  guideline; antibiotics for pneumonia and for pharyngitis, otitis media and sinusitis associated with specific clinical signs and symptoms. No antibiotics for bronchiolitis, laryngotracheitis, asthma with ARI, rhinopharyngitis, vesicular pharyngitis, laryngitis, bronchitis. | There were "equal numbers of intervention and  comparison clinics in each location," and "for each intervention clinic, the control clinic was similar in number of physicians, infrastructure, and population for which the clinic provided care." Not clear if similarity resulted from matching. Models adjusted for "cluster sampling of physicians," but adjustment for other confounders not discussed. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | Relative risk of a congruent prescription, intervention vs. control:  RR=1.24; 95% Cl, 1.11 to 1.39  Targeted antibiotics:  RR=2.57; 95% Cl, 1.87 to 3.54  Antibiotics not targeted: RR=1.18; 95% Cl, 0.69 to 2.01  "Adjusted multivariable difference-in-difference models between the two study sites, post- vs. pre-intervention periods"  "We defined an ARI visit as 'congruent' with the guidelines if an antibiotic was either prescribed or withheld in accordance with the criteria" provided by CDC guidelines. | NR |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | Appropriate prescription of antibiotics (difference of mean proportions vs. baseline; 95%  CI):  Post-workshop:  Intervention: 14; 95% Cl, 2.6 to 26  Control: -1.2; 95% Cl, -11 to 8.3  Post-tutorial:  Intervention: 11; 95% Cl, -0.7 to 23  Control: -4.4; 95% Cl, -14 to 5.3  Post-peer review:  Intervention: 23; 95% Cl, 10 to 35\* Control: 1.5; 95% Cl, -8.6 to 12  \*p<0.05, intervention vs. control | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | NR | NR |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Rattinger, 2012  United States  Patient N = 3,831  Provider N = NR for study  population (intervention was "part of a larger quality improvement initiative...used by at least 1379 unique providers during the study period.")  Practice N = NR | NR | NR |  |
| Razon, 2005  (Please refer to Vodicka, 2013 systematic review) |  |  |  |
| Reyes-Morales, 2009  Mexico  Patient N = 1,495 over course of study  Provider N = 106  Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | Pre/post  Intervention period: January through June 2001. Data collected retrospectively for intervention period and for baseline period of January through June 2000. | "acute URTI (e.g.,  pharyngitis, rhinosinusitis, otitis media, bronchitis, and nonspecific URTI)." "All patients presenting to their primary care professional with URTI symptoms were included in the study." | The two family practice  groups in the study community, though one health care professional declined to participate (not clear whether this provider represented one of the two practices). | Type: Multifaceted (Educational, Clinical)  Target: Patients, public, providers  Description: Patient education materials, media campaign, physician small group session, algorithms for diagnosis and management of acute URTIs. Providers asked to use algorithms with ≥200 consecutive URTI patients. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | Medicaid data for  Community A compared with "the rest of rural Utah." Chart review data pre/post comparison only. | Type of RTI: Bronchitis (14% in  intervention community at baseline), streptococcal (3%) and nonstreptococcal (23%) pharyngitis, otitis media (33%), sinusitis (7%), nonspecific URTI (19%). Signs/symptoms and duration: NR | Baseline data for residents of Community  A overall (not limited to URTI patients included in study):  Median age: 27.7 years  % female: 49  Other patient characteristics: NR | Provider characteristics: NR  Type of clinic: family practice in Community A, NR for "rest of rural Utah" Medicaid comparison group Geographical region/population served: Community A is a rural Utah community of <10,000 residents |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | Time of year: January through June of two  consecutive years.  Pattern of disease activity: NR Locally tailored: NR  System-level characteristics: rural Utah community, health care provided by 2 family practice groups | Algorithms focus on selecting narrower-  spectrum antibiotics (e.g. amoxicillin) for streptococcal pharyngitis, acute otitis media, rhinosinusitis present for ≥ 14 days in children and ≥ 7 days in adults, and acute exacerbation of chronic bronchitis. Antibiotics not indicated for nonspecific URTI, croup, or bronchitis. | Logistic regression models for patient-level  data included time, diagnosis and antimicrobial class. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | Medicaid data:  Difference in proportion of URTI episodes treated with antibiotics (baseline - intervention, positive values indicate decreased use) for Community A (intervention) vs. the rest of rural Utah (comparison); p-value for Community A vs. control:  All URTI episodes: 15.6% vs. 1.5%, p=0.006, p=0.004 controlling for diagnoses  Acute bronchitis: 56.1% vs. 1.7%, p=0.024  Pharyngitis, nonspecific URTI, acute sinusitis, otitis media: p=NS  [Note: difficult to interpret highly-significant difference for all URTIs vs. generally not statistically significant differences for individual diagnoses.]  By antimicrobial class:  Macrolides: 13.4% vs. 0.2%, p<0.001  Cephalosporins, penicillins, quinolones: p=NS  Medical record data:  Difference in proportion of URTI episodes treated with antibiotics for Community A (intervention) only, p-value for intervention period vs. baseline period: p<0.05 for 3/3 macrolides, 1/3 penicillins, 4/4 cephalosporins, 1/2 quinolones | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Rubin, 2005  United States  Patient N = 309 for chart review in intervention community, 17,483 for Medicaid data (354 of these in intervention community) (all pre+post)  Provider N = NR Practice N = NR | NR | NR | Paper also reports local community  pharmacy data, but prescriptions not linked to diagnoses and these aggregate data not abstracted. Apparent typographic error in Figure  2: chart review data for "urinary tract infection," vs. URTI in text of results. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | Pre/post  Retrospective survey on antibiotic prescribing before (1/1999 to 1/2000) and after (1/2002 to 1/2003) the AOM/SNAP study (1/2000 to  12/2000). | Children age 1 to 12 with  AOM. Exclusion criteria: temperature >101.5F, AOM symptoms >48 hours, another AOM episode within  3 months, child "toxic appearing," tympanic membrane "not intact" or "signs of impending perforation," immunodeficiency,  coexisting bacterial infection. | Pediatricians in the  Cincinnati Pediatric Research Group, a PBRN. | Type: Clinical  Target: Families of pediatric patients  Description: Families given Safety-Net Antibiotic Prescription (SNAP), a prescription given with instructions not to fill it unless child did not improve after 48 hours. |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | PBRN pediatricians  compared with "30 randomly selected community pediatricians." | Type of RTI: acute otitis media  Signs/symptoms and duration: NR | Age: 18% 1 to 2 years old, 82% >2 to 12  Other characteristics: NR | Specialty: pediatrics  Years in practice: NR but "not statistically significantly different between the 2 groups"  Type of clinic: primary care (NR for control providers) Geographical region: Cincinnati, Ohio  Population served: community of 1.8 million |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | Time of year: intervention and before and  after data collection periods each a full calendar year (January through December or through the following January)  Patterns of disease activity, local tailoring: NR  System-level characteristics: Practice- Based Research Network in Cincinnati, vs. community pediatricians with setting not further characterized | "Several investigators have demonstrated  that antibiotics have a very modest benefit in most children with AOM" (with journal articles cited). Exclusion criteria (see population criteria) to identify severe or chronic disease. Families instructed not to fill antibiotic prescription if child improved by 48 hours. | Some outcomes for the two provider groups  were compared before and after the SNAP intervention (i.e. minimal adjustment for time as a confounder). |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | Antibiotics for AOM:  "Before the study, the majority of both groups, 51%, were using antibiotics almost all the time for AOM compared to 20% after the study, p<.001" Reporting unclear for: 1) Frequency definition (76 to 95% and >95% are options on questionnaire), and 2) whether 20% applied to both groups after study  Use of SNAP: "Only one community pediatrician used SNAP before the study, while 8 used it afterward, p<.05" Not reported for PBRN physicians. | NR |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | NR for provider comparison groups | NR |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Siegel, 2006  United States  Patient N = 194  Provider N = 47  Practice N = NR | NR | NR |  |
| Smabrekke, 2002  (Please refer to Boonacker, 2010 and Vodicka, 2013 systematic reviews) |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | Before/after | Patients from general  practices within a geographically defined area in the middle region of the Netherlands | General practitioners in  the predefined area of the  Netherlands | Type: Multifaceted  -Educational  Target: Providers  Description: Educational material given to providers based on the Dutch National Guideline for RTIs and given at educational meetings that included 1) group education meeting with a consensus procedure on indication and type of Abs for RTIs with academic detailing at the start of the intervention.  -Communication  Target: Providers  Description: Communication skills training to make better agreements with patients about prescriptions.  - System  Target: Providers  Description: Audit and feedback given on prescriptions. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | Intervention  (N=194): educational outreach visit including feedback, communication skills training, audit and feedback vs Control: no intervention, practices from the same region | NR | NR | Specialty: General practice  Number of years in practice: NR  Type of clinic: NR Geographical region: Europe Population served: 23-20% urban |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | Time of year: January to June 2007  Patterns of disease activity: NR  Locally tailored: yes, base don the Dutch national guideline for RTIs  System-level characteristics: National  Health Service | Based on national guidelines for antibiotics  for RTI | Sorted out based on previous research  protocols (see refs 26, 27) |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | Number of prescriptions per 1000 patients in the intervention and control group:  2006:+12% (206) vs +15% (202), NS  2007: +13% (232) vs +12% (227); -1% difference, NS | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Smeets, 2009  The Netherlands  Patient N = NR  Provider N = 382 providers Practice N = 141 (25 groups) (see Welschen, 2004) | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | Time series  Time frame: "before, during, and after the initial audit registration, before interventions and feedback of the audit data". Registration during 5 weeks in April and May 1995. Data extracted for five 5-week time periods: A  (six months before registration), B (immediately before), C (registration), D (immediately after), and E (three months after). | Diagnoses: upper  respiratory tract infection, otitis media, sinusitis, tonsillitis, acute bronchitis, chronic obstructive lung disease, or pneumonia. | All general practitioners  (GPs) at 14 public health centres. | Intervention type: System-level  Target: Providers (N=45) who agreed to participate in audit  Description: Intervention studied was "the effect of the actual registration process" on providers who agreed to participate in an "audit on treatment of respiratory tract infections (RTIs)", measured before the audit intervention actually takes place. "The question is whether the attentiveness that a registration entails leads to changed attitudes." |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | Providers (N=35)  who did not agree to participate in audit. | NR | NR | Specialty: 77.5% general  practice, 5% locums, 17.5%  residents  Years in practice: NR  Type of clinic: primary health care  Geographical region: Blekinge county, Southern Sweden Population: 151,000 county inhabitants |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | Time of year, patterns of disease activity:  registration in April/May, followup for 5 weeks immediately after and also 3 months after (~August). "We found it possible but less likely that the reduction [in antibiotic use] had anything to do with seasonal variations."  Local tailoring: NR  System-level characteristics: "14 health centres and about 80 publicly employed GPs. Within the county there were in addition 12 private GPs, but they were excluded." | "The aim was to reduce the prescription of  antibiotics for RTI, and to change prescriptions towards a greater proportion of Penicillin V (PcV), with a reduction in the prescription of broad-spectrum drugs." No authority cited or definition of broad- spectrum antibiotic given. | Stratified time series analysis only: results  reported for each of five time periods, but no adjustment for other confounders. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | Percentage of visits for RTI resulting in antibiotic prescription in each time period, A-E,  participants vs. nonparticipants:  A: RR=0.92; 95% CI, 0.87 to 0.97  B: RR=0.87; 95% CI, 0.82 to 0.92  C: RR=0.96; 95% CI, 0.90 to 1.0  D: RR=0.96; 95% CI, 0.89 to 1.0  E: RR=0.88; 95% CI, 0.81 to 0.95  Percentage of prescriptions of Penicillin V and broad-spectrum antibiotics of all antibiotics prescriptions in each time period, participants vs. nonparticipants:  A: PcV RR=1.2; 95% CI, 1.1 to 1.3  Broad: RR=0.90; 95% CI, 0.79 to 1.0  B: PcV RR=1.1; 95% CI, 1.0 to 1.2  Broad: RR=0.89; 95% CI, 0.78 to 1.0  C: PcV RR=1.1; 95% CI, 1.0 to 1.2  Broad: RR=0.99; 95% CI, 0.85 to1.2  D: PcV RR=1.0; 95% CI, 0.93 to 1.1  Broad: RR=1.1; 95% CI, 0.93 to 1.3  E: PcV RR=0.94; 95% CI, 0.85 to 1.0  Broad: RR=1.0; 95% CI, 0.83-1.2 | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Strandberg, 2005  Sweden  Patient N = 14,719 visits  Provider N = 80  Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | Pre/post  Baseline survey June/July  1997, intervention September- December 1997, post- intervention survey June- August 1998. | Household caregivers of  children < 4 years surveyed (nonparent caregivers excluded from analyses). Diagnoses included in  survey question on antibiotic indications: bronchitis, colds, dry cough, flu, nonstreptococcal sore  throat. | "Primary care clinicians"  and "staff at each primary care clinic." | Type: Educational  Target: Patients and their parents, providers Description: Intervention conducted in northern Wisconsin (MESA-North). Parent and patient education: CDC pamphlet distributed to clinics, pharmacies, child care facilities; CDC posters to clinics and community organizations; presentations by nurse educators to parents and staff at child care centers, public health departments, schools, community organizations; newspaper articles on antibiotic resistance. Physician education: nurse educator presentations to primary care clinic staff; grand rounds presentation by study investigator; small- group teaching or telephone discussions with a physician educator; distribution of guidelines,  fact sheets, and patient education materials. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | Control area was  the MESA-Central region, comprising  14 zip codes in central Wisconsin | NR | Patient characteristics (intervention +  control): Age: NR  % female: NR  Race: 98% white, 2% nonwhite  Ethnicity: 98% non Hispanic, 2% Hispanic SES, child's insurance: 75% private, 25% medical assistance  Education (caregiver): 35% high school only, 65% some college | Provider characteristics:  Specialty, type of clinic:  primary care  Years in practice: NR Geographical region: intervention conducted in 3 counties and 2 adjacent cities in northern Wisconsin; outcome survey conducted in the 8-zip code MESA-North region, a subarea of the intervention region.  Population served: intervention population (MESA-North): population  27,692 (957 children <4);  control 58,910 (2,655 <4) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | Time of year: surveys 2 consecutive  summers, intervention September to  December  Patterns of disease activity: NR Locally tailored: NR  System-level characteristics: Study conducted in the Marshfield Epidemiologic Study Area (MESA), a defined geographic region with care provided by Marshfield Clinic regional network and subject sampling frame available for research. Intervention conducted by Marshfield Medical Research Foundation. | Survey question on whether antibiotics  were indicated for 5 diagnoses (see Comments), where "higher scores indicated less accurate knowledge regarding indications for antibiotic use." Educational pamphlet "provides examples of when antibiotics are and are not needed for children (e.g., rarely for bronchitis, not for colds)." | Yes: cofactors associated with post-  intervention knowledge outcomes in univariate analysis (p<0.1) were entered into multivariate models. For ARA these were intervention area residence, preintervention ARA, parent & child ages, and exposure to interventions. For antibiotic indications score, univariate analysis showed no significant associations and unadjusted scores were reported. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | NR | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | NR | Patient satisfaction:  "Percentage of parents who brought their child to another physician because they did not receive an antibiotic decreased from 4.6% to 1.7% in the intervention area and increased in the control area from 2.2% to 3.8%. The difference between the 2 area changes was -4.5%; 95% CI, -8.0 to -0.9; p=0.02." |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Trepka, 2001  United States  Patient N = 365  Provider N = NR Practice N = NR | (See Comments for outcome definitions)  Factors associated with high post-intervention ARA in final multivariate model included exposure to 2 or more local interventions: OR=1.9; 95% CI, 1.1 to 3.1  Univariate comparison of high ARA, difference of proportions,  (Post-Pre)I - (Post-Pre)C:  +10% (95% CI +1.9% to +18%)  Mean antibiotic indications scores, intervention vs. control areas:  Preintervention:  3.9 vs. 4.3, p=0.07  Postintervention:  2.7 vs. 3.5, p<0.001 | NR | Outcome definitions:  Antibiotic resistance awareness (ARA): high level of ARA defined as agreement with each of 3 statements on antibiotic overuse and resistance. Antibiotic indications score: using survey question on whether antibiotics are indicated for 5 respiratory diagnoses (bronchitis, cold, dry  cough, flu, nonstreptococcal sore throat), "always", "sometimes," and "never" were assigned scores of 2, 1, and 0, respectively. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | Prospective cohort study, with  providers followed over time with pre/post intervention assessments for Academic detailing (AD) study and four time points for PM study.  AD study: patient visits assessed during 1998 (baseline) and 2000, with intervention conducted in  1999.  PM study: intervention conducted 9/1/01 to 1/1/02, with patient visits assessed during 4 time periods: 1/1/01 to 8/31/01, 1/1/00 to 8/31/00,  1/1/02 to 8/31/01, and 1/1/03 to 8/31/03. | Upper respiratory infections:  acute bronchitis, cough, acute pharyngitis, acute URI, all by ICD-9 codes. | Academic detailing study:  Intensive intervention group: 7 faculty providers with highest baseline antibiotic use for acute bronchitis  Mild intervention group: 7 faculty providers with next highest baseline antibiotic use  Patient mailing study: Intervention group: faculty providers with highest number of visits for the inclusion diagnoses  (N=48 in results). | Academic detailing study:  Type: Multifaceted  Target: Providers and patients  Description: Intensive intervention: a pharmacist and the director of the hospital Antimicrobial Stewardship Program met with each provider, presented published literature, and gave "provider-specific evaluation results," along with patient education materials.  Mild intervention: patient education materials alone mailed to providers.  Patient mailing study: Type: Educational Target: Patients  Description: Educational brochure and explanatory letter signed by provider or Antimicrobial Stewardship director mailed to providers' patients with previous URI diagnoses. |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | Time-series  April 2005 to December 2007 | Patients filling prescriptions  at pharmacies in Quebec that are part of the IMS Health database | "All physicians and  pharmacists in Quebec." | Type: Educational  Target: Clinicians  Description: Eleven 2-page guidelines with information on prescribing antibiotics for lower and upper respiratory tract infections, urinary tract infections and C. difficile infections were distributed along with letters from key stakeholders. CME and medical schools were encouraged to promote the guidelines. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | Academic detailing  study: no intervention group of 14 nonfaculty providers  Patient mailing study: control group were nonfaculty providers with highest number of visits for inclusion diagnoses (N=22 in results) | NR | NR | Geographical region:  Pennsylvania  Other characteristics: NR |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | Pre-period. Other  interventions are noted to possibly have been going on at the same time. | NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | Time of year: NR for AD study, February  through August for PM study  Patterns of disease activity, local tailoring: NR  System-level characteristics: Clinical Practices of the University of Pennsylvania (CPUP) practice providers are university faculty; Clinical Care Associates (CCA) providers are nonfaculty but affiliated with the university. | Study outcome is proportion of visits for  acute bronchitis or URI for which antibiotics prescribed. Limited reporting of broad- versus narrow-spectrum antibiotic use for PM study. | Intervention and control providers matched for  baseline bronchitis visits. Models of effects of intervention on antibiotic prescribing included provider, time, and a time/ intervention interaction term. AD model also adjusted for sex and smoking. |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | NR | No clear definition provided. | Analysis of prescribing over time only. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | AD study:  Adjusted odds ratio; 95% CI for reduction in antibiotic use over time in intervention vs. control groups:  Intensive intervention (with academic detailing): OR=2.8; 95% Cl, 1.3 to 6.0  Mild intervention (patient materials only): OR=1.7; 95% Cl, 0.7 to 3.8  PM study:  Change in prescribing rate, pre/post time points pooled: Intervention group:  19% vs. 14% (-4.7%) Control group:  58% vs. 59% (+1.2%)  p=0.13, intervention vs. control | NR |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | Total outpatient antibiotic prescriptions per 1000 population:  471 vs 526; 10.5% lower  Decreased by 4.2% in the first year after implementation (2005; p=0.002) | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | NR | NR |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | NR | NR |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** |
| Vinnard, 2013  United States  Patient N = 3,421 (total patient visits pre + post)  Provider N = 98  Practice N = NR | NR | NR | Two substudies included: academic  detailing (AD) and patient mailing  (PM) |
| Weiss, 2011  Canada  Patient N = Population of Quebec  Provider N = Unclear  Practice N = NR | NR | NR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Study Design (e.g. pre/post, time series)**  **Time frame** | **Patient Population Criteria** | **Provider Population**  **Criteria** | **Intervention Strategy Type: (1) Educational/Behavioral (2) Communication**  **(3) Clinical**  **(4) System-level**  **(5) Multifaceted**  **Target of Intervention (patient, provider, etc.) Intervention Description** |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | Before/after study  1999 baseline, 2000 - 2004 intervention years | Australian population aged  15 y and over (national annual surveys of consumers) or aged 18 y or over (national omnibus surveys of consumers) | General practitioners and  pharmacists | Type: Educational  Target: Consumers (general public) and health professionals (general practitioners and pharmacists)  Description: Small scale media-based community awareness campaign conducted via radio, television, and newspaper coverage in  2000. Larger scale interventions for consumers were implemented during the winter months in  2001, 2002, 2003, and 2004. Large scale intervention included persuasive message/tag line, various printed and electronic resources (information brochure for adults; posters for general practice, pharmacies, schools, and community centers; stickers and badges; prescription pads for symptomatic management and patient information leaflets distributed to GPs), mass media strategies including billboards, television, radio, and magazines. Small grants provided to community groups to  implement community-based education sessions in 2001, 2002, and 2004. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Comparator** | **Patient Characteristics: Type of RTI**  **Types of Signs and Symptoms Duration of Signs and Symptoms When Counting Started for Duration** | **Patient Characteristics:**  **Mean Age Percent Female Ethnicity**  **SES**  **Educational Level Frailty Comorbidities Prior RTIs**  **Prior use of Antibiotics** | **Provider Characteristics: Specialty**  **Number of Years in Practice**  **Type of Clinic Geographical Region Population Served** |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |  |  |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | Pre-campaign vs.  Post-campaign | NR | NR | Specialty: General practice  and pharmacy  Number of years in practice: NR  Type of clinic: General practices and pharmacies Geographical region: Australia  Population served: General public |

|  |  |  |  |
| --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **Background Contextual Factors: Time of Year**  **Patterns of Disease Activity**  **Locally Tailored**  **System-Level Characteristics** | **Definition of Appropriateness** | **Confounders and Method(s) Used to Control for Them** |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |  |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | Time of year: Winter months (June -  August) in 2000, 2001, 2002, 2003, and  2004  Patterns of disease activity: NR Locally tailored: Yes  System-level characteristics: Australia's National Prescribing Service undertook campaign | NR | National annual surveys of consumers  were stratified by age, gender, and region. National omnibus surveys of consumers were stratified by postcode area, age, and gender. For all consumer surveys, frequency distributions of weighted data were calculated for all variables. Analysis of drug utilization by Medicare Australia database involved augmented regression, which included seasonality, autocorrected error terms, and one point in the regression model to indicate the timing of the first intervention in 1999. |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ1 outcomes: Appropriate prescription and use of antibiotics** | **KQ2 outcomes: Antibiotic resistance** |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | Proportion of the community reporting taking antibiotics when ill with last cough, cold, or  flu  1999 % vs. 2000 % (change, p) vs. 2001 % (change, p) vs. 2003 % (change, p) vs. 2004  % (change, p): 10.8 vs. 10.0 (- 0.8, NS) vs. 10.1 (- 0.7, NS) vs. 9.8 (- 1.0, NS) vs. 7.4 (-  3.4, p< 0.05; 95% CI, 1.3 to 5.5  Median number of original antibiotic prescriptions for nine antibiotics commonly used for URTI decreased at a rate of 0.18 prescriptions per 1000 consultations per GP per month (p < 0.0001), equating to a decrease of 10.8 original antibiotic prescriptions per GP per year or 216,000 fewer PBS subsidized antibiotic prescriptions per year (given the approximate 20,000 GPs in Australia provide an average of 6,000 consultations per  year) | NR |

|  |  |  |
| --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ3 outcomes: Mortality, hospital admission, medical complications, adverse drug effects** | **KQ4 outcomes: Clinic/ED visits, time to return to work/school, patient satisfaction, quality of life, symptom improvement, use of nonantibiotic treatments, utilization of vaccinations, quality metrics** |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | NR | Proportion of the community reporting actions when ill with last  cough, cold, or flu  1999 % vs. 2000 % (change, p) vs. 2001 % (change, p) vs.  2002 % (change, p) vs. 2003 % (change, p) vs. 2004 % (change, p)  Took nonprescription medicine: 67.5 vs. 68.9 (+ 1.4, NS) vs.  69.4 (+ 1.9, NS) vs. 70.5 (+ 3.0, NS) vs. 70.1 (+ 2.6, NS) Rested at home: 56.8 vs. 54.4 (-2.4, NS) vs. 53.7 (-3.1, NS) vs.  60.7 (+ 3.9, NS) vs. 57.5 (+ 0.7, NS)  Asked pharmacists for advice: 20.2 vs. 20.6 (+ 0.4, NS) vs.  21.9 (+ 1.7, NS) vs. 22.4 (+ 2.0, NS) vs. 22.4 (+ 2.2, NS) Visited a doctor: 23.3 vs. 21.8 (- 1.5, NS) vs. 19.3 (- 4.0, NS) vs. 20.3 (- 3.0, NS) vs. 18.0 (- 5.3, p< 0.05) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, Year**  **Country**  **Patient Sample Size Provider Sample Size Practice Sample Size** | **KQ5 outcomes: Intermediate outcomes, improved knowledge, improved shared decision making** | **KQ6 outcomes: Adverse**  **effects of the strategy, such as increased time burden on clinicians, sustainability, diagnostic resource use associated with POC testing, diagnostic coding** | **Comments** | |
| Wheeler, 2001  (Please refer to Andrews, 2012 systematic review) |  |  |  | |
| Wutzke, 2007  Australia  Patient N = 12,217  Provider N = 5,758  Practice N = NR | Proportion of the community reporting certain behaviors are  appropriate for cold and flu  Pre 2002 % appropriate vs. Post 2002 % appropriate  (change, p) vs. Post 2003 % appropriate (change, p) vs. Post  2004 % appropriate (change, p)  Get some rest: 89.4 vs. 89.7 (+ 0.3, NS) vs. 90.8 (+ 1.4, NS)  vs. 91.1 (+ 1.7, NS)  Drink lots of fluids: 96.4 vs. 97.8 (+ 1.4, NS) vs. 97.3 (+ 0.9, NS) vs. 97.3 (+ 0.9, NS)  Take antibiotics: 28.7 vs. 24.9 (- 3.8, NS) vs. 26.1 (- 2.6, NS)  vs. 21.7 (- 7.0, p<0.05; 95% CI, 3.5 to 10.5 | NR |  | |
| aMedian adult and pediatric ARIs per practice multiplied by number of practices | | | | |
| bMedian providers per practice multiplied by number of practices | | | | |