UNIVERSITY OF MANCHESTER NATIONAL PRIMARY CARE RESEARCH AND DEVELOPMENT CENTRE AND UNIVERSITY OF YORK HEALTH ECONOMICS CONSORTIUM (NICE EXTERNAL CONTRACTOR)

Health economic report on piloted indicator(s)

QOF indicator area: Diabetes structured education	
Potential output: Recommendations for NICE Menu	

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Introduction

This briefing paper is intended to provide a summary of the economic evidence generated on the proposed pilot three diabetes mellitus indicator. The format of this paper is intended to provide the QOF Advisory Committee with sufficient information upon which to make a recommendation on whether the indicator is economically justifiable.

Piloted indicator

The percentage of patients newly diagnosed with diabetes in the preceding 1 April to 31 March who have a record of being referred to a structured education programme within 9 months of entry on to the diabetes register

Economic rationale for the indicator

Diabetes is a progressive long-term medical condition that is predominantly managed by the person with the diabetes and/or their carer as part of their daily life. Accordingly, an understanding of diabetes, informed choices of management opportunities and the acquisition of relevant skills for successful self-management play an important role in achieving optimal health outcomes. Delivery of these needs is not always assured by conventional clinical consultations.

Structured education has demonstrated improved psychological well-being, reduced anxiety and overall improvement in the quality of life in people with diabetes [1]. NICE recommends that structured patient education is made available to all people with diabetes at the time of initial diagnosis and then as required on an ongoing basis, based on a formal, regular assessment of need [2].

Objective

To evaluate whether the proposed indicator represents a cost effective use of NHS resources.

Type of health economic analysis

An indicative net benefit approach is applied. Indicative evidence is available on the health benefits (and costs) of providing structured education to patients with diabetes, measured by quality-adjusted life years (QALYs).

NICE considers that the Dose Adjustment for Normal Eating (DAFNE) programme is potentially the most suitable option for people with type 1 diabetes [2]. There is less clarity on specific educational programmes recommended for patients with type 2 diabetes, the X-PERT and Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) programmes are the most cited in the published literature.

There is a paucity of evidence available on the cost-effectiveness of specific programmes, however, a recent Health Technology Assessment [3] appraised an economic evaluation of the DAFNE programme which was submitted to NICE. The HTA documented that the evidence base is more compelling for patients with type 1

diabetes in comparison to patients with type 2 diabetes, where the findings are unclear [3]. For the purpose of this indicative net benefit analysis, the costs and health outcomes are extracted from the Southampton assessment of cost effectiveness of the DAFNE programme reported in the HTA. It is assumed that the potential costs and health outcomes are equivalent for patients with type 1 and type 2 diabetes. For more details of the analysis that are not explicit in this document surrounding the model structure and specific model inputs, refer to the HTA report [3].

The costs and benefits were evaluated over a 10-year time horizon.

Delivery cost of indicator

The analysis is from the perspective of the healthcare provider, i.e. NHS. All direct costs to the NHS are considered. The intervention costs of the DAFNE programme, staff costs and microvascular complications are included in the analysis. An additional practice nurse visit is included costed at £12, extracted from the Unit Costs of Health and Social Care 2010 [4]. The discount rates were not explicit.

The incremental discounted cost of providing structured education to patients with diabetes in comparison to usual care was estimated to be a net saving, i.e. £535 saved per patient.

Effectiveness of indicator

The 10-year health outcomes, measured using quality adjusted life year (QALYs) were estimated and discounted. The incremental discounted QALY gain of providing structured education in comparison to usual care in patients with type 1 diabetes is estimated to be 0.063.

Incremental cost-effectiveness ratio

In the base case analysis, providing structured education to patients with diabetes is the dominant strategy in comparison to usual care, i.e. better health outcomes and lower costs. This can be considered a highly cost-effective use of NHS resources before considering the QOF payments.

Figure 1: Incremental cost-effectiveness ratio

$$ICER = \frac{Cost_{Treatment} - Cost_{Alternativ e}}{Effect_{Treatment} - Effect_{Alternativ e}}$$

Eligible population

During the pilot phase, the eligible population at 18 piloted practices ranged between 0.06% - 0.13% of the total practice population. In the base case analysis, the eligible population is assumed to be 0.13%.

Baseline level of achievement

Pre-pilot the mean practice achievement recorded at 16 sites was estimated to be 9.7% and 40.2% at the post-pilot phase reported by 18 primary care sites. In the base case a baseline level of achievement of 9.7% is assumed. Caution is required in the interpretation of these reported baselines due to the coding difficulties facing the practices during the piloting phase for these indicators.

Population

In the base case, the threshold analysis of the proposed indicator was conducted based on the total practice population registered with practices in England, that is, 8,228 practices with a mean practice size of 6,297 [5].

Country	Number of practices	Number of patients
England	8,228	6,297
Scotland	1,014	5,122
Wales	488	6,146
Northern Ireland	357	5,011

Table 1: Practice information for all UK members

QOF Payments

Each QOF point is assumed to result in a payment of £130.51. This is the forecast value per point in England during 2011/12 (source; Information Centre).

Country	Value per point
England	£130.51
Scotland	£127.29
Wales	£130.47
Northern Ireland	£122.00

Table 2: Value per point for all UK members (most recently available)

Societal value of a QALY

The expected increase in quality adjusted life year (QALY) will be costed at £25,000 per QALY. This is based on the middle of the range £20,000 - £30,000, below which NICE generally considers something to be cost effective.

QOF Points

The economic analysis considers the cost-effectiveness of incentivising the proposed activity over a range of QOF points. The range of QOF points evaluated

were agreed by NICE, YHEC and the economic sub-group to justify the practice successfully completing the activity.

In the base case analysis, 7 points were allocated to the proposed diabetes structured education indicator. Sensitivity analysis will be followed out between the agreed lower and upper bounds of 5 and 11 points (i.e. the range evaluated).

Thresholds

The minimum threshold is set to 40% and the incentivised payments increase linearly up to the maximum threshold of 90%.

Results

The indicative net benefit analysis suggests that the indicator is highly cost effective, with QOF payments up to the upper bound of 11 points warranted on economic grounds (Appendix A). Providing structured education to patients with diabetes is a dominant treatment strategy, assuming the benefits accrued are equivalent across both type 1 and type 2 diabetes, i.e. increased health benefit at reduced cost.

Sensitivity analysis shows the findings are highly insensitive to changes in any of the inputs, most importantly the estimates of incremental costs and effectiveness. The indicator still warrants the maximum QOF payments for this indicator when the incremental cost of the indicator is changed from a cost saving of £535 to cost incurring of £535 per patient. Providing the activity achieves cost savings, the size of the health benefit (provided a QALY gain) is insignificant and will justify the maximum QOF payments (appropriate for this indicator, i.e. 11 points).

Discussion

It is important emphasise that the indicative net benefit analysis is dependent on the assumption that the benefits accrued from structured education programmes in type 1 diabetes can be seen as equivalent to the potential benefits gain by patients with type 2 diabetes from similar programmes. Especially considering the type 2 population makes up approximately between 85-90% of the total diabetic population.

There is limited economic evidence available on structured education programmes for patients with diabetes, especially type 2 diabetes. A recent publication in the Diabetic Care journal reports the cost-effectiveness of structured education in patients with type 2 diabetes [6]. However, the incremental costs and QALYs reported do not match the ICERs presented, and it is unclear based on the information provided in the paper how the base case ICERs were estimated. They concluded there was a 10% chance of the DESMOND programmes being cost effective at a threshold of £20,000 per QALY gained. Taking these potential findings into consideration, although very unclear, would subsequently change the conclusions of the paper and greatly restrict the number of points justified on economic grounds for the incentivisation of this activity. Although if the analysis extracted the incremental cost and QALY data presented in the paper [6], the ICER is estimated to be £6,300 per QALY gained and the indicator would remain cost effective up to 9 points (see Appendix B). The type 2 diabetes structured education speculative analysis presented in Appendix B is highly sensitive to changes in the incremental cost, QALYs and societal value of a QALY and subsequently limits the number of QOF points justified on economic grounds for incentivising this activity.

It has been appreciated by the SIGN guidelines team that research in this area is challenging [1]. The paucity of evidence makes it near impossible to recommend a specific programme over another in the relevant populations treated.

References

[1] Management of diabetics; A national clinical guideline (116). Scottish Intercollegiate Guidelines Network. March 2010.

[2] Diabetes (types 1 and 2) - patient education models. National Institute for Health and Clinical Excellence. NICE Technology Appraisal 60. April 2003.

[3] Loveman E, Cave C, Green C, Royle P, Dunn N, Waugh N (2003). The clinical and cost-effectiveness of patient education models for diabetes: a systematic review and economic evaluation. Health Technology Assessment; 7(22).

[4] Unit Costs of Health & Social Care 2010. Personal Social Services Research Unit (PSSRU). Complied by Lesley Curtis. University of Kent.

[5] General Practice Trends in the UK. NHS Information Centre. Published 22 March 2011.

[6] Jacobs-van der Bruggen MAM, Van Baal PH, Hoogenveen RT, Feenstra TL, Briggs AH, Lawson K, Feskens EJM, Bann CA (2009). Cost-effectiveness of lifestyle modification in diabetic patients. Diabetes Care; 32(8), 1453-1458.

Appendix A: Net Benefit Analysis

Pilot three indicator - Diabetes structured education: Indicative Net Benefit Analysis

	Value per point ac Number of practic Mean practice pop	es	£130.51 8,228 6,297	4		Soc	ietal v	alue of	a QAL	Y					£25,000) 🦜									
	Minimum threshold Maximum threshol		40% 90%	1		Eligi	ible po		n (mea	n % of	•		ulation) atients)		0.13% 9.7%	4		Inc	rement	tal co	eness es st (£ per pa ect (QALY	atient)	ient)	-£535 0.063	2
Points	1	2	3	٩	4	•	5	•	6	•	7	•	8	٦	9		10		11	٦					

						Natio	nal totals						
Expected Achievement					QOF pay	/ments (£00)0s)					Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£7,315,115	861
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£9,116,867	1074
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£10,918,620	1286
45%	£107	£215	£322	£430	£537	£644	£752	£859	£966	£1,074	£1,181	-£12,720,372	1498
50%	£215	£430	£644	£859	£1,074	£1,289	£1,503	£1,718	£1,933	£2,148	£2,362	-£14,522,125	1710
55%	£322	£644	£966	£1,289	£1,611	£1,933	£2,255	£2,577	£2,899	£3,222	£3,544	-£16,323,877	1922
60%	£430	£859	£1,289	£1,718	£2,148	£2,577	£3,007	£3,436	£3,866	£4,295	£4,725	-£18,125,629	2134
65%	£537	£1,074	£1,611	£2,148	£2,685	£3,222	£3,758	£4,295	£4,832	£5,369	£5,906	-£19,927,382	2347
70%	£644	£1,289	£1,933	£2,577	£3,222	£3,866	£4,510	£5,154	£5,799	£6,443	£7,087	-£21,729,134	2559
75%	£752	£1,503	£2,255	£3,007	£3,758	£4,510	£5,262	£6,013	£6,765	£7,517	£8,269	-£23,530,887	2771
80%	£859	£1,718	£2,577	£3,436	£4,295	£5,154	£6,013	£6,873	£7,732	£8,591	£9,450	-£25,332,639	2983
85%	£966	£1,933	£2,899	£3,866	£4,832	£5,799	£6,765	£7,732	£8,698	£9,665	£10,631	-£27,134,392	3195
90%	£1,074	£2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	-£28,936,144	3407
95%	£1,074	£2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	-£30,737,896	3620
100%	£1,074	£2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	-£32,539,649	3832

Net Benefit (£000s)

30%	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850	£28,850
35%	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956	£35,956
40%	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062	£43,062
45%	£50,061	£49,953	£49,846	£49,739	£49,631	£49,524	£49,417	£49,309	£49,202	£49,094	£48,987
50%	£57,059	£56,845	£56,630	£56,415	£56,200	£55,986	£55,771	£55,556	£55,341	£55,127	£54,912
55%	£64,058	£63,736	£63,414	£63,092	£62,769	£62,447	£62,125	£61,803	£61,481	£61,159	£60,836
60%	£71,057	£70,627	£70,198	£69,768	£69,338	£68,909	£68,479	£68,050	£67,620	£67,191	£66,761
65%	£78,055	£77,518	£76,981	£76,444	£75,908	£75,371	£74,834	£74,297	£73,760	£73,223	£72,686
70%	£85,054	£84,409	£83,765	£83,121	£82,477	£81,832	£81,188	£80,544	£79,899	£79,255	£78,611
75%	£92,052	£91,301	£90,549	£89,797	£89,046	£88,294	£87,542	£86,791	£86,039	£85,287	£84,536
80%	£99,051	£98,192	£97,333	£96,474	£95,615	£94,756	£93,897	£93,037	£92,178	£91,319	£90,460
85%	£106,050	£105,083	£104,117	£103,150	£102,184	£101,217	£100,251	£99,284	£98,318	£97,351	£96,385
90%	£113,048	£111,974	£110,900	£109,827	£108,753	£107,679	£106,605	£105,531	£104,457	£103,384	£102,310
95%	£120,154	£119,080	£118,006	£116,933	£115,859	£114,785	£113,711	£112,637	£111,563	£110,490	£109,416
100%	£127,260	£126,186	£125,112	£124,039	£122,965	£121,891	£120,817	£119,743	£118,669	£117,596	£116,522

Where the net benefit produces a non-negative outcome then it is cost <u>effective</u> for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

Appendix B: Net Benefit Analysis

Pilot three indicator - Diabetes structured education: Indicative Net Benefit Analysis

	Value per poin Number of pra Mean practice	ctices		£130.51 8,228 6,297			Soc	ietal va	alue of	a QAL	Y			-	£25,000									
	Minimum thres Maximum thres			40% 90%	•		Eligi	ible pop		(mea	n % of	•	 ulation) atients)		0.13% 9.7%	4		Inc	ost-effect cremental cremental	cost (£ per pa	atient)	£63 0.01	1
Points	1	2	•	3	•	4	•	5	•	6		7	8	٩	9	•	10	•	11	۹.				

						Natio	nal totals						
Expected Achievement					QOF pay	/ments (£00)0s)					Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£861,406	137
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,073,575	170
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,285,744	204
45%	£107	£215	£322	£430	£537	£644	£752	£859	£966	£1,074	£1,181	£1,497,913	238
50%	£215	£430	£644	£859	£1,074	£1,289	£1,503	£1,718	£1,933	£2,148	£2,362	£1,710,082	271
55%	£322	£644	£966	£1,289	£1,611	£1,933	£2,255	£2,577	£2,899	£3,222	£3,544	£1,922,251	305
60%	£430	£859	£1,289	£1,718	£2,148	£2,577	£3,007	£3,436	£3,866	£4,295	£4,725	£2,134,420	339
65%	£537	£1,074	£1,611	£2,148	£2,685	£3,222	£3,758	£4,295	£4,832	£5,369	£5,906	£2,346,589	372
70%	£644	£1,289	£1,933	£2,577	£3,222	£3,866	£4,510	£5,154	£5,799	£6,443	£7,087	£2,558,758	406
75%	£752	£1,503	£2,255	£3,007	£3,758	£4,510	£5,262	£6,013	£6,765	£7,517	£8,269	£2,770,927	440
80%	£859	£1,718	£2,577	£3,436	£4,295	£5,154	£6,013	£6,873	£7,732	£8,591	£9,450	£2,983,096	474
85%	£966	£1,933	£2,899	£3,866	£4,832	£5,799	£6,765	£7,732	£8,698	£9,665	£10,631	£3,195,265	507
90%	£1,07	4 £2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	£3,407,434	541
95%	£1,07	4 £2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	£3,619,603	575
100%	£1,07	4 £2,148	£3,222	£4,295	£5,369	£6,443	£7,517	£8,591	£9,665	£10,738	£11,812	£3,831,772	608

						•	•				
30%	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557	£2,557
35%	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187	£3,187
40%	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816	£3,816
45%	£4,339	£4,231	£4,124	£4,017	£3,909	£3,802	£3,695	£3,587	£3,480	£3,372	£3,265
50%	£4,861	£4,646	£4,432	£4,217	£4,002	£3,787	£3,573	£3,358	£3,143	£2,928	£2,714
55%	£5,384	£5,061	£4,739	£4,417	£4,095	£3,773	£3,451	£3,129	£2,806	£2,484	£2,162
60%	£5,906	£5,476	£5,047	£4,617	£4,188	£3,758	£3,329	£2,899	£2,470	£2,040	£1,611
65%	£6,428	£5,891	£5,355	£4,818	£4,281	£3,744	£3,207	£2,670	£2,133	£1,596	£1,059
70%	£6,951	£6,306	£5,662	£5,018	£4,374	£3,729	£3,085	£2,441	£1,796	£1,152	£508
75%	£7,473	£6,721	£5,970	£5,218	£4,466	£3,715	£2,963	£2,211	£1,460	£708	-£44
80%	£7,996	£7,136	£6,277	£5,418	£4,559	£3,700	£2,841	£1,982	£1,123	£264	-£595
85%	£8,518	£7,551	£6,585	£5,619	£4,652	£3,686	£2,719	£1,753	£786	-£180	-£1,147
90%	£9,040	£7,966	£6,893	£5,819	£4,745	£3,671	£2,597	£1,523	£450	-£624	-£1,698
95%	£9,670	£8,596	£7,522	£6,449	£5,375	£4,301	£3,227	£2,153	£1,079	£6	-£1,068
100%	£10,300	£9,226	£8,152	£7,078	£6,004	£4,931	£3,857	£2,783	£1,709	£635	-£439

Net Benefit (£000s)

Where the net benefit produces a non-negative outcome then it is <u>cost</u> <u>effective</u> for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

Appendix C: Background to cost-effectiveness evidence (QOF)

This appendix provides background information to the approach used for evaluating the economic implications of existing and potential new indicators for the QOF. The approach has been developed by economists at the Universities of York and East Anglia, and presented previously to the QOF Advisory Committee.

The approach to cost effectiveness considers two issues:

- 1. Is the activity/intervention described by the indicator cost effective?
- 2. What level of payment is economically justifiable to increase the activity?

The first question seeks to determine whether an activity or intervention will result in benefits which are greater than the costs of undertaking the activity. In this analysis, health benefits are assumed to be measured in Quality Adjusted Life Years (QALYs) which can be valued in monetary terms at £25,000 each. The net benefit calculation subtracts the delivery costs and the QOF payments from the monetarised health benefits

Net benefit = (monetised benefit – delivery cost) – QOF payment

The second question relates to the level of QOF payments which can be justified to increase levels of desired activities whilst retaining net benefits to the NHS. This is directly relevant to negotiations relating to the implementation of indicators and decisions on the number of QOF points to be allocated to a particular indicator. Where sufficient data are available, detailed sensitivity analysis on QOF points and uptake levels can be undertaken within the cost-effectiveness model. This paper provides information on the cost-effectiveness of the pilot indicators, to inform the decisions of the QOF Advisory Committee.

Nature of cost-effectiveness evidence

A couple of conditions must hold for an indicator to be deemed cost-effective:

- 1. The intervention/activity itself must be cost-effective. In the UK, NICE use an implicit threshold of £20,000 to £30,000 per QALY gained.
- 2. The intervention/activity must lead to an increase in the number of eligible patients receiving the intervention/activity.

The main challenge associated with cost-effectiveness analyses of the indicators is the availability of data on the costs and health benefits of implementing the targeted activities. The main source of this has been the review of NICE clinical guidelines and published literature. For several indicators there is the additional problem of linking them directly to changes in patient outcomes so that net health benefits can be assessed.

Many of the indicators relate to areas of clinical management which have been shown to be cost-effective if correctly carried out. However, the indicators themselves do not always measure the delivery of treatment; they frequently require the assessment and documentation of a patient's disease status, or whether they have had a particular diagnostic test. These types of indicators may lead to changes in treatment and improvement in patient outcomes, but it is not certain to happen. In reviewing the piloted indicators we have applied a three-way classification:

- i. Indicators which relate directly to a change in treatment;
- ii. Indicators which change the availability of information available to the treating clinician in a disease where there is a proven therapy;
- iii. Indicators which change the availability of information but which do not directly inform a treatment decision.

Indicators in category (i) are most amenable to cost-effectiveness analysis as they can lead directly to a change in outcome. Those in category (ii) may also lead to a change in outcomes if the new information is acted upon. To carry out the cost-effectiveness an assumption must be made on the likelihood of such a change in management taking place. The third category is least amenable to cost-effectiveness analysis as improvement in the process of information collection is unlikely to change the patient outcome.

The main challenge associated with the analyses outlined above, is the availability of evidence on the costs and health benefits of existing and new clinical indicators. Two economic approaches have been derived:

Approach one – Net benefit analysis

A net benefit approach has been recommended as the most appropriate means of evaluating whether an indicator can be considered cost effective. Cost effectiveness is intended to consider whether the costs associated with an indicator are outweighed by the benefits accrued by the health service. When a robust evidence base is available for an indicator, they can be identified as a category (i) indicator. When an indicative evidence base is available for category (ii) indicators it is possible to apply the net benefit approach.

Approach two – Threshold analysis

Threshold analysis has been identified as the approach when considering indicators with a thin evidence base, i.e. missing data. For example, where the costs of delivering an indicator are known or can be easily estimated, but the effectiveness is unknown, then it is possible to identify the minimum level of effectiveness necessary for an indicator to be considered cost effective, in terms of quality-adjusted life years (QALYs) per patient per annum. This can also be expressed in terms of a minimum cost-saving (£) per patient per annum. This approach is applied to the category (ii) indicators with a thin evidence base.

Data on costs of implementation can be estimated from descriptions of the actions required to meet the potential indicator targets. The nature and extent of any QOF payment is unknown at this stage. Judgement can be made on the potential cost-effectiveness of an indicator if the difference between the costs and benefits of implementation is known. If this is relatively small, then there will be little scope for incentive payments if positive net benefits are to be achieved.

Piloted indicators are reviewed to determine which are associated with a therapeutic benefit that can be measured in QALY terms. Indicators which do not have a direct link to therapeutic benefit (process indicators) are subject to a preliminary economic

appraisal. The danger of attributing a therapeutic benefit to a process indicator is that the necessary assumptions may be seen, in some cases, as tenuous.

Although the cost-effectiveness of indicators that do not have a direct link to therapeutic benefit may be unclear, this does not mean that they are poor value for money, but rather that new studies are required to produce the data needed to determine their cost-effectiveness (Walker *et al.* 2010).

References

Walker S, Mason AR, Claxton K, Cookson R et al. (2010) Value for money and the Quality and Outcomes Framework in primary care in the UK NHS. British Journal of General Practice; May 2010, e213-220.