**Supplementary files**

**Table 1. Search strategy output for Cochrane database**

|  |  |
| --- | --- |
| **Database** | **Cochrane** |
| Host | http://onlinelibrary.wiley.com/cochranelibrary/ |
| Date of search | January 2012-June 2014 last date searched: 26/6/14 |
| Years covered | 1990-2014 no date restrictions |
| Search Strategy | Key word search: Financial incentives, Pay for performance, Performance based financing  There are 20 results from 8524 records for your search on 'financial incentive or pay for performance or performance based financing in Title, Abstract, Keywords in Cochrane Reviews'  There are 12 results from 30299 records for your search on 'financial incentive or pay for performance or performance based financing in Title, Abstract, Keywords in Other Reviews'  There are 3 results from 16096 records for your search on 'financial incentive or pay for performance or performance based financing in Title, Abstract, Keywords in Economic Evaluations' |
| Language restrictions | None |
| Number of citations | 35 |
| Relevant reviews | 8: Huang et al., 2013, Gillam et al., 2012, Reda et al., 2012, Chaix-couturier et al., 2012, Hamilton et al., 2013, Witter et al 2012, Scott et al 2011, Petersen et al 2006, |
| **Database** | **Medline** |
| Host | <http://www.ncbi.nlm.nih.gov/sites/entrez> (Pubmed) |
| Date of search | January 2012-June 2014 last date searched: 26/6/14 |
| Years covered | 1990-June 2014 (no date restrictions) |
| Search Strategy | 1. Search (((((((financial incentive\*) OR performance based financing) OR pay for performance) OR paying for performance) OR incentive\*) AND Review[ptyp] AND Humans[Mesh] AND English[lang])) AND health |
| Language restrictions | None |
| Number of citations | 1453 |
| Relevant reviews | 12: Van Herck P et al 2010, de Bruin SR, et al 2011, Witter et al 2012, Scott et al 2011, Petersen et al 2006, Eijkenaar 2012, Christianson et al 2008, Reda et al., 2012, Hamilton et al., 2013, Houle et al., 2012, Gillam et al., 2012, Andrew D Oxman and Atle Fretheim, 2009 |

**Table 2. Summary of identified reviews**

| **Reviews** | **P4P evaluation studies** |
| --- | --- |
| 1. OXMAN, A. D. & FRETHEIM, A. 2009a. Can paying for results help to achieve the Millennium Development Goals? A critical review of selected evaluations of results-based financing. *J Evid Based Med,* 2**,** 184-95. 2. CANAVAN, A., TOONEN, J. & ELOVAINIO, R. 2008. Performance Based Financing: An international review of the literature Mauritskade, Amsterdam: KIT Development Policy & Practice 3. CHAIX-COUTURIER, C., DURAND-ZALESKI, I., JOLLY, D. & DURIEUX, P. 2000. Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues. *Int J Qual Health Care,* 12**,** 133-42. 4. Christianson JB, Knutson DJ, Mazze RS. Physician pay-for-performance. Implementation and research issues. *J Gen Intern Med.* 2006;21(2):S9-S13. 5. DE BRUIN, S. R., BAAN, C. A. & STRUIJS, J. N. 2011. Pay-for-performance in disease management: A systematic review of the literature. *BMC Health Services Research,* 11. 6. EIJKENAAR, F. 2012. 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An LC, Bluhm JH, Foldes SS, Alesci NL, Klatt CM, Center BA (2008). A randomized trial of a pay-for-performance program targeting clinician referral to a state tobacco quitline. Archives of Internal Medicine; 168(18):1993-1999. 2. Armour BS, Friedman C, Pitts MM, Wike J, Alley L, Etchason J (2004). The influence of year-end bonuses on colorectal cancer screening. Am J Managed Care; 10(9):617-624 3. Ashworth M, Lea R, Gray H, Rowlands G, Gravelle H, Majeed A (2004). How are primary care organizations using financial incentives to influence prescribing? Journal of Public Health; 26(1):48-51. 4. Basinga P, Gertler P, Binagwaho A, Soucat A, SturdyJ, Vermeersch C. (2011). Paying primary health facilities for performance in Rwanda. World Bank, Washington, DC, Policy research working paper 5190. 5. Beaulieu, N. D., & Horrigan, D. R. (2005). Organizational processes and quality. Putting smart money to work for quality improvement. *HSR: Health Services Research, 40,* 1318-1334. 6. Bardach, N. 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| 1. Hamilton et al., 2013 2. Houle et al., 2012 3. Huang et al., 2013 4. Petersen et al., 2006, 5. Reda et al., 6. Scott et al., 2011 7. Van Herck P et al., 2010, 8. Witter et al., 2012 |

**Table 3. Search strategy output for economic theories to inform the P4P typology**

|  |  |
| --- | --- |
| Database | **PubMed, PsycINFO, EconLit,** |
| Host | http://ovidsp.tx.ovid.com/sp-3.13.1a/ovidweb.cgi |
| Date of search | January 2012-June 2014 last date searched: 26/6/14 |
| Years covered | 1990-2014 no date restrictions |
| Search Strategy | **You searched:**  ((behavioural economics or behavioural theories or incentive theories or economic theories) and incentive).mp. [mp=hw, ab, ti, ct, sh, tn, ot, dm, mf, dv, kw, nm, kf, px, rx, an, ui, tc, id, tm]  ***-****Search terms used:*   * behavioural * behavioural economics * behavioural theories * economic * economic theories * economics * incentive * incentive theories * theories |
| Language restrictions | None |
| Number of citations | 170 |

**Table 4. Application of the typology on selected identified P4P schemes**

| **Program** | **Perceived risk** | **Incentive size** | **Who receives the incentive** | **Fines or bonuses** |
| --- | --- | --- | --- | --- |
| Advancing Quality  United kingdom  2008 | High risk  Annually (long time lag)  Mostly within Physicians control (2 final outcomes and 26 processes)  Relative measure | Small  2-4% | Group | Bonuses |
| Clalit  Israel, 1998 | Low risk  Annually (long time lag)  Mostly within Physicians control (10 processes and 8 intermediate outcomes)  Absolute measure | Large Dependent on budget savings | Groups | Bonuses |
|
|
|
| Clinical Practice Improvement Pay (CPIP)  Australia, Queensland (started 2008) | Low risk  Semi-annually (long time lag)  Within physicians control (12 structures and 7 processes)  Absolute measure | Large  8-10% | Group | Bonuses |
| MACCABI  Israel  2001 | High risk  Annually (long time lag)  Mostly within Physicians control (12 processes and 5 intermediate outcomes)  Relative measure | Most likely large  Size not reported | Group | Bonus |
| National Health Insurance P4P (NHI-P4P)  Taiwan  2004 | High risk  Monthly and annually  12 structures, 3 final outcomes, and 2 intermediate outcomes  Absolute and relative measures | Large  Up to 20% | Individuals and groups | Bonuses |
| Primary care P4P (PC-P4P)  Netherlands | High risk  Annually (long time lag)  Within physicians control (31 processes)  Relative measures | Large  8-10% | Individual and groups | Bonuses |
| Primary Care Renewal Models (PCRM)  Canada Ontario  Started 2007 | Low risk  Annually Within physicians control (12 processes)  Absolute measure | Small  2-4% | Individual and groups | Bonuses |
| Physician Integrated Network (PIN)  Canada Manitoba  2004 | Low risk  Immediately after performance measure (short time lag)  Within physicians control (only processes)  Absolute | Maximum payment unknown but likely large | Groups | Bonuses |
| Practice Incentive Program (PIP)  Australia 1998 | Low risk  Quarterly, semi-annually and annually, Within physicians control (only structures and processes)  Absolute measure | Size not reported relative to income but likely small | Group | Bonuses |
| Quality and Outcomes Framework (QOF) | Low risk  Annually (long time lag)  Mostly within physicians control (85% processes)  Absolute measure | Large  Up to 30-40% | Group | Bonuses |
| Western New York Physician Incentive Program (WNY-PIP)  USA | Low risk  Annually (long time lag)  Mostly process: 6 Process and 3 outcomes  Intermediate outcome  Absolute measure | Size of varied from $3,000 till $12,000  large | Individuals | Bonus |
|
| Kouides et al., 1998  Rochester, New York, USA | Low risk  Annually (long time lag)  Process  Absolute measure | Size  ‘Modest’ for just one process? | Group | Bonus |
| Ashworth et al., 2004  UK 2004 | Low risk  Annually (long time lag)  Process/structure  Absolute measure | up to £5000 per GP  (large)  Up to 5% | Groups but money trickled down to individuals | Bonus |
| Cattaneo et al., 2001  Italy  1998-1999 | Low risk  Yearly (long time lag)  Process  Absolute measure | Small 0.5% of annual revenue deducted | Groups | Fines |
| Fairbrother et al., 1999  New York  12 months | Low risk  Annually (long time lag) Process  Absolute measure | $1000  Large | Individuals | Bonus plus feedback |
| Fairbrother et al., 2001  USA  16 months | Low risk  One off payment after 16 months (long time lag)  Process  Absolute measure | 1000 usd | Individual | Bonus |
| Grady et al., 1997  USA | Low risk  Quarterly payments (short time lag)  Process  Absolute  Measure | Token  Small?  , i.e., $50 for a 50% referral rate.  Small up to 1% | Groups | Bonus with education |
| Hillman et al., 1998 | Low risk  Every 6 months (long time lag)  Process  Absolute measure | Large Up to 20% of capitation fees | Individuals and groups | Bonus and feedback 18 months: no effect |
| LeBaron et al., 1999  USA | Not enough information reported on the costs and nature of incentives |  |  | Bonuses |
| Rooski et al., 2003  USA | Low risk  3 month time lag in payment  Process  Absolute measure | Size: up to $10,000 not reported relative to practice budget/income  Most likely large. | Groups | Bonuses |
| Ritchie et al., 1991  Scotland: UK | Low risk Quarterly payments (short time lag)  Process  Absolute measure | Not enough information reported on size | Groups  Clinical practices | Bonuses |
| Hillman et al., 1999  USA | Low risk  Process  Absolute and relative really  Payment frequency: every 6 months | Bonuses based on total compliance score for quality indicators; full and partial bonuses  Average bonus, $2,000 (range, $772 to $4682) | Payments to provider groups | Bonuses  Feedback |
| Hillman et al., 1998  USA | Low risk  Payment frequency: every 6 months (long time lag)  Process  Absolute measure | $1260  Large: up to20% | Provider group | Bonuses |
| Chien et al., 2012 Hudson Health Plan's P4P program in New York | High risk  Both process and outcomes  Yearly  Absolute | 300$ per patient | Groups | Bonuses |
| Harries et al., 2005  Malawi National Tuberculosis Control Programme  (four year program/0 | Low risk  6month (short time lag)  process  absolute measure | Size: up to 100% of usual reimbursement | Individual physicians | Bonuses |
| Gavagan, et al., 2010  USA | Low risk  Annually (long time lag)  Processes  Absolute Measure | Small  approximately 3% to 4% of a  provider’s total salary | Individual physicians | Bonuses |
| An et al., 2008  USA | Low risk  Annual (long time lag)  Process  Absolute measure | Small  5000$ onetime payment at the end of the programme | Groups | Bonuses |
| Glickman et al.,2007  USA  CMS  Premier program | High risk  Yearly (long time lag)  Process and outcomes  Relative | Small 2% | Groups (hospitals) | Bonuses |
| [Mandel](http://www.ncbi.nlm.nih.gov/pubmed?term=Mandel%20KE%5BAuthor%5D&cauthor=true&cauthor_uid=17606827) et al., 2007  Cincinnati  USA | Can’t tell: not enough information reported  Process | Large  7% fee schedule increase | Practices (groups) | Bonuses |
| Greenberg et al., 2008 | Low risk  Payment every three months (short time lag)  Process | Not enough informtion reported | Individuals | Bonuses |
| Levin et al., 2006  USA | Low risk  Paid monthly (short time lag)  Process  Relative measure | Up to 20% of budget/salary | Groups | Bonuses |
| Christensen et al., 2000  USA | Low risk  Timing of payment not reported  Process  Absolute measure | $4 for cognitive services | Provider group | Bonuses |
| Fagan et al., 2010 | Low risk  Timing of payment not reported  Process and structures  Absolute measure | Large  Up 20% | Groups | Bonuses |
| Yao H et al., 2008  China | Not enough information reported  Process | $31 694 for spreading TB knowledge in villages | Doctors  Individuals | Bonuses |
| Jha et al., 2012  CMS | High risk  Yearly (long time lag)  Process and outcomes  Relative measure | 2% | Groups  hospitals | Bonuses |
| Basinga et al., 2011  Rwanda | Low risk  Monthly and quarterly payments (short time lag)  Processes  Absolute measure | Large 22-38% of usual budget and salary | Individuals and groups | Bonuses |
| Chien et al., 2010  USA | Low risk  Timing of payment not reported  Process  Absolute measure | Large | Individuals | Bonuses |
| Lynch et al.,1995 | Annually  Paid quarterly  Absolute (tournament) it would between 70% and 89%; rates below 70% do not qualify for these payments.  Low risk |  | Paid to GP practices  Groups | Bonuses |
| Sussman et al., 2000  Boston, Massachusetts  USA | Low risk  Yearly (long time lag)  Process  Absolute measure | Large Size: up to 10% of salary | Bonuses | Groups |
| Norton et al.,1992 | High risk  Can’t tell  Timing of payment not reported: yearly Outcomes  Absolute measure | Large $126 to $370 | Groups | Bonuses |
| Shen et al., 2003  Maine, USA | Low risk  Annual payment (long time lag)  Process  Absolute measure | Not enough reported about size | Groups | Bonuses |
| Werner et al., 2012  CMS  USA | High risk  Yearly (long time lag)  Process and outcomes  Relative measure  Yearly  HIGH RISK | Small 2% | Groups | BONUSES |
| Canavan A. and Swai G. (2008)  Tanzania | Low risk  Payment every 6 months (long time lag)  Processes  Absolute measure | Large 5-10% of hospital budget and clinicians salary | Individuals and groups | Bonuses |
|
| Sulku, 2011  Turkey | Low risk  Monthly payments (short time lag)  Process and outcomes  Absolute measure | Large  Up to 80% of budget and salary | Individuals and groups | Bonuses |
|
| Vergeer and Chansa, 2008.  Zambia | Low risk  Absolute measure  Quarterly payments (short time lag)/Processes | Up to 100% of salary | Individuals and groups | Bonuses |
| Cutler et al., 2007  USA (California P4P) | High risk  Annual payments (long time lag)  Processes and intermediate outcomes  Relative measure | Large  Up to 5% of budget | Groups | Bonuses |
| Ssengooba et al., 2012.  Uganda | Low risk  6monthly payment (long time lag)  Process  Absolute measure | Large up to 11% of hospital budget | Groups | Bonuses |
| Gilmore et al., 2007  Hawaii Medical Services Association | High risk  Annual (long time lag)  Relative  Outcomes | Large  Up to 7% of salary | Individuals | Bonuses |
| Young et al., 2007 | High risk  Annual (long time lag)  Processes  Relative measure | Large 5% of physician fees was at risk | Individuals | Fines |
| Schauffler et al., 1999  California  USA | Low risk  Annual (long time lag)  Processes  Absolute measure | Small  up to 2% of premiums at risk | Groups | Fines |
| Twardella and Brenner, 2007 | High risk  Annual (long time line)  Outcome  Absolute measure | Unclear | Individuals | Bonuses |
| Kouides et al., 1993 | Low risk  Annual payment (long time lag)  Processes  Absolute | Unclear | Individuals | Bonuses |
| St Jacques et al., 2004 | low risk  Monthly payment  Processes  Relative | Large  Up to 500 dollars per month | Individuals | Bonuses |
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| Salize et al., 2009 | High risk  Payment after a year  Outcomes (quit rate)  Absolute | financial incentive of (€130) | Individuals | Bonuses |
| McMenamin et al., 2003 | Low risk  Process  Absolute | Not reported | Groups | Bonuses |
| Chee et al, 2007  GAVI Incentives for national governments | Low risk  Time lag not clear  Processes  Absolute measure | Up to 15% increased immunization funding  (large) | National government: institutions/groups | Bonus |
| Eichler et al., 2007  Haiti: RBF for NGO | Low risk  Quarterly payments  Processes  Absolute measure | Up to 15% of previous budget of NGO  (large) | NGOs: groups/institutions | Bonus |
| CORT 2007 | Low risk  Payment every three months  Processes  Absolute measure | $4.94 to $34.58  (large as per Indian standards) | health professionals (ASHA’s) (individuals) | Bonuses |
| Chen et al., 2010 | Low risk  Annually  Processes  Absolute | Large  Up to 7.5% of salary | Individuals | Bonuses |
| Armour et al., 2004 | Low risk  End of the year payments  Processes  Absolute measure | Size unknown | Individuals | Bonuses |
| Bardach et al., 2014 | Low risk  Unclear timing of payment  Processes  Absolute measure | large | Groups | bonuses |
| Greene et al., 2004 | High  Yearly  Process and outcomes  Relative | Large  Up to 20% of capitation fees | Individuals | Withholds  Fines |
| Bischoff et al, 2012 | Low risk  Payment after a year  Processes  Absolute | Unclear | Groups | Bonuses |
|
|
| Boland et al., 2010 | Low risk  Payment at 6 months intervals  Processes  Absolute measure | Up to $5000 annually  Large | Individuals | Bonuses |
|
| Kruse et al., 2013 | Low risk  Payment after 2 years  Processes  Absolute | Large  Approximately 5% | Groups | Bonuses |
| Peabody et al., 2011 | Low risk  Payment date no known  Process  Absolute | Large approximately 5% of clinicians salary | Groups and individuals | Bonuses |

**Table 5 P4P studies used in testing the inter-rater reliability of the P4P typology**

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**Table 6 Rater population**

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| The rater population consisted of five PhD students, four Master’s students, and three health service researchers (with a Master’s degree being their highest qualification). Four of the raters had between zero to one year of research experience, seven raters had between two to four years of research experience, and one rater had over five years of research experience. Three of the raters had previous research experience in or were currently working on P4P schemes in healthcare.  A training manual was developed to train the volunteer raters. This included clear and concise decision rules (with examples where needed) to accompany the guidance for applying the tool to the P4P schemes. Volunteer raters were trained face to face or over skype on how to use the typology to categorize P4P schemes. The raters were asked to rate the studies independently. |

**Table 7 Sources of disagreement**

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| Sources of disagreements between the raters were random and not specific to any particular rater. The sources of disagreement in the third and fourth item (size of incentive and perceived risk of not earning the incentive) reflected subjective rater judgement.  Table 8 illustrates raters’ responses to judging the size of incentive in a P4P study, which according to the typology guideline should be considered small if less than 5% of usual salary or budget and large if 5% or more than usual salary or budget. Item 4 (‘risk’) consist of three design variables (timing of payment, domain of performance, and performance measure), therefore, there is higher likelihood of disagreement between the raters because differences in judgement of just one of the design features led to different categorisations regarding the fourth item. Table 9 shows examples of sources of disagreement on item 4 (risk). Both raters agreed on categories of domain of performance and performance measure, but one of the raters was unclear about the timing of payment and had indicated that he/she judged subjectively (the typology states that timing of payment should be considered short if payment is made anytime within four months of measurement of performance, while payments made after 4 months is considered long). The lack of clarity as pointed out by the raters reflects lack of clarity and structure in reporting design features in the P4P papers, which supports our argument for the need for a uniform reporting template and the adoption of our developed tool-the Healthcare Incentives Reporting Framework (HISReF). |

**Table 8 An example of source of disagreement between raters (risk)**

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| **Quote/extract from study (Werner et al. 2011)**[**67**](#_ENREF_67) | | |
| **Rater 1** | **Time lag: short or long** | **Perceived risk of not earning the incentive: high or low risk** |
| **Domain of measurement: within the clinicians control or out of clinicians control** |
| **Performance measure: absolute or relative measure** |
| Unclear**:** The study does not specify the time lag between performance measure confirmation and payouts. It might have been a short time lag | Low risk |
| Processes (within clinicians control); For two of the three clinical conditions we studied, Medicare’s composite measures are based exclusively on process measures. |
| Partially relative; Two additional payment incentives were introduced in the fourth year (fiscal year 2007). Hospitals that attained a target performance level (defined as median performance two years previously) received an incentive. In addition, of the hospitals attaining that level, those that were in the top 20 percent in terms of improvement received another incentive. |
| **Rater 2** | Long time lag: The first two years of the demonstration project (fiscal years 2004 and 2005), financial bonuses were distributed to the top 20 percent of hospitals. | High risk |
| Processes (within clinicians control): Participating hospitals received higher payments for treating medicare patients with certain condition- acute myocardial infarction, heart failure, pneumonia, coronary artery bypass graft and knee and hip replacements. |
| Relative: Two additional payment incentives were introduced in the fourth year (fiscal year 2007). Hospitals that attained a target performance level (defined as median performance two years previously) received an incentive. In addition, of the hospitals attaining that level, those that were in the top 20 percent in terms of improvement received another incentive |