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The most common drug causes of preventable hospital admissions: A systematic review

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January 2005

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Background

- Three recent systematic reviews have looked at the proportion of drug related admissions[1,2,3]
- 7.1% of hospital admissions are drug-related[1]
- Two-thirds are preventable[1]
- No systematic reviews have looked at the underlying causes of preventable drug-related hospital admissions (PDRA)

1. **Winterstein** et al. Ann Pharmacother 2002; 36: 1238-48.
2. **Beijer** et al. Pharm World Sci 2003; 24: 46-54.
3. **Wiffen** et al. Bandolier extra 2002: 1-15.

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Objectives

To identify the:

1. Proportion of admissions to hospital which are drug-related and preventable
2. Drug classes most commonly causing PDRA
3. Types of “errors” most commonly associated with PDRA

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Method (1)

Databases searched from 1980 to September 2004:

- The Cochrane controlled trials register
- The Cochrane database of systematic reviews
- Index UK
- US Dissertation abstracts
- International Pharmaceutical abstracts
- MEDLINE
- EMBASE
- Cinahl
- Pharmline
- National Research Register
- Psychinfo
- Science Citation Index
- SIGLE

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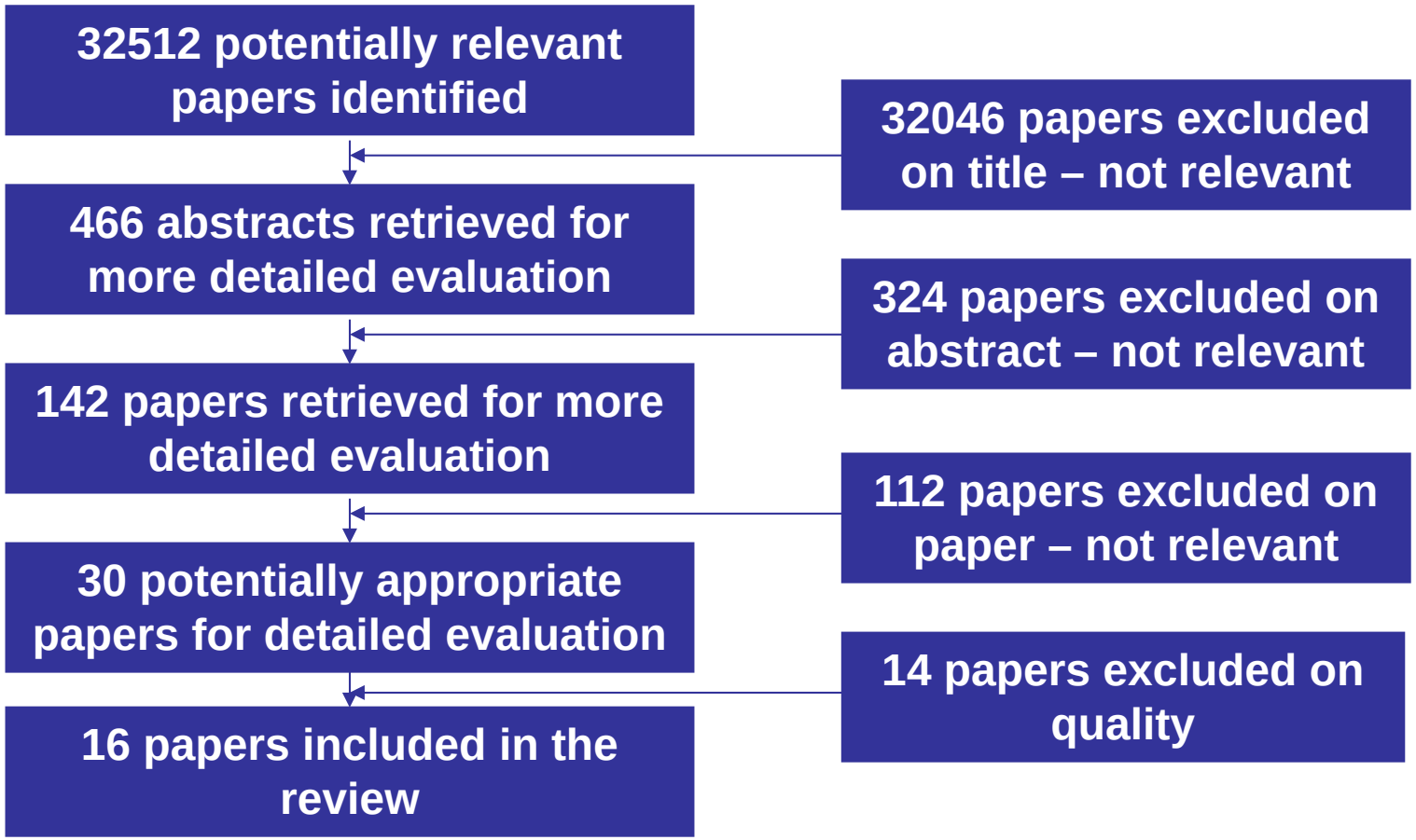
Quorum Flow Diagram



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Method (2)

Two reviewers extracted the following data:

1. Proportion of PDRA
2. Drugs causing PDRA due to ADRs, poor patient adherence, or under treatment
3. Underlying causes of PDRA (prescribing problems, monitoring problems, adherence problems)

Percentage of PDRA

Median percentage (range) of PDRA due to:

- All causes (13 studies)

  4.25% (1.36, 12.00)

- Adverse drug reactions (11 studies)

  3.13% (2.28, 8.75)

- Poor patient adherence and under treatment (7 studies)

  1.66% (0.71, 6.67)

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Drug Classes Causing PDRA

(Data from 7 studies)

Drug class	*Underlying cause of PDRA (number (%))*			
	All PDRA (n = 388)	Prescribing/ monitoring (n=244)	Under treatment (n = 45)	Poor adherence (n=97)
Cardiovascular	191 (49.2)	113 (46.3)	27 (60.0)	51 (52.6)
Analgesics (including NSAIDs)	54 (13.9)	49 (20.1)	0	5 (5.2)
CNS (excluding analgesics)	46 (11.9)	23 (9.4)	13 (28.9)	10 (10.3)
Endocrine	44 (11.3)	31 (12.7)	1 (2.2)	12 (12.4)

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Drug Groups Causing PDRA

(Data from 7 studies)

Drug group	*Underlying cause of PDRA (number (%))*			
	All PDRA (n = 388)	Prescribing/ monitoring (n = 244)	Under treatment (n = 45)	Poor adherence (n = 97)
Diuretics	66 (17.0)	45 (18.4)	1 (2.2)	20 (20.6)
NSAIDs	39 (10.1)	35 (14.3)	0	4 (4.1)
Antidiabetics (oral and parenteral)	30 (7.7)	21 (8.6)	0	9 (9.3)
Antiepileptics	27 (7.0)	6 (2.5)	13 (28.8)	8 (8.2)
Antiplatelets	19 (4.9)	13 (5.3)	4 (8.9)	2 (2.1)
Beta-blockers	19 (4.9)	10 (4.1)	5 (11.1)	4 (4.1)
Anticoagulants	16 (4.1)	12 (4.9)	0	4 (4.1)
Digoxin	14 (3.6)	10 (4.1)	1 (2.2)	3 (3.1)

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Underlying causes of PDRA

(Data from 5 studies)

Median percentage (range) of PDRA attributed to:

- Prescribing problems 31% (11, 42)
- Adherence problems 33% (21, 42)
- Monitoring problems 22% (0, 31)

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Conclusions (1)

- A number of good quality observational studies have reported the percentage of preventable drug-related admissions
- Few studies have reported the drugs and underlying causes associated with these admissions
- However, it has been possible to identify a small number of drug groups which could be targeted to help reduce PDRA

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Conclusions (2)

- Cardiovascular drugs contribute to almost 50% of PDRA, irrespective of the underlying problem
- The biggest drug group causes of PDRA associated with:
  - Prescribing or monitoring problems are diuretics and NSAIDs
  - Adherence problems are diuretics
  - Under treatment are antiepileptics