Appendix Table. **Articles Identified as Assessing Explicit Financial Incentives and Health Care Quality from a Systematic Review of the Literature after Applying Study Inclusion and Exclusion Criteria***

Study, Year (Reference)	Study Design	Incentives	Domains of Quality	Analysis and Results	Overall Effect†	Methodologic Strength‡
Norton, 1992 (37)	RCT (2 arms); November 1980 to April 1983; 36 SNFs (18 study facilities; 18 control facilities)	Level: payment system Type: bonus Duration: admission incentive up to 4 y; outcome and discharge incentives 1 to 2 y Admission incentive: per diem bonus for type D ($5) and E ($3 to $28) patients (vs. $36 reimbursement) Outcome incentive: improved health status within 90 d (measured by ADL classification); $126 to $370 per case (range of bonus) Discharge incentive: timely discharge and resident did not return within 90 d; $60 to $230 (range of bonus); type A patients not eligible Payment frequency: NS	Access; outcome	Markov model Experimental homes admitted more type D and E patients (sicker patients) than control homes Patients in experimental homes were more likely to be discharged to home or to an ICF and had less likelihood of hospital admission or death ($P < 0.001$)	Positive	3
Shen, 2003 (38)	CBA; FY 1991 to 1995; 5552 clients (2367 OSA clients; 3185 Medicaid clients)	Level: payment system Type: PBC Duration: FY 1993 to 1995 Description: additional funds based on efficiency, effectiveness, and service to special populations Efficiency: minimum service delivery (% of contracted amount); minimum service to primary clients (% of units delivered) Effectiveness: abstinence/drug-free 30 d before termination; reduction of use of primary substance abuse problem; maintaining employment; employability; employment improvement; reduction in number of problems with employer; reduction in absenteeism; not arrested; participation in self-help during treatment; reduction of problems with spouse/family members Special populations: female; age 0 to 19 y; age ≥50 y; corrections; homeless; concurrent psychological problems; history of IV drug use; polydrug use Payment frequency: yearly	Access	Probit specification (regression) Significant decrease in the likelihood that an OSA patient was a "most severe user" after PBC implementation compared with the likelihood of a Medicaid (control) patient; coefficient = −0.74; t-value = 3.26; $P \leq 0.01$	Negative	2
Clark et al., 1995 (43)	CBA; July 1992; 7 CMHCs; 185 clients (95 in TCM and 90 in CTT)	Level: provider group Type: enhanced FFS Duration: NA Description: CMHCs received $15.75 per 15 min spent in community settings delivering MIMS Payment frequency: FFS	Access	Student t-test for paired comparisons; MANOVA Student t-test: average weekly time spent in community treatment per client increased after the payment change (30.71 min vs. 38.61 min; $P < 0.05$) Office-based case management weekly time per client decreased (32.96 min vs. 23.31 min; $P < 0.001$) Total case manager average weekly time per client was not significantly different (63.68 min vs. 61.93 min) MANOVA: after the payment change, center-based treatment time decreased (F-value = 10.41; $P = 0.001$). The increase in community minutes had an F-value of 3.72 ($P = 0.055$). Program type and Medicaid status were not associated with change in time in community vs. mental health center	Partial effect	2

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Appendix Table—**Continued**

Hillman et al., 1998 (39)	RCT (2 arms); 1993 to 1995; 52 PC sites (26 intervention; 26 control)	Level: provider group Type: bonus Duration: 18 mo Description: compliance with cancer screening for women age ≥50 y; aggregate compliance scores and improvement in scores over time; full and partial bonuses (20%; 10% of capitation); range of bonus per site, $570 to $1260 Payment frequency: every 6 mo	Process	Repeated-measures ANOVA Absolute increase in total mean compliance scores for intervention group from baseline was 26.3%; control group was 26.4%. No significant differences between the groups	No effect	3
Kouides et al., 1998 (42)	RCT (2 arms); September to December 1991; 54 solo/group practices (27 intervention; 27 control)	Level: provider group Type: bonus Duration: 4 mo Description: influenza immunization rate ($8 standard fee); if rate >70%, bonus of $0.80 per immunization; if rate >85%, bonus of $1.60 Payment frequency: one time (end of study)	Process	Linear regression Absolute increase in immunization rates (from 1990 [baseline] to 1991) was 6.8%; $P = 0.03$	Positive	3
Hillman et al., 1999 (40)	RCT (3 arms); 1993 to 1995; 49 PC sites (19 FB+I; 15 FBO; 15 control)	Level: provider group Type: bonus Duration: 18 mo Description: pediatric immunizations; well-child visits; bonuses based on total compliance score for quality indicators; full and partial bonuses (20%; 10% of site's total 6-mo capitation for pediatric members age ≤6 y); 3 highest-scoring sites received full bonus; next 3 received partial bonus; most improved sites received partial bonus; average bonus, $2,000 (range, $772 to $4682) Payment frequency: every 6 mo	Process	Repeated-measures ANOVA Absolute increase in total mean compliance scores from baseline: FB+I, 17.2%; FBO, 22.6%; control, 22.6% Differences in compliance score improvement between groups: FB+I vs. control, 5.9%; FBO vs. control, 11.3% No significant differences between the groups	No effect	3
Christensen et al., 2000 (44)	RCT (2 arms); February 1994 to September 1995; 200 pharmacies (110 intervention; 90 control)	Level: provider group Type: enhanced FFS Duration: 20 mo Description: $4 for cognitive services interventions (<6 min); $6 for ≥ 6 min; cognitive services are judgmental or educational services provided by the pharmacist to the patient, such as consulting the prescriber about a suboptimal dose Payment frequency: FFS	Process	Student *t*-test Mean rate, 1.59 interventions per 100 Medicaid prescriptions (study pharmacies) vs. 0.67 (controls); $P < 0.001$	Positive	2
Casalino et al., 2003 (46)	Cross-sectional survey; September 2000 to September 2001; 1040 physician organizations (no patient-level data included)	Level: provider group Type: better contracts with health plans; bonuses Duration: not ascertained in survey Description: not ascertained in survey Payment frequency: not ascertained in survey	Process	Multivariate linear regression Receiving better contracts for quality was associated with an increase of 0.74 CMP implemented ($P = 0.007$) Receiving a bonus for scoring well on quality measures was not associated with CMP implementation ($P = 0.08$)	Partial effect	1

Appendix Table—**Continued**

McMenamin et al., 2003 (45)	Cross-sectional survey; September 2000 to September 2001; 1104 physician organizations	Level: provider group Type: financial incentives; additional income; better contracts with health plans Duration: not ascertained in survey Description: not ascertained in survey Payment frequency: not ascertained in survey	Process	Multivariate logistic regression Receiving financial incentives from HMOs increased the adjusted odds of having a smoking cessation intervention for 6 of the 7 organizational supports (OR, 2.13 to 14.46; $P < 0.038$) Receiving additional income from health plans for performance on quality measures: 2 of 7 organizational supports (OR, 1.49, 1.90; $P < 0.033$) Receiving better contracts with health plans was not associated with supporting smoking cessation interventions Examples of organizational supports include offering smoking cessation health promotion programs and giving providers nicotine-replacement starter kits to distribute to patients	Partial effect	1
Roski et al., 2003 (41)	RCT (3 arms); May 1999 to June 2000; 37 PC sites (13 incentive; 9 incentive + registry; 15 control)	Level: provider group Type: bonus Duration: 12 mo Description: 75% of patients with smoking status identified/documented at the last visit; 65% of patients with quitting advice documented at the last visit (targets set at approximately 15% above the average from 2 y before study); bonuses, $5000 for sites with 1–7 providers and $10 000 for sites with ≥8 providers Outcome measured: 7-d sustained abstinence from smoking (not associated with financial incentive) Payment frequency: one time (end of study)	Process	Logistic regression, clustering at the practice level Change in tobacco use status identification: incentive group increased 14.1%; incentive + registry group increased 8.1%; control group increased 6.2%; $P = 0.009$ Change in providing quitting advice to patients: incentive group increased 24.2%; incentive + registry increased 18.3%; control increased 18.3%. No significant difference across the study groups The quitting rate (7-d sustained abstinence) was 22.4% for the incentive group; 21.7% for the incentive + registry group; 19.2% for the control group. No significant difference across the study groups	Partial effect	2
Rosenthal et al., 2005 (47)	CBA; October 2001 to April 2004; 163 provider groups contracted with PacifiCare Health Systems in California (provider groups in the Pacific Northwest were the comparison group)	Level: provider group Type: bonus Duration: July 2003 to April 2004 (10 mo) Description: incentive payout based on provider's groups ability to reach or exceed target rates for cervical cancer screening, mammography, and hemoglobin A_{1c} testing for diabetic patients Incentive reward: $0.23 PMPM Payment frequency: quarterly	Process	Differences-in-differences analysis using generalized estimating equations Improvement in cervical cancer screening rates before and after the quality incentive program was statistically significant between the intervention and comparison groups (difference, 3.6%; $P = 0.02$). Improvements in mammography screening rates and hemoglobin A_{1c} testing were not statistically significant	Partial effect	2

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Grady et al., 1997 (51)	RCT (3 arms); 1 year (NS); 61 community-based primary care practices (20 cue and reward; 18 cue; 23 control [total of 95 physicians]); cues were posters in waiting rooms and chart reminder stickers	Level: physician Type: bonus ($50 for a 50% referral rate) Duration: 6 mo Description: "token" reward, based on the percentage referred for mammography during quarterly audit Payment frequency: 1 per quarterly audit; rewards given last 2 quarters	Process	Repeated-measures ANOVA The financial incentive arm was not significantly different from the control arm	No effect	2
Fairbrother et al., 1999 (48)	RCT (4 arms); July 1995 to July 1996; 60 physicians (15 bonus; 15 enhanced FFS; 15 feedback only; 15 control)	Level: physician Type: bonus and FFS Duration: 12 mo Description: patients' up-to-date coverage for pediatric immunizations Bonuses: $1000 (20% improvement from baseline); $2500 (40% improvement); $5000 (80% up-to-date) Enhanced FFS: $5 per vaccine given within 30 d of its coming due; $15 for each visit at which >1 vaccine was due and all were given Payment frequency: every 4 mo	Process	Linear and logistic regression Bonus group improved significantly in documented up-to-date immunization status, with an overall change of 25.3% ($P < 0.01$), but none of the other groups improved significantly compared with controls	Partial effect	3
Safran et al., 2000 (50)	Cross-sectional survey; January to April, October 1996; physicians in 8 IPA/network HMOs (2761 patients)	Level: physician Type: not ascertained in survey Duration: not ascertained in survey Description: survey of health plan executives elicited information about use of financial incentives regarding patient satisfaction Payment frequency: not ascertained in survey	Patient experience	Linear regression Financial incentives concerning patient satisfaction were related to increase in score on primary care scale completed by patients on 2 of the 4 aspects of primary care assessed (access, physicians' knowledge of patients, clinician–patient communication, and interpersonal treatment) Access to care ($\beta = 2.57$; $P < 0.01$) and dimensions of comprehensiveness of care ($\beta = 2.00$ for knowledge of patient; $P < 0.05$) and preventive counseling ($\beta = 3.50$; $P < 0.05$)	Partial effect	1
Fairbrother et al., 2001 (49)	RCT (3 arms); July 1997 to July 1998; 57 physicians (24 bonus; 12 FFS; 21 control)	Level: physician Type: bonus and FFS Duration: 16 mo Description: patients' up-to-date coverage for pediatric immunizations Bonuses: $1000 (30% improvement from baseline); $2500 (45% improvement); $5000 (80% up-to-date); $7500 (90% up-to-date) Enhanced FFS: $5 per vaccine given within 30 d of its coming due; $15 for each visit at which >1 vaccine was due and all were given Payment frequency: every 4 mo	Process	Linear and logistic regression Both the bonus and the enhanced FFS groups improved significantly in documented up-to-date immunization status, with an overall change of 5.9% ($P < 0.05$) and 7.4% ($P < 0.01$), respectively, compared with the control group	Positive	3

Appendix Table—**Continued**

Beaulieu and Horrigan, 2005 (53)	CBA; April 2001 to January 2002; 21 PCPs contracted with Independent Health in upstate New York (476 diabetic patients); 600 Independent Health diabetic patients were the comparison group	Level: physician Type: bonus Duration: 8 mo Description: meeting target CS of ≥6.23; CS of ≥6.86; or overall 50% improvement in composite score. CS based on PCP's performance of process and outcome measures for diabetes care (e.g., LDL test, dilated retinal examination, LDL cholesterol level <2.59 mmol/L (<100 mg/dL) Incentive rewards: CS ≥6.86, $3.00 PMPM (Medicare), $0.75 PMPM (commercial); CS ≥6.23, $1.50 PMPM (Medicare), $0.37 PMPM (commercial); 50% improvement and CS ≤6.23, $0.75 PMPM (Medicare), $0.18 PMPM (commercial) Payment frequency: at the conclusion of the study	Process; intermediate outcome	Before-and-after comparison, specific test not described Patients treated by physicians in the demonstration project had statistically significant improvement (final − baseline performance) on the following process and outcomes measures ($P < 0.001$ unless otherwise noted): second hemoglobin A_{1c} test (25.5% difference); LDL cholesterol test (18.3% difference); diabetic retinal examination (25.6% difference); nephropathy test (37.0% difference); foot examination (45.4% difference); hemoglobin A_{1c} level < 9.5% (13.9% difference); LDL cholesterol level <2.59 mmol/L (<100 mg/dL) (10.5% difference); LDL cholesterol level <3.37 mmol/L (< 130 mg/dL) (23.5% difference); BP < 130/80 mm Hg (6.3% difference; $P < 0.05$). No significant improvement on performing 1 hemoglobin A_{1c} test	Partial effect	1
Pourat et al., 2005 (52)	Cross-sectional survey; January to May 2002; PCPs contracted with Medicaid HMOs in 8 California counties with the highest rates of *Chlamydia trachomatis* infection and Medicaid HMO enrollment	Level: physician Type: better contracts with health plans Duration: not ascertained in survey Description: HMO contracts included reimbursements for quality-of-care dimensions, including patient satisfaction or peer review Payment frequency: not ascertained in survey	Process	Chi-square, logistic regression Primary care physicians reimbursed under salary and quality of care more often adhered to annual screening of sexually active females age 15 to 19 y, compared with physicians compensated by capitation and financial performance, salary and productivity, salary and financial performance, or FFS ($P < 0.05$) Physicians with salary and quality of care incentive also more often consistently screened women age 20 to 25 y for *Chlamydia trachomatis* infection annually compared with physicians reimbursed using other payment mechanisms ($P < 0.05$)	Positive	1

* Study inclusion criteria were that the article must be an original report providing empirical results and the study must assess the relationship between an explicit financial incentive and a quantitative measure of health care quality. Articles were excluded if there was no concurrent comparison group, or if there was no baseline, preintervention analysis of the groups on the quality measure. ADL = activities of daily living; ANOVA = analysis of variance; BP = blood pressure; CBA = controlled before and after; CMHC = community mental health center; CMP = care management process; CS = composite score; CTT = continuous treatment team; FB + I = feedback and incentive; FBO = feedback only; FFS = fee for service; FY = fiscal year; HMO = health maintenance organization; ICF = intermediate care facility; IPA = independent practice association; IV = intravenous; LDL = low-density lipoprotein; MANOVA = multivariate analysis of variance; MIMS = mental illness management services; NA = not applicable; NS = not specified; OR = odds ratio; OSA = Office of Substance Abuse; PBC = performance-based contracting; PC = primary care; PCP = primary care physicians; PMPM = per member per month; RCT = randomized, controlled trial; SNF = skilled nursing facility; TCM = traditional case managers.
† Positive studies were those for which all measures of quality demonstrated a statistically significant improvement with the financial incentive. Partial effect studies showed improved performance on some measures of quality but not others. Negative studies were those for which all measures of quality demonstrated a statistically significant decrease with the financial incentive.
‡ Graded on a scale of 1 (poor) to 4 (excellent).