stated previously, prevention is often used as only one component of quality of care when measuring effectiveness of incentives. For example, Dudley conducted a literature review on the effect of financial incentives on quality of care that relied on IOM's definition of quality (the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge) and included a general category of preventive services utilization as one of eight study outcome measures.[26, 27]

Figure 1. Conceptual framework

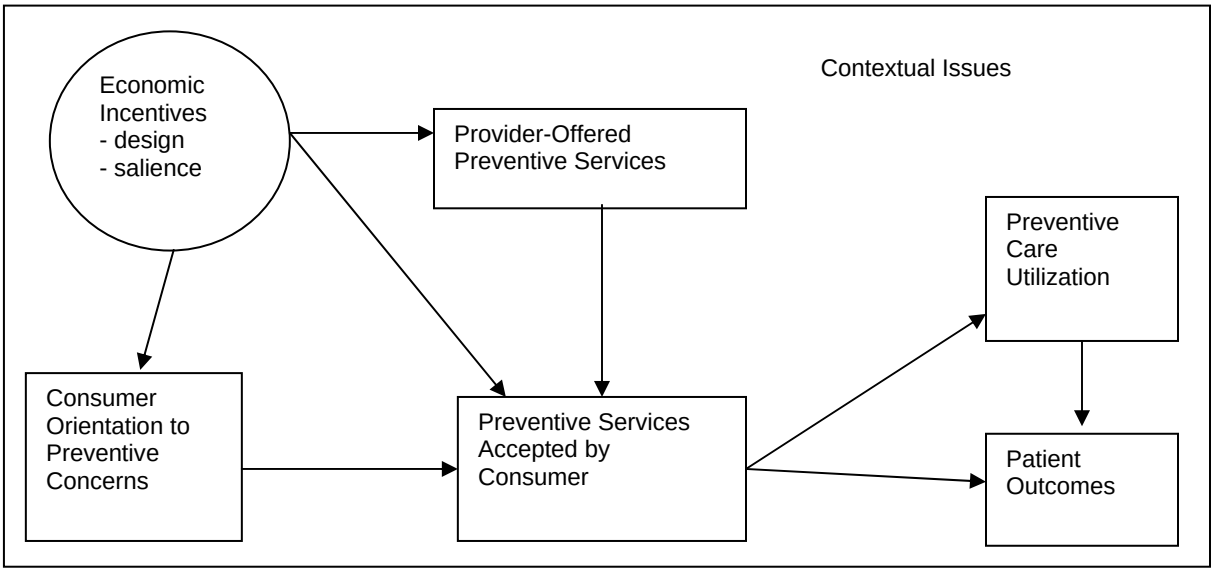

Table 1. Conceptual framework: Level of action

	Participate	**Act**
Consumer	Attend educational sessions	Accept service Change behavior
Provider	Identify prevention needs	Give service

Table 2. Consumer incentive type

Incentive Type	Positive Findings to Total Studies						
	Lottery	**Gift**	**Cash**	**Coupon**	**Free Medical**	**Punishment**	**Totals**
Simple	2 of 5 (40%)	2 of 5 (40%)	5 of 5 (100%)	10 of 12 (83%)	3 of 4 (75%)	3 of 3 (100%)	25 of 34 (74%)
Complex	4 of 5 (80%)	2 of 2 (100%)	3 of 6 (50%)	2 of 3 (67%)	1 of 2 (50%) *	6 of 7 (86%)	18 of 25 (72%)
Totals	6 of 10 (60%)	4 of 7 (57%)	8 of 11 (73%)	12 of 15 (80%)	4 of 6 (67%)	9 of 10 (90%)	43 of 59 (73%)

* One non-significant study mismatched test for effect of incentive. No direct measure of uptake.

Coupon = coupons, vouchers, gift certificates, free or reduced non-medical services
Free = free or reduced medical services
Punishment:

Punishment for simple category was clearly punishment.
Punishment for complex category was monetary return contracts that included a reward element. Those that measured followup periods showed rebound back to non-significant levels.
Non-significant test was for smoking cessation. The rest were weight loss.

Table 3. Impact of provider incentives

Study Characteristics	Frequency of Interventions with Positive Effects	Frequency of Interventions with No Effects
Total studies	4	5
Performance bonus - target outcome	3	3
Bonus structure - Tournament	0	2
Bonus structure - All providers have potential to qualify	4	3
Bonus structure - Reward/punishment	0	1
Performance bonus - target behavior	0	3
Adjusted capitation rates	1	0
Raised fees	0	1
Subgroup analysis - Group practice vs. solo	3	0
Source of bonus - Paid by HMO	1	3
Source of bonus - Not paid by HMO	3	2
Prevention target - Immunizations	4	2
Prevention target - Other	1	3

Table 4. Potential explanations by category

Category	Number of Studies
Study design – Insufficient power	2
Study design – Inadequate size and duration of bonus	5
Study design – Historical trends	4
Salience - Physician beliefs and attitudes about the bonus	3
Salience - Lack of physician awareness	2

Table 5. Overall positive findings to total consumer studies

	Facilitating	Participating	Adhering	Outcome
Simple	6 of 6 (100%)	4 of 6 (67%)	9 of 12 (75%)	0 studies
Complex	1 of 1 (100%)	4 of 5 (80%)	5 of 8 (63%) *	10 of 12 (83%)

* One non-significant study mismatched test for effect of incentive. No direct measure of uptake.
Outcome studies - 8 of the 10 positive studies either did not check for long-term results or showed rebound to original levels and non-significant.

	Structural Barrier Removal	Attitude Barrier Removal	Reward	Punishment
Simple	6 of 6 (100%)	0 studies	10 of 14 (71%)	2 of 2 (100%)
Complex	2 of 3 (67%) *	1 of 2 (50%)	11 of 15 (73%)	5 of 6 (83%)

* One non-significant study mismatched test for effect of incentive. No direct measure of uptake.
Only 1 of the Attitude Barrier studies actually measured change in attitude - negative finding.
Four of the five positive findings for punishment showed rebound to original levels.
Complex reward changes to 12 of 18 (67%) and 9 of 13 (69%) if remove studies which included punishment

	Purchasing Behavior	Income Behavior
Simple	6 of 7 (86%)	13 of 17 (76%)
Complex	7 of 8 (88%)*	10 of 15 (67%)

* One non-significant study mismatched test for effect of incentive. No direct measure of uptake.
Complex income behavior drops to 8 of 19 (42%) and 6 of 15 (40%) with long term results.

Table 6. Consumer incentive type by significance

Non-Significant Findings Studies	Significant Findings Studies
Lotteries:	
$50/session + $2,000 travel package. For middle-class people to attend group exercise program.[91] (complex)	$100/month; a 1 in 10 chance to win over 3 years. For low SES and middle-class people to return monthly nutrition newsletter postcards.[74] (complex)
Microwave. For people who showed for community program cholesterol retest.[73] (simple)	Three travel packages: one week in Hawaii, weekend in San Juan, weekend at local hotel. For self-help smoking members of GHCPS.[72] (complex)*
Dinner for two. For car dealership employees attending off-hour smoking cessation class.[92] (simple)	Five $100 cash prizes; 5 in 29 chance if all participants make goal. For health fair participants with high cholesterol.[93] (complex) **
$100 cash. For low SES women returning for post-partum check.[65] (simple)	Two $40 cash for meeting three-month goal; 1 in 4 chance at $1,000 competitive lottery. For employees of ambulance services.[69] (complex)*
	$25, $50, and $100 cash prizes. For immunizing parents of children/patients at public clinic.[62] (simple)
	Three $50 grocery gift certificates. For low SES urban community health center.[63] (simple)
Gifts:	
Nutritional information package. For community women attending mammography.[94] (simple)	Nutritional information package. For community women attending mammography.[95] (simple)
Jewelry. For low SES women attending post-partum check.[55] (simple)	Ceramic coffee mug (also lottery). For smoking members of GHCPS in self-help program.[72] (complex)*
Baby blanket. For low SES women attending prenatal checks.[77] (simple)	Turkey buffet and pooled kitty to winning worksites for competitive smoking cessation program. For employees of state government department.[71] (complex)**
	Gerry Cuddler. For low SES women attending post-partum check.[56] (simple)
Cash:	
$50 payment. For middle-class worksite employees for cigarette abstinence.[96] (complex)	$5 cash payment. For active drug users to return for TB skin test reading.[53] (simple)
Potential of up to $266 over 18 months; $1 to $3 per exercise session. For middle-class people to attend group exercise program.[97] (complex)	$10 cash payment. For active drug users to return for TB skin test reading.[53] (simple)
$12.50 to $25 per week for 20 weeks. For middle-class people to lose weight.[98] (complex)	$10 cash payment. For active drug users to return for TB skin test reading.[54] (simple)
	Two $15 payments. For low SES people to attend STD prevention education.[64] (simple)
	Three cash payments totaling $35. For active drug users to attend AIDS prevention education.[52] (simple)
	$5 to $15 per participant for competitive team members. For employees of diverse firms for smoking cessation.[70] (complex)*
	$1 to $10 per day for six weeks. For mostly hospital workers for decreased smoking.[75] (complex)**
	$50 for participation, $15/month for abstinence, $1,980 competitive kitty. For employees of aerospace firms for smoking cessation.[68] (complex)*
	$50/month for smoking abstinence, maximum ten months. For low SES pregnant women.[67] (complex)***
Coupons:	
Fitness center passes. For lower SES people for attending motivational counseling for exercise program.[99] (complex)	Free postage. For lower SES people to return completed FOBT.[59] (simple)

Non-Significant Findings Studies	Significant Findings Studies
Bus passes. For lower SES women returning for abnormal pap.[100] (simple)	Bus passes. For lower SES women returning for abnormal pap.[60] (simple)
$5 department store gift certificate. For lower SES women returning for post-partum check.[65] (simple)	75% off coupons for box of condoms. For young adults for STD prevention.[101] (simple)
	Coupon for infant formula. For low SES women to attend post-partum check.[55] (simple)
	Free taxicab fare. For low SES women to attend prenatal visit.[77] (simple)
	$10 of free bus passes or fast food coupons. For active drug users to return for TB skin test reading.[54] (simple)
	$10 grocery gift certificate. For active drug users to return for TB skin test reading.[54] (simple)
	$20 in coupons for farmer's market fresh produce. For low SES women to improve nutrition.[102] (complex)**
	Two $15 coupons for goods or services. For low SES people to attend STD prevention education.[64] (simple)
	Free evening day care. For immunizing parents of children/patients at public clinic.[62] (simple)
	Three grocery gift certificates totaling $35. For active drug users to attend AIDS prevention education.[52] (simple)
	Multiple kinds, of high frequency and moderate to high value. For low SES women to breast feed.[66] (complex)***
Free/Reduced Medical:	
Free nicotine patches - did not test for uptake, only effect on cessation.[103] (complex)	Free or reduced price of $6 or $20 (vs. $24) per pack of nicotine gum. For smoking rural family practice patients.[76] (complex)
Voucher for reduced clinic visit. For low SES women for abnormal pap.[100] (simple)	Voucher for reduced clinic visit. For low SES women for abnormal pap.[61] (simple)
	Free flu shots. New Zealand[104] (simple)
	Free flu shots. Denmark[78] (simple)
Punishment	
Return contracted amount, minimum $5 per paycheck. For worksite employees for smoking abstinence.[105] (complex)	Return contracted amount, minimum $5 per paycheck. For worksite employees for meeting weight loss goals.[105] (complex)**
	Return $20 per session for ten sessions. For overweight people to attend meet weight loss goals.[106] (complex)**
	Return $20 per session for ten sessions. For overweight people to attend weight loss sessions.[106] (complex)**
	Return $30 per every five pound reduction, up to $150. For overweight people to meet weight loss goals.[107] (complex)**
	Return $1, $5, or $10 per session for 30 sessions. For overweight people to meet weight loss goals.[108] (complex)**
	Return $5 per session, 14 sessions; forfeit money split. For mostly female employees of a hospital to attend weight loss sessions.[109] (complex)
	Return to WIC offices monthly (not bimonthly) for vouchers. For low SES parents of non-immunized children.[57] (simple)
	Return to WIC offices monthly (not quarterly) for vouchers. For low SES parents of non-immunized children.[110] (simple)
	Lose AFDC benefits. For low SES parents of non-immunized children.[58] (simple)

* Studies showed rebound of outcomes back to pre-test levels
** Studies did not follow up participants for long-term effects
*** Incentives also paid to participant's chosen Significant Other