

Supplemental Digital Appendices

Contents

Appendix 1. Search and text mining strategies	1
1-A. Search strategy to identify health professions education research studies eligible for manual coding: 1985, 1995, 2005, 2015	1
1-B. Search strategy to identify biomedical research studies eligible for manual coding: 1985, 2015	4
1-C. Search strategy to identify health professions education research studies eligible for automated text mining: 1970-2015	5
1-D. Text mining automated data extraction: definition and validation	7
Appendix 2. Supplemental tables	8
eTable 1. Extended description of included research studies	8
eTable 2. Number and proportion of reports with abstracts over time	10
eTable 3. Text mining analysis: Reporting of <i>P</i> values and confidence intervals in health professions education research, 1970-2015	12
eFigure 1. Text mining analysis: <i>P</i> values in health professions education research abstracts, 1970-2015	14

Appendix 1. Search and text mining strategies

1-A. Search strategy to identify health professions education research studies eligible for manual coding: 1985, 1995, 2005, 2015

We searched PubMed, including MEDLINE, Embase via Embase.com, and CINAHL via EBSCOhost in ten-year increments to locate controlled studies of educational interventions or programs for health professions learners. After exhausting all studies identified in 1985, we extended the search into 1986.

	Before deduplication ^a	After deduplication			
Year	TOTAL	MEDLINE/PubMed	Embase	CINAHL	TOTAL
1985	438	236	76	1	313 (309 ^b)
1986	414	220	48	10	278
1995	1558	807	200	54	1061
2005	5658	2181	1572	317	4070
2015	7314	3273	2022	344	5639

^a See by-database totals before deduplication below.

^b During manual review we found 2 additional duplicates, and 2 articles without abstract, leaving 309.

MEDLINE/PubMed 5/7/16

((("Acad Med"[Journal:__jrid1346] OR "Acad Psychiatry"[Journal] OR "Acad Radiol"[Journal] OR "Adv Health Sci Educ Theory Pract"[Journal:__jrid22366] OR "Adv Physiol Educ"[Journal:__jrid21755] OR "AHME J"[Journal] OR "Am J Pharm Educ"[Journal:__jrid448] OR "Anat Sci Educ"[Journal] OR "Annu Conf Res Med Educ"[Journal:__jrid632] OR "BMC Med Educ"[Journal:__jrid22345] OR "Br J Med Educ"[Journal:__jrid1836] OR "Clin Teach"[Journal] OR "Educ Health (Abingdon)"[Journal:__jrid31754] OR "Educ Prim Care"[Journal] OR "Eur J Dent Educ"[Journal:__jrid20866] OR "Indian J Med Educ"[Journal:__jrid27821] OR "Int J Med Educ"[Journal] OR "Int J Nurs Educ Scholarsh"[Journal] OR "J Adv Med Educ Prof"[Journal] OR "J Assoc Hosp Med Educ"[Journal:__jrid4454] OR "J Contemp Med Educ"[Journal] OR "J Contin Educ Nurs"[Journal:__jrid4679] OR "J Contin Educ Health Prof"[Journal:__jrid5082] OR "J Dent Educ"[Journal] OR "J Educ Eval Health Prof"[Journal] OR "J Educ Res"[Journal:__jrid27887] OR "J Healthc Educ Train"[Journal] OR "J Int Assoc Med Sci Educ"[Journal] OR "J Med Educ"[Journal:__jrid4939] OR "J Nurs Educ"[Journal] OR "J Nurs Staff Dev"[Journal] OR "J Nurses Prof Dev"[Journal] OR "J Nurses Staff Dev"[Journal] OR "J Physician Assist Educ"[Journal] OR "J Surg Educ"[Journal] OR "J Vet Med Educ"[Journal:__jrid25487] OR "Korean J Med Educ"[Journal] OR "Med Educ"[Journal:__jrid5814] OR "Med Educ (Chicago Ill)"[Journal] OR "Med Educ Online"[Journal] OR "Med Sci Educ"[Journal] OR "Med Teach"[Journal:__jrid5712] OR "Nurs Educ Perspect"[Journal] OR "Nurse Educ"[Journal] OR "Nurse Educ Pract"[Journal] OR "Nurse Educ Today"[Journal] OR "Physiol Teach"[Journal] OR "Teach Learn Med"[Journal:__jrid21959] OR "Schools, Health Occupations"[Mesh] OR "Students, Health Occupations"[Mesh] OR clerkship*[ti] OR residency[ti] OR internship*[ti] OR preceptor*[ti] OR precepting[ti] OR "Nursing Education Research"[MeSH] OR "Allied Health Personnel/education"[MeSH] OR "Health Occupations/education"[Mesh] OR "Education, Professional"[Mesh] OR didactic*[ti] OR curricul*[ti] OR ((student*[ti] OR school*[ti] OR curricul*[tiab] OR resident*[ti] OR intern[ti] OR interns[ti] OR internship*[ti]) AND (medical[ti] OR nurse*[ti] OR nursing[ti] OR pharmacy[ti] OR physician assistant*[ti] OR health profession*[ti] OR interprofessional[ti] OR dental[ti] OR dentist*[ti] OR physical therap*[ti] OR occupational therap*[ti] OR surgery[ti] OR surgical[ti] OR clinical[ti] OR gynecology[ti] OR neurosurgery[ti] OR obstetrics[ti] OR ophthalmology[ti] OR orthopedics[ti] OR otolaryngology[ti] OR urology[ti] OR internal medicine[ti] OR transitional year[ti] OR anesthesiology[ti] OR dermatology[ti] OR emergency medicine[ti] OR family practice[ti] OR neurology[ti] OR pathology[ti] OR pediatrics[ti] OR radiology[ti] OR psychiatry[ti] OR rehabilitation medicine[ti]))) AND ("Evaluation Studies" [Publication Type] OR "Evaluation Studies as Topic"[Mesh] OR "Clinical Trial" [Publication Type:NoExp] OR "Validation Studies"[Publication Type] OR "Controlled Clinical Trial"[Publication Type] OR "Multicenter Study"[Publication Type] OR "Controlled Clinical Trials as Topic"[Mesh] OR "Random Allocation"[Mesh] OR ((pretest OR pre-test OR pre) AND (posttest OR post-test OR post)) OR "Control Groups"[Mesh] OR intervention[tiab] OR (control*[tiab] AND (group*[tiab] OR trial*[tiab])) OR randomized[tiab] OR randomised[tiab] OR randomly[tiab] OR trial*[ti] OR effectiv*[ti] OR effect[ti] OR effects[ti] OR compar*[ti] OR evaluat*[ti] OR pilot study[tiab]) AND hasabstract[text]) NOT ("Editorial" [Publication Type] OR "Comment" [Publication Type] OR "Case Reports" [Publication Type] OR "Meta-Analysis" [Publication Type] OR narrative review[ti] OR systematic review[ti] OR systemic review[ti] OR "News" [Publication Type]))

AND 1985[pdat]: 236

AND 1986[pdat]: 221

AND 1995[pdat]: 807

AND 2005[pdat]: 2182

AND 2015[pdat]: 3273

Embase via Embase.com 5/7/16

((('paramedical education'/exp OR 'medical education'/exp OR 'teaching'/exp OR 'continuing education'/exp OR 'curriculum'/exp OR 'medical student'/exp OR 'resident'/exp OR 'nursing student'/exp OR 'paramedical student'/exp OR didactic*:ti OR curricul*:ti OR ((student*:ti OR school*:ti OR curricul*:ti,ab OR resident*:ti OR intern:ti OR interns:ti OR internship*:ti) AND ('health care personnel'/mj OR medical:ti OR nurse*:ti OR nursing:ti OR pharmacy:ti OR (physician NEXT/1 assistant*):ti OR (health NEXT/1 profession*):ti OR interprofessional:ti OR dental:ti OR dentist*:ti OR (physical NEXT/1 therap*):ti OR (occupational NEXT/1 therap*):ti OR surgery:ti OR surgical:ti OR clinical:ti OR gynecology:ti OR

neurosurgery:ti OR obstetrics:ti OR ophthalmology:ti OR orthopedics:ti OR otolaryngology:ti OR urology:ti OR 'internal medicine':ti OR 'transitional year':ti OR anesthesiology:ti OR dermatology:ti OR 'emergency medicine':ti OR 'family practice':ti OR neurology:ti OR pathology:ti OR pediatrics:ti OR radiology:ti OR psychiatry:ti OR 'rehabilitation medicine':ti))) AND ('intervention study'/exp OR 'clinical study'/de OR 'controlled study'/exp OR 'evaluation study'/exp OR 'validation study'/exp OR 'experimental study'/exp OR 'quasi experimental study'/exp OR 'control group'/exp OR 'pretest posttest design'/exp OR 'randomization'/exp OR ((pretest OR pre-test OR pre) AND (posttest OR post-test OR post)):ti,ab,de OR intervention:ti,ab OR (control*:ti,ab AND (group*:ti,ab OR trial*:ti,ab)) OR randomized:ti,ab OR randomised:ti,ab OR randomly:ti,ab OR trial*:ti OR effectiv*:ti OR effect:ti OR effects:ti OR compar*:ti OR evaluat*:ti OR 'pilot study':ti,ab) AND [abstracts]/lim) NOT ('systematic review'/exp OR 'editorial'/exp OR 'note'/exp OR 'case report'/exp OR 'meta analysis'/exp OR 'narrative review':ti OR 'systematic review':ti OR 'systemic review':ti OR 'conference abstract'/it)

AND [1985-1985]/py: 201

AND [1986-1986]/py: 177

AND [1995-1995]/py: 615

AND [2005-2005]/py: 2766

AND [2015-2015]/py: 3343

CINAHL via EBSCOhost: 5/7/16

((MH "Education, Health Sciences") OR (MH "Education, Clinical+") OR (MH "Education, Competency-Based") OR (MH "Education, Allied Health+") OR (MH "Education, Chiropractic") OR (MH "Education, Dental") OR (MH "Education, Medical, Continuing") OR (MH "Education, Nursing, Continuing") OR (MH "Education, Nursing, Diploma Programs") OR (MH "Education, Nursing, Graduate") OR (MH "Education, Nursing, Doctoral") OR (MH "Education, Nursing, Post-Doctoral") OR (MH "Education, Nursing, Masters") OR (MH "Education, Interdisciplinary") OR (MH "Education, Medical") OR (MH "Education, Midwifery") OR (MH "Education, Pharmacy") OR (MH "Education, Podiatry") OR (MH "Education, Nursing, Theory-Based") OR (MH "Internship and Residency") OR (MH "Preceptorship") OR (MH "Schools, Health Occupations") OR (MH "Students, Health Occupations") OR (MH "Interns and Residents") OR (MH "Health Personnel+/ED") OR TI didactic* OR curricul* OR TI ((student* OR school* OR resident* OR intern OR interns OR internship) AND (medical OR nurse* OR nursing OR pharmacy OR physician assistant* OR health profession* OR allied health OR interprofessional OR dental OR dentist* OR physical therap* OR occupational therap*))) AND ((MH "Intervention Trials") OR (MH "Clinical Trials") OR (MH "Randomized Controlled Trials") OR (MH "Pretest-Posttest Design+") OR (MH "Quasi-Experimental Studies+") OR (MH "Controlled Before-After Studies") OR (MH "Historically Controlled Study") OR (MH "Nonrandomized Trials") OR (MH "Interrupted Time Series Analysis") OR (MH "Repeated Measures") OR (MH "Control Group") OR (MH "Nonequivalent Control Group") OR (MH "Pretest-Posttest Control Group Design") OR (MH "Solomon Four-Group Design") OR (MH "Static Group Comparison") OR TX ((pretest OR pre-test OR pre) AND (posttest OR post-test OR post)) OR TI (intervention OR (control* AND (group* OR trial*)) OR randomized OR randomised OR randomly OR trial* OR effectiv* OR effect OR effects OR compar* OR evaluat* OR pilot study) OR AB (intervention OR (control* AND (group* OR trial*)) OR randomized OR randomised OR randomly))

Limit to Academic Journal Articles,

Limiters - Abstract Available

1985: 1

1986: 16

1995: 136

2005: 710

2015: 698

Removal of duplicate citations

Duplicate citations were identified and removed using an approach described by Bramer et al. (De-duplication of database search results for systematic reviews in EndNote. J Med Libr Assoc 2016;104:240-3.)

1-B. Search strategy to identify biomedical research studies eligible for manual coding: 1985, 2015

As a comparator, we searched the Core Clinical Journals subset of MEDLINE, in PubMed, using the same terms for finding controlled interventional studies as were used in the health professions education research search. We searched for these at 2 time points, 1985 and 2015. Because the Core Clinical Journals subset is fully indexed in MEDLINE and is a MEDLINE-specific designation, we did not repeat the search in Embase or CINAHL.

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((("Evaluation Studies" [Publication Type] OR "Evaluation Studies as Topic"[Mesh] OR "Clinical Trial" [Publication Type:NoExp] OR "Validation Studies"[Publication Type] OR "Controlled Clinical Trial"[Publication Type] OR "Multicenter Study"[Publication Type] OR "Controlled Clinical Trials as Topic"[Mesh] OR "Random Allocation"[Mesh] OR ((pretest OR pre-test OR pre) AND (posttest OR post-test OR post)) OR "Control Groups"[Mesh] OR intervention[tiab] OR (control*[tiab] AND (group*[tiab] OR trial*[tiab]))) OR randomized[tiab] OR randomised[tiab] OR randomly[tiab] OR trial*[ti] OR effectiv*[ti] OR effect[ti] OR effects[ti] OR compar*[ti] OR evaluat*[ti] OR pilot study[tiab]) AND hasabstract[text] AND jsubsetaim[text]) NOT ("Editorial" [Publication Type] OR "Comment" [Publication Type] OR "Case Reports" [Publication Type] OR "Meta-Analysis" [Publication Type] OR narrative review[ti] OR systematic review[ti] OR systemic review[ti] OR "News" [Publication Type])
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AND 1985[pdat]: 6151

AND 2015[pdat]: 11193

1-C. Search strategy to identify health professions education research studies eligible for automated text mining: 1970-2015

A more specific search was designed for PubMed, including MEDLINE, Embase via Embase.com, and CINAHL via EBSCOhost for performing large-scale automated text mining. A more specific search was needed to produce fewer false positives than the searches used for the full-text component of this project.

Total identified through May, 2016: 72,212

After deduplication: 57444 (1170 CINAHL, 21562 Embase, 34712 PubMed/MEDLINE)

After removal of 1004 articles published in 2016: 56440

PubMed/MEDLINE

("Acad Med"[Journal: __jrid1346] OR "Acad Psychiatry"[Journal] OR "Acad Radiol"[Journal] OR "Adv Health Sci Educ Theory Pract"[Journal: __jrid22366] OR "Adv Physiol Educ"[Journal: __jrid21755] OR "AHME J"[Journal] OR "Am J Pharm Educ"[Journal: __jrid448] OR "Anat Sci Educ"[Journal] OR "Annu Conf Res Med Educ"[Journal: __jrid632] OR "BMC Med Educ"[Journal: __jrid22345] OR "Br J Med Educ"[Journal: __jrid1836] OR "Clin Teach"[Journal] OR "Educ Health (Abingdon)"[Journal: __jrid31754] OR "Educ Prim Care"[Journal] OR "Eur J Dent Educ"[Journal: __jrid20866] OR "Indian J Med Educ"[Journal: __jrid27821] OR "Int J Med Educ"[Journal] OR "Int J Nurs Educ Scholarsh"[Journal] OR "J Adv Med Educ Prof"[Journal] OR "J Assoc Hosp Med Educ"[Journal: __jrid4454] OR "J Contemp Med Educ"[Journal] OR "J Contin Educ Nurs"[Journal: __jrid4679] OR "J Contin Educ Health Prof"[Journal: __jrid5082] OR "J Dent Educ"[Journal] OR "J Educ Eval Health Prof"[Journal] OR "J Educ Res"[Journal: __jrid27887] OR "J Healthc Educ Train"[Journal] OR "J Int Assoc Med Sci Educ"[Journal] OR "J Med Educ"[Journal: __jrid4939] OR "J Nurs Educ"[Journal] OR "J Nurs Staff Dev"[Journal] OR "J Nurses Prof Dev"[Journal] OR "J Nurses Staff Dev"[Journal] OR "J Physician Assist Educ"[Journal] OR "J Surg Educ"[Journal] OR "J Vet Med Educ"[Journal: __jrid25487] OR "Korean J Med Educ"[Journal] OR "Med Educ"[Journal: __jrid5814] OR "Med Educ (Chicago Ill)"[Journal] OR "Med Educ Online"[Journal] OR "Med Sci Educ"[Journal] OR "Med Teach"[Journal: __jrid5712] OR "Nurs Educ Perspect"[Journal] OR "Nurse Educ"[Journal] OR "Nurse Educ Pract"[Journal] OR "Nurse Educ Today"[Journal] OR "Physiol Teach"[Journal] OR "Teach Learn Med"[Journal: __jrid21959] OR "Students, Health Occupations"[Mesh] OR "Allied Health Personnel/education"[MeSH] OR "Health Occupations/education"[Mesh] OR "Education, Professional"[Mesh] AND ("Evaluation Studies" [Publication Type] OR "Evaluation Studies as Topic"[Mesh] OR "Clinical Trial" [Publication Type:NoExp] OR "Validation Studies"[Publication Type] OR "Controlled Clinical Trial"[Publication Type] OR "Multicenter Study"[Publication Type] OR "Controlled Clinical Trials as Topic"[Mesh] OR "Random Allocation"[Mesh] OR ((pretest[tiab] OR pre-test[tiab]) AND (posttest[tiab] OR post-test[tiab])) OR "Control Groups"[Mesh] OR (control*[tiab] AND (group*[tiab] OR trial*[tiab])) OR randomized[tiab] OR randomised[tiab] OR randomly[tiab]) AND hasabstract[text] AND 1970:2015[pdat]

Results: 34745

Embase via Embase.com

('paramedical education'/exp OR 'medical education'/exp OR 'medical student'/exp OR 'resident'/exp OR 'nursing student'/exp OR 'paramedical student'/exp) AND ('intervention study'/exp OR 'clinical study'/de OR 'controlled study'/exp OR 'evaluation study'/exp OR 'validation study'/exp OR 'experimental study'/exp OR 'quasi experimental study'/exp OR 'control group'/exp OR 'pretest posttest design'/exp OR 'randomization'/exp OR ((pretest OR pre-test) AND (posttest OR post-test)):ti,ab OR (control*:ti,ab AND (group*:ti,ab OR trial*:ti,ab)) OR randomized:ti,ab OR randomised:ti,ab OR randomly:ti,ab) AND [abstracts]/lim) AND [1970-2016]/py

Results: 34979

CINAHL via EBSCOhost

((MH "Education, Health Sciences") OR (MH "Education, Clinical+") OR (MH "Education, Allied Health+") OR (MH "Education, Chiropractic") OR (MH "Education, Dental") OR (MH "Education, Medical, Continuing") OR (MH "Education, Nursing, Continuing") OR (MH "Education, Nursing, Graduate") OR (MH "Education, Nursing, Doctoral") OR (MH "Education, Nursing, Post-Doctoral") OR (MH "Education,

Nursing, Masters") OR (MH "Education, Medical") OR (MH "Education, Midwifery") OR (MH "Education, Pharmacy") OR (MH "Education, Podiatry") OR (MH "Education, Nursing, Theory-Based") OR (MH "Internship and Residency") OR (MH "Preceptorship") OR (MH "Students, Health Occupations") OR (MH "Interns and Residents") OR (MH "Health Personnel+/ED")) AND ((MH "Intervention Trials") OR (MH "Clinical Trials") OR (MH "Randomized Controlled Trials") OR (MH "Pretest-Posttest Design+") OR (MH "Quasi-Experimental Studies+") OR (MH "Controlled Before-After Studies") OR (MH "Historically Controlled Study") OR (MH "Nonrandomized Trials") OR (MH "Interrupted Time Series Analysis") OR (MH "Repeated Measures") OR (MH "Control Group") OR (MH "Nonequivalent Control Group") OR (MH "Pretest-Posttest Control Group Design") OR (MH "Solomon Four-Group Design") OR (MH "Static Group Comparison") OR TX ((pretest OR pre-test) AND (posttest OR post-test)) OR TI ((control* AND (group* OR trial*)) OR randomized OR randomised OR randomly))

Limiters - Abstract Available

Limited to Academic Journals

Results: 2,488

Removal of duplicate citations

Duplicate citations were identified and removed using an approach described by Bramer et al (above).

1-D. Text mining automated data extraction: definition and validation

We used a purpose-built program to operationalize the following regular expressions search strings using the .NET Regex class with the following flags enabled: CultureInvariant, IgnoreCase, Compiled.

Search strings for *P* values:

Less than: \Wp(?>[-]+values?,?(+of)?)(?> *<=* *| +less(+than)?(+or)?(+equal)?(+to)? +)(?<data>[0-9]*[\.,\.:/] * [0-9]+(*e[-+]*[0-9]+)?|\w{1,10})

Greater than: \Wp(?>[-]+values?,?(+of)?)(?> *>=* *| +greater(+than)?(+or)?(+equal)?(+to)? +)(?<data>[0-9]*[\.,\.:/] * [0-9]+(*e[-+]*[0-9]+)?|\w{1,10})

Equal to: \Wp(?>[-]+values?,?(+range)?)(?> *+=* *| +of +| +equals?(+to)? +)(?<data>[0-9]*[\.,\.:/] * [0-9]+(*e[-+]*[0-9]+)?|\w{1,10})

Search string for confidence intervals:

\W(?>confidence +intervals?(+or)?[\(\(]+cis?|confidence +intervals?|cis?)(?> +(for|of) +the +difference +| +was +| [-\[\]\(\)\?<=>:, ,]+)-?(?<data>([0-9]*\.)?[0-9]+(e[-+]*[0-9]+)?|\w{1,10}))

Validation

We tested this data extraction approach by applying it to the abstracts from the 1985 and 2015 health professions education research and biomedical research datasets. Agreement with manual data extraction was near-perfect, with intraclass correlation coefficients (for 1 rater) as follows:

- Any *P* value: 0.93
- Number of *P* values: 0.93
- Smallest *P* value: 0.97
- Any confidence interval: 1.0
- Number of confidence intervals: 0.97.

Appendix 2. Supplemental etables and eFigures

eTable 1. Extended description of included research studies

Domain	Feature	Health Professions Education Research					Biomedical Research		
		1985 (N=100) ^a	1995 (N=25) ^a	2005 (N=25) ^a	2015 (N=100) ^a	Total (N=250) ^a	1985 (N=50)	2015 (N=50)	Total (N=100)
HP participants, type ^b	Medical students	34 (34.0%)	5 (20.0%)	9 (36.0%)	26 (26.0%)	74 (29.6%)	-	-	-
	Postgraduate physicians	22 (22.0%)	9 (36.0%)	3 (12.0%)	26 (26.0%)	60 (24.0%)	-	-	-
	Physicians in practice	13 (13.0%)	8 (32.0%)	9 (36.0%)	16 (16.0%)	46 (18.4%)	-	-	-
	Nursing students	11 (11.0%)	2 (8.0%)	1 (4.0%)	12 (12.0%)	26 (10.4%)	-	-	-
	Nurses in practice	12 (12.0%)	3 (12.0%)	1 (4.0%)	15 (15.0%)	31 (12.4%)	-	-	-
	Other HP students	9 (9.0%)	3 (12.0%)	2 (8.0%)	19 (19.0%)	33 (13.2%)	-	-	-
	Other HP in practice	8 (8.0%)	3 (12.0%)	3 (12.0%)	14 (14.0%)	28 (11.2%)	-	-	-
	Other HP, NOS	4 (4.0%)	4 (16.0%)	4 (16.0%)	12 (12.0%)	24 (9.6%)	-	-	-
Participants, no.	Enrolled: median (IQR)	85.5 (44.0, 176.0)	56.0 (23.5, 128.0)	120.0 (58.0, 270.0)	76.5 (38.0, 140.0)	83.0 (39.0, 170.0)	44.0 (18.0, 148.0)	270.5 (70.0, 1018)	91.5 (29.5, 331.0)
	Analyzed: median (IQR)	80.0 (44.0, 176.0)	42.5 (20.5, 94.0)	98.0 (46.0, 270.0)	64.5 (32.0, 132.0)	73.0 (35.0, 153.0)	44.0 (18.0, 114.0)	224.0 (70.0, 988.0)	87.5 (29.5, 301.0)
No. of groups	1 group	25 (25.0%)	9 (36.0%)	8 (32.0%)	44 (44.0%)	86 (34.4%)	11 (22.0%)	12 (24.0%)	23 (23.0%)
	2 group	54 (54.0%)	11 (44.0%)	13 (52.0%)	41 (41.0%)	119 (47.6%)	24 (48.0%)	34 (68.0%)	58 (58.0%)
	>2 group	21 (21.0%)	5 (20.0%)	4 (16.0%)	15 (15.0%)	45 (18.0%)	15 (30.0%)	4 (8.0%)	19 (19.0%)
Group assignment	Randomized	15 (15.0%)	8 (32.0%)	7 (28.0%)	29 (29.0%)	59 (23.6%)	19 (38.0%)	13 (26.0%)	32 (32.0%)
Timing of measurement	>1 time point (pre-post, time series)	69 (69.0%)	23 (92.0%)	16 (64.0%)	82 (82.0%)	190 (76.0%)	31 (62.0%)	37 (74.0%)	68 (68.0%)
No. of institutions sampled	1	70 (70.0%)	17 (68.0%)	20 (80.0%)	66 (66.0%)	173 (69.2%)	45 (90.0%)	30 (60.0%)	75 (75.0%)
	2	5 (5.0%)	3 (12.0%)	1 (4.0%)	13 (13.0%)	22 (8.8%)	4 (8.0%)	1 (2.0%)	5 (5.0%)
	>2	25 (25.0%)	5 (20.0%)	4 (16.0%)	21 (21.0%)	55 (22.0%)	1 (2.0%)	19 (38.0%)	20 (20.0%)
Geographic origin ^c	USA	70 (70.0%)	12 (48.0%)	11 (44.0%)	42 (42.0%)	135 (54.0%)	29 (58.0%)	22 (44.0%)	51 (51.0%)
	Europe	18 (18.0%)	6 (24.0%)	6 (24.0%)	22 (22.0%)	52 (20.8%)	11 (22.0%)	17 (34.0%)	28 (28.0%)
	Canada	8 (8.0%)	5 (20.0%)	2 (8.0%)	9 (9.0%)	24 (9.6%)	6 (12.0%)	5 (10.0%)	11 (11.0%)
	Oceania	2 (2.0%)	1 (4.0%)	4 (16.0%)	8 (8.0%)	15 (6.0%)	1 (2.0%)	3 (6.0%)	4 (4.0%)
	Asia			1 (4.0%)	14 (14.0%)	15 (6.0%)	3 (6.0%)	10 (20.0%)	13 (13.0%)
	Africa	1 (1.0%)	1 (4.0%)	1 (4.0%)	3 (3.0%)	6 (2.4%)	0	2 (4.0%)	2 (2.0%)

Domain	Feature	Health Professions Education Research					Biomedical Research		
		1985 (N=100) ^a	1995 (N=25) ^a	2005 (N=25) ^a	2015 (N=100) ^a	Total (N=250) ^a	1985 (N=50)	2015 (N=50)	Total (N=100)
	Other North/South America	1 (1.0%)	1 (4.0%)		4 (4.0%)	6 (2.4%)	0	2 (4.0%)	2 (2.0%)
Primary outcome	Identified in Methods	1 (1.0%)	0	3 (12.0%)	14 (14.0%)	18 (7.2%)	1 (2.0%)	13 (26.0%)	14 (14.0%)
Measures of effect size ^d	Non-standardized mean difference	21 (21.0%)	4 (16.0%)	5 (20.0%)	14 (14.0%)	44 (17.6%)	6 (12.0%)	13 (26.0%)	19 (19.0%)
	Correlation coefficient or R ²	15 (15.0%)	4 (16.0%)	2 (8.0%)	16 (16.0%)	37 (14.8%)	8 (16.0%)	10 (20.0%)	18 (18.0%)
	Standardized mean difference	2 (2.0%)	1 (4.0%)	1 (4.0%)	6 (6.0%)	10 (4.0%)	0	4 (8.0%)	4 (4.0%)
	Risk ratio	0	0	1 (4.0%)	5 (5.0%)	6 (2.4%)	2 (4.0%)	22 (44.0%)	24 (24.0%)
	Beta coefficient	0	0	1 (4.0%)	2 (2.0%)	3 (1.2%)	0	1 (2.0%)	1 (1.0%)
							0	8 (16.0%)	8 (8.0%)

Abbreviations: HP=health professional, NOS=not otherwise stated, IQR=interquartile range.

^a Data reflect No. (%) unless otherwise indicated.

^b Other health professionals included nurse practitioners, physician assistants, dentists, pharmacists, and allied health. Some studies enrolled more than one type of participant. We did not abstract detailed information on the patients enrolled in biomedical research studies.

^c The HP education research sample included 9 articles written in languages other than English, including German (N=5), Spanish (2), Italian (1), and Chinese (1).

^d Required explicit reporting of the effect size (i.e., reporting two group means or two proportions would not count without also reporting the mean difference or risk ratio, respectively).

eTable 2. Number and proportion of reports with abstracts over time

Studies identified as "comparative studies" in our manual coding search (see Appendices 1-A and 1-B).

	Health Professions Education Research		Biomedical Research	
Year	No. reports	No. (%) with abstracts	No. reports	No. (%) with abstracts
2015	4243	3124 (73.6)	54003	30758 (57)
2014	3981	2988 (75.1)	52016	30103 (57.9)
2013	3861	2845 (73.7)	51829	30144 (58.2)
2012	3504	2584 (73.7)	49346	30805 (62.4)
2011	3380	2450 (72.5)	49685	31487 (63.4)
2010	3432	2416 (70.4)	49058	31742 (64.7)
2009	3103	2308 (74.4)	48961	32225 (65.8)
2008	2642	2037 (77.1)	49046	31992 (65.2)
2007	2325	1827 (78.6)	49729	32422 (65.2)
2006	2216	1706 (77)	50415	33001 (65.5)
2005	1929	1435 (74.4)	52027	34357 (66)
2004	1860	1324 (71.2)	52085	33862 (65)
2003	1717	1202 (70)	51793	32592 (62.9)
2002	1894	1193 (63)	50766	31839 (62.7)
2001	1672	1045 (62.5)	49761	31221 (62.7)
2000	1521	802 (52.7)	49749	31614 (63.5)
1999	1306	738 (56.5)	49940	31657 (63.4)
1998	1265	681 (53.8)	48830	30828 (63.1)
1997	1161	683 (58.8)	48617	31101 (64)
1996	1339	661 (49.4)	48536	30824 (63.5)
1995	1138	640 (56.2)	48620	30777 (63.3)
1994	1012	498 (49.2)	47537	30082 (63.3)
1993	963	538 (55.9)	48714	30647 (62.9)
1992	902	537 (59.5)	47298	29713 (62.8)
1991	901	528 (58.6)	45466	29255 (64.3)
1990	922	555 (60.2)	44644	28809 (64.5)
1989	886	542 (61.2)	45227	28582 (63.2)
1988	773	261 (33.8)	44117	28007 (63.5)
1987	747	230 (30.8)	42147	26995 (64)
1986	737	234 (31.8)	40743	26412 (64.8)
1985	628	220 (35)	39546	26156 (66.1)
1984	600	259 (43.2)	38903	25273 (65)
1983	585	221 (37.8)	37628	23139 (61.5)
1982	547	219 (40)	34273	19115 (55.8)
1981	566	179 (31.6)	33043	19429 (58.8)
1980	704	226 (32.1)	35777	20158 (56.3)
1979	650	238 (36.6)	36887	18910 (51.3)
1978	514	171 (33.3)	33934	18304 (53.9)
1977	667	222 (33.3)	32177	18700 (58.1)
1976	606	181 (29.9)	31466	19111 (60.7)
1975	568	142 (25)	30218	17459 (57.8)
1974	458	0 (0)	30130	2063 (6.8)
1973	505	0 (0)	29918	1823 (6.1)

	Health Professions Education Research		Biomedical Research	
Year	No. reports	No. (%) with abstracts	No. reports	No. (%) with abstracts
1972	484	4 (0.8)	28091	1700 (6.1)
1971	435	1 (0.2)	26942	1505 (5.6)
1970	319	1 (0.3)	26320	1479 (5.6)

eTable 3. Text mining analysis: Reporting of *P* values and confidence intervals in health professions education research, 1970-2015

Year	Abstracts No.	Abstracts reporting a <i>P</i> No. (%)	Abstracts reporting a CI No. (%)	No. <i>P</i> reported per abstract Mean (95% CI)	% <i>P</i> ≤ .05 per abstract Median (IQR); mean ^a	Smallest reported <i>P</i> value Mean (95% CI)	Largest reported <i>P</i> value Mean (95% CI)	Exact <i>P</i> values ^b %
2015	3574	1400 (39.2%)	306 (8.6%)	2.9 (2.7, 3.0)	100 (80.0, 100); 84.5	0.0035 (0.0031, 0.0039)	0.031 (0.026, 0.036)	51.6
2014	4000	1506 (37.7%)	326 (8.2%)	2.8 (2.7, 2.9)	100 (80.0, 100); 84.4	0.0034 (0.0030, 0.0038)	0.031 (0.026, 0.036)	50.5
2013	3879	1426 (36.8%)	289 (7.5%)	2.6 (2.5, 2.7)	100 (75.0, 100); 83.7	0.0038 (0.0034, 0.0043)	0.035 (0.030, 0.041)	54.1
2012	3732	1284 (34.4%)	243 (6.5%)	2.9 (2.7, 3.0)	100 (75.0, 100); 83.9	0.0034 (0.0030, 0.0038)	0.036 (0.031, 0.041)	51.5
2011	3549	1151 (32.4%)	247 (7.0%)	2.7 (2.6, 2.8)	100 (75.0, 100); 84.6	0.0034 (0.0030, 0.0038)	0.033 (0.028, 0.039)	51.9
2010	3340	1054 (31.6%)	195 (5.8%)	2.7 (2.6, 2.8)	100 (90.0, 100); 86.1	0.0032 (0.0028, 0.0037)	0.029 (0.024, 0.034)	49.8
2009	3293	956 (29.0%)	208 (6.3%)	2.6 (2.5, 2.7)	100 (80.0, 100); 83.4	0.0036 (0.0031, 0.0042)	0.024 (0.020, 0.029)	50.3
2008	3088	761 (24.6%)	151 (4.9%)	2.6 (2.4, 2.7)	100 (100, 100); 86.8	0.0033 (0.0028, 0.0038)	0.024 (0.020, 0.030)	50.4
2007	3300	787 (23.8%)	183 (5.5%)	2.6 (2.5, 2.7)	100 (100, 100); 85.4	0.0038 (0.0032, 0.0044)	0.028 (0.023, 0.034)	45.9
2006	3438	788 (22.9%)	186 (5.4%)	2.6 (2.5, 2.8)	100 (100, 100); 88.3	0.0035 (0.0030, 0.0041)	0.026 (0.022, 0.032)	42.9
2005	2803	679 (24.2%)	153 (5.5%)	2.7 (2.6, 2.9)	100 (100, 100); 87.5	0.0038 (0.0032, 0.0045)	0.026 (0.021, 0.032)	42.2
2004	2620	524 (20.0%)	133 (5.1%)	2.6 (2.4, 2.8)	100 (81.7, 100); 85.1	0.0038 (0.0032, 0.0046)	0.033 (0.026, 0.042)	45.5
2003	2228	439 (19.7%)	103 (4.6%)	2.4 (2.3, 2.6)	100 (100, 100); 86.8	0.0034 (0.0028, 0.0042)	0.021 (0.016, 0.028)	40.1
2002	2130	399 (18.7%)	74 (3.5%)	2.6 (2.4, 2.7)	100 (87.5, 100); 84.8	0.0034 (0.0027, 0.0042)	0.028 (0.021, 0.036)	44.0
2001	1801	298 (16.5%)	51 (2.8%)	2.5 (2.3, 2.7)	100 (100, 100); 86.3	0.0027 (0.0021, 0.0036)	0.024 (0.017, 0.033)	46.9
2000	1129	207 (18.3%)	31 (2.7%)	2.2 (2.0, 2.4)	100 (100, 100); 86.8	0.0041 (0.0030, 0.0055)	0.028 (0.019, 0.041)	46.5
1999	1004	198 (19.7%)	34 (3.4%)	2.3 (2.1, 2.6)	100 (100, 100); 89.4	0.0030 (0.0022, 0.0041)	0.021 (0.013, 0.032)	39.9
1998	869	135 (15.5%)	25 (2.9%)	2.2 (1.9, 2.5)	100 (100, 100); 87.7	0.0037 (0.0025, 0.0055)	0.024 (0.014, 0.040)	35.7
1997	829	139 (16.8%)	17 (2.1%)	2.2 (1.9, 2.5)	100 (100, 100); 85.6	0.0028 (0.0019, 0.0042)	0.027 (0.016, 0.046)	46.6
1996	757	126 (16.6%)	17 (2.2%)	2.2 (1.9, 2.5)	100 (100, 100); 85.7	0.0025 (0.0014, 0.0047)	0.020 (0.006, 0.069)	37.5
1995	612	93 (15.2%)	13 (2.1%)	2.0 (1.7, 2.4)	100 (100, 100); 88.9	0.0025 (0.0014, 0.0044)	0.018 (0.008, 0.037)	34.7
1994	578	93 (16.1%)	8 (1.4%)	2.3 (2.0, 2.6)	100 (100, 100); 88.4	0.0036 (0.0022, 0.0058)	0.015 (0.009, 0.028)	35.8
1993	499	75 (15.0%)	12 (2.4%)	2.1 (1.8, 2.3)	100 (75.0, 100); 84.1	0.0014 (0.0007, 0.0025)	0.029 (0.013, 0.062)	32.5
1992	421	63 (15.0%)	9 (2.1%)	1.7 (1.5, 2.0)	100 (100, 100); 89.4	0.0036 (0.0020, 0.0063)	0.029 (0.016, 0.054)	49.5
1991	413	46 (11.1%)	4 (1.0%)	2.0 (1.7, 2.3)	100 (100, 100); 92.6	0.0030 (0.0016, 0.0060)	0.026 (0.009, 0.072)	34.4
1990	354	47 (13.3%)	3 (0.8%)	2.4 (1.9, 2.9)	100 (100, 100); 92.2	0.0049 (0.0024, 0.010)	0.038 (0.018, 0.081)	27.4
1989	315	40 (12.7%)	2 (0.6%)	2.0 (1.5, 2.5)	100 (100, 100); 94.5	0.0022 (0.0011, 0.0046)	0.018 (0.007, 0.049)	35.0
1988	188	21 (11.2%)	0	1.5 (1.2, 1.8)	100 (100, 100); 92.1	0.0078 (0.0037, 0.016)	0.021 (0.006, 0.080)	9.4
1987	142	18 (12.7%)	0	2.5 (1.5, 3.5)	100 (100, 100); 89.8	0.0021 (0.0008, 0.0060)	0.019 (0.006, 0.059)	13.3

Year	Abstracts No.	Abstracts reporting a P No. (%)	Abstracts reporting a CI No. (%)	No. P reported per abstract Mean (95% CI)	% $P \leq .05$ per abstract Median (IQR); mean ^a	Smallest reported P value Mean (95% CI)	Largest reported P value Mean (95% CI)	Exact P values ^b %
1986	126	19 (15.1%)	0	1.7 (1.4, 2.1)	100 (100, 100); 94.7	0.0029 (0.0009, 0.0091)	0.038 (0.021, 0.054)	18.2
1985	142	25 (17.6%)	0	2.2 (1.4, 2.9)	100 (100, 100); 100	0.0040 (0.0016, 0.0096)	0.026 (0.012, 0.055)	13.0
1984	137	18 (13.1%)	0	1.7 (1.1, 2.2)	100 (100, 100); 95.8	0.0053 (0.0021, 0.013)	0.040 (0.002, 1)	10.0
1983	126	12 (9.5%)	0	2.0 (1.0, 3.0)	100 (100, 100); 93.8	0.0048 (0.0010, 0.023)	0.063 (0.042, 0.095)	16.7
1982	101	9 (8.9%)	0	2.1 (1.1, 3.1)	100 (100, 100); 94.4	0.0041 (0.0009, 0.018)	0.004 (0.0002, 0.069)	10.5
1981	108	7 (6.5%)	0	1.4 (0.7, 2.2)	100 (100, 100); 95.2	0.0082 (0.0018, 0.038)	0.2	10.0
1980	135	8 (5.9%)	0	3.1 (1.4, 4.8)	100 (58.3, 100); 79.2	0.0024 (0.0003, 0.016)	0.022 (0.0008, 0.57)	44.0
1979	163	7 (4.3%)	1 (0.6%)	2.0 (0.9, 3.1)	100 (100, 100); 100	0.0053 (0.0007, 0.042)	0.033 (0.009, 0.12)	0
1978	117	1 (0.9%)	0	1.0	100 (100, 100); 100	0.015 ^c	-	0
1977	136	1 (0.7%)	0	1.0	100 (100, 100); 100	0.01 ^c	-	0
1976	97	3 (3.1%)	0	1.7 (0, 4.5)	100 (66.7, 100); 88.9	0.0017 (0.0002, 0.017)	0.3	0
1975	114	2 (1.8%)	0	1.5 (0, 7.9)	50.0 (0.0, 100); 50.0	0.001 ^c	-	66.7
1974	32	2 (6.3%)	0	1.0	100 (100, 100); 100	0.0224 (0.0000, 1) ^c	-	50.0
1973	10	0	0	0	-	-	-	0
1972	4	0	0	0	-	-	-	0
1971	4	0	0	0	-	-	-	0
1970	3	0	0	0	-	-	-	0
All years	56,440	14,867 (26.3%)	3024 (5.4%)	2.6 (2.6, 2.7)	100 (90.9, 100); 85.4	0.0034 (0.0033, 0.0036)	0.029 (0.028, 0.030)	48.3

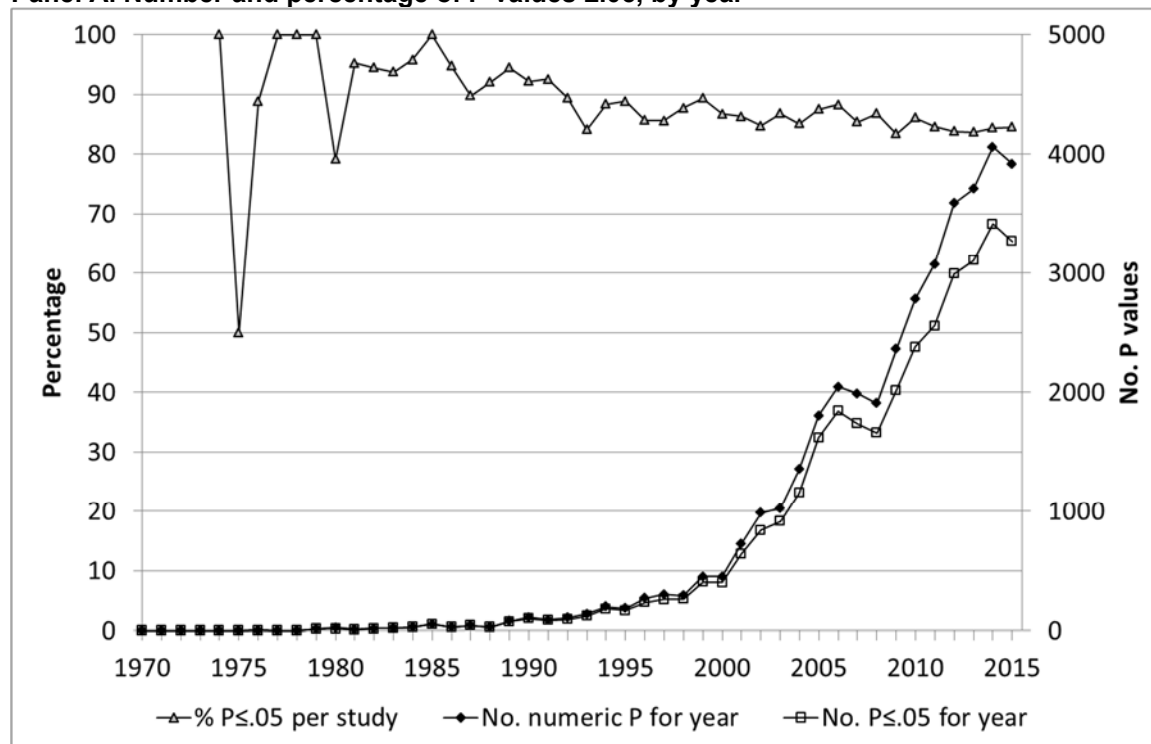
^a These data did not follow a normal distribution, thus we report median and interquartile range (IQR); we also provide the mean as a secondary summary metric to facilitate comparisons across years.

^b Exact P values written as "P=x" (as compared with inequalities i.e., $P < x$ or $P > x$).

^c Only one level of P value was reported this year (either a single P value or the same value reported multiple times), such that the smallest and largest reported P values were the same. In this analysis, we counted these as the "smallest reported P value."

eFigure 1. Text mining analysis: P values in health professions education research abstracts, 1970-2015

Panel A. Number and percentage of P values $\leq .05$, by year



Panel B. Smallest and largest P values, by year

Dashed line indicates the nominal level of statistical significance ($P=.05$). In some years (e.g., 1975) there was only one level of P value reported (either a single P value or the same value reported several times), such that the smallest and largest reported P values were the same in that year. In this analysis, we counted these as "smallest P."

