Quality indicators and quantitative metrics for responsible antibiotic use, lessons from DRIVE-AB project

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DRIVE AB RE-INVESTMENT IN R&D AND RESPONSIBLE ANTIBIOTIC USE

imi innovative medicines initiative

ND4BB

efpia

DRIVE-AB

- Funded by the Innovative Medicines Initiative
- New Drugs for Bad Bugs program
- 16 public and 7 private partners from 11 countries

- Provide answers to the following issues:

  - Reduce antibiotic resistance through responsible antibiotic use

  - Identify how to incentivise the discovery and development of new novel antibiotics through new economic models

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DRIVE – AB objectives

- **Define "responsible" use of antibiotics**
- Set, communicate and revise public health priorities
- Develop antibiotic valuation models
- Create, test and validate new economic models

October 2014 → October 2017

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Background (WP 1A)

- Antibiotic use is frequently inappropriate, both in the outpatient and intpatient settings[1,2]
- Antibiotic consumption varies significantly across countries[3]
- There is a huge methodological variability in the evaluation of antibiotic use

Need for standardized indicators and metrics
for an appropriate qualitative and quantitative evaluation
of antibiotic use

1: Adriaenssens N et al., J Antimicrob Chemoth 2011
2: Hulscher ME et al., Lancet Infect Dis 2010
3: http://ecdc.europa.eu/en/healthtopics/antimicrobial_resistance/esac-net-database/Pages/database.aspx

Objectives (WP1A)

Obtain global consensus on:

1. Definition of responsible antibiotic use
2. Quality indicators of responsible antibiotic use
3. Quantity metrics of responsible antibiotic use

Methods: definitions

- A quality indicator reflects the degree in which an antibiotic prescription is correct or appropriate.

> example: 'Empirical antibiotic therapy should be prescribed according to the local guidelines'

- A quantity metric reflects the volume or the costs of antibiotic use.

> example: 'Consumption of antibiotics expressed in DDD per 1000 inhabitants and per day'

Methods: protocol

Quality Indicators (QI)		Quantity Metrics (QM)	
Inpatient (IQI)	Outpatient (OQI)	Inpatient (IQM)	Outpatient (OQM)
Radboudumc	**University of Lorraine**	**University of Rijeka**	**University of Antwerp**

Methods: protocol

4-step RAND-modified Delphi procedure

1. Systematic review of the literature
2. First online survey of a multidisciplinary expert panel
3. Face-to-face consensus meeting
4. Second online survey of the multidisciplinary expert panel

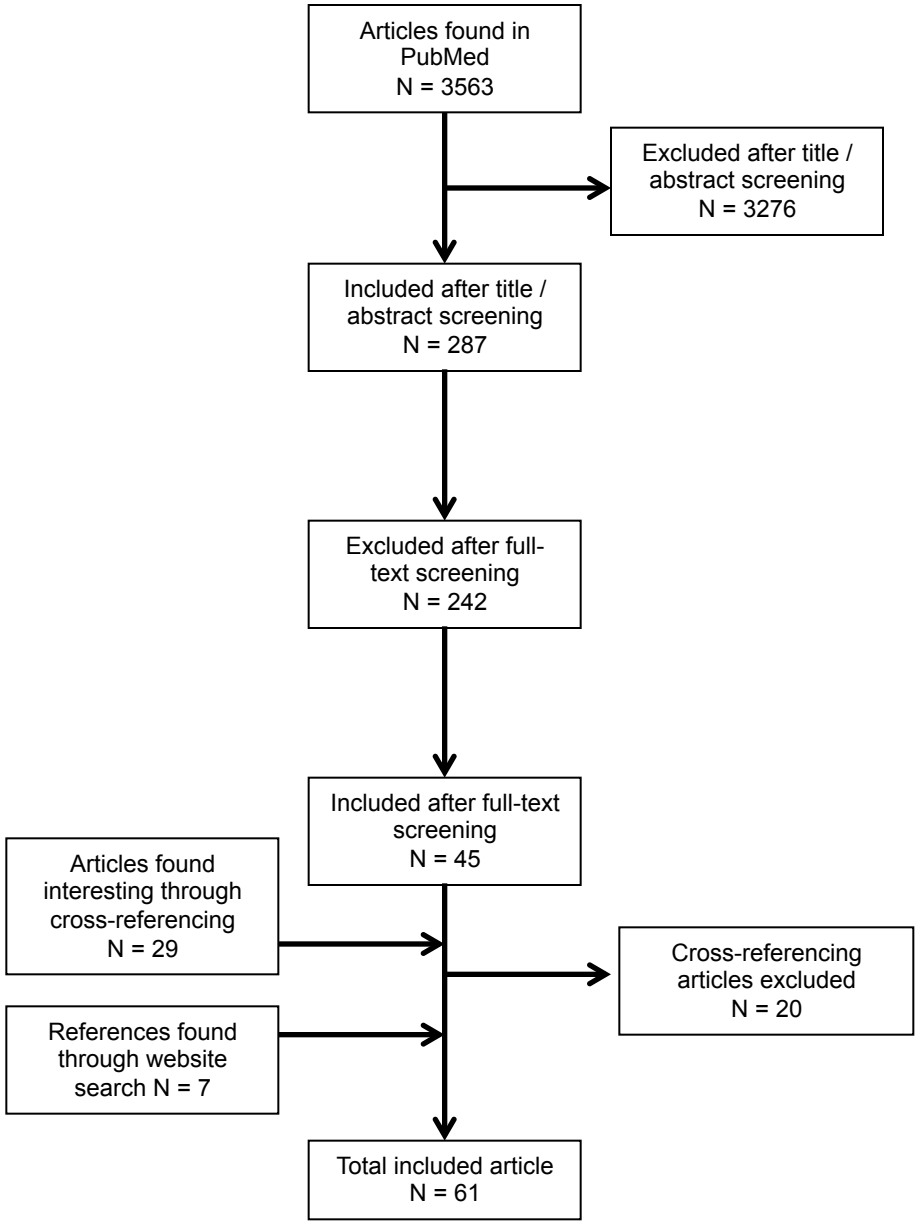
Schouten et al., Clin Infect Dis 2005;
Hermanides et al., Clin Infect Dis 2008;
Van den Bosch et al., BMC Infect Dis 2014

Systematic review

- Medline + websites' search
- 2 independent reviewers

Example: for OQIs

- 96 search terms organised around 7 « concepts »
- 3563 articles for title/abstract screening
- 325 articles for full text screening
- 61 included references



Consensus procedure (1)

DRIVE-AB stakeholders	A. Medical Community	B. Patients/ Global Public Health/Ethicists	C. R&D: Pharma/ SME, (health)-economists	D. Payers/Policy Makers/ Governments/ Regulators
Inpatient survey	5 medical specialists 2 pharmacists 3 professional societies: ESGAP/ESCMID, SPILF, ID Hellenic SC	3 (e.g. WHO, Chennai Declaration Group)	3 pharma 1 SMEs 1 Economist 2 HE	5 (e.g CDC, EMA)
Outpatient survey	3 medical specialists 2 pharmacists 3 GPs 3 professional societies: ISC, API, ISID	3 (e.g. ReAct)	4 pharma 2 SMEs	3 (e.g. CDC, ECDC)

47 stakeholders, 20 countries, 6 continents

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Consensus procedure (2)

- First online survey (SurveyMonkey®)

  - Sent to a panel of experts (stakeholders)
  - Appraisal of the relevance of indicators/metrics for 'assessing the quality of antibiotic use' or 'measuring the quantity of antibiotic use'

    ↳ Likert scale ranging from 1 to 9 + 'I cannot assess'

Median Rating Level of agreement	**Likert Scale ≥8**	**Likert Scale <8**
Agreement: ≥70 % highest percentiles	Selection	Exclusion
Disagreement: <70 % highest percentiles	Discussion	Exclusion

Consensus procedure (3)

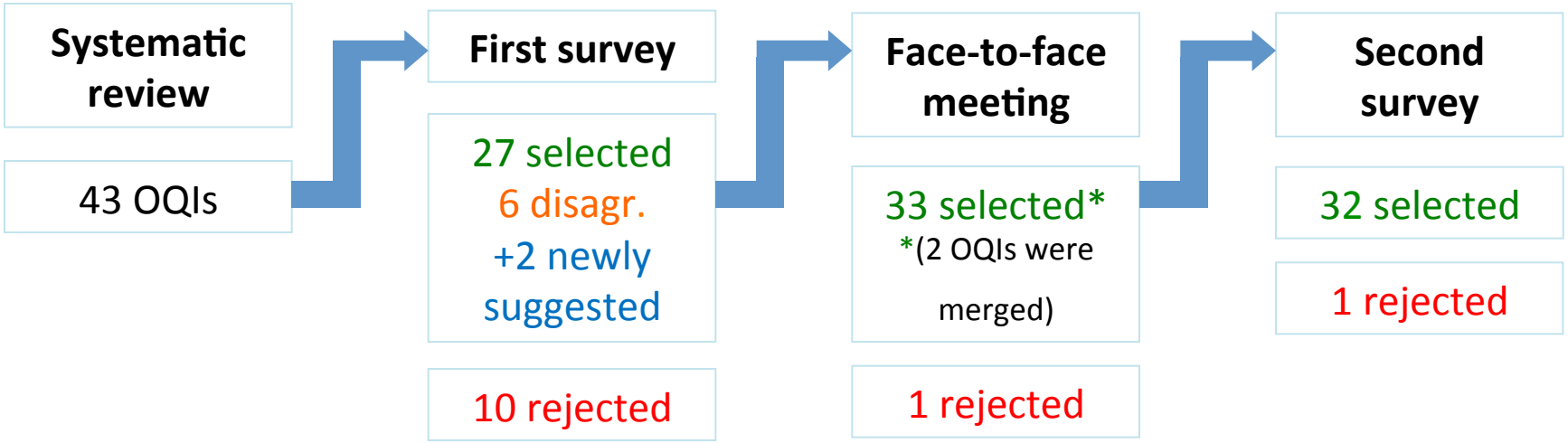
- Face to face meeting: 30th of September 2015 at Schiphol (NL)

  - Discussion among stakeholders to solve disagreements observed in the first survey
  - Evaluation of indicators/metrics newly suggested during the first survey

- Second online survey (SurveyMonkey®)

  - Final validation of indicators/metrics
    - ↳ Accept/reject + reason(s) for disagreement

Results: Outpatient quality indicators (OQIs)



Results: highest appraised OQIs

- **OQIs for general practice:**
  - OQI-3 Outpatients should receive antibiotic therapy compliant with guidelines; this includes, but is not limited to indication, choice of the antibiotic, duration, dose and timing.
  - OQI-13 Antibiotics in stock should not be beyond the expiry date.
  - OQI-14 Antibiotics that are dispensed to outpatients should be adequately labelled (patient name, antibiotic's name, when antibiotics should be taken).

- **OQIs for Outpatient Parenteral Antibiotic Treatment (OPAT):**
  - OQI-23 All OPAT plans should include dose, frequency of administration and duration of therapy.
  - OQI-25 Administered doses of OPAT intravenous therapy should be documented on a medication card.
  - OQI-30 The OPAT (Outpatient Antibiotic Parenteral Treatment) plan should be communicated to the general practitioner (GP) at discharge.

Results: one example of OQIs

OQI-5 Acute upper respiratory infections and bronchitis should not be treated with antibiotics within the first three days, unless there is documented indication for treatment

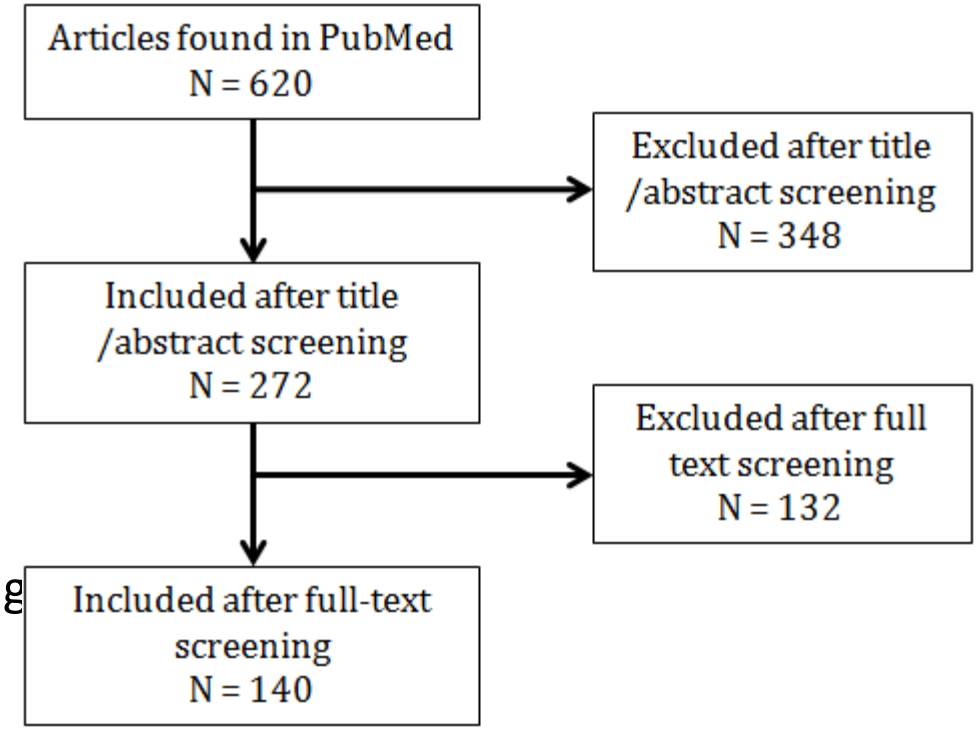
Delayed AB prescribing strategy should be agreed for patients with the included conditions	Patients with delayed prescribing	Patients with the included conditions (acute otitis media, acute sore throat/ acute pharyngitis/ acute tonsillitis, common cold, acute rhinosinusitis, acute cough/ acute bronchitis.)	NICE – 2008 (29)
Acute upper respiratory infection (AURTI)	Number of patients with an AURTI where the AB are avoided within 3 days of unique visit	Number of patients with an AURTI	Wessel – 2008 (30)
Acute otitis media	Patients > 2 yo with less than 3 days of symptoms of AOM with AB	Patients > 2 yo with AOM	Hansen – 2010 (4) Hansen – 2013 (5)
Acute bronchitis	Number of patients with an acute bronchitis where the AB are avoided within 3 days of unique visit	Number of patients with an acute bronchitis	Wessel – 2008 (30)
Acute pharyngitis	Number of patients with an acute pharyngitis where the AB are avoided within 3 days of unique visit	Number of patients with an acute pharyngitis	Wessel – 2008 (30)

Systematic review: IQIs

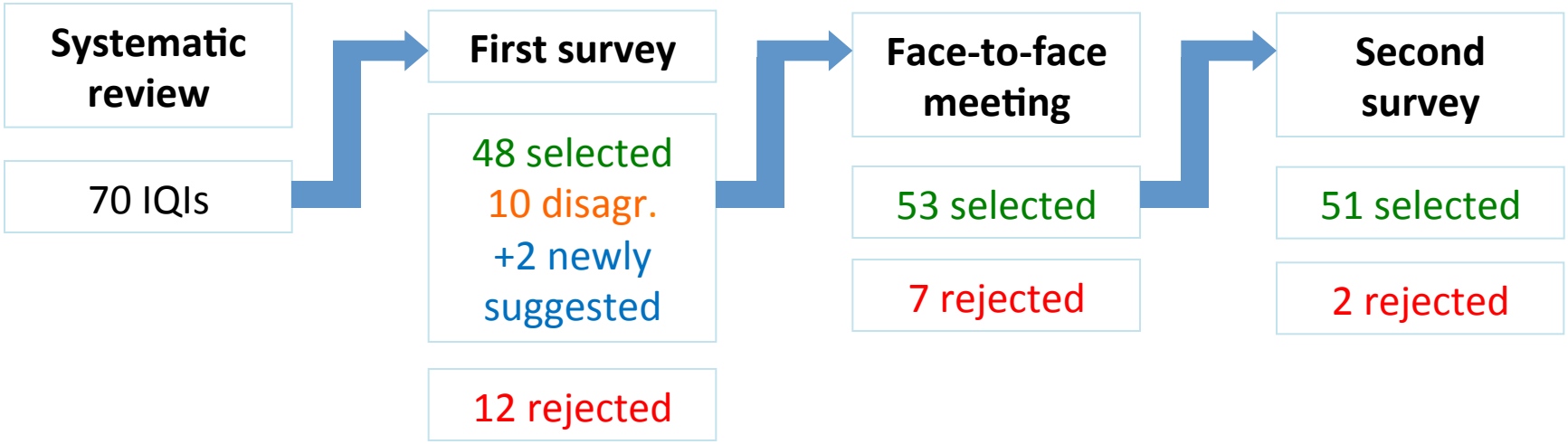
- Medline + websites' search
- 2 independent reviewers

For IQIs

- 20 search terms organised around 2 « concepts »
- 620 articles for title/abstract screening
- 272 articles for full text screening
- 140 included articles



Results: Inpatient quality indicators (IQIs)



Results: highest appraised IQIs

- IQI-9 An antibiotic stewardship programme (antibiotic prescribing control programme and/or antibiotic prescribing policy) should be in place at the health care facility.

- IQI-17 An antibiotic plan should be documented in the medical record at the start of the antibiotic treatment. (Antibiotic plan includes: indication, name, doses, duration, route, and interval of administration)

- IQI-19 The results of bacteriological sensitivities should be documented in the medical records.

- IQI-34 The local guidelines should correspond to the national guideline but should be adapted based on local resistance patterns.

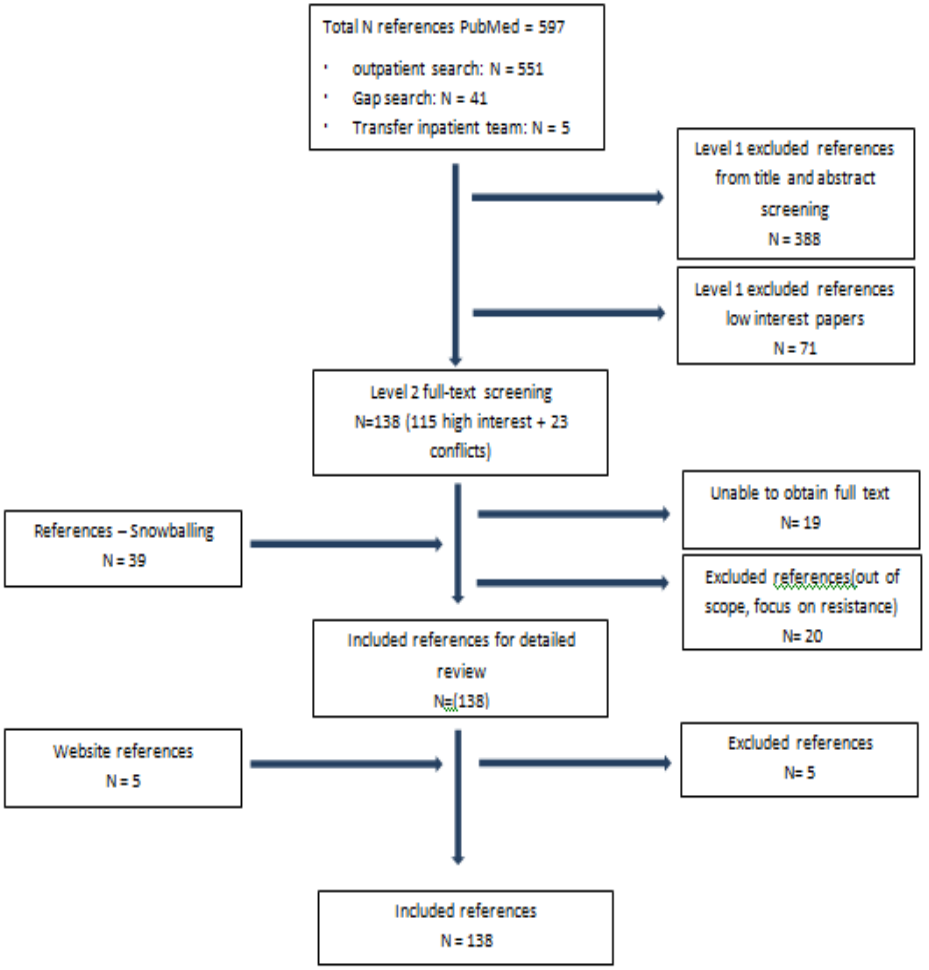
- IQI-49 Allergy status should be taken into account when antibiotics are prescribed.

Systematic review: OQMs

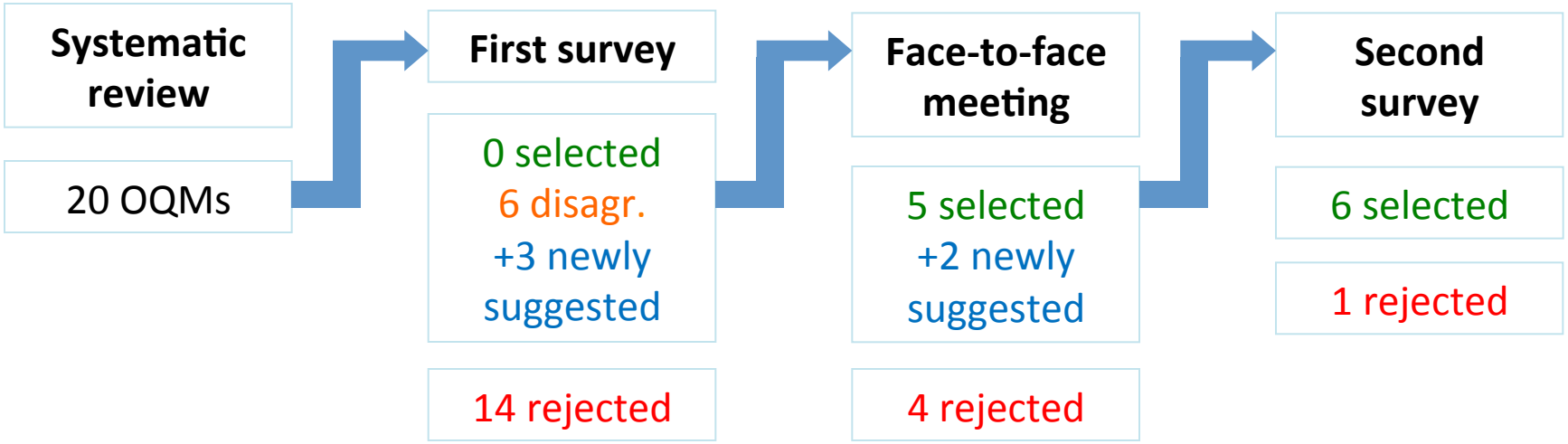
- Medline + complementary websites' search

For OQMs

- 66 OQMs based on metric numerator
- 597 articles for title/abstract screening
- 138 included articles



Results: Outpatient quantity metrics (OQMs)



Results: OQMs

OQM-1 DDD per defined population

OQM-2 Treatments/courses per defined population

OQM-3 Treatments/courses per physician contacts

OQM-4 Prescriptions per defined population

OQM-5 Prescriptions per physician contact

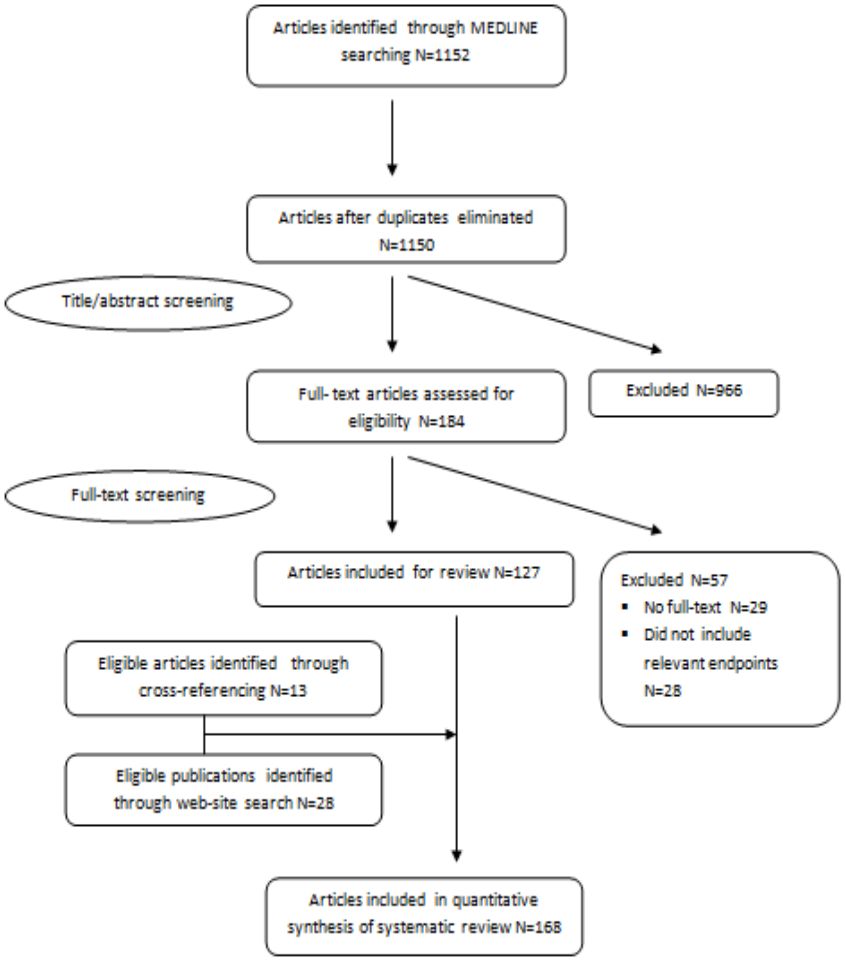
OQM-6 Seasonal variation of total antibiotic use

Systematic review: IQMs

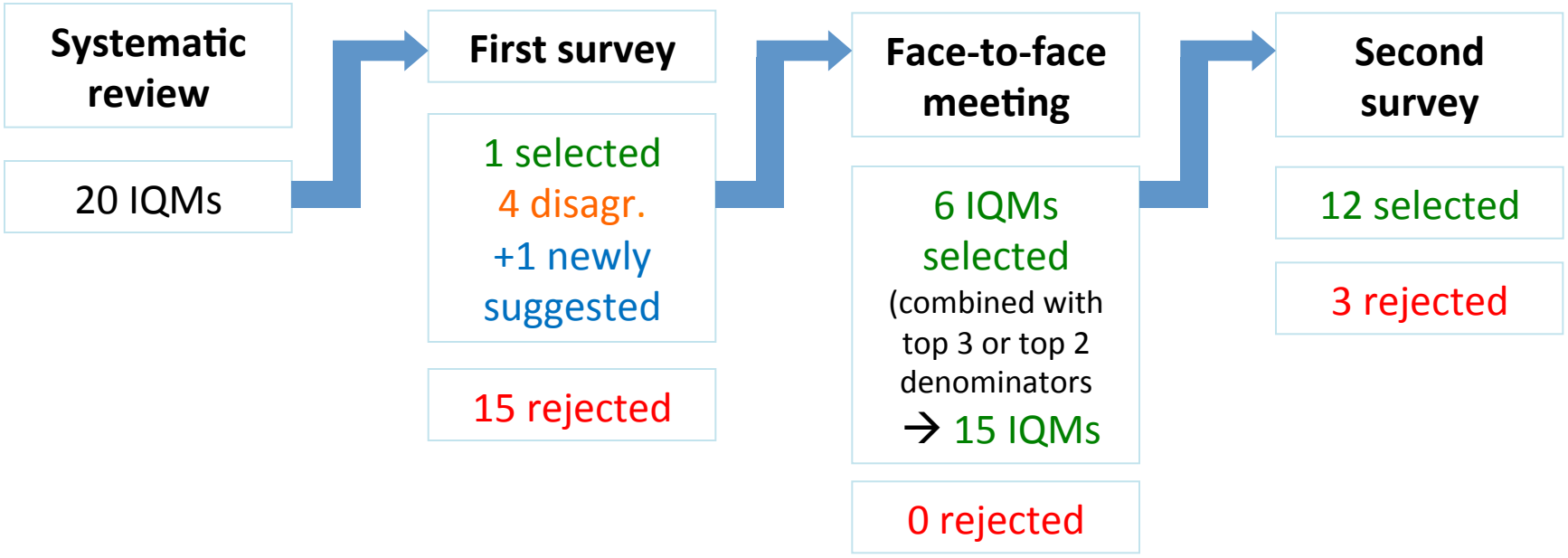
- Medline + references + websites' search
- 3 independent reviewers

For IQMs

- 73 nominator/denominator combinations organised around 20 groups
- 1150 articles for title/abstract screening
- 168 included articles



Results: Inpatient quantity metrics (IQMs)



Results: some examples of IQMs

- IQMs 1-3: **Defined Daily Dose (DDD)**
  - per 100(0) PD/ BD/ OBD
  - per Admissions
  - per (100 BD per CMI)

- IQMs 5-7: **Days of Therapy (DOT**)
  - per Patient Days
  - per Patients
  - per Admissions

- IQM-12: Antibiotic use should be preferably expressed **in at least two metrics simultaneously**

http://drive-ab.eu/wp-content/uploads/2014/09/WP1A_Final-QMs-QIs_final.pdf

Further developments of DRIVE-AB indicators and metrics

- Evaluation of feasibility in different settings
- Application in clinical studies
- Implementation in antimicrobial stewardship policies
- Use for education/teaching material

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