ACP CRIO
Advance Care Planning Collaborative Research & Innovation Opportunities Program

Alberta Innovates Health Solutions

Alberta Health Services

UNIVERSITY OF CALGARY

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Covenant Health

The Economics of Advance Care Planning: A Systematic Review

Konrad Fassbender
University of Alberta
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Angie Chiu, Jessica Simon, and Neil Hagen

1A: Research Highlights from ACP CRIO

Outline

1. Introduction and Background
   - Motivation for study
   - Costing process for economic evaluations
2. Previous reviews on ACP and resource use
3. Research Question
4. Methods – Systematic Search
5. Results
6. Conclusion and Recommendations

Introduction

- Primary research studies have examined the effects of ACP, at an individual- or patient-level, on costs to individuals and families, healthcare organizations and healthcare systems, and society.
- Synthesizing the results of primary studies allows us to generate a complete picture of how ACP activities affect healthcare resource use from all payer perspectives.
- Six studies that involve synthesis of primary studies on ACP and healthcare resource use were identified.

The Costing Process in Economic Evaluations

Baladi et al. (2006)

- Identification: Resources utilized for health care include inpatient care, clinic or outpatient visits, emergency visits, physician and other professional care, home care, long-term care, medication, medical devices and supplies, hospice care, or insurance or program implementation costs.
- Measurement: Through primary or secondary data gathering with administrative data or retrospective chart reviews, interviews with patients and caregivers.
- Valuation:
  - Resources identified may be measured by natural units such as days hospitalized or number of clinic visits.
  - Dollar value is assigned by calculating costs for patients, or charges to patients, insurers, and other parties.

Previous reviews on ACP and resource use

1. Systematic Review by Brinkman-Stoppelenburg et al. (2014)

- 113 studies examined.
- PICOS:
  - All populations and settings
  - Documentation (DNR, DNH, AD, DPOA, LW), Discussion, and "Complex" ACP interventions
  - Comparator: Usual or Standard Care (without ACP)
  - Outcomes examined:
    - Effects on medical treatment in the last phase of life
    - Effects on quality of life and patients' and families' satisfaction with care
    - Effects on patients' and families' prevalence and/or severity of symptoms
  - Study design: All study designs included.
- Medical treatment in the last phase of life is measured as quantitative health utilization outcomes in 'natural units' including number of admissions and length of stay.

Previous reviews on ACP and resource use

1. Systematic Review by Brinkman-Stoppelenburg et al. (2014) (cont'd)

	Utilization Outcomes [Number of studies and impacts: (+/-/mixed results/no difference)]			
	Hospitalization	**ICU use**	**Hospice and/or palliative care**	**Life-sustaining treatment**
DOCUMENTATION				
Do-not-resuscitate orders	8: (-) 4: (+) 2: (No difference)	2: (-) 3: (+) 3: (No difference)	6(+)	
Do-not-hospitalize orders	8: (-) 1: (No difference)		5: (+)	3: (-)
Advance directives/living will/DPOA	2: (-) 1: (+) 5: (No difference)		5: (+) 2: (No difference)	10: (-) 1: (Mixed results) 11: (No difference)
COMPLEX INTERVENTIONS OR DISCUSSION				
Complex ACP interventions or ACP discussions	3: (-) 1: (Mixed results)		2: (+) 3: (Mixed results)	3: (-) 2: (Mixed results)

Adapted from Brinkman-Stoppelenburg (2014)

Previous reviews on ACP and resource use

2. Literature Review by Emanuel (2006)

- 6 studies examined.
- PICOS:
  - All populations and settings
  - Intervention: Advance Directive document or participation in comprehensive ACP program (SUPPORT)
  - Comparator: Usual or Standard Care (without ACP)
  - Study design: All study designs included. Included studies had randomized control trial, retrospective observational study, and prospective observational study designs.
- Results:
  - 3 studies: Cost savings between $6000 and $64 827 (in 1995 dollars)
  - 2 studies: Cost increases between $9234 and $16500 per patient (in 1995 dollars)
  - 1 study: Showed cost savings of $198 with assessment of data from last month of life, and cost increases of $16500 from enrollment in program to death.
- Shortcomings of review: No comprehensive search strategy was carried out.

Previous reviews on ACP and resource use

3. Systematic Review by Taylor, Heyland, and Taylor (1999)

- 6 studies examined.
- PICOS:
  - Hospitalized patients only
  - Intervention: Documentation and Discussion ("Any expression of patient wishes (written, verbal or otherwise)")
  - Comparator: Usual or Standard Care (without ACP)
  - Study design: All study designs included. Included studies had randomized control trial, retrospective chart review, and prospective cohort study designs.
  - Search strategy: 5 databases systematically searched, covering period 1966 to 1997.
- Results:
  - 4 studies: Cost or charge savings between $6000 and $68427 per patient
  - 2 studies: Cost or charge increases between $9235 and $16900 per patient
- Shortcomings of review: Only included hospitalized patients.

Previous reviews on ACP and resource use

4. Systematic Review by AHFMR (2005)

- 1 study examined (Molly et al. 2000).
- PICOS:
  - Seniors 55 years of age and older, residents in a long term care facility.
  - Intervention: Documentation (AD, LW, DPAHC, DNR, Let Me Decide order)
  - Comparator: Usual or Standard Care (without ACP)
  - Study design: All study designs included. Included study had RCT design.
  - Search stategy: 8 core databases searched, covering up to year 2005.
- Results:
  - Mean hospitalization costs: Cost savings $2097 per patient
  - Mean nursing home drug costs: Cost increase $236 per patient
  - Mean program implementation costs: $113 per patient
  - Mean total cost per resident: Cost savings $1749 per patient
- Shortcomings of review: Limited study population.

Previous reviews on ACP and resource use

5. Systematic Review by Klinger, Marckmann, and in der Schmitten (2015)

- 7 studies examined.
- PICOS:
  - All population and settings.
  - Intervention: Documentation (resuscitation order, AD, LW), Discussion, or "Comprehensive" ACP programs, all of which had to include verbal communication as part of the ACP process
  - Comparator: Usual or Standard Care (without ACP)
  - Study design: All study designs included. Included studies had randomized control trial, retrospective observational, and prospective observational (longitudinal) designs.
  - Search strategy: 5 databases systematically searched.
- Results:
  - 6 studies: Cost or charge savings between $1041 and $64830 per patinet
  - 1 study: Resource use ratio of 1.05 (no evidence of cost savings)
- Shortcomings of review: No meta-analysis conducted or reported to show comparisons among heterogeneous results with different units and periods of assessments.

Previous reviews on ACP and resource use

6. Systematic Review by Dixon et al. (2015)

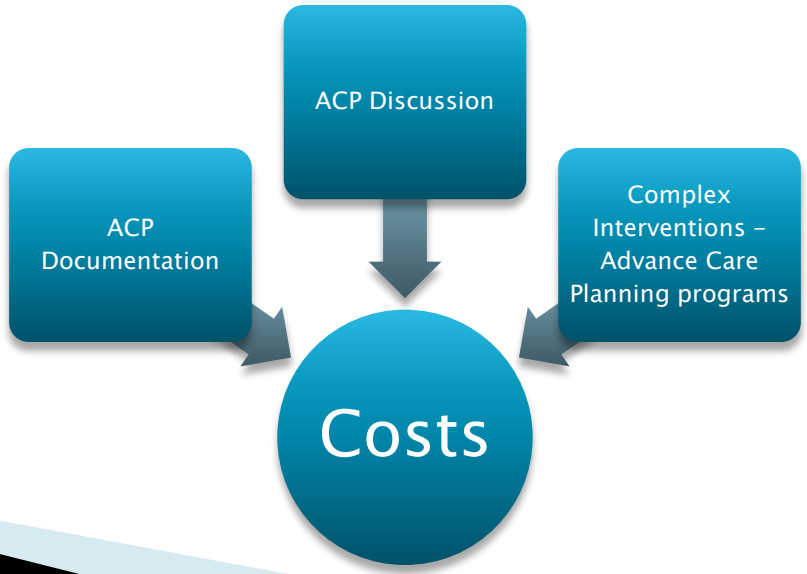
- 18 studies examined.
- PICOS:
  - All population and settings.
  - Intervention: Documentation (ADs, advance care statements or written plans), Discussion, or "programs with "substantial" ACP component
  - Comparator: Usual or Standard Care (without ACP)
  - Outcomes examined: "Costs, expenditures, savings"
- Search strategy: 7 databases systematically searched.
- Results:
  - 10 studies with cost savings
  - 5 with cost increases
  - 2 with mixed results; 1 with no comparison.
- Shortcomings of review: Did not included studies solely with medical orders (e.g. do-not-hospitalize, do-not-resuscitate).

Previous reviews on ACP and resource use

1. Limited population or study setting: restriction of study sample
2. Definition of ACP
3. Focus on non-cost outcomes
4. No formal search strategy was implemented
5. No synthesis of quantitative results was carried out

Research Question

- What is the effect of participation in Advance Care Planning activities on healthcare resource use as measured in monetary values?
  - Population: Adults
  - Intervention: Having conversations or discussions; having completed documentation (including medical orders such as DNR orders); or participating in a formal program that involves facilitation of documentation/discussion
  - Comparison: No ACP activity or usual care
  - Outcomes: Costs of care for society, institution, or payer, including patients and families
  - Study types: Observational (cross-sectional, cohort, case control), experimental (Randomized Control Trial)

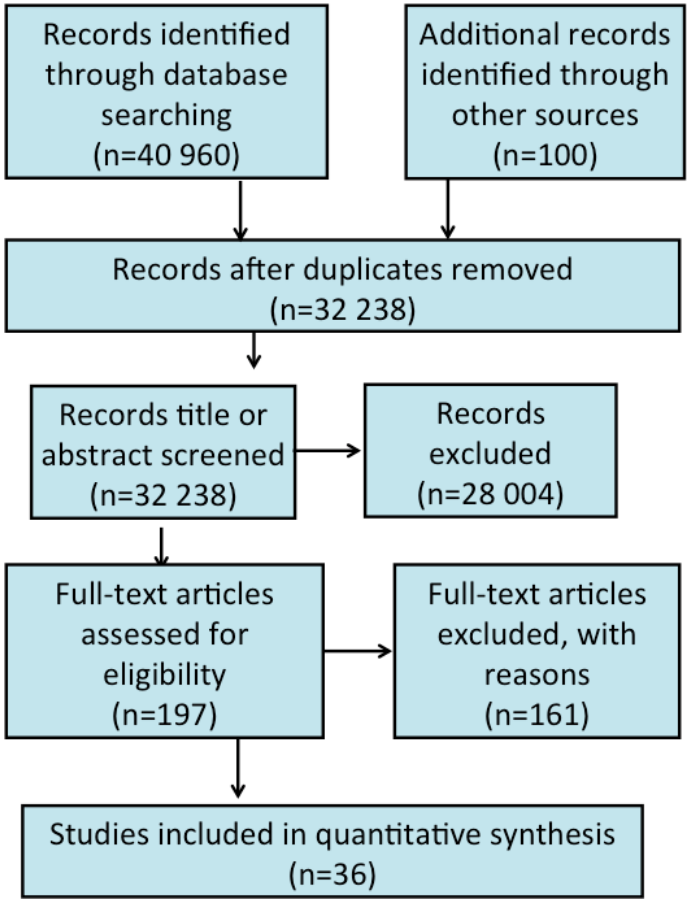


Methods: Search strategy

- An electronic database search was carried out with the following databases in April 2015.
  - Medical science and related databases: MEDLINE, CINAHL, EMBASE, PsycINFO and Social Work Abstracts
  - Systematic reviews and clinical trials: 'All EBM Reviews'
  - Grey literature: Scopus and Google Scholar were searched to capture grey literature
- No date restrictions were applied.
- Search terms:
  - Terms used for cost outcomes include the following: cost, charge, fee, expenditure, budget, economic, health economic, economic evaluation, cost-benefit analysis, cost effectiveness analysis
  - The following terms related to ACP were used:

Concept	Search terms
Advance Care Planning	Advance Care Planning, Advance Care Plan, Advance Medical Plan, End-of-life care plan
ACP Documentation	Advance Directive, Personal Directive, Power of Attorney, Resuscitation Order, Do Not Resuscitate, Goals of Care, Living Will, Healthcare Directive
Discussion/Conversation	End-of-Life discussion, End-of-life conversation
Healthcare proxy	Proxy, Substitute Decision Maker, Surrogate Decision Maker
Decision Making	End-of-life Decision, Healthcare Decision

Methods: Search strategy



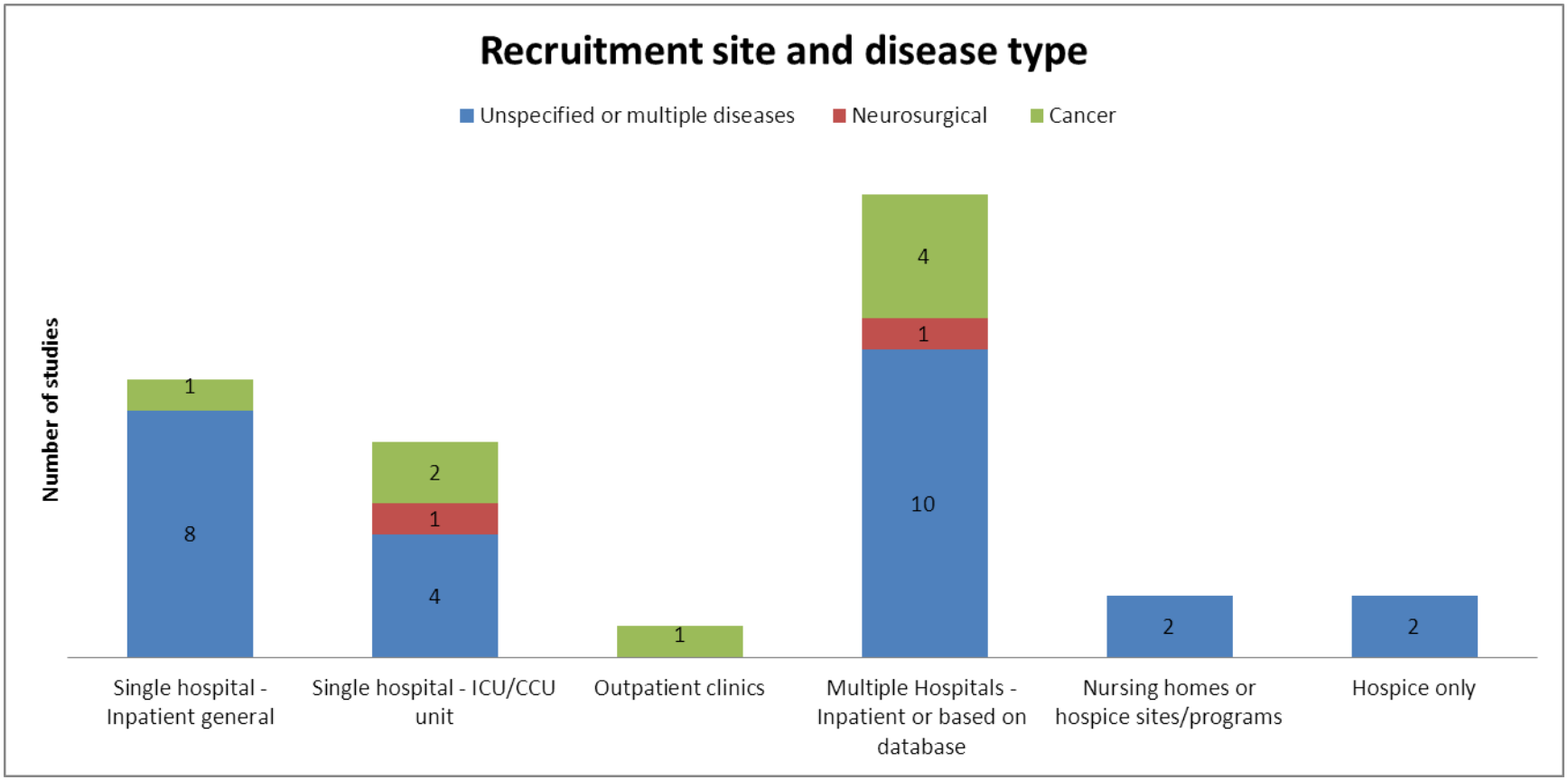
PRISMA diagram.

Selected studies

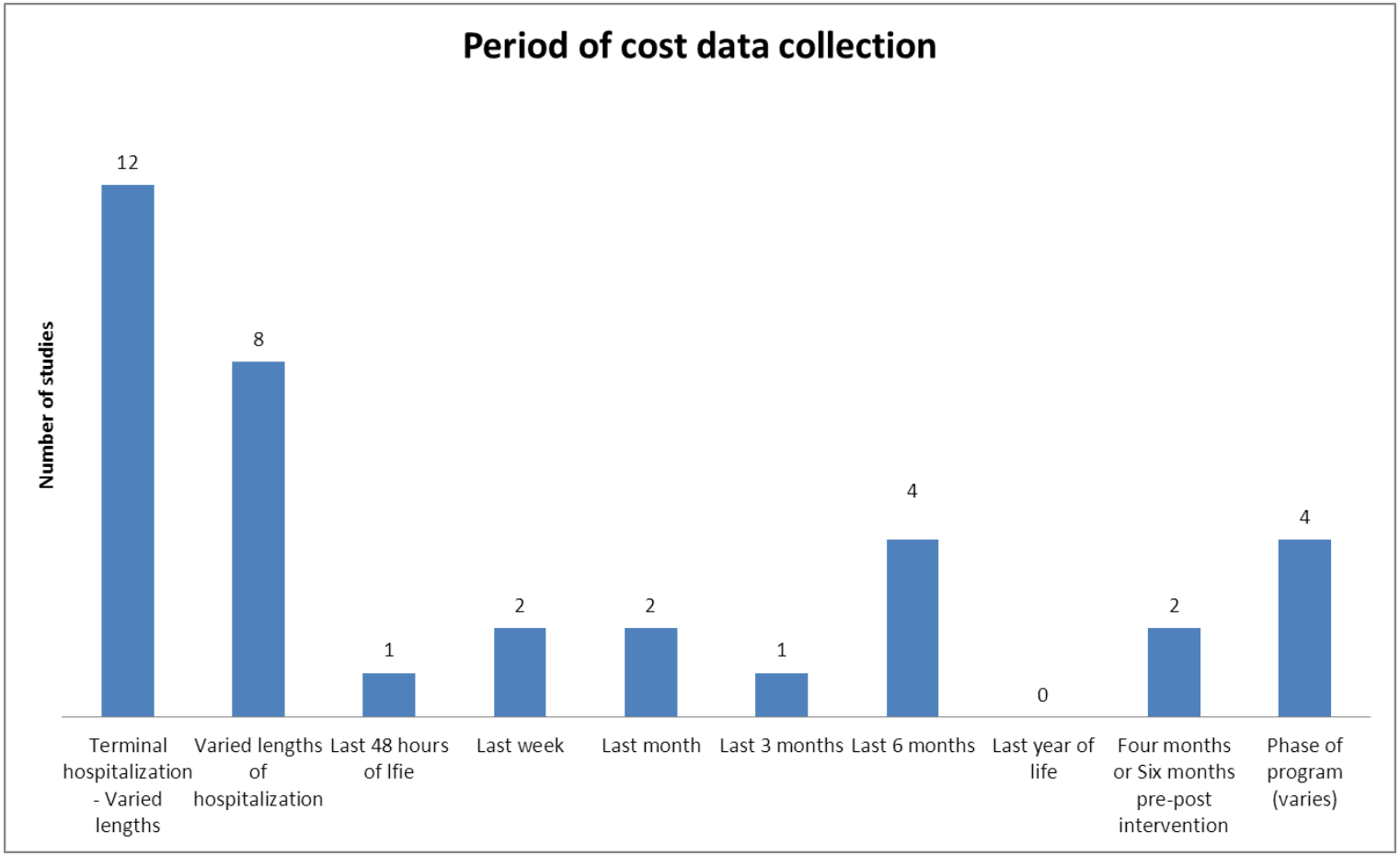
- Publication dates for studies ranged from 1992 to 2015, with data collection ranging from 1987 to 2013.

- Only four out of 36 studies were situated outside the United States, with two from the UK, one from Canada, and one from Singapore.

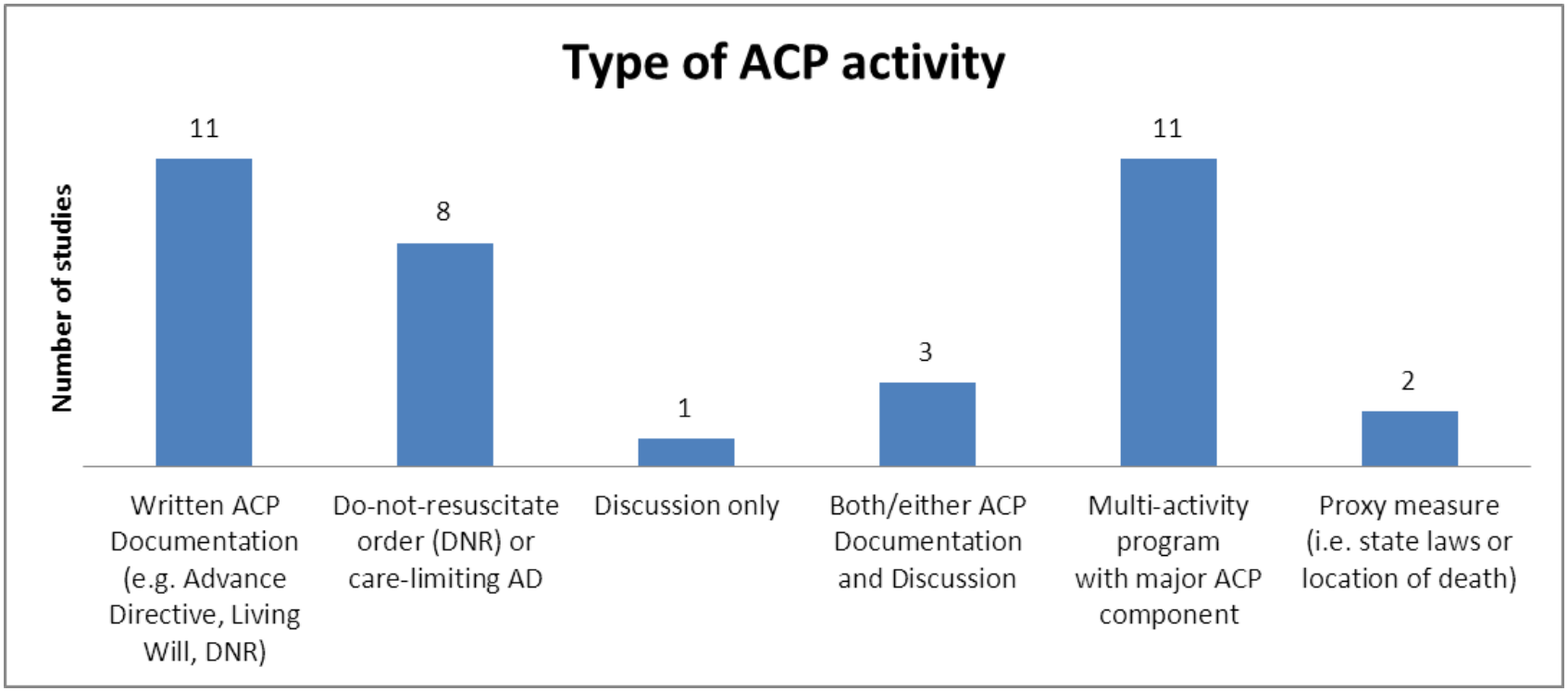
Characteristics of Selected Studies: Recruitment sites



Characteristics of Selected Studies: Period of data collection



Characteristics of Selected Studies: Type of intervention



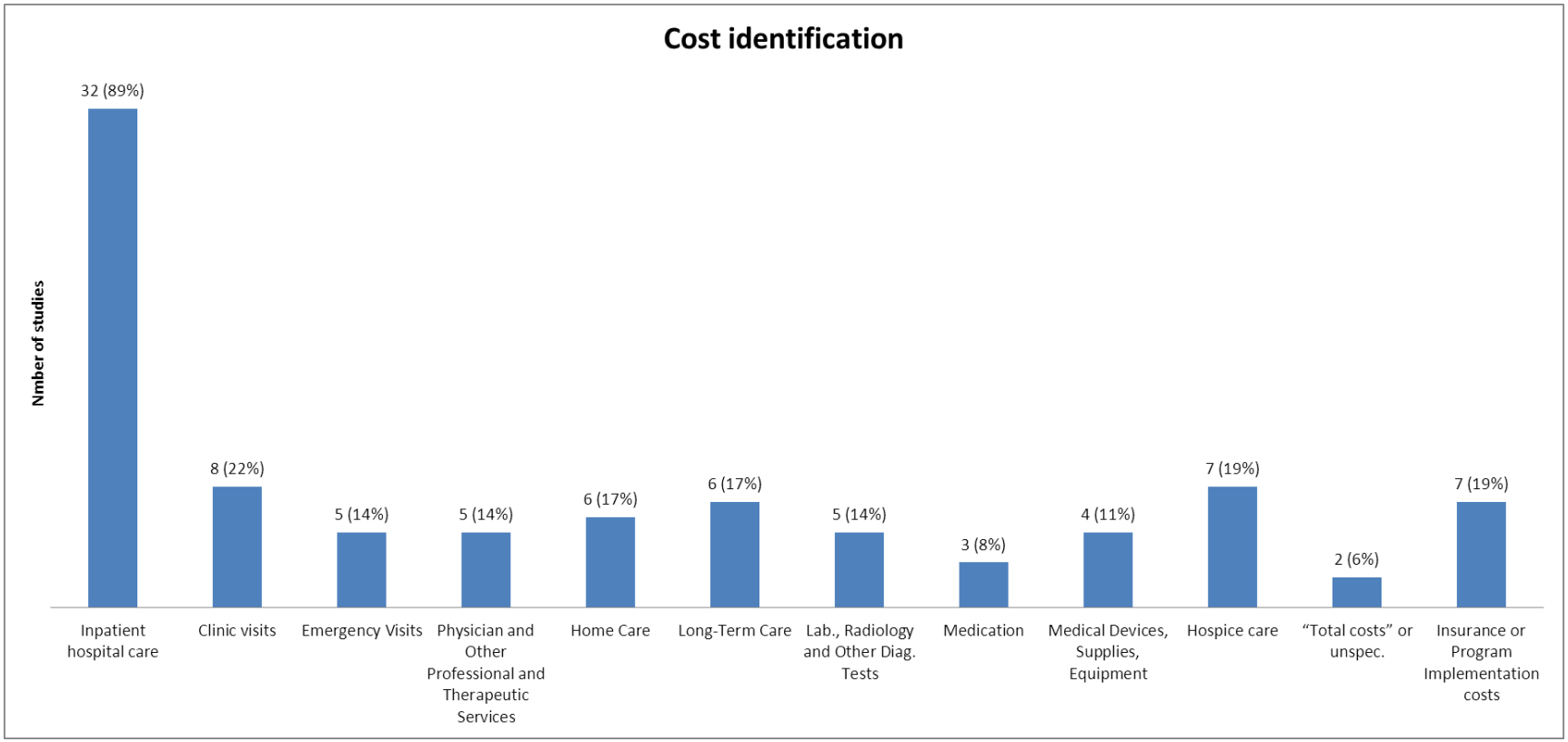
Characteristics of Selected Studies: Grading of Studies

Grading	Number of studies
Grade I: Randomized controlled trial (RCT) or RCT review	
IA	4
IB	3
Grade II: Prospective study with comparison group or retrospective study with control variables	
IIA	8
IIB	13
Grade III: Retrospective or observational or cross-sectional studies	
IIIA	1
IIIB	7

- Framework used by Higginson et al. (2002) and Dixon et al. (2015) was used to appraise the quality of evidence based on study design.
- We found that the majority of studies were observational studies.

Results: Costing characteristics of selected studies

Identification → Measurement → Valuation



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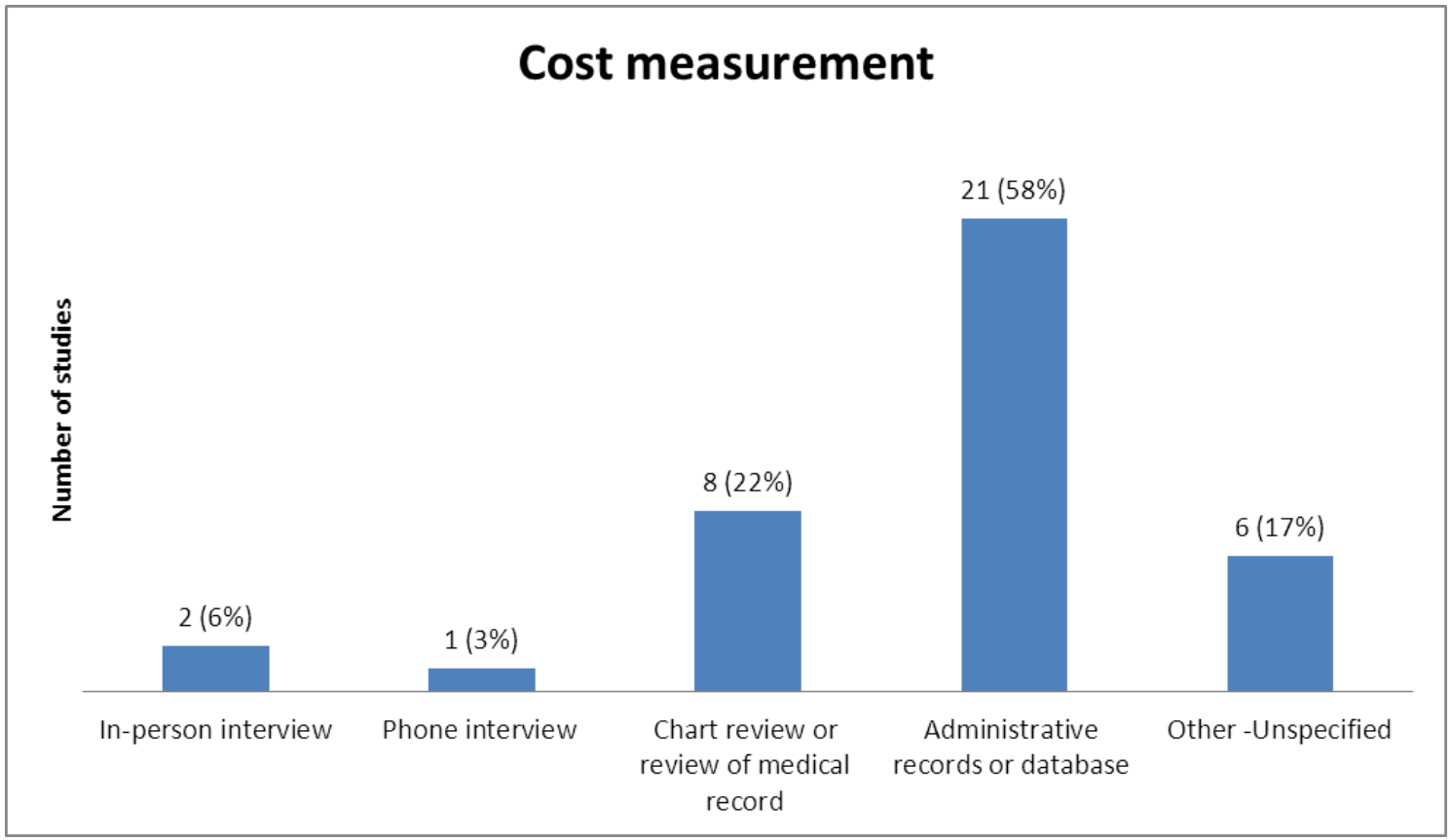
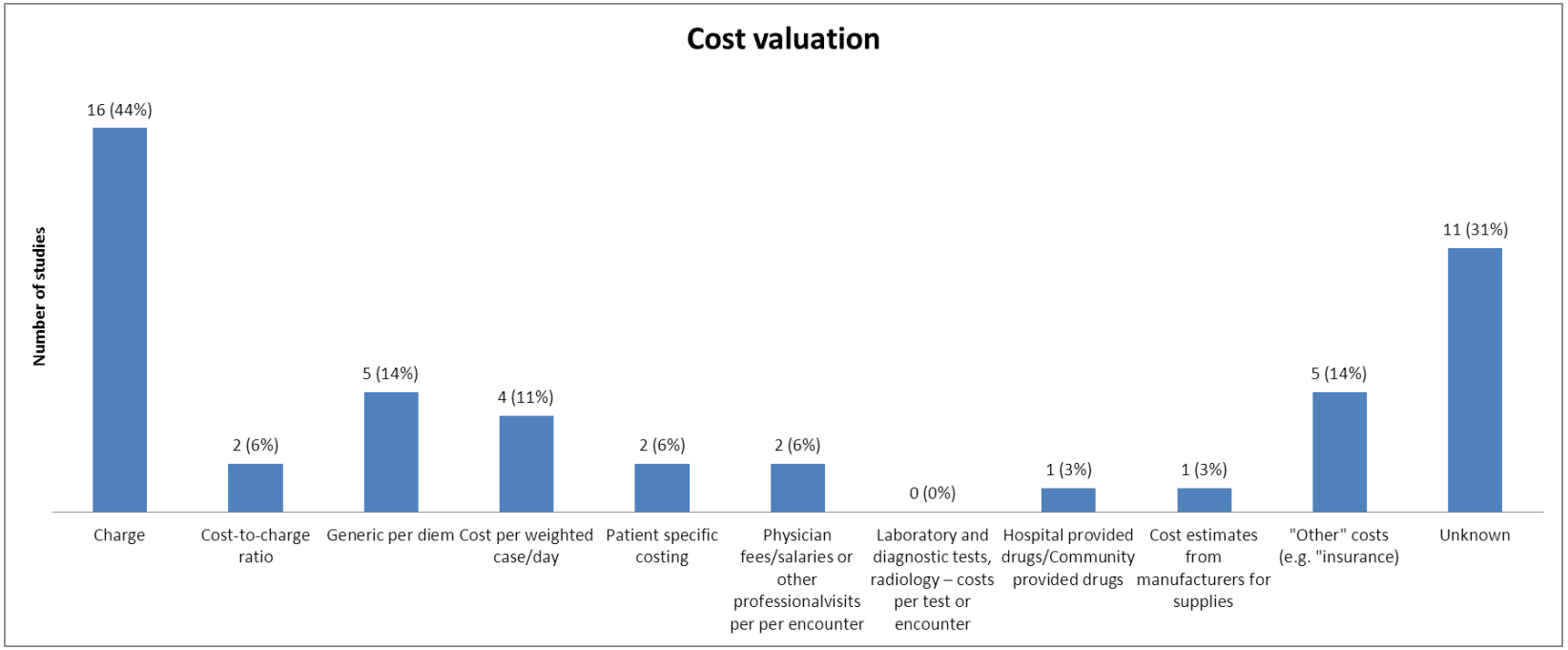


Results: Costing characteristics of selected studies

Identification → Measurement → Valuation



Results: Cost estimates

- Of the 36 identified studies, 33 studies provided estimates for mean or median costs
  - Of the 33 studies, 8 studied provided solely model-adjusted estimates for costs or charges
- 3 studies provided only modeled coefficients
- Across the 36 studies, 64 statistical comparisons were available to determine the cost differences between the intervention and comparator groups

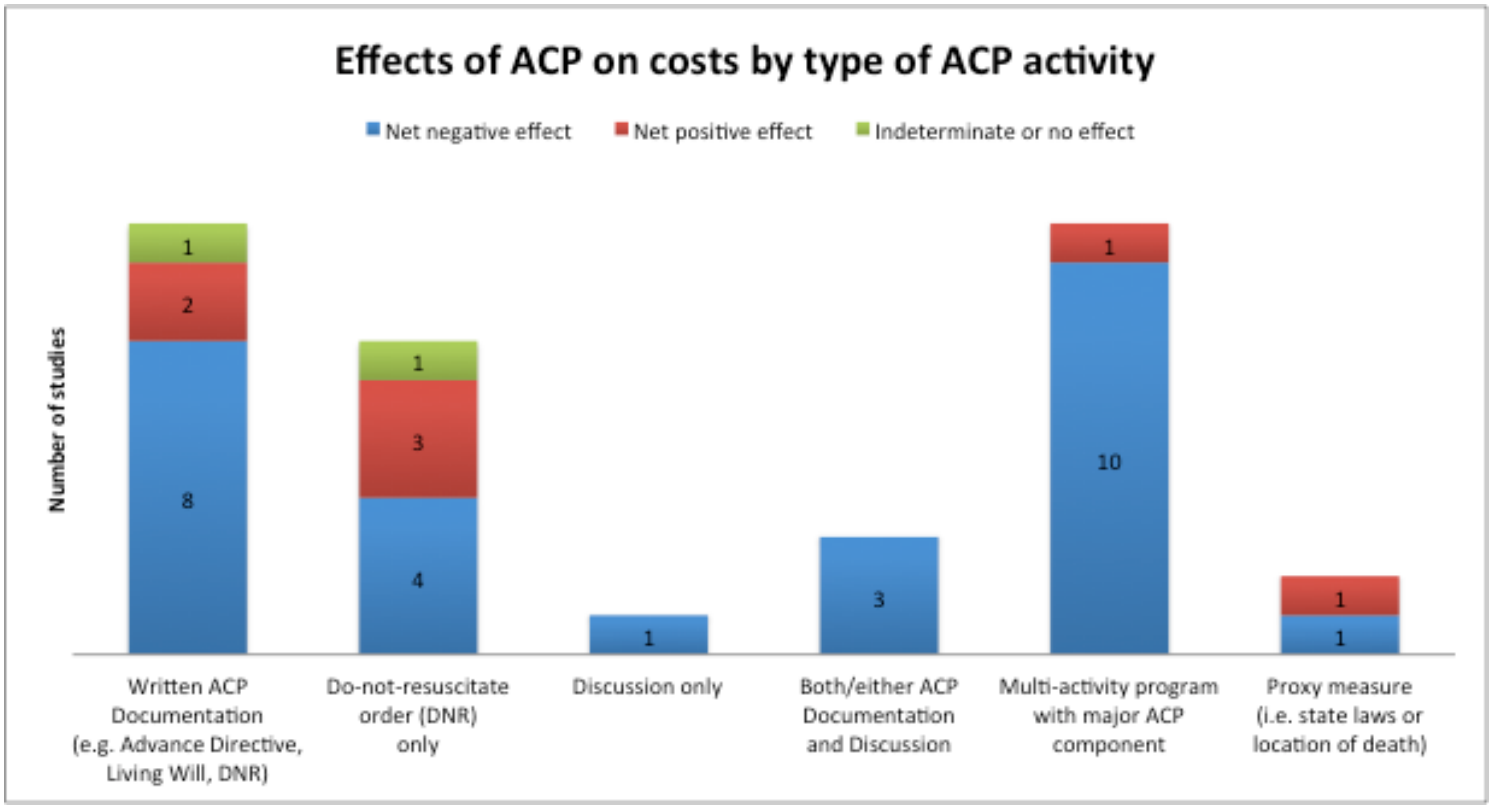
Results: Cost estimates, by observation period

		Intervention		Control		Difference due to ACP ('Control' – 'Intervention')			
	Number of studies	Minimum mean or median value	Maximum mean or median value	Minimum mean or median value	Maximum mean or median value	Minimum difference	Maximum difference	Average Nominal	Average Adjusted to 2015 USD
Terminal hospitalization	13	3151	333 020	3575	418 335	-125 000	197 097	27 518	43 229
Varied lengths of hospitalization (decedent and alive)	8	2483	241 332	2392	305 448	-2 044	64 116	9111	11 579
Last 48 hours of life	1	515	876	2883	2883	2007	2368	2188	3808
Last week	2	1876	7925	2870	9402	855	3268	1894	1941
Last month of life	2	N/A	N/A	N/A	N/A	191	494	250	388
Last 3 months of life	1	8617	8617	15746	15746	2894	7129	4769	5009
Last 6 months of life	4	14153	40363	15880	42276	-3000	11500	1809	2135
Four months or Six months pre- and post-intervention	2	12123	23000	16295	29500	3719	9271	6495	7613
Specific phase of program (varied lengths)	4	14486	57126	21252	69082	4855	11956	8305	9327

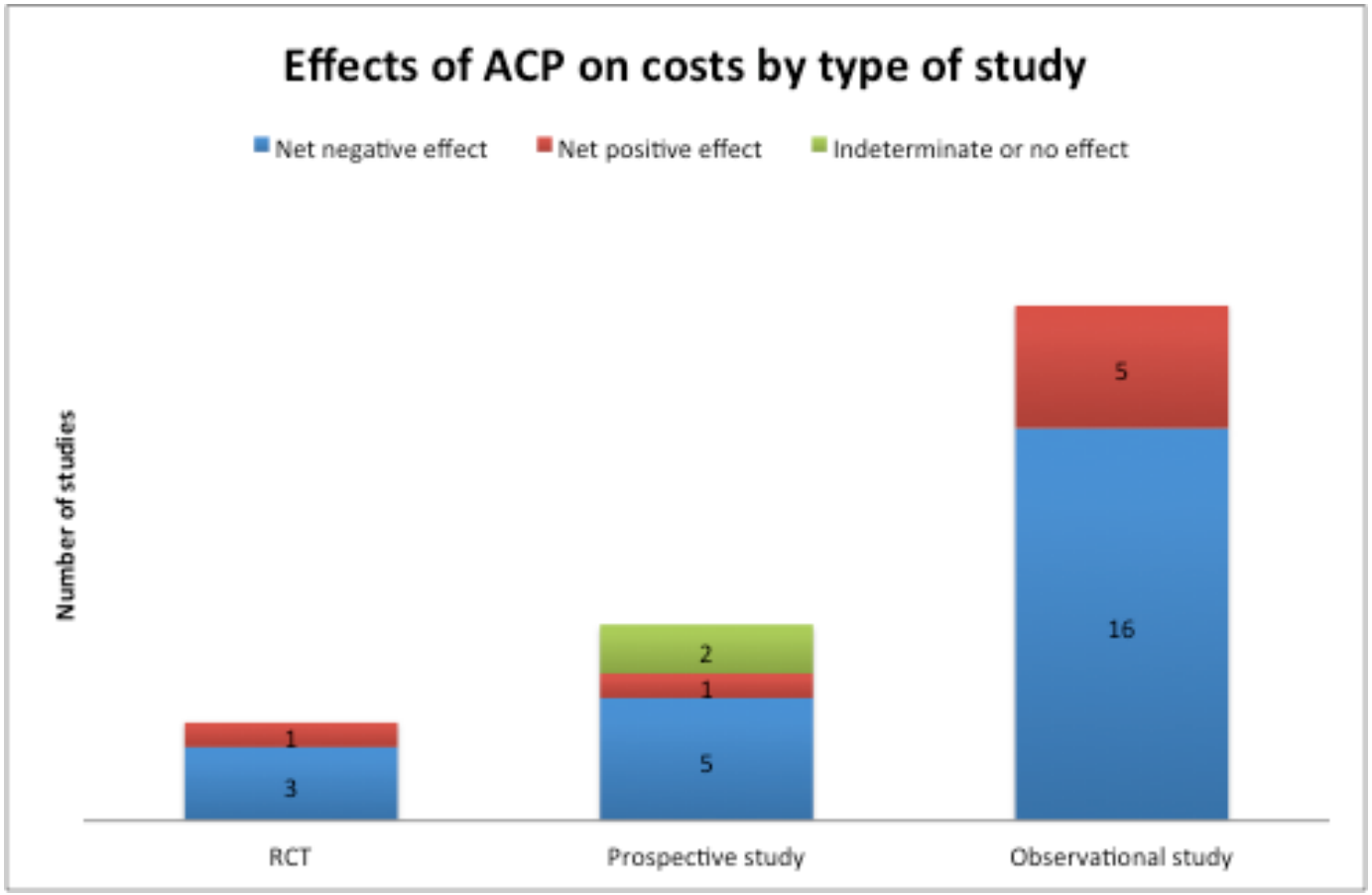
Results: Synthesis

- For the purposes of synthesizing results, each study was summarized on the basis of whether or not cost savings or cost increases were realized
  - Mean and median values shown for the entire sample was considered, even if subgroup analysis was shown
- Shortcoming of approach:
  - Differences in time periods among studies not considered
  - Summarizing by study may lead to selection bias—results of subgroup analysis
  - In some cases, statistical tests of significance were not conducted

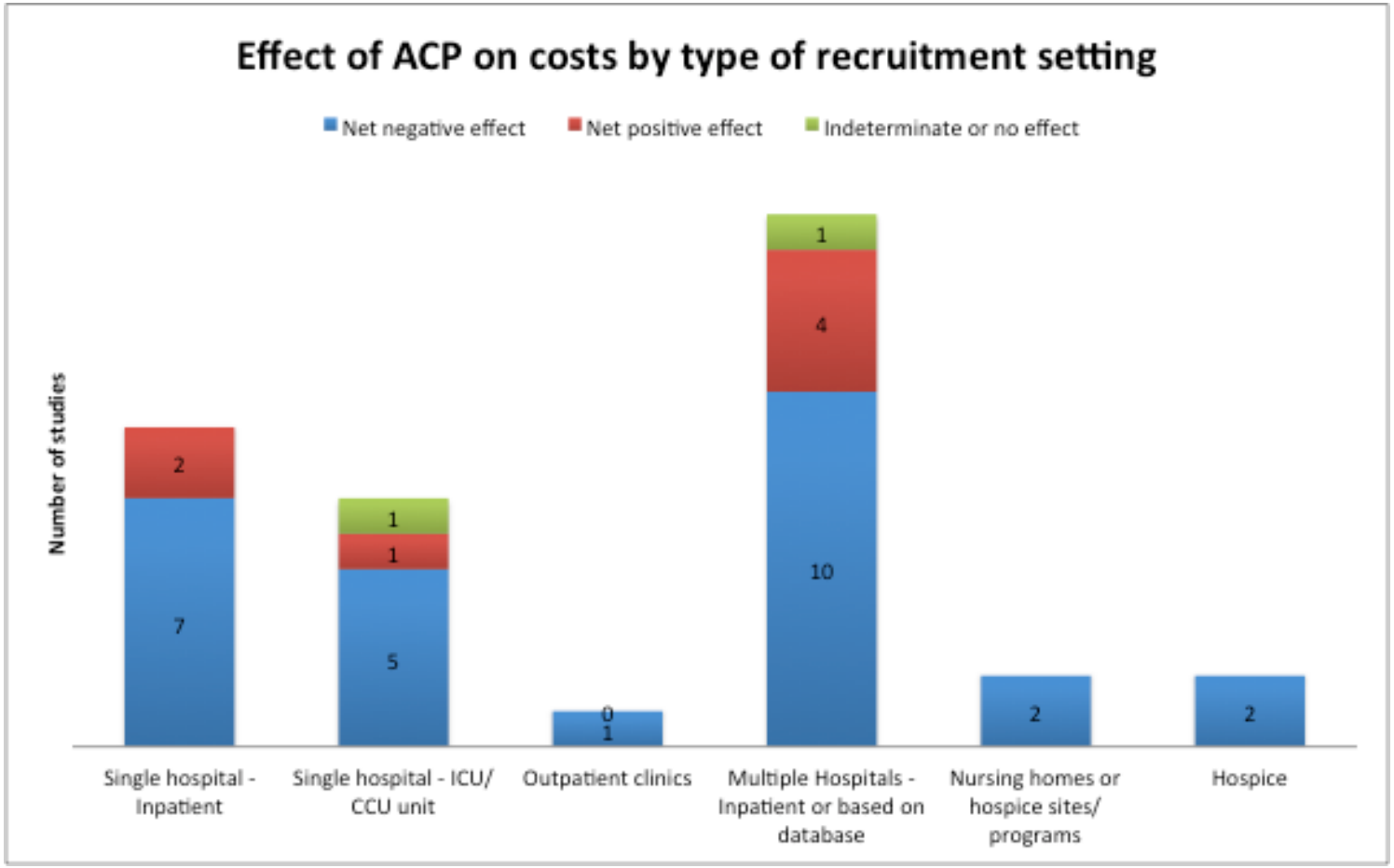
Results: Trends in cost savings by ACP activity



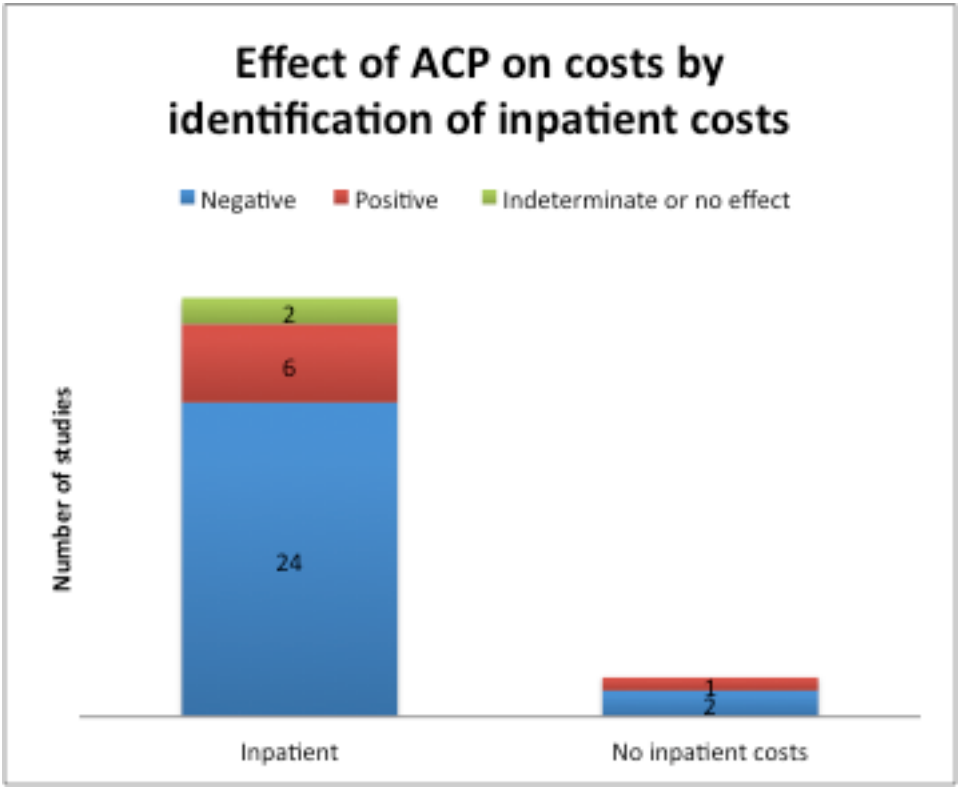
Results: Trends in cost savings by type of study



Results: Trends in cost savings by type of setting



Results: Trends in cost savings by identification of resources



Conclusion

- The findings from this study mirror those found in the other reviews
  - 27 studies showed cost decreases with ACP, 7 studies showed cost increases with ACP, and 2 studies were indeterminate.
- Across ACP interventions:
  - On studies with written and/or verbal ACP components, more than half of the selected studies showed cost savings with ACP
- Across settings and study types:
  - We find that there is consistency in findings of ACP saving; >50% across all settings and types

Limitations

- Statistical significance:
  - 11/26 studies showing cost savings had statistically significant findings
  - 1/7 studies showing cost increases had statistically significant findings
- Published estimates are modelled
- Does not account for magnitude in savings from ACP activities
- There is heterogeneity across observation periods and identification of resources:
  - Cost of administering ACP programs is not always included
  - Types of costs identified may depend on available data

Limitations (continued)

- The specific mechanisms by which costs may be reduced are not clear from this analysis:
  - Cost savings may be achieved through reallocation of specific resources or the components of hospital care, or increases or decreases in types of medical treatments performed
- Intervention types may differ:
  - Complex interventions vary in levels of ACP facilitation and provision of other services
  - Written documents may differ: some studies considered only documentation at admission
  - Further investigation needed to investigate differences in impacts of care-limiting and non-care-limiting documents

Further study

- Planned meta-analysis:
  - Strength of statistical significance will be examined
  - Analysis of variance of reported measures

- Implications for present trials:
  - Given limited scope of identification in existing studies, present ACP CRIO studies may incorporate a wider set of identified resources