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ORIGINAL PAPER

Applying lot-by-lot double sampling plan to reform Taiwan National Health Insurance auditing system

Hwai-Hui Fu · Dennis K. J. Lin · Hsien-Tang Tsai · Duan Wei

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Abstract This paper seeks to design an elaborate and effective "sampling audit and payment process" for a single-payer system of national health insurance. Furthermore, contrive incentive mechanisms in the "sampling audit and payment process" to make the healthcare providers willing to apply for their medical claim payments straightforwardly. A framework of "medical claim payment auditing by double sampling plan (MCPAD)" procedure based on the lot-by-lot double sampling plan was proposed to curb the growth of medical expenses. The proposed procedure entertains several advantages, including: (1) it meets international standards of sampling plan; (2) it simplifies the auditing process; (3) it reduces sample size and auditing costs; and (4) it encourages healthcare providers using an honest medical claim payment through the incentive mechanisms. This study successfully reduces the sampling cost and effectively audits the claimed medical fees as well as encourages healthcare providers to straightforwardly apply for their medical claim payments. Practically, the proposed MCPAD procedure is also applied to healthcare provider. It is anticipated that the proposed procedure in other nations in the future.

H.-H. Fu
Department of Business Administration, Shu-Te University, No. 50, Hun Shan Road, Yen Chau, Kaohsiung Country, 824, Taiwan
e-mail: fuuwuu@gmail.com

D. K. J. Lin
Department of Supply Chain and Information Systems, The Smeal College of Business Administration, Pennsylvania State University, 483 Business Building, University Park, PA 16802-3603, USA
e-mail: DKL5@psu.edu

H.-T. Tsai (✉)
Department of Business Management, National Sun Yat-sen University, 70 Lien-hai Rd., Kaohsiung 804, Taiwan
e-mail: htt@mail.nsysu.edu.tw

D. Wei
Department of Finance, Yu Da College of Business, No. 168, Hsueh-Fu Road, Chaochiao, Miaoli Country, 361, Taiwan
e-mail: duanwei@gmail.com

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1 Introduction

In recent years, many nations have faced the trends of increased health spending. Some critical factors are: population changes (Denton et al. 2002), population aging (Anderson and Hussey 2000; Denton and Spencer 2000; Naohiro 1997; Yashiro 1997; Chou et al. 2003), increasing demand for health care along with economic growth (Getzen 2000), and rising health care costs (Lu and William 2003; Getzen 2000). This is certainly the case in Taiwan. Taiwan's NHI program was first established in 1995. As of October 2005, nearly 22 million individuals were enrolled in the Taiwan's NHI program with a coverage rate of 98.67% (BNHI 2006). The issue of cost management is very important because it is related to the financial status of the government and the welfare of all Taiwanese (Chase 2003; Cheng 2003).

Lot Quality Assurance Sampling (LQAS) is a considerable approach to enhance the efficiency and reduce the cost of sampling audit and payment (SAP) procedure. LQAS was initially developed to meet industrial quality control needs and subsequently adopted for health surveys. It was repeated that LQAS is able to measure quality indicators (Jane and Cintas 1999; Stewart et al. 2001), to monitor an endemic coverage (Murthy et al. 1999, 2001) and to measure country's primary health care system (Valadez et al. 1996; Lanata and Black 1991). The LQAS, familiar to health policymakers, is a simple and time-efficient procedure for assessing quality assurance. The double sampling plan (i.e. MIL-STD-105E double sampling plan, ISO/DIS-2859) is one of LQAS methods (Lameshow and Taber 1991). The current research investigates the current SAP procedure and seeks to assess whether the double sampling plan is appropriate to ameliorate the current SAP procedure.

With a rapidly changing health care environment, Taiwan's health policymakers have to maintain Taiwan's health insurance system more efficiently and effectively. This paper propose a new "medical claim payment auditing by double sampling plan (MCPAD)" procedure to enhance the SAP procedure of Taiwan's NHI program.

The paper is organized as follows. Section 2 provides background on National health insurance in Taiwan and some problems associated with the current SAP procedure. Section 3 outlines a theoretical framework. Section 4 illustrates the proposed procedure via an empirical application. Section 5 discussed the advantages of MCPAD procedure in sampling audit and payment system and Sect. 6 provides the conclusions.

2 Background

Three main components of the National Health Insurance system in Taiwan are the insured, the healthcare providers and the BNHI. The system works as follows: the BNHI collects premiums from the insured people and then issues them the insurance cards. When an insured person uses the medical services, he or she only pays for a small portion of the cost. The provider will then claim reimbursement for the rest of the medical expenses from BNHI. The processes of the NHI system are demonstrated in Fig. 1. This paper will focus on the issues of claims and reimbursement between BNHI and providers.

The current SAP procedure of BNHI for reimbursement process comprises three components: sampling, auditing and payment. Healthcare providers are requested to apply for monthly medical costs from BNHI, mainly based on the medical care prescriptions of individual patients. SAP procedure was the main technology used in the system to recognize

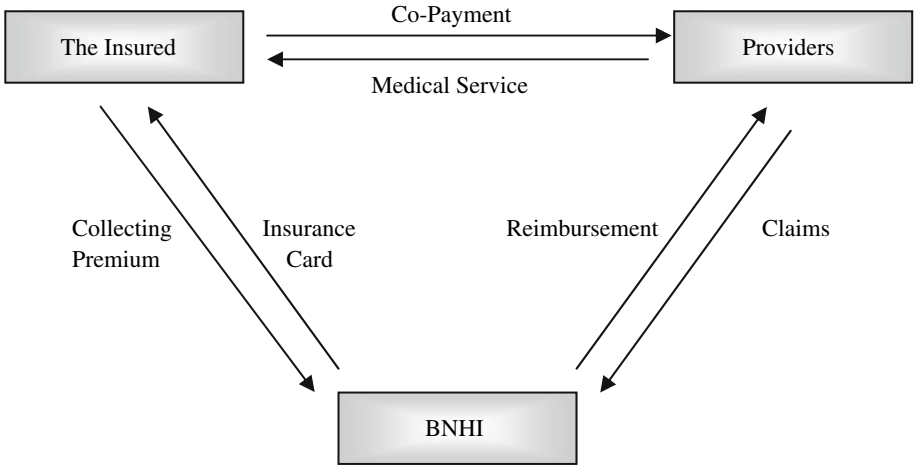

Fig. 1 Processes of NHI system in Taiwan

fraudulent claims, duplication of services, etc. SAP procedure enables BNHI to deduct unjustified costs from health care providers' applications and helps manage health spending inflation.

In the last decades, the aging population has caused the increasing demands of hospitalized and outpatient services. This problem in Taiwan has resulted in nearly 253,000 cases of hospitalized patients and over 30 million cases for outpatient services monthly in 2004. In order to alleviate BNHI's financial burden caused by large sampling audit cost and fraudulent claims, BNHI was forced to improve the reimbursement process (Lu and William 2003; Fu et al. 2004).

3 The framework

This research proposes an efficient and effective SAP procedure for the Taiwan NHI system. Moreover, incentive mechanisms are incorporated into the new SAP procedure to make healthcare providers willing to apply for their medical payments claims in an honest manner. The "MIL-STD-105E Double Sampling Plan" is a powerful methodology for monitoring product quality in manufacturing. Our research adopts the use of the MIL-STD-105E Double Sampling Plan to design a new SAP procedure for the medical claim payment process, called the MCPAD procedure, for improving the reimbursement process of current NHI system.

3.1 The MIL-STD-105E Double Sampling Plan

The MIL-STD-105E Double Sampling Plan is a useful approach in statistical quality management (Jutand and Salamon 2000; Valadez et al. 1996; Lanata and Black 1991). This approach is a proven method of accepting or rejecting a lot by inspecting a random sample. The MIL-STD-105E Double Sampling Plan has four fundamental characteristics: (1) tables are ready and easy to use; (2) existence of self-regulated quality mechanisms; (3) reducing the total number of required sample size, and reducing auditing time and personnel costs; and (4) meeting international standards (Lameshow and Taber 1991; Weber 1991).

The MIL-STD-105E Double Sampling Plan is a sampling plan to classify entire lots as either acceptable or unacceptable. An unacceptable lot is also named as a reject lot. The characteristics of this plan mainly lie in the concepts of "double sampling" and "lot-by-lot". A "double sampling" can be considered as a two-staged sampling. If the sampling results of the first stage cannot be used to determine whether the lot is acceptable or not, then the second stage of sampling would be employed. The sampling results of the second stage determine the lot to be acceptable or not. This two-staged sampling has the psychological advantage of giving a lot a second chance. The underlying idea of "lot-by-lot" can be considered as an accumulation of quality history and feedback for process quality control.

3.2 Reform procedure in the sampling audit and payment process

A reform procedure known as the MCPAD procedure is proposed in this research. The MCPAD procedure is a cyclical auditing system illustrated in Fig. 2. The policymakers can follow the procedure of Fig. 2 for implementing the MCPAD procedure.

3.3 Applications and administration reviews

BNHI receives medical claim payment applications from each healthcare provider monthly, and then delivers these applications into an administrative review. The administrative reviews are used to examine completion of application data and eliminate the irrelevant data beyond coverage under national health care insurance. When insufficient application data are provided, the health care provider is requested to provide missing information for review. In this study, lot size N is defined as the number of monthly valid medical claim payment cases of each healthcare provider.

3.4 Double sampling plan

In adopting the double sampling plan methodology, two important parameters, the "inspection level" and the "acceptable quality level (AQL)", must to be determined. Inspection level determines the relationship between lot size N and sampling size. Inspection levels can be divided into general inspection levels (I, II and III) and special inspection levels. Unless otherwise specified, inspection level II will be used. Both lot size and inspection level are affirmed, and then the sample size code letter can be decided (Lameshow and Taber 1991; Duncan 1994; Weber 1991). The sample size code letters are tabulated in Appendix 1.

AQL is the maximum defective percentage within an acceptable lot. In the MCPAD procedure, NHI policymakers can select a reasonable AQL value according to previous experience. Based on the sample size code letter and the given AQL, the double sampling Plan (n_1, A_1, R_1; n_2, A_2, R_2) can be obtained from the Master Table of Normal Inspection-Double Sample, as displayed in Appendix 2 (Lameshow and Taber 1991; Duncan 1994; Weber 1991).

3.5 Sampling and professional review

The sampling plan (n_1, A_1, R_1; n_2, A_2, R_2) can be obtained from the Master Table in Appendix 2. Two sample sizes (n_1, n_2), two acceptance numbers (A_1, A_2) and two rejected numbers (R_1, R_2) need to be specified.

After the first sample (n_1) is tested, there are three possibilities: (1) accept the lot, (2) reject the lot, or (3) no decision. If the number of defectives (d_1) in the first sample does not exceed A_1, the lot is accepted and the second sample (n_2) will not be selected. If the number

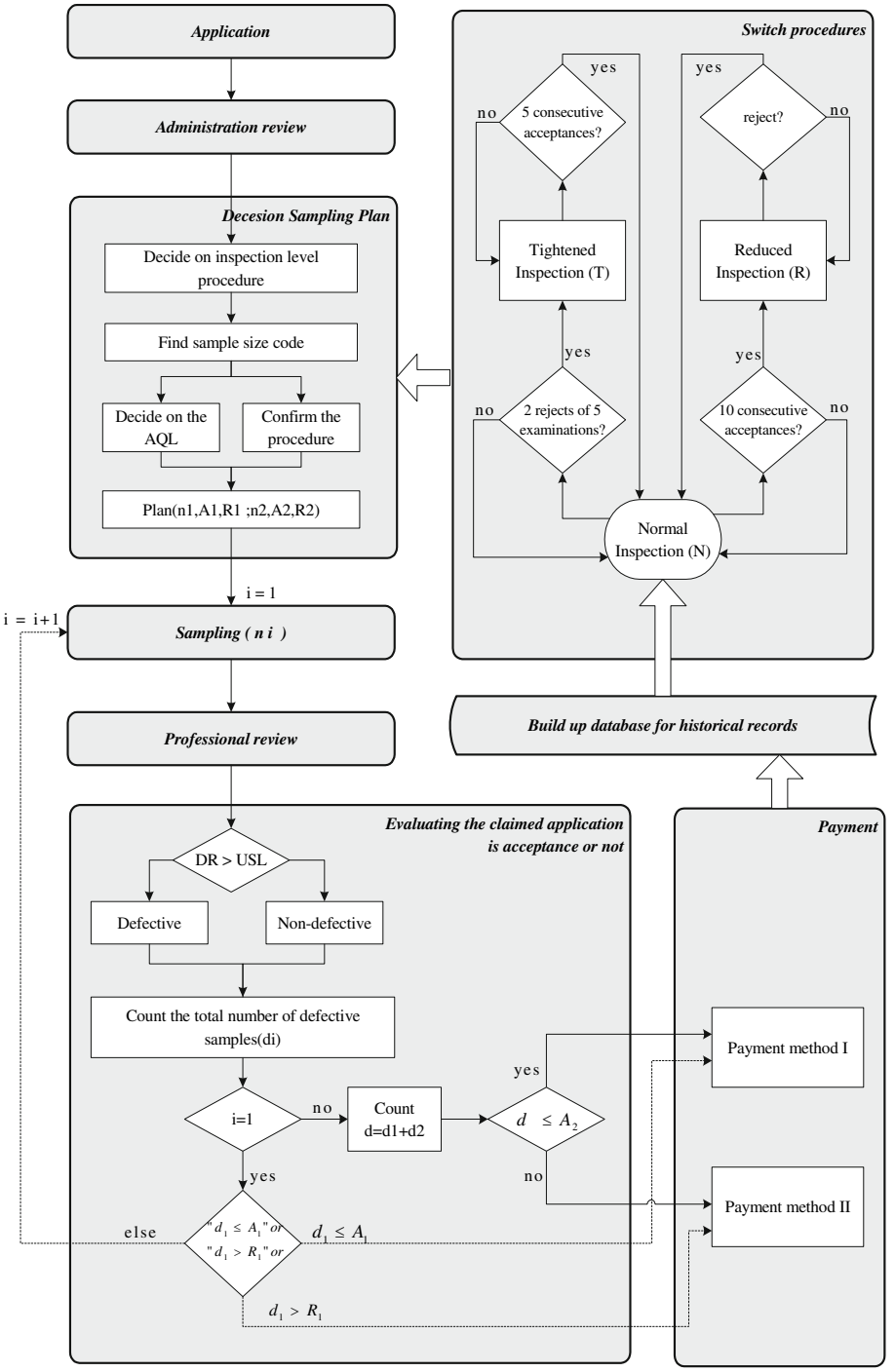

Fig. 2 The flowchart of MCPAD procedure

of defectives (d_1) in the first sample exceeds R_1, the lot is rejected and the second sample will not be selected. If the number of defectives (d_1) in the first sample are more than A_1 but less than or equal to R_1, the outcome is "No decision". Then a second sample n_2 is selected and inspected. If a second sample is taken, the procedure is to combine the results of the first and the second samples to make a final decision based on that information.

After the second sample (n_2) is tested, the lot will be either accepted or rejected. If the number of defectives (d) in the combination of the first and second sample does not exceed A_2, the lot is accepted. If the number of defectives (d) exceeds R_2, the lot is rejected.

Sample units selected for inspection should be representative of the entire lot. This is referred to as random sampling. Random samples can be drawn by computer. After sampling, the BNHI sends the medical records of the selected samples to auditing physicians for evaluating the necessity of stated medical care services. These professional auditing physicians thoroughly review the medical records and eliminate unnecessary items.

3.6 Determing fraudulent claim by deduct ratio

The deduct ratio (DR) of each selected sample represents, the portion of elimination by the auditing physician, for which the auditing physician believed it is an unnecessary medical fees from a particular application portfolio for medical claim payment. The smaller the DR is, the more consistent the opinions between the healthcare service providers and the professional auditing physician are. In MCPAD procedure, a DR value lower than the upper specification limit (USL) can be considered a reasonable tolerance. The USL is a criterion to determine the classification of the selected sample as a defective or non-defective case. If the DR of a selected sample is greater than the USL level, this selected sample is marked as a "defective case". If the DR of a selected sample is equal to or less than the USL level, this selected sample is marked as a "non-defective case". A "defective case" is recognized as a fraudulent claim case. The tolerance design of the MCPAD can be viewed as the major techniques for this auditing system.

3.7 Evaluating the medical claim payments application

In the MCPAD procedure, the result from selected samples is used to determine whether the entire lot of medical claim payment applications is acceptable or not. In other words, if the applications are reasonable, the entire lot of medical claim payments is marked "acceptable lot". Otherwise the entire lot of medical claim payments is marked "unacceptable lot".

3.8 Payment decision

After the double sampling step is completed, the results of the entire lot of medical claims payment will be either an accepted lot or an unaccepted lot. In the MCPAD procedure, the incentive mechanism design provides a higher payment rate for the acceptance lot and a lower payment rate for the rejected lot. The two payment methods are defined as "payment method I" and "payment method II".

"Payment method I" should be applied when the entire lot is accepted. The accepted pay rate (PR_a) can be calculated by Eq. 1 given below. "Payment method II" should be applied when the entire lot is rejected. The unaccepted pay rate (PR_u) is shown in Eq. 2 below. PR_a is greater than the PR_u. The BNHI will defray more medical claim payments when 'payment method I' is applied. In other words, hospitals will receive more medical claim payments

when the lot is accepted.

$$PR_a = 1 - \left(\frac{\text{deduct amount of sample}}{\text{medical fare of lot}}\right) \quad (1)$$

$$PR_u = 1 - \left(\frac{\text{deduct amount of sample}}{\text{medical fare of sample}}\right) \quad (2)$$

3.9 Switch procedure

The MCPAD procedure provides a cyclical procedure with a switch procedure design. The BNHI officer will decide to adopt either a "normal", "tightened" or "reduced" degree of inspection depending on the conclusion for the previous inspection of the health care provider. In the absence of a previous inspection a "normal" inspection will be employed as a first inspection. After several "normal" inspections have been employed, the inspection procedure may be switched under two circumstances. (1) If the preceding 10 lots have been on a "normal" inspection and none of these has been rejected, the BNHI would give the health care provider a "reduced" inspection for its next application as a reward. (2) If two out of five consecutive lots have been rejected on "normal" inspection, the BNHI would give the health care provider a "tightened" inspection for its next application as a retribution. The rewarded health care provider with a "reduced" inspection is required to maintain its status, in order to remain in the acceptance lot; otherwise, the reward would be taken back and a "normal" inspection would be applied. By contrast, if the retribution health care provider with a "tightened" inspection achieves five consecutive accepted lots, the BNHI will then change the inspection degree from "tighten" to "normal". The switch procedures are shown on the top of the right-hand-side of Fig. 2.

4 Empirical application

To illustrate the application of the MCPAD procedure, data was obtained from 1,013 hospitalized patients of a famous local healthcare provider in September 2004. Because of budget and time limitations, the researchers utilized statistical analyses and simulation technology to simulate every deduction for these sampled cases. In MCPAD cyclical procedure, normal inspection and general inspection level II were used for the initial application.

In this case, the sample size code letter "J" can be determined by a lot size of 1,013 and general inspection level II (see Appendix 1). The Master Table for Normal Inspection-Double sampling plan (see Appendix 2) provided various figures for different levels of AQL. AQL is an important parameter in the MCPAD procedure for varying audit stringency. The researchers used Appendix 2 to find out all different levels of AQL and Table 1 lists these AQL figures, 0.65, 1.0, 1.5, 2.5, 4.0, 6.5, 10, 15, 25, 40, 65, and 100 (%). The researchers further used Appendix 2 to obtain every plan (n_1, A_1, R_1; n_2, A_2, R_2) that was associated with different AQL levels, while the sample size code letter was "J".

The deduction ratio (DR) of each medical claim payment case could be sequentially calculated based on the simulation results. According to BNHI reports, the maximum USL was designated at 40%. In this case, the researchers adopted various USL levels (5, 9, 10, 15, 20, 25, 30, 35, and 40%)to evaluate the audit results.

In the MCPAD procedure, the unit medical claimed payments case was considered a defective case when the DR was greater than the USL. Thus, the researchers examined the

Table 1 Simulation results under various combinations of AQL and USL levels

AQL%	USL																	
	0.05		0.09		0.10		0.15		0.20		0.25		0.30		0.35		0.40	
	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S
0.65	R		R		R		R		R		R		R		R		R	
1	R		R		R		R		R		R		R		R		R	
1.5	R		R		R		R		R		R		R		R		R	
2.5	R		R		R		R		R		R		R		R		R	
4	R		R		R		R		R		R			R		R		R
6.5	R		R		R		R		R		R			R		R		R
10	R		R		R		R		R		R		A		A		A	
15	R		R		R		R			R	A		A		A		A	
25	R			R		R	A		A		A		A		A		A	
40	A		A		A		A		A		A		A		A		A	
65	A		A		A		A		A		A		A		A		A	
100	A		A		A		A		A		A		A		A		A	

Note: "F" represents the first sampling, "S" represents the second sampling

simulation results of samples individually, and counted the total number of defective cases for each USL level. If the whole lot of medical claimed payments was rejected, it was recorded as "R"; otherwise it was recorded as "A". Table 1 demonstrates the simulation results under various combinations of AQL and USL levels.

We will discuss two scenarios in Table 1 to demonstrate the reimbursement of MCPAD procedure. In the first scenario, the AQL level is 25% and the USL is 10%, then the double sampling plan ($n_1 = 50$, $A_1 = 2$, $R_1 = 5$; $n_2 = 50$, $A_2 = 6$, $R_2 = 7$) can be obtained. Because the number of defectives in the first sample ($n_1 = 50$) is 4 which is more than $A_1 = 2$ but less than $R_1 = 5$, the outcome is "No decision". Then a second sample $n_2 = 50$ is selected and inspected. Combining the results of the first and the second samples, the total number of defectives is 9 which is greater than $R_2 = 7$. The final decision should be rejected and "payment method II" will be applied. The healthcare provider will only receive some of their claimed medical payments. BNHI only pays 79.15% of the total medical claim payments (see Eq. 3 below).

$$\mathrm{PR_u} = 1 - \left(\frac{\text{deduct amount of sample}}{\text{medical fare of sample}}\right) = 1 - \left(\frac{1,807,200}{8,665,730}\right) = 1 - 0.2085 = 0.7915 \tag{3}$$

where "deduction amount of sample" is the total deducted amount of 100 sampled cases, while "medical fare of sample" is the total medical claim payments for the 100 sampled cases.

For the second scenario, the AQL level is 25% and the USL is 15%, then the double sampling plan ($n_1 = 50$, $A_1 = 2$, $R_1 = 5$; $n_2 = 50$, $A_2 = 6$, $R_2 = 7$) can be obtained. Because the number of defectives in the first sample ($n_1 = 50$) is 2 which is less than or equal to $A_1 = 2$, the outcome is accepted. Thus, "payment method I" will be applied and BNHI defrays 99.61% of the total medical claim payments (see Eq. 4 below).

$$\mathrm{PR_a} = 1 - \left(\frac{\text{deduct amount of sample}}{\text{medical fare of lot}}\right) = 1 - \left(\frac{214,800}{54,854,800}\right) = 1 - 0.0039 = 0.9961 \tag{4}$$

Table 2 Sample size comparison between BNHI's system and MCPAD procedure

Population size N	The BNHI's system		The MCPAD procedure					
	Sampling rate	Sample size	Reduced		Normal		Tightened	
			*	**	*	**	*	**
2–8	1	2–8	0	0	0	0	0	0
9–15	1	9–15	0	0	2	4	2	4
16–25	1/15	1–2	0	0	3	6	3	6
26–50	1/15	2–4	2	4	5	10	5	10
51–90	1/15	3–6	3	6	8	16	8	16
91–150	1/15	6–10	5	10	13	26	13	26
151–280	1/15	10–19	8	16	20	40	20	40
281–500	1/15	19–33	13	26	32	64	32	64
501–1,200	1/15	33–80	20	40	50	100	50	100
1,201–3,200	1/15	80–213	32	64	80	160	80	160
3,201–10,000	1/15	213–667	50	100	125	250	125	250
10,001–35,000	1/15	667–2,333	80	160	200	400	200	400
35,001–150,000	1/15	2,333–10,000	125	250	315	630	315	630
150,001–500,000	1/15	10,000–33,333	200	400	500	1000	500	1000
500,001 and above	1/15	33,333 and above	315	630	800	1600	800	1600

Note: "$_*$" represents the sample size with outcome be decided at the first sampling, "$_{**}$" represents the sample size with outcome be decided at the second sampling

where "deduction amount of sample" is the total deduction amount for the 50 sampled cases, while "medical fare of lot" is the total amount of medical claim payments for the 1,013 cases. Apparently, PR_a (99.61%) is greater than PR_u (79.15%) on this healthcare provider.

5 Advantages of MCPAD procedure in sampling audit and payment system

This study compared the BNHI's current SAP procedure with the proposed MCPAD procedure. The following advantages can be revealed.

5.1 Fair and efficient sampling process

The sample size directly impacts the auditing time and costs, including both administration review and professional review. Table 2 indicates the following three phenomena. Firstly, the current SAP procedure of BNHI may not be fair because a provider with less than lot size 15 has a 100% sampling rate. And, lot size equal to or greater 15 only has a 6.67% (1/15) sampling rate. Secondly, comparing to the sample size of BNHI, the "reduced" inspection of the MCPAD procedure has a much smaller sample size for any population size. Figures 3 and 4 clearly illustrate this phenomenon. Moreover, MCPAD procedure will encourage providers to apply their health care fee honestly and move to "reduced" inspection. Thirdly, increasing the amount of sampling rate is slower than increasing the amount of the population when the MCPAD procedure is used. In other words, the more applications for medical claim payment to be audited, the more evident of cost reduction by using the MCPAD procedure.

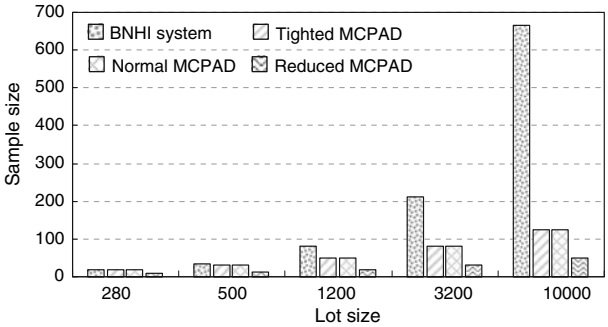

Fig. 3 Sample size comparisons between the current system of BNHI and MCPAD under the first sampling size (n_1)

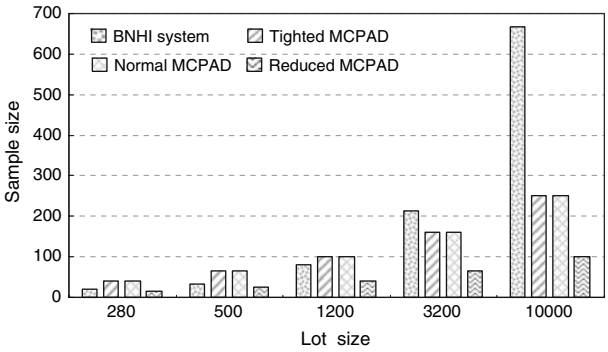

Fig. 4 Sample size comparisons between the current system of BNHI and MCPAD under the accumulative sampling size ($n_1 + n_2$)

5.2 Incentive mechanism design of payment process

In the BNHI current SAP procedure, BNHI officials and healthcare provider's association decided the rule of eliminating the outliers and the payment decision rule through negotiation. Not all healthcare providers have quality self-regulation mechanisms, however.

In the MCPAD procedure, the accepted pay rate is higher than the unaccepted pay rate. Healthcare providers will have a stronger incentive to enhance their applications' quality for medical claim payments while they receive the unaccepted pay rate. Therefore, the proposed MCPAD procedure can be regarded as an incentive mechanism design of payment decision.

5.3 Incentive mechanism design of switch process

In the BNHI current SAP procedure, the payment decision is independent of the previous inspective results. In the proposed MCPAD procedure, the switch process design enables the sampling rate to be monitored by "tightened", "normal", or "reduced" inspection. Additionally, the switch process design provides feedback for processing quality control. The "reduced" inspection is most advantageous to healthcare providers, because it has the lowest sampling rate (see Fig. 3). The "reduced" inspection design can be considered an

incentive mechanism for helping healthcare providers to claim their payments honestly. However, the incentive of beneficial medical claimed payments is not found in the current SAP procedure of BNHI. In brief, the incentive mechanisms of MCPAD procedure stimulate healthcare providers to apply their health care fee honestly and to well use the medical resources.

6 Conclusions

The proposed MCPAD procedure offers an efficient and effective approach for Taiwan's BNHI and other health care systems. The MCPAD procedure can be more effectively because of following reasons: (1) it meets international standards of sampling plan to avoid argument between BNHI and providers; (2) it simplifies the auditing process by relying on ready-made tables; (3) it reduces sample size and auditing costs; and (4) it encourages healthcare providers using an honest medical claim payment through the incentive mechanisms of the MCPAD procedure. These incentive mechanisms discourage healthcare providers from submitting fraudulent claims, thereby gradually reducing the BNHI's auditing costs and required manpower, helping to alleviate the public's financial burden and to better provide excellent national healthcare services.

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Appendix 1 Sample size code letters

Lot size N	Special inspection levels				General inspection levels		
	S-1	S-2	S-3	S-4	I	II	III
2–8	A	A	A	A	A	A	B
9–15	A	A	A	A	A	B	C
16–25	A	A	B	B	B	C	D
26–50	A	B	B	C	C	D	E
51–90	B	B	C	C	C	E	F
91–150	B	B	C	D	D	F	G
151–280	B	C	D	E	E	G	H
281–500	B	C	D	E	F	H	J
501–1,200	C	C	E	F	G	J	K
1,201–3,200	C	D	E	G	H	K	L
3,201–10,000	C	D	F	G	J	L	M
10,001–35,000	C	D	F	H	K	M	N
35,001–150,000	D	E	G	J	L	N	P
150,001–500,000	D	E	G	J	M	P	Q
500,001 and over	D	E	H	K	N	Q	R

Source: Weber RT. An Easy Approach to Acceptance Sampling: How to Use MIL-Std-105E

Appendix 2 Master table for Normal Inspection-Double sampling plan

Code letter	Sample size		AQL (defects per hundred units)																													
			0.10		0.15		0.25		0.40		0.65		1.0		1.5		2.5		4.0		6.5		10		15		25		40		65	
			A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R
A																			↓		→				↓		→		→		→	
B	1st	2															↓			→	↑		↓		0	2	0	3	1	4	2	5
	2nd	2																							1	2	3	4	4	5	6	7
C	1st	3													↓			→	↑		↓		0	2	0	3	1	4	2	5	3	7
	2nd	3																					1	2	3	4	4	5	6	7	8	9
D	1st	5											↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9
	2nd	5																			1	2	3	4	4	5	6	7	8	9	12	13
E	1st	8									↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11
	2nd	8																	1	2	3	4	4	5	6	7	8	9	12	13	18	19
F	1st	13							↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16
	2nd	13															1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27
G	1st	20					↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16		
	2nd	20													1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑	
H	1st	32			↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16				
	2nd	32											1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑			
J	1st	50	↓		→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16						
	2nd	50									1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑					
K	1st	80	→		↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16								
	2nd	80							1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑							
L	1st	125	↑		↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16										
	2nd	125					1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑									
M	1st	200	↓		0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16												
	2nd	200			1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑											
N	1st	315	0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	16														
	2nd	315	1	2	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑													
P	1st	500	0	3	1	4	2	5	3	7	5	9	7	11	11	16																
	2nd	500	3	4	4	5	6	7	8	9	12	13	18	19	26	27	↑															

Appendix 2 continued

Code letter	Sample size	AQL (defects per hundred units)																											
		0.10		0.15		0.25		0.40		0.65		1.0		1.5		2.5		4.0		6.5		10		15		25		40		65	
		A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R
Q	1st 800	1	4	2	5	3	7	5	9	7	11	11	16																		
	2nd 800	4	5	6	7	8	9	12	13	18	19	26	27	↑																	
R	1st 1250	2	5	3	7	5	9	7	11	11	16																				
	2nd 1250	6	7	8	9	12	13	18	19	26	27	↑																			

↓ = Use the double sampling plan below the arrow. If the sample size equals, or exceeds, lot or batch size, perform a full inspection
↑ = Use the double sampling plan above the arrow
→ = Use the Single sampling plan
A = Acceptance number
R = Rejection number
Source: Weber RT. An easy approach to acceptance sampling: how to use MIL-Std-105E

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