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## Translating English Medical Terms into Indonesian: A Study of Phonological Translation and Spelling Adjustment

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### ABSTRACT

This study investigates phonological translation and spelling adjustment as linguistic phenomena in the translation of English medical terms into Indonesian. It aims at identifying the phonological translation and describing spelling adjustment taking place in English-Indonesian medical terms translation. Here, phonological adaptation is specifically discussed to demonstrate the translation of the English terms that are, then, adopted into the Indonesian language through the adjustment of pronunciation. The adjustment can be clearly seen through the comparison of the phonemic transcription of each term. Meanwhile, spelling adjustment presents the adaptation of writing system in accordance with the phonological translation. In Indonesian, the spelling system of the foreign adopted terms is standardized in the Indonesian guidance of term formation. The data are taken from the translation of six selected articles from a medical textbook, *General Ophthalmology* (2008) that is translated into *Oftalmologi Umum* (2013). The results demonstrate that phonological translation does occur in the process of translating the English medical terms into Indonesian and the spelling adjustment includes the writing of affix, vowel, vowel combination, vowel-consonant combination as well as consonant combination.

**Keywords:** *Phonological Translation, Phonemic Transcription, Spelling Adjustment, Term formation, Medical Terms*

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### 1. Introduction

Language contact may take place through some procedures of translation like borrowing (Vinay & Dalbarnet in Venuti, 2000), transference and naturalization (Newmark, 1988), pure borrowing and naturalized borrowing (Molina & Albir, 2002). It enables the enhancement of specific terms in a certain discipline. This activity results in adoption of the terms in source language (SL) to the terms in target language TL). The example of transference or pure borrowing is the English term *orbit* that is used in Indonesian without undergoing spelling and pronunciation adaptation. The adoption of the words *microphone* into *mikrofon* and *nasal* to *nasal* with different pronunciation is also the phenomenon that can be categorized as the process of vocabulary enrichment in

Indonesian language through the contact with other languages.

Translation activity has been explicitly accepted as a significant factor to create new terms in the Indonesian language. In the Indonesian general guidance of term formation the contribution of translation is included in the discussions about forming equivalent words for foreign terms. The search of equivalence is conducted through three ways i.e., (1) translation process, (2) absorption, and (3) combination of translation and absorption. Translation is considered to be the activity of translating foreign terms into the Indonesian cognate words, for example the term *supermarket* becomes *pasar swalayan*. Absorption in this case is the process of transferring foreign terms into Indonesian with or without changes in pronunciation and spelling, e.g. *golf* becomes *golf*, *system*

becomes *sistem*, and *science* becomes *sains*. This process is the result of scientists' efforts to disseminate information, findings, and thoughts that are useful for the improvement of the language and the nation since there are opportunities to expose concepts in science, technology and art in creating new terms (The Indonesian General Guidance of Term Formation, 2007: 11-13).

One of the interesting phenomena that can be observed from the process of creating Indonesian new terms through a translation activity is the results that the medical texts translation demonstrates. Development of translating medical books from English into Indonesian cannot be separated from two interesting phenomena i.e., (1) the process of absorption or more often it is called adoption of some Latin or English terms, and (2) the process of finding or creating equivalent words in Indonesian (Wonodirekso, 2002; Handayani, 2009:4). What is meant by direct adjustment here is the process of adjustment of form in terms of pronunciation and spelling in accordance with the rules in the target language. In translation theory, this adjustment is called naturalization (Newmark, 1988:82) that is in line with essence of the so-called phonological translation (Catford, 1965:56-61). Meanwhile, the process of creating equivalents through the use of original Indonesian words is the activity of adapting meaning. Adaptation of meaning that results in the term that is "the Indonesian cognate word" is not an adjustment of form that is categorized by Vinay and Dalbernet (in Venuti 2000:90) as adaptation procedure.

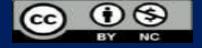
This study focuses on pronunciation adjustment followed by the investigation on the writing system in the process of foreign terms adoption into Indonesian. The discussion of pronunciation adjustment in translation cannot be separated from the adaptation of one language phonology with the other language phonology. It is called phonological translation that refers to "restricted translation in which the source language (SL) phonology of a text is replaced by equivalent target language (TL) phonology" (Catford, 1965:56). This means that the investigation of pronunciation adjustment includes the comparison of how the SL and TL terms are pronounced and what the characteristics of SL and TL phonemes are. In addition, it is also interesting to observe the spelling of the adopted terms and how the Indonesian

language standardizes the foreign adopted terms.

## 2. Literature Review

The researches on the translation of scientific and medical texts confirm the results that the adaptation of SL linguistic units involve the application of several translation procedures like transference and borrowing with two types namely pure borrowing and naturalized borrowing that shows the adoption of foreign terms into Indonesian (Khaerun, 2003; Praekananta, 2007; Putri, 2014). One specific characteristic shown in the translation of English Medical terms into Indonesian is the phenomenon of borrowing from Latin and Greek (Handayani, 2009; Silalahi, 2009). The procedure is sometimes irrefutable since a lot number of English medical terms are rooted from Latin and Greek. For the sake of universality, the Latin and Greek words are used in the translation of English medical terms because the stakeholders like doctors and other paramedics have known and learned the terms so that it will not be either confusing or misleading (Handayani, 2009; Silalahi, 2009, Jayantini, 2017).

The mapping of translation procedures in medical texts translation is worth doing to list the predominant and appropriate strategies applied in this field that, practically, will be informative as references for the professionals who take the translation tasks (Widarwati, 2015). In her study, Widarwati found that there were seven procedures of translation utilized in the translation of medical text from English into Indonesian, namely pure borrowing, naturalized borrowing, established equivalent, borrowing using Latin words, amplification, reduction and transposition. Widarwati's study contributed to the mapping of how medical terms found in medical texts were translated, particularly when English and Indonesian were the involved languages in the translation. Despite the mapping that the study had made, the analysis was still not complete. It was due to the adjustments of pronunciation and spelling that were not clearly presented. For example, the linguistic phenomena behind the translation of the term *diagnostic* into *diagnosa* and the term *cataract* becomes *katarak* were not completely explored in the study. The patterns found in Widarwati's study (2015) were similar to the previous research concerning medical texts translation as found in Praekananta (2007) Handayani (2009), and Silalahi (2009). Therefore, further investigation on



the adjustment of pronunciation, which is the focus of phonological translation followed by the analysis on the orthographical system must be an interesting topic to research.

Phonological translation is closely related to loanwords and borrowing. Phonological adaptation can be investigated through the comparison of phonemic transcription that results in several categories like loss of phoneme, shift of stress, addition of phoneme and phonemic change (Kridalaksana in Wicaksono, 2014). The translation of the the verb *describe* into *mendeskripsikan* demonstrates both phonological and morphological adjustment. The addition of the affix *me-* *kan* in the verb *deskripsi* and phonological adaptation from the verb *describe* /di'skraɪb/ becomes *deskripsi* /deskripsi/ shows the change of vowel (V) from /i/ to /e/ and the diphthong /aɪ/ becomes /i/, the change of consonant from /b/ to /p/. There is also an addition of consonant /s/ and vowel /i/ in the Indonesian word (Jayantini in Sudipa and Primahadi, 2014).

From macro linguistic perspective, phonological translation cannot be separated from Haugen's borrowing or loanwords (in Kaerun, 2003) as one interesting phenomenon in the study of sociolinguistics. Haugen's loanword division can be divided into three criteria, i.e. pure loanwords, which are the loanwords without undergoing the process of morphological and orthographical adaptation, (2) mix loanwords, which are the borrowed words which experience the adaptation process and (3) loanblends, which are the combination of a loanword from SL and an original word of TL in the form of compounding. In the inventory of loanwords, phonological changes involving the adoption of English terms into Indonesian may take place in several categories like (1) no phonological change, e.g. *striker* /straikə(r)/ becomes /straikə(r)/ and (2) phonological changes including (a) addition e.g. *dribble* /driɪbəl/ → *dribble* /driɪbəl/, (b) reduction, e.g. *goal* /gou/ → *gol* /gol/, (c) dissimilation e.g. *athlete* /æθli:t/ → *atlet* /atlet/, (d) complex phonological changes e.g. *medal* /medl/ → *medali* /mədali/ (Widyaningsih, 2010).

In case of English-Indonesian translation, borrowing is an irrefutable technique applied by a translator. The investigation on the borrowing words in digital camera magazine by Yusuf (2015) confirmed the result that there were several

criteria of borrowing words based on how the adjustments take place. Two interesting terms were mentioned in the study to explain the linguistic phenomena occur in the translation. One term used was "adoption" to show direct transference from foreign terms into Indonesian that occurred without spelling and pronunciation adjustments, e.g. *tripod* becomes *tripod*. Another term in the study was "adaptation" that was used to describe the adjustments of pronunciation and spelling, e.g. *compensation* becomes *kompensasi* and *resolution* becomes *resolusi*. In terms of borrowing classification, this study attempted to demonstrate the phenomena of adjustment and direct transference. However, the explanation made in this study was only on the adjustment of spelling without complete presentation on the adjustment of pronunciation when adaptation was found. Hence, undertaking a research on the patterns of pronunciation and spelling adjustments must be beneficial to contribute to clear description on how phonological translation and spelling adjustments occur in the English-Indonesian translation.

### 3. Theoretical Framework

Translation is a bilingual activity that cannot be separated from the linguistic aspects of the involved language. Contact phonology is one of the aspects that can be observed as the result of language contact. Contact phonology may occur in bilingualism, multilingualism, history, language and dialect development (Smith in Pennington, 2007: 76-79). It takes place due to language or dialect contact. The understanding on contact phonology can be used to accept the changes in language and its phonological system. The role of English as the second language of people in the world influences phonological system of other languages in the current era in which the bilingualism and English terms adoption is widespread (Smith in Pennington, 2007:76). As further explained by Smith (in Pennington, 2007), there are two significant features of contact phonology that is how contact phonology occurs and types of the transferred phonological phenomenon. Among other situations that become the focus of contact phonology, i.e loanword phonology, areal influence, dialect mixing, language mixing and "simplification" due to pidginization/creolization, loanword phonology is closely connected to phonological translation.

According to Catford (1965), phonological translation is “restricted translation in which the SL phonology of a text is replaced by equivalent TL phonology.” The grammar and lexis of the SL text do not undergo any change, except grammatical or lexical deviations are needed to follow the process of adjustment. For example, the phonological translation of the English plural 'cats' / kats / into a language that does not have final consonant clusters, the translation might become something like /kat/. The phonological translation equivalent here ends in /t/ and thus appears to be a singular. (Catford,1965:56-61).

Another example that shows the clear concept of phonological translation mentioned by Catford (1965: 56-57) is the translation of the English /had/ into the Greek /xent/. The fundamental aspect in phonological translation is the relationship of SL and TL phonological units to 'the same' phonic substance. Given this definition, the comparison of sound segments in the English term 'had' / had / into Greek /xent/ can be analyzed from each phonic substance of the sound. The English /h/ has the distinctive phonic substance 'voiceless glottal fricative' while Greek only has one phoneme that is related to nearly the same phonic substance, / x /—i.e. a 'deep' voiceless fricative. The English / a / is a low front vocoid, and the same phonic features are present in Greek / e /. They are closely connected although, actually, the Greek vowel is not so low as the English / a /. Both vowels are the lowest in the front series of each language. The last phoneme in the English word *had* is / d /, which is a voiced apical stop. The translation equivalent of English / d / is either Greek / t /, or Greek / nt / manifested phonetically as [nd]. In phonological translation, Greeks frequently use the latter especially when speaking English with a 'Greek accent.' The comparison of phonic substance of /had/ can be summarized in the table below:

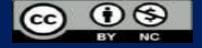
*Table 1: The example of phonological translation of English into Greek (Catford, 1965:56)*

English /had/	Phonic substance	Greek /xent/	Phonic substance
/h/	voiceless glottal fricative	/x/	'deep' voiceless fricative
/a/	low front vocoid	/e/	lowest front vocoid
/d/	voiced apical stop	/nt/	apical nasal stop

Phonological translation is worth investigating in the discussion of language

contact that involves the relationship of the words' sound of one language and the other languages. An interesting part of phonological translation in the study of language acquisition is the creativity in making the translation involve the system of sound in different languages. Creative translation is most likely needed when lexicalized translation versions are not found so that foreign matching phonological materials are used to transfer the meaning (Oller et al., 1998). The specific characteristics of phonological translation are (1) the principle of 'the same phonic substance' of SL and TL phonological units, (2) the differences between formal correspondence and translation equivalence must be recognizable, (3) it is close to the term 'total translation' in the search of phonological correspondence between SL and TL terms, (4) it involves change of rank that presents the arrangement of substance to the TL formal units. Phonological translation may be regarded as translation taking place only at the phonological level from SL into TL (Catford, 1965). These principles can be applied in the investigation of English lexicons that became Indonesian found in many different texts including a novel (Baiatun, 2010).

According to Nida (1994:193), phonological correspondences are of three types. Such correspondences are structural and formal involving correspondences between source language and target language. Here, the explanation of the three categories is supported by examples of English-Indonesian translation for particular examples as found in (Baiatun, 2010). The first category is transliteration of borrowed lexical units. A translator may apply this type of correspondence when he/she meets proper names to translate. Borrowing that affects the adjustment of the borrowed word's sound is chosen considering that the languages in the world do not have the exact same sounds, e.g when translating the name *Mickey Mouse* in into Indonesian, the name of *Micky Mouse* becomes *Miki Mouse*. The pronunciation may be the same yet the spelling is different. The second category is plays on words which are phonologically similar. The example of this category is the translation of the word *canvas* into *kanvas* that is pronounced in the same but the words are written differently. The last category is patterns of form-sound style that may be presented in alliteration, rhyme and acrostic arrangements. The three types of form-



sound style are almost similar to play on words. As it is named, such a correspondence includes the same rhyming in the initial and final syllable like in the translation of the word *compulsive* in English into *kompulsif* /kəm'pʌlsɪv/ in Indonesian. The syllable of *com* /kəm/ in English is translated into *kom* /kom/ in Indonesian and the syllable of *-sive* in English is translated into *-sif* /sif/ in Indonesian. The example shows that the beginning of two or more stressed syllables of a word group is translated by the same sound or combination of sounds.

#### **4. Method**

This is a qualitative study that explores phonological translation and spelling adjustment taking place in the translation of medical terms found in the selected articles of Vaughan & Asbury's General Ophthalmology and their translation in the Indonesian book *Vaughan & Asbury Oftalmologi Umum*. Specifically, this study is designed to the identification of phonological translation and the analysis of spelling adjustment in accordance with the Indonesian terms orthographical system. Observation method was applied in collecting the data that was realized through note taking technique (Sudaryanto, 1988, p.1-9). This technique was utilized considering that the present study involved objective data in the form of written English and Indonesian texts as the data source. The objective data were thoroughly observed and listed in the table showing the SL and TL sentences in which the medical terms got a special highlight. The examples of data can be seen in the appendix. Both English and Indonesian medical terms are bolded for the purpose of giving special attention to the terms since this study focuses on the phrasal and lexical units.

After classifying the data that resulted in the categories of pronunciation and spelling adjustment, data analysis was undertaken. The analysis was of two major categories. First, the analysis was done by observing the results of phonemic adaptation from SL term into TL term. The description of English phoneme phonic substance was made in accordance with Roach (2007) while the Indonesian one was based on Dardjowidjojo (2009). Second, the application of rules in the Indonesian general guidance of term formation known as *Pedoman Umum Pembentukan Istilah* (PUPI) in Indonesian was observed as the basis for the spelling adjustment analysis. The SL and TL terms were compared

regarding several principles determined in PUPI, namely the writing system of foreign affixes, vowels, consonants, vowel combination, consonant combination, and combination of vowels and consonants. Then, both formal and informal methods were utilized to present the analysis. Formal presentation in the form of comparative description of the SL and TL phoneme was used to show the changes of pronunciation. Meanwhile, informal presentation was done through descriptive paragraphs supported with several representative data for each reported category which was made in the classification.

#### **5. Results and Discussion**

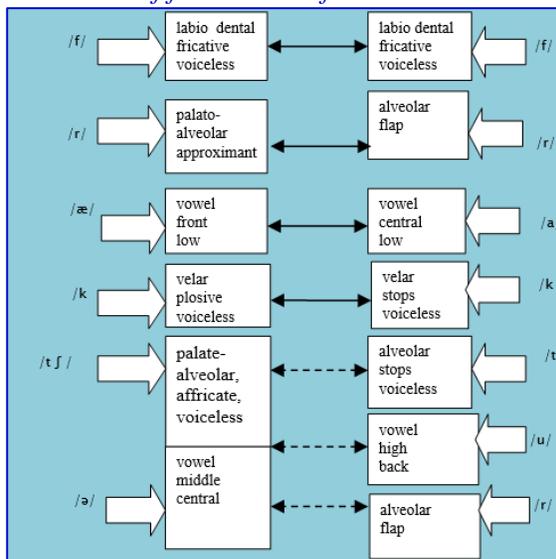
Having done the observation, the results show that phonological translation does take place in the translation of English medical terms into Indonesian. The phonological translation can be observed from two criteria, i.e. (1) the English and Indonesian phonemes that have the similar phonic substance and (2) the phonemes in English that are not found in Indonesian, or vice versa. The presentation of the examples is done formally in the form of a figure showing the comparison of the phonemes in English and Indonesian. The straight line indicates that the phonemes in English are found in the Indonesian while the dashed line is made to show that the English phonemes are not found in Indonesian. There may be additional phoneme or replacement, yet they are still admitted and are recognizable through the explanation of their place and manner of articulation. Meanwhile, the writing system of a word in Indonesian shows that a word is written as it is pronounced. The spelling adjustment occurs in four categories of orthographical system, namely (1) affix adjustment, (2) vowel adjustment, (3) vowel combination adjustment, (4) vowel-consonant combination, and (5) consonant combination adjustment.

##### **5.1 Phonological Translation**

The description of phonological translation in this study is represented by the terms that are widely known as the medical terms both in English and Indonesian. The two data used as the examples to show the phonological translation are usually used by the paramedics to explain certain body and health condition. As a medical term, fracture is categorized as verb and noun that means 'to break (a bone)' and 'break in a bone' (Collin, 2005, p.151). Cataract is a noun that explains a condition in which the

lens of the eye gradually becomes hard and opaque (Collin, 2005: 63). The phonological translation of the terms *fracture* becomes *fraktur* and *cataract* → *katarak* are shown in a figure containing each of the term's phonemic transcription. The comparison of the two terms pronunciation is done in accordance with the description of their phonic substance. The phonic substance of the English term is based on Roach (2007) and the Indonesian one is in accordance with Dardjowidjojo (2009).

Figure 1: The description of phonological translation of *fracture* into *fraktur*

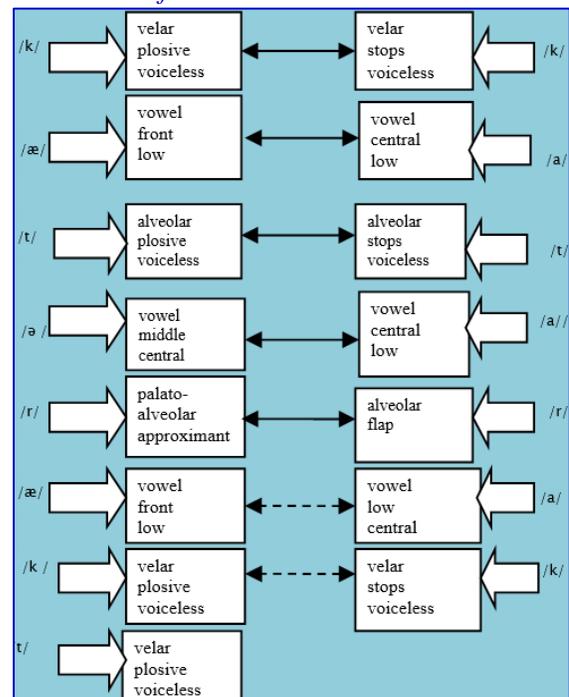


As found in Figure 1, there are three important parts in the description showing the phonological translation of the term *fracture* to *fraktur*. First, the left part of the picture is the phonemic transcription of the English term and the right part is phonemic transcription of the Indonesian term that constructs the pronunciation of the two terms. Second, the phonic substance of the English and Indonesian phonemes indicates place and manner of articulation of the phonemes. Third, the interconnected arrow is a straight line that is used to show that the phonemes in English and Indonesian terms have similar characteristics. The dashed line is used to show the adjustment made in phonological translation. The characteristics of the English and Indonesian phonemes may be similar or completely different due to the addition of phoneme when adaptation is made.

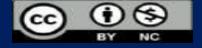
Phonemic transcription of the English and Indonesian terms is not exactly the same. The term *fracture* /fræktʃə/ involves two syllables namely /fræk/ with the pattern CCVC and /tʃə/ with the pattern CV. In the second syllable, the sound /tʃ/ in English is treated as one phoneme represented by two characters (t and j) (Roach, 2007, p.41). Similarly, two syllables construct the Indonesian term, i.e.

/frak/ that consists of CCVC and /tur/ with the pattern CVC. Similar phonic substance between English and Indonesian is shown in the five English phonemes, namely /f/, /r/, /a/, /k/, /tʃ/ to be compared with the Indonesian phonemes /f/, /r/, /a/, /k/, /t/ respectively. The use of the other two phonemes in Indonesian, i.e. /u/ and /r/ indicates that phonological translation involves the adjustment of SL phonology of a text to be replaced by the equivalent TL phonology. The adjustment occurs when the consonant /tʃ/ and the vowel /ə/ are replaced by /t/ /u/ and /r/ as an additional phoneme in the second syllable of the Indonesian term, *fraktur*. The phonic substance of each term can be clearly seen in figure 1. A slight difference is found in each of the Indonesian and English phoneme showing that the different phonology of the world's language. Take for example, the phoneme /f/ in English is identified as labio dental fricative and voiceless while /f/ in Indonesian is also *labio dental frikatif* (fricative) *tak bersuara* (voiceless).

Figure 2: The description of phonological translation of *cataract* into *katarak*



Phonological translation can also be seen in Figure 2. Visualization in the picture shows that phonological translation can describe the sound characteristics of the SL term and TL term. The second example used here is the translation of *cataract* into *katarak*. Similar to the phonological translation found in figure 1 showing the phonological translation of *fracture* into *fraktur*, the description includes the phonemic transcription of each term, the phonic substance showing the characteristics of the terms' sound and the relationship between each phoneme found



in English and Indonesian. The English term *cataract* /'kætərækt/ and the Indonesian term *katarak* have three syllables showing the combination of CV in /'kæ/, CV in /tə/, and CVCC/rækt/ for *cataract* while the pattern of CV in /ka/, CV in /ta/, and CVC in /rak/ is found in *katarak*.

The phonological translation of the term *cataract* into *katarak* demonstrates that phonemic transcription of the English and Indonesian terms is not the same. Similar phonic substance found in *cataract* becomes *katarak* is five English phonemes, namely /k/, /t/, /r/ for the consonants and three English vowel /æ/, /ə/ that are replaced by the Indonesian vowel /a/. The phonic substance of *cataract* and *katarak* can be clearly seen in figure 2. The difference is seen from the omission of the phoneme /t/ and the end the final syllable of the English term. It is, again, the representation of the Indonesian and English phoneme showing that the languages in the world have different inventory of phonology.

### 5.2 Spelling Adjustment

The discussion of spelling adjustment cannot be separated from phonological translation since a certain word is understood from how it is spelled and pronounced. From the perspective of language contact involving Indonesian and other languages, the spelling and pronunciation adjustment can be divided into several criteria. This study utilizes the term adoption to refer to process of adopting foreign terms into Indonesian. In Indonesian guidance of term formation (PUI), the adoption is called *penyerapan* (literally means 'absorption'). Four criteria of adoption are proposed in the adoption of foreign terms into Indonesian, namely (1) the adjustment of spelling and pronunciation, e.g. *camera* /'kæməɹə/ → *kamera* /kamera/, (2) the adjustment of spelling without adjustment of pronunciation, e.g. *design* /dri'zæn/ → *desain* /desain/, (3) the adjustment of pronunciation without adjustment of spelling, e.g. *bias* /baɪəs/ → *bias* /bias/, (4) without adjustment of pronunciation without adjustment of spelling, e.g. *print* /prɪnt/ → *print* /prɪnt/.

#### 5.2.1 Affixation

In relation to the process of adopting foreign terms to Indonesian, there are rules in the Indonesian guidance of term formation that determine the writing system of the foreign language affixes. The use of foreign terms derived from Indo-European language is strongly considered after having

some adjustments. Spelling adjustment may occur in the words with affixes including various prefixes and suffixes. Table 1 is the list of representative data that are attached by prefixes and suffixes usually used in medical texts. The prefixes found here are de-, inter-, intra-, para- and peri- and the suffixes used in the collected data are -ine, -al, -ity, and -ary.

Table 2: Spelling adjustment involving the use of affix in the translation of English medical terms into Indonesian

No	English	Indonesian	Affix
1	Degeneration	Degenerasi	Prefix de-
2	Interferometry	Interferometri	Prefix inter-
3	Intraocular	Intraocular	Prefix intra-
4	Parasympathetic	Parasimpatis	Prefix para-
5	Periocular	Periokular	Prefix peri-
6	Crystalline	Kristalina	Sufiks -ine
7	Industrial	Industrial	Sufiks -al
8	Disability	Disabilitas	Sufiks -ity
9	Hereditary	Hereditas	Sufiks -ary

#### 5.2.2 Vowel and Consonant Adjustment

The writing system of foreign adopted terms in Indonesian involving certain vowels and consonants and the arrangement of their position in the terms is standardized in the enhanced Indonesian spelling system called *Ejaan yang Disempurnakan* (EYD) in Indonesian language. The rules and examples of words are found in EYD to show how the adoption of foreign terms must be made. Several categories are found to accommodate the adjustment of spelling that must be done when adoption in every language contact media takes place. The translation of medical terms that results in the adoption of foreign terms into Indonesian is no exception.

##### 5.2.2.1 Vowel

Several vowels in the initial position of the foreign term are directly transferred into Indonesian, for instance vowel 'e' remains 'e' in Indonesian. It can be seen from the maintenance of vowel 'e' in the terms *ectoderm* and *episclera* which become *ektoderm* and *episklera*. Some other examples involving the vowels 'a', 'i', 'o' and 'u.' The examples of the terms that show the unchanging vowels from English to Indonesian are *amacrine* becomes *amakin* in which 'a' remains 'a,' *interferometri* becomes *interferometri* in

which 'i' remains 'i', *opportunistic* → *oportunistik* in which 'o' remains 'o' and *ultrasonography* becomes *ultrasonografi* in which 'u' remains 'u'.

#### 5.2.2.2 Vowel Combination

The writing of vowel combination is also determined in the spelling adjustment of foreign terms formation. The arrangement of double vowels in certain words is generally fixed. Take for example, the vowel clusters 'au' in *glaucoma* dan 'eu' in *neurologic*. There is no change of spelling in the two terms. However, the rule saying the vowel combination does not undergo any changes cannot be applied in the translation of the term *haemoglobin* becomes *hemoglobin*. In EYD, it is said that the vowel combination like 'au' and 'eu' remain the same, yet it is not applicable to 'eu' that must be changed into 'e' as applied in the translation of *haemoglobin* becomes *hemoglobin*.

#### 5.2.2.3 Vowel and Consonant

The writing of consonant and vowel in EYD shows that adjustments must be made when a particular vowel is preceded or followed by several consonants. The adjustment of consonant 'c' is made differently depending on the combination of the vowel and consonant. Spelling adjustments can occur if a particular consonant is followed by a particular vowel. For example, the adjustment of consonant 'c' that occurs before 'a', 'u', 'o' the consonant 'c' is changed to 'k' as found in the translation of *construction* to *konstruksi*. The writing of 'c' that precedes 'e', 'i', 'oe' and 'y' become 's' as found in the change of *central* becomes *sentral*. This adjustment depends on the way the term is pronounced in Indonesian so that its spelling system follows. Several representative examples found in this study are the changes of terms like *cataract* → *katarak* ('c' precedes 'a' becomes 'k') *congenital* → *kongenital* (c precedes 'o' becomes 'k') *cell* → *sel* ('c' precedes 'e' becomes 's') *central* → *sentral* (c precedes 'e' becomes 's').

#### 5.2.2.4 Consonant Combination

When consonant combinations are found in the English terms, the adjustment must also be made in accordance with the Indonesian rules. For example, the double consonant 'cc' that precedes the vowel 'o', 'u', becomes k as found in the adjustment of the terms *accomodation* into *akomodasi*, acculturation becomes akulturasi, acclimatization to aklimatisasi. The dominant examples found in this study are 'ch' to 'k' as in *choriocapillary* becomes *koriokapilari*, 'ph' becomes f and a double

consonant 'll' becomes only single 'l' as in *collagen* to *kollagen*.

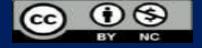
## 6. Conclusions

In case of English-Indonesian medical terms translation, it is found that phonological translation does occur in the process of transferring the meaning from English medical texts into Indonesian. Phonological translation cannot be separated from the fact that translation is the real example of how language contact takes place. When translating a certain term, adopting the linguistic form including phonological elements is not irrefutable. In Indonesian, words are written in accordance with their pronunciation that is reflected in the phonemic transcription of the terms and their spelling system. The existence of phonological translation in the adoption of the English terms into the Indonesian involves the phonemes that have the same phonic substance, addition and omission of phonemes.

Spelling adjustments in the adoption of English medical terms into Indonesian takes place in several criteria following the categories determined in the Indonesian standards. The English medical terms are adopted into Indonesian with several adjustments involving how the affixation is presented. The English prefixes and suffixes found in the collected data are mostly modified based on how they are pronounced in Indonesian considering that the spelling and pronunciation in this language does not differ. In this study, the rules are not violated since the spelling adjustment involving some English affixes are written in accordance with the category of affix mentioned in the guidance. In the same way, the writing system of vowel, vowel combination, vowel-consonant combination, and consonant combination follows the rules determined in the Indonesian guidance of term formation.

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#### Appendix: Samples of Translation Data

The data has been taken from the medical textbook *Vaughan and Asbury's General Ophthalmology* (Riordan-Eva, P and P.Whitcher, 2008) and its Indonesian translation *Oftalmologi Umum* (Riordan-Eva, P and P.Whitcher, 2013 translated by dr Brahm U.Pendit)

#### **Examples of phonological translation**

##### 1. Fracture → *fraktur*

SL	It is frequently damaged in <b>fractures</b> of the orbital floor.
TL	Ia sering cedera pada <b>fraktur</b> dasar orbita.

##### 2. Cataract → *katarak*

SL	Any corneal disease, <b>cataract</b> , capsular opacification, or vitreous opacities interfere with refraction of light rays entering the eye.
TL	Setiap penyakit kornea, <b>katarak</b> , pengeruhan kapsul lensa, atau kekeruhan vitreus mempengaruhi refraksi berkas cahaya yang masuk ke mata.

#### **The examples of spelling adjustments involving the use of affix**

1. Degeneration → *degenerasi*

SL	This depend on education of ophthalmologist, nonophthalmologic medical personnel, and lay people about the necessity for screening for glaucoma and diabetic retinopathy and about the importance of the early symptoms of retinal detachment, age-related macular <b>degeneration</b> , and herpes simplex keratitis.
TL	Hal ini bergantung pada pendidikan ahli oftalmologi, petugas medis nonoftalmologis, dan orang awam dalam hal perlunya pemeriksaan skrining untuk mencari parallel dan retionapati parallel serta pentingnya gejala-gejala dini parallel retinae, <b>degenerasi</b> parall terkait-usia, dan keratitis herpes simpleks.
2. Interferometry → <i>interferometri</i>	
SL	Laser <b>interferometry</b> employs laser light to generate interference fringes or gratings, which the patient sees as a width of parallel lines.
TL	<b>Interferometri</b> laser memakai sinar laser untuk menghasilkan bingkai atau kisi-kisi interferensi, yang dilihat pasien sebagai sederatan garis parallel.
3. Intraocular → <i>intraokular</i>	
SL	Contact lenses, keratoplasty, corneal laser refractive surgery, posterior capsulotomy and <b>intraocular</b> lens implants may also be considered in specific cases.
TL	Lensa kontak, keratoplasti, bedah refraksi laser kornea, kapsulotomi posterior dan lensa <b>intraokular</b> tanam dapat juga digunakan untuk kasus-kasus tertentu.
4. Parasympathetic → <i>parasimpatis</i>	
SL	A small twig from the proximal end of the nerve to the inferior oblique carries <b>parasympathetic</b> fibers to the ciliary ganglion.
TL	Sebuah cabang kecil dari ujung proksimal saraf yang ke obliquus inferior membawa serat-serat <b>parasimpatis</b> ke ganglion ciliare.
5. Periocular → <i>periokular</i>	
SL	Examples of <b>periocular</b> pain are tenderness of the lid, tear sac, sinuses, or temporal artery.
TL	Contohnya nyeri <b>periokular</b> adalah nyeri tekan pada palpebra, saccus lacrimalis, sinus-sinus atau arteria temporalis.
6. Crystalline → <i>kristalina</i>	
SL	Infectious <b>crystalline</b> keratopathy (in which the cornea has a crystalline appearance) is often caused by alpha-hemolytic streptococci
TL	Keratopati <b>kristalina</b> infeksiosa (kornea tampaknya mirip kristal), penyebab umumnya adalah Streptococcus a-hemolyticus

7. Industrial → <i>industrial</i>	
SL	" <b>Industrial</b> blindness" is said to be present when a worker can no longer pursue an occupation because of poor vision; "automobile blindness" when vision is so poor get the responsible licensing agency in that state will not issue a driver's license.
T L	"Kebutaan <b>industrial</b> " dikatakan terjadi bila seorang pekerja tidak lagi dapat melakukan sesuatu pekerjaan karena berkurangnya pengelihatannya; disebut "kebutaan automobile" bila penglihatan sedemikian kurangnya sehingga badan yang bertanggung jawab memberikan surat izin mengemudi di negara tersebut tidak akan mengeluarkan surat izin mengemudi.
8. Disability → <i>disabilitas</i>	
SL	WHO estimates that there are more than 50 million blind people in the world today, with at least 135 million suffering significant <b>visual</b> disability
T L	WHO memperkirakan bahwa terdapat lebih dari 50 juta orang buta diseluruh dunia saat ini, dan sedikitnya terdaoat 135 juta orang yang mengalami <b>disabilitas</b> penglihatan yang signifikan
9. Hereditary → <i>herediter</i>	
SL	<b>Hereditary conditions</b> are important cause of blindness but should gradually decrease in incidence in response to the efforts of genetic counselors to increase public awareness of the preventable nature of these disorder
T L	<b>Penyakit-penyakit herediter</b> merupakan penyebab kebutaan yang penting dan insidennya berkurang secara bertahap sebagai respon terhadap usaha-usaha konsultan genetik untuk meningkatkan kesadaran masyarakat mengenai sifat penyakit herediter yang dapat dicegah ini.