Table E1. Categorization of questionnaire outcomes by 4 key components of the EPR-3 guidelines

|  |  |
| --- | --- |
| **1. Assessment and monitoring of asthma severity and control** | **Question**  |
| **Assessment of impairment frequency**For what percentage of asthma visits do you document overall asthma control?For what percentage of asthma visits do you ask about patient’s ability to engage daily activities?For what percentage of asthma visits do you ask about frequency of daytime symptoms?For what percentage of asthma visits do you ask about frequency of nighttime awakening?For what percentage of asthma visits do you ask about patient’s perception of symptom control?For what percentage of asthma visits do you use control assessment tool (e.g., Asthma Control Test, Asthma Control Questionnaire, Asthma Therapy Assessment Questionnaire, etc.)For what percentage of asthma visits do you ask about frequency of rescue inhaler use (e.g., Albuterol)? |    7 8a 8b 8c 8d 8e  8f |
| **Assessment of risk frequency**For what percentage of asthma visits do you ask about frequency of emergency department visits or urgent care visits for asthma?For what percentage of asthma visits do you ask about frequency of exacerbations requiring oral steroids? | 8h 8g |
| **Objective assessment and monitoring**For what percentage of asthma visits do you ask about patient’s peak flow results from home?For what percentage of asthma visits do you perform spirometry (among those who can perform spirometry)? |  8i 8j |
| **Ongoing monitoring frequency**For what percentage of asthma visits do you assess daily use of controller medication (e.g., ICS) for patients with severe asthma?For what percentage of asthma visits do you perform repeated assessment of inhaler technique? |  9g 9h |
| **2. Patient education** |  |
| **Asthma action plans**For what percentage of asthma visits do you provide a new or review an existing written asthma action plan outlining medications, triggers, and when to seek emergency care? |   9a |
| **Asthma therapies**How often do you encounter patient misunderstandings about medication risks or side effects or belief in myths (e.g., muscle development, addiction)?How often do you encounter patient concerns about short-term side effects of inhaled corticosteroids (e.g., thrush)?How often do you encounter patient concerns about long-term side effects of inhaled corticosteroids (e.g., delayed growth in children)?How often do you encounter confusion between symptom relief medications and daily controller medications? |   13a 13b  13c  13d |
| **3. Control of environmental factors** |  |
| For what percentage of asthma visits do you assess triggers at home (e.g., pets, mold, tobacco smoke)?For what percentage of asthma visits do you assess triggers at school or workplace (e.g., mold, dust, exhaust, fumes, chemicals)?For what percentage of asthma visits do you test allergic sensitivity via skin or allergen-specific IgE (e.g., RAST) testing?For the following 7 questions, under what circumstances do you make the following recommendations about environmental exposures: 1) Most asthma patients, 2) Only patients with sensitivity to this trigger, or 3) Rarely or never recommend:Using dust mite control measures (e.g., mattress covers)?Controlling household mold and pests (e.g., cockroaches)?Removing pets from home?Avoiding pollen (e.g., limit outdoor time, close windows)?Avoiding air pollution (e.g., ozone warnings)?Making changes to cooking appliances (e.g., exhaust vents)?Avoiding second-hand smoke? |   9b 9c, 9e 9f   10a  10b 10c 10d 10e 10f 10g  |
| **4. Pharmacologic treatment**  |  |
| Do you use the following medications for: 1) Symptom relief/acute exacerbation, 2) Daily long-term control, 3) Add on daily control therapy, 4) Difficult to control asthma, 5) Never useShort acting beta agonists Inhaled corticosteroidsLong acting beta agonists (LABA)Combination medication that includes both LABA and ICS Leukotrine modifiers Anticholinergics Methylxanthines OmalizumabShort course of oral/injectable corticosteroidsLong course of oral corticosteroids (> 10 days) |   11a 11b 11c 11d 11e 11f 11g 11h 11i 11j |

NOTE: \* Response categories included (except where noted): Almost always (≥75% of the time), Often (25-<75% of the time), Sometimes (1%-24% of the time), Never (0% of the time)

\* 2012 Asthma Supplement Questionnaire is available at: <https://www.cdc.gov/nchs/data/ahcd/2012_NAMCS_Asthma_Supplement.pdf>

Source: National Center for Health Statistics, 2012 National Asthma Survey of Physicians: National Ambulatory Medical Care Survey

Table E2. Agreement and self-efficacy with the EPR-3 guidelines

|  |  |
| --- | --- |
| **A. Assessment of agreement** | **Question**  |
| Spirometry is an essential component of a clinical evaluation for asthma diagnosis in patients able to perform it (please do not include peak flow monitoring as spirometry)Inhaled corticosteroids are the most effective medications to control persistent asthmaAsthma action plans are an effective tool to guide patient self-management effortsPatients with persistent asthma should have follow-up visits at least every 6 months to assess controlAssessing asthma severity is necessary to determine initial therapy |   5a  5b 5c 5d  5e |
| **B. Assessment of self-efficacy**  |  |
| Using spirometry data as a component of a clinical evaluation for an asthma diagnosis in patientsAssessing underlying asthma severity using standard criteriaPrescribing the appropriate dose of inhaled corticosteroidsEvaluating the need to step up controller therapyEvaluating the need to step down controller therapy |  6a 6b 6c 6d 6e |

NOTE: \* Response categories: A) Agreement categories: Strongly agree, agree, neutral, disagree, strongly disagree; B) Self-efficacy categories: Very confident, somewhat confident, not at all confident, do not perform

\*\* 2012 Asthma Supplement Questionnaire is available at: <https://www.cdc.gov/nchs/data/ahcd/2012_NAMCS_Asthma_Supplement.pdf>

Source: National Center for Health Statistics, 2012 National Asthma Survey of Physicians: National Ambulatory Medical Care Survey

Table E3. Strong agreement and high self-efficacy with individual EPR-3 recommendations (n=1355)

|  |  |  |
| --- | --- | --- |
|  | Strong agreement, % (SE)a |  |
| Questionnaire item | Total | Family/ General Medicine | Internal Medicine  | Pediatrics | CHC Mid-level Clinicians  | p-value |
| “Spirometry is an essential component of a clinical evaluation for an asthma diagnosis in patients able to perform it (please do not include peak flow monitoring as spirometry)” | 35.4 (2.3) | 36.2 (3.5) | 40.7 (5.5) | 29.4 (4.1) | 33.1 (4.6) | .18 |
| “Inhaled corticosteroids are the most effective medications to control persistent asthma” | 48.1 (2.4) | 42.8 (3.5) | 46.2 (5.5) | 61.1 (4.3) | 41.1 (4.5) | .02 |
| “Asthma action plans are an effective tool to guide patient self-management efforts” | 29.6 (2.1) | 24.2 (3.1) | 27.5 (4.6) | 40.1 (4.4) | 31.5 (4.7) | .29 |
| “Patients with persistent asthma should have follow-up visits at least every 6 months to assess control” | 48.5 (2.4) | 42.4 (3.6) | 49.1 (5.7) | 58.0 (4.1) | 48.9 (5.0) | .29 |
| “Assessing asthma severity is necessary to determine initial therapy” | 50.1 (2.4) | 42.7 (3.5) | 52.7 (5.7) | 58.4 (4.2) | 52.8 (5.2) | .27 |
| Overall agreement indexc | 11.6 (1.4) | 7.7 (1.4) | 16.4 (3.8) | 10.8 (2.7) | 17.4 (3.8) | .05 |
|  | High self-efficacy, % (SE)b |  |
| “Using spirometry data as a component of a clinical evaluation for an asthma diagnosis in patients able to perform it” | 37.4 (2.4) | 42.0 (3.6) | 51.8 (5.7) | 20.3 (3.3) | 21.2 (3.6) | <.001 |
| “Assessing underlying asthma severity using standard criteria” | 49.7 (2.4) | 45.3 (3.6) | 50.3 (5.6) | 58.0 (4.3) | 45.5 (4.9) | .02 |
| “Prescribing the appropriate dose of inhaled corticosteroids” | 65.0 (2.2) | 64.5 (3.5) | 60.3 (5.4) | 72.6 (3.8) | 60.5 (4.5) | .09 |
| “Evaluating the need to step up controller therapy” | 64.5 (2.3) | 64.8 (3.5) | 58.8 (5.6) | 70.1 (4.2) | 64.1 (4.7) | .47 |
| “Evaluating when to step down controller therapy” | 49.7 (2.4) | 46.0 (3.6) | 52.0 (5.6) | 57.6 (4.4) | 37.8 (4.9) | .03 |
| Overall self-efficacy indexc | 21.3 (2.2) | 20.0 (2.8) | 35.8 (5.8) | 12.6 (2.5) | 8.7 (2.3) | <.001 |

a The percentage responding “strongly agree” to the question.

b The percentage responding “very confident” to the question.

c The percentage responding “strongly agree” to all agreement questions, or “very confident” to all self-efficacy questions.

Table E4. Adjusted OR “almost always” adhering to assessment- and monitoring recommendations: Guideline component 1

|  | Documt control | Normal activity | Daytime sympt | Night waking | Sympt control | Control tool | Rescue med | Oral steroid | ED visit freq | Peak flow | Perform spiro | Med use | Inhaler tech |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Primary care specialty (referent: FM/GM)** |
|  Internal med | 0.6(0.3-1.1) | 0.9(0.5-1.6) | 0.9(0.5-1.5) | 0.9(0.5-1.6) | 0.6(0.4-1.1) | 0.4\*(0.2-0.9) | 0.8(0.4-1.4) | 0.9(0.5-1.5) | 1.1(0.6-1.9) | 0.7(0.3-1.8) | 1.6(0.6-4.5) | 0.7(0.4-1.2) | 0.7(0.3-1.5) |
|  Pediatrics | 1.2(0.7-1.9) | 2.6\*(1.7-4.2) | 2.8\*(1.7-4.6) | 2.7\*(1.6-4.5) | 1.1(0.7-1.8) | 2.1\*(1.2-4.0) | 2.2\*(1.3-2.7) | 2.2\*(1.3-3.5) | 2.0\*(1.2-3.1) | 1.2(0.6-2.5) | 1.5(0.6-3.6) | 1.1(0.7-1.7) | 2.0\*(1.1-3.6) |
|  CHC mid-level | 1.1(0.6-2.1) | 0.9(0.6-1.6) | 0.9(0.6-1.6) | 0.9(0.5-1.4) | 0.4\*(0.3-0.7) | 1.3(0.6-2.8) | 0.8(0.5-1.5) | 0.6\*(0.4-1.0) | 0.8(0.5-1.2) | 0.6(0.2-1.6) | 1.5(0.5-4.5) | 0.9(0.5-1.5) | 1.2(0.6-2.7) |
| **Frequency of specialist referral (referent: never/sometimes)** |
|  Often | 0.8(0.5-1.3) | 0.8(0.5-1.3) | 0.9(0.5-1.4) | 1.1(0.7-1.6) | 0.7(0.5-1.1) | 0.6(0.3-1.1) | 0.9(0.6-1.4) | 0.9(0.5-1.4) | 1.1(0.7-1.7) | 2.1\*(1.1-4.2) | 0.6(0.3-1.5) | 0.9(0.6-1.3) | 2.0\*(1.2-3.3) |
|  Always | 1.5 (0.7-3.4) | 3.3\*(1.3-8.3) | 3.8\*(1.5-9.3) | 2.6\*(1.1-6.3) | 2.1(0.9-4.6) | 3.2\*(1.3-7.7) | 1.6(0.6-4.7) | 2.0(0.9-4.6) | 2.1(0.9-5.1) | 5.2\*(1.9-14) | 10.6\*(4.2-26) | 1.7(0.7-4.5) | 13.8\*(5.6-34) |
| **Index of agreement with guideline recommendations (referent: less than strongly agree)** |
|  Strong | 1.3(0.7-2.5) | 1.4(0.8-2.7) | 1.3(0.7-2.4) | 1.2(0.6-2.2) | 0.8(0.4-1.4) | 1.3(0.6-2.6) | 2.8\*(1.5-5.5) | 1.0(0.5-1.9) | 1.3(0.8-2.4) | 1.8(0.8-4.2) | 1.4(0.6-3.2) | 1.7(1.0-3.0) | 0.9(0.4-1.9) |
| **Index of self-efficacy with guideline recommendations (referent: less than high self-efficacy)** |
|  High self-efficacy | 2.0\*(1.1-3.4) | 2.7\*(1.5-4.8) | 3.0\*(1.6-5.6) | 2.1\*(1.2-3.6) | 2.1\*(1.2-3.6) | 2.0\*(1.1-3.7) | 3.8\*(2.0-7.2) | 5.2\*(3.0-9.1) | 4.0\*(2.1-6.9) | 4.6\*(2.2-9.5) | 7.5\*(3.3-16) | 3.0\*(1.6-5.4) | 3.6\*(1.9-6.9) |
| **Provider age group (referent: <40 years)** |
|  40-59 years | 0.8(0.5-1.4) | 0.7(0.4-1.2) | 0.7(0.4-1.1) | 0.6\*(0.3-1.0) | 0.7(0.4-1.7) | 1.0(0.5-1.8) | 0.7(0.4-1.2) | 0.6(0.4-1.0) | 0.9(0.5-1.4) | 0.6(0.3-1.4) | 0.7(0.3-1.9) | 0.7(0.4-1.2) | 0.5\*(0.3-0.9) |
|  60+ years | 0.8(0.4-1.6) | 0.8 (0.4-1.4) | 0.5\*(0.3-0.9) | 0.5\*(0.3-1.0) | 0.8(0.4-1.5) | 1.5(0.7-3.4) | 0.6(0.3-1.2) | 0.6(0.4-1.1) | 1.0(0.5-1.7) | 1.3(0.5-5.5) | 1.2(0.6-2.5) | 0.5\*(0.3-0.9) | 0.6(0.3-1.4) |
| **Provider sex (referent: male)** |
| Female | 1.1(0.7-1.8) | 1.3(0.8-1.9) | 1.2(0.8-1.7) | 1.3(0.9-2.0) | 1.1(0.8-1.7) | 0.9(0.5-1.5) | 1.6(1.0-2.4) | 1.4(0.9-2.1) | 1.8\*(1.2-2.6) | 1.6(0.8-3.2) | 1.2(0.6-2.5) | 1.2(0.8-1.8) | 1.3(0.8-2.2) |

Table E4 continued. Adjusted OR “almost always” adhering to assessment- and monitoring recommendations: Guideline component 1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Documt control | Normal activity | Daytime sympt | Night waking | Sympt control | Control tool | Rescue med | Oral steroid | ED visit freq | Peak flow | Perform spiro | Med use | Inhaler tech |
| **Census region (referent: West)** |
|  Northeast | 2.8\*(1.5-5.2) | 1.0(0.5-1.8) | 1.6(0.9-3.1) | 1.4(0.7-2.6) | 1.3(0.7-2.4) | 1.3(0.6-3.1) | 0.7(0.3-1.3) | 1.1(0.6-2.1) | 1.1(0.6-2.0) | 3.8\*(1.5-9.4) | 1.7(0.6-4.9) | 1.2(0.6-2.1) | 2.2(0.9-5.1) |
|  Midwest | 1.3(0.7-2.4) | 1.3(0.7-2.4) | 2.7(1.5-4.9) | 1.8\*(1.0-3.2) | 1.6(0.9-2.8) | 1.2(0.5-2.5) | 1.8(0.9-5.5) | 1.2(0.7-2.1) | 1.2(0.7-2.2) | 3.2\*(1.3-8.1) | 0.5(0.2-1.5) | 1.6(0.9-2.8) | 2.0(0.9-4.1) |
|  South | 1.3 (0.7-2.2) | 1.2(0.7-2.1) | 1.7(1.0-2.9) | 1.2(0.7-2.1) | 1.5(0.9-2.6) | 0.8(0.4-1.7) | 0.8(0.5-1.5) | 1.1(0.6-1.8) | 1.1(0.6-1.8) | 2.6\*(1.1-6.0) | 1.0(0.4-2.7) | 1.0(0.6-1.8) | 1.5(0.7-3.3) |
| **Urbanization (referent: Large metro)** |
|  Med/Small Metro | 0.8(0.5-1.3) | 1.2(0.8-1.8) | 1.6\*(1.0-2.5) | 1.5(1.0-2.3) | 0.9(0.6-1.4) | 0.7(0.4-1.3) | 1.2(0.8-1.9) | 1.1(0.7-1.6) | 1.2(0.8-1.8) | 0.6(0.3-1.2) | 0.9(0.4-2.1) | 0.9(0.6-1.5) | 1.1(0.6-2.0) |
|  Non-metro | 0.8(0.5-1.3) | 1.2(0.8-2.0) | 0.9(0.6-1.5) | 1.2(0.8-1.9) | 1.3(0.8-2.0) | 0.9(0.5-1.9) | 0.9(0.5-1.5) | 0.7(0.4-1.1) | 0.8(0.5-1.4) | 0.3\*(0.1-0.8) | 0.2\*(0.1-0.7) | 0.8(0.5-1.2) | 1.1(0.6-2.1) |

Notes: Model adjusted for all covariates shown in the table. Primary care specialty, index of agreement, index of self-efficacy and frequency of referral frequency are shown in Figure 2.

\*P<0.05, 95% confidence interval excludes 1.0

Source: National Center for Health Statistics, 2012 National Asthma Survey of Physicians, National Ambulatory Medical Care Survey

Table E5. Adjusted OR of “almost always” adhering to asthma action plan and environmental assessment recommendations: Guideline components 2,3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Provide asthma action plan | Assess triggers at home | Assess triggers at school and/or work | Perform allergy testing |
| **Primary care specialty (referent: FM/GM** |
|  Internal med | 0.6 (0.3-1.5) | 0.9 (0.5-1.6) | 1.3 (0.7-2.2) | 1.5 (0.5-4.7) |
|  Pediatrics | 2.9\* (1.6-5.2) | 1.5 (0.9-2.4) | 0.8 (0.5-1.3) | 0.9 (0.3-2.4) |
|  CHC mid-level | 1.7 (0.8-3.3) | 1.1 (0.7-1.9) | 0.8 (0.4-1.4) | 0.4 (0.1-1.3) |
| **Frequency of specialist referral (referent: never/sometimes)** |
|  Often | 1.2 (0.7-2.0) | 1.2 (0.8-1.9) | 1.9\* (1.2-3.0) | 1.7 (0.6-4.4) |
|  Always | 3.0\* (1.3-7.0) | 2.6\* (1.1-6.0) | 3.6\* (1.4-9.6) | 33.4\* (11.6-96.0) |
| **Index of agreement with guideline recommendations (referent: less than strongly agree)** |
|  Strong | 1.4 (0.7-2.6) | 1.3 (0.7-2.3) | 1.1 (0.6-2.2) | 0.3\* (0.1-0.9) |
| **Index of self-efficacy with guideline recommendations (referent: less than high self-efficacy)** |
|  High self-efficacy | 3.9\* (2.0-7.6) | 3.8\* (2.2-6.8) | 4.2\* (2.3-7.7) | 9.6\* (3.4-27.4) |
| **Provider age group (referent: <40 years)** |
|  40-59 years | 0.5\* (0.2-0.8) | 1.1 (0.7-1.8) | 1.0 (0.6-1.6) | 0.9 (0.3-2.5) |
|  60+ years | 0.6 (0.3-1.3) | 1.1 (0.6-2.0) | 0.7 (0.4-1.4) | 0.2\* (0.0-1.0) |
| **Provider sex (referent: male)** |
| Female | 1.5 (0.8-2.6) | 1.3 (0.9-2.0) | 0.9 (0.6-1.3) | 1.3 (0.6-2.8) |
| **Census region (referent: West)** |
|  Northeast | 1.1 (0.5-2.4) | 1.6 (0.8-3.0) | 1.4 (0.7-2.6) | 1.2 (0.3-4.3) |
|  Midwest | 1.6 (0.8-3.4) | 1.5 (0.8-2.6) | 1.5 (0.8-2.6) | 1.1 (0.2-6.2) |
|  South | 1.0 (0.5-2.1) | 1.0 (0.6-1.7) | 1.4 (0.8-2.5) | 2.4 (0.9-6.6) |
| **Urbanization (referent: Large metro)** |
|  Med/Small Metro | 0.9 (0.5-1.7) | 1.3 (0.8-1.9) | 1.4 (0.9-2.3) | 0.6 (0.2-1.4) |
|  Non-metro | 0.5 (0.2-1.1) | 1.0 (0.6-1.7) | 0.9 (0.6-1.5) | 0.5 (0.2-1.8) |

Notes: Model adjusted for all covariates shown in the table. Primary care specialty, index of agreement, index of self-efficacy and frequency of referral frequency are shown in Figure 2.

\*P<0.05, 95% confidence interval excludes 1.0

Source: National Center for Health Statistics, 2012 National Asthma Survey of Physicians, National Ambulatory Medical Care Survey