

**AN ANALYSIS OF DERIVATIONAL AFFIXES  
IN THE ARTICLES OF SCIENCE NEWS MAGAZINE**

**THESIS**

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**THESIS**

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Malang, 26 August 2022

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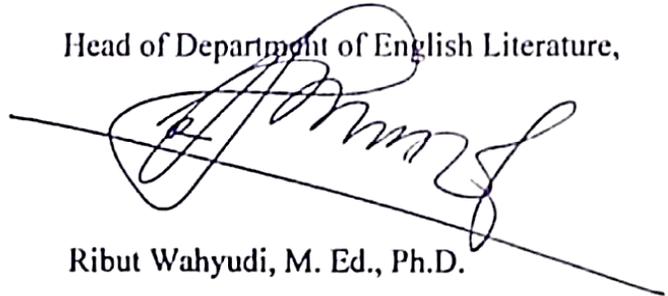
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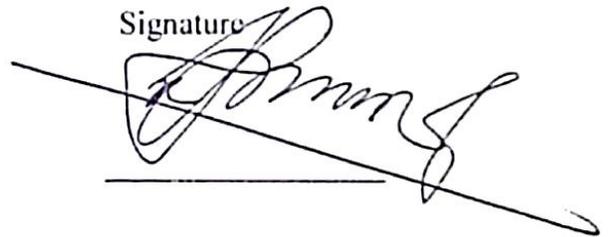
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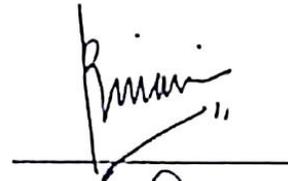
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## **MOTTO**

“We can deduce, often, from one part of physics like the law of gravitation,  
a principle which turns out to be much more valid than the derivation.”

(Richard P. Feynman)

## **DEDICATION**

I dedicate this thesis to my mother, Hamsia Mahulauw, my father, Ahmad Laitupa, my brothers, Fadli, Fahmi and Apik, and my sister, Lulu.

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*Bismillahirrahmaanirrahim*

First off all thanks to Allah swt., because of His blessings and grace I am able to complete this ungraduate thesis with the title "An Analysis of Derivational Affixes in the Article of Science News Magazine" to achieve a degree from Bachelor of Letters (S.S) at the Faculty of Humanities, Universitas Islam Negeri Maulana Malik Ibrahim Malang.

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Lastly, I apologize if this thesis is far from perfect, I am ready to accept suggestions and critics that can build and make this thesis even better. Hopefully, this thesis will be useful in the field of Morphology. Therefore, this thesis can provide readers with new knowledge about Derivational affixes.

Malang, 24 August 2022

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## ABSTRACT

**Laitupa, Ummu Latipa Morani** . (2022). *An Analysis of Derivational Affixes in the Article of Science News Magazine*. Undergraduate Thesis. Department of English Literature, Faculty of Humanities, Universitas Islam Negeri Maulana Malik Ibrahim Malang. Advisor: Rina Sari, M.Pd.

Keywords: Prefix, Suffix, Derivational affixes, Science News Magazine

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Morphological analysis is a key to explore vocabulary. It is an analysis that breaks the word into its elements (prefix and suffix). Derivational affixes are the part of morphological analysis. Knowing derivational affixes is important for students. When the students are able to identify derivative affixes; they can form the new word by adding prefix or suffix to the word because one word can form many words with different meanings. The research analysed types and the processes of forming new words of derivational affixes in the articles of Science News Magazine. This research used theory of Katamba (1993) about morphological analysis. The finding shows that there are 36 derivational affixes found in two articles of Science New Magazine, namely 10 prefixes and 26 suffixes. There are 6 prefixes and 15 suffixes in the first article and 4 prefixes and 11 suffixes in the second article. The prefixes found are un-, under-, on-, anti-, out-, and trans-. The identified suffixes are -ed, -ly, -ing, -ion, -ist, and -ment. In the processes of forming new word, there are Noun to Noun, Noun to Adjective, Adjective to Verb, Adjective to Adverb, Verb to Noun, and Verb to Adjective. This research suggests the students of Department of English Literature to use Derivational affixes correctly in their writing. Meanwhile, to the further researchers who are interested in researching about derivational affixes, they are suggested to study derivational affixes in different objects, such as in newspaper, poem, and song lyric.

## مستخلص البحث

ليتوبا، أم لطيفة موراني. (2022). "تحليل الألقاب المشتقة في مقالة المجلات *Science News*" قسم الأدب الإنجليزي، كلية العلوم الإنسانية، جامعة مولانا مالك إبراهيم الإسلامية الحكومية مالانج. المشرفة: رينا ساري، الماجستير.

**الكلمات المفتاحية:** البادئة، اللاحقة، الألقاب المشتقة، المجلات *Science News*.

تحليل الصرفي هو مفتاحية في استكشاف المفردات. تحليل الصرفي هو تحليل بحد ذاته يقسم الكلمات إلى عناصرها (البادئة واللاحقة). ذلك، تعتبر الألقاب المشتقة جزءًا من تحليل التشكل. بحث الألقاب المشتقة مهمًا جدًا للطلاب، عندما يكون الطلاب قادرين على تحديد الألقاب المشتقة؛ يمكنهم تطوير المفردات عن طريق إضافة البادئات أو اللواحق لكلمات أخرى. لأنه من كلمة واحدة يمكن الحصول على العديد من الكلمات بالمعنى المتخالف. هذا البحث يهدف إلى تحليل أنواع الألقاب المشتقة. نتائج البحث يدل أن هناك 36 الألقاب المشتقة، وهناك نوعان من المشتقات الموجودة في مقالتي من مجلة *Science News*، وهما 10 بادئات و 26 لواحق. في المقالة الأولى، تم العثور على 6 بادئات و 15 لواحق، وفي المقالة الثانية تم العثور على 4 بادئات و 11 لواحق. البادئات التي تم العثور عليها هي *un-* و *under-* و *on-* و *out-* و *anti-* و *trans-*. النهايات التي تم العثور عليها هي *-ed*، *-ly*، *-ing*، *-ist*، *-ion*، و *-ment*. في عملية تكوين الكلمات، يتم العثور على العملية من الأسماء إلى الأسماء، والأسماء إلى الصفات، والصفات إلى الظروف، والصفات إلى الأفعال، والأفعال إلى الأسماء، والأفعال إلى الصفات. لذلك، يمكن أن يكون هذا البحث مفيدًا لطلاب الأدب الإنجليزي لتعليم الألقاب المشتقة التي يمكن استخدامها بشكل جيد في الكتابة الخيال الأعمال العلمية.

## ABSTRAK

**Laitupa, Ummu Latipa Morani.** (2022). *“An Analysis of Derivational Affixes in the Article of Science News Magazine”* Program Studi Sastra Inggris, Fakultas Humaniora, Universitas Islam Negeri Maulana Malik Ibrahim Malang. Dosen Pembimbing: Rina Sari M. Pd.

Kata kunci: awalan, akhiran, Afiks turunan, Science News Magazine

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Analisis morfologi adalah kunci dalam mengeksplorasi kosakata. Analisis morfologi merupakan analisis yang memecahkan kata-kata menjadi unsur-unsurnya (awalan dan akhiran). Afiks turunan adalah bagian dari morfologi analisis. Penelitian afiks turunan ini sangat penting bagi mahasiswa, Ketika mahasiswa mampu mengidentifikasi afiks turunan, mereka akan dapat mengembangkan kosakata baru dengan menambahkan awalan atau akhiran pada kata lainnya karena dari satu kata bisa membentuk banyak kata dengan makna yang berbeda. Penelitian ini bertujuan untuk menganalisa tipe-tipe afiks turunan. Hasil penelitian menunjukkan bahwa terdapat 36 afiks turunan yang ditemukan pada kedua artikel Science News Magazine, yaitu 10 awalan dan 26 akhiran. Pada artikel pertama ditemukan 6 awalan dan 15 akhiran, dan pada artikel kedua ditemukan 4 awalan dan 11 akhiran. Awalan yang ditemukan yaitu un-, under-, on-, out-, anti-, and trans-. Akhiran yang ditemukan yaitu -ed, -ly, -ing, -ist, -ion, and -ment. Pada proses pembentukan kata ditemukan proses dari kata benda ke kata benda, kata benda ke kata sifat, kata sifat ke kata keterangan, kata sifat ke kata kerja, kata kerja ke kata benda, kata kerja ke kata sifat. Saran dari penelitian ini kepada mahasiswa Program Studi Sastra Inggris adalah agar mereka menggunakan afiks turunan dengan tepat pada saat menulis. Sementara itu, bagi peneliti selanjutnya yang tertarik untuk meneliti tentang afiks turunan, disarankan untuk mempelajari afiks turunan pada objek yang berbeda, seperti di koran, puisi, dan lirik lagu.

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## **CHAPTER I**

### **INTRODUCTION**

This chapter presents background of the study, research question, significance of the study, scope and limitation, and definition of key terms.

#### **A. Background of the Study**

Morphology is one of linguistic branches that focus on the internal structure of words. According to Yule (2010), people learn more about the structure or how words are formed, and some elements apply to other words. Studying word is the important knowledge that people have to learn where; words are the smallest component combined into one called morpheme. Brinton (2010) said morpheme is the smallest unit of meaning in language; the morpheme does not have to be equivalent to the word. A morpheme is divided into two, namely free morpheme and bound morpheme. Morpheme that cannot stand alone and only occurs as a part of other morphemes is Bound Morpheme. Free Morpheme is a morpheme that can stand alone.

According to Katamba (1993) words have an internal structure and some words build elements to create the structure, such as stems, roots, bases and affixes. An affix is a morpheme which only occurs to root, stem or bases. With affixes, one word can be made into several words.

In news, if there is derivative affixation, the reader is difficult to understand about the content of the news because the function of derivational affixes can change

the meaning and classify the word formation. According to Booij (2005) the function of derivational affixes are used to create a new lexeme. For example, in the Street Magazine (2013, p.102), the word “unleaded” in sentence “We want through about 1000 liters of premium unleaded on the who trip” is derived from the root word “leaded” and it is combined with prefix “un-”, so it will be a new lexeme “unleaded”.

Derivational affixes are used to create new lexeme. Lexemes are vocabulary items listed in the dictionary, by changing the basic meaning of the word significantly, without changing its grammatical category. Thereby, it causes a shift in the grammatical class of word and a possible change in meaning, and it causes a shift in the grammatical subclass of word without moving new word class (Katamba, 1993).

According to Booji (2005), the basic function of the derivation process is to allow language users to create new lexemes. Lexemes that fall into lexical categories such as noun, verb, adjective and derived lexeme may fall into different categories from their base. Derivational meanings are much more diverse than inflectional values. Derivational patterns commonly change the word-class of the base lexeme such as nouns and it can be derived to verbs; from adjectives can be nouns, and so on. For such cases, the term *derived* is from verbal and derivative adjective.

There are several previous studies about derivational affixes that have been conducted. The first previous study was conducted by Paramita (2018). This research studied about derivational morphology based on derivation of a noun, adverb, adjectives, gerund after verb, derivational in modals, and derivational in passive

participial focused in EFL's English Narrative composition. This research used descriptive qualitative method and found some types of derivational affixes. This research did not explain about prefix and suffix but only in derivational types such as noun, adjectives, gerund, and verb and et cetera.

The second previous study was conducted by Etana and Beletew (2018). They studied about derivational affixes on Bambasi Mao language spoken. This research used qualitative method to describe the derivational affixes as well as the distribution of prefix and suffix. It explained the processes of derivational affixes in the different kinds of derived noun and adjectives. This research found 9 prefixes and 11 suffixes from Bambasi Mao language. This research did not explain the detail of the processes of derivational affixes, different types of nominal derivatives and derivation changed class suffix. Therefore, other studies need to examine on categories or class of derivational word.

The third previous study was conducted by Rizkia (2020). She identified derivational and inflectional morphology that occur in *Deen Squad* lyric. This research used qualitative method to collect and analyse the data. This research found 93 inflectional morphemes and 17 derivational morphemes which were classified into 4 types. This research does not explain in detail the processes of derivational and inflectional affixes. The research needs to explain in more detail the processes of formed the word.

The forth previous study was conducted by Efrika and Barlin (2020). This research studied about the types and function of derivational affixes from the story of

Rapunzel. The researchers found prefixes: en-, un-, and re-, and the suffixes: -ful, -ness, -able, -ly, -ing, -ed, -en, -ent, -less, -y, -ous, and -dom. Meanwhile, their functions are as noun formation, adjectives formation, verb formation, and adverb formation. This research not found the verb formation because the verbs in Rapunzel's story are mostly in the form of past tense, therefore, the verb past tense cannot be classified as derivational. This research did not explain the detail on adjectives formation and should be more occurrences in noun formation and adverb formation.

The fifth previous study was conducted by Erlinawati (2020). She studied about derivational and inflectional affixes in text of quotes of @TheGoodQuote's posts on Instagram. The researcher investigated the most frequently kinds of derivational and inflectional affixes and described the process of intended meaning. This research used descriptive qualitative method and content analysis in text of quotes in @TheGoodQuote's on Instagram. The researchers found 62 derivational words which change grammatical classes. The classification as follows: Noun derivation, Adjectives derivation, Adverb derivation, and Verb derivation. This research did not find bound morpheme like adverb derivation, it only found many suffixes -ly on the text of Quotes. This study is about derivational and inflectional affixes and the researcher suggest to other studies to continue this study about affixes of Bound morpheme because it cannot be found by the researcher.

The sixth previous study was conducted by Merciana et al. (2021). This research focused on the changing of the words in prefix and suffix, the use of word

grammatical and looking for spelling and definition of derivational affixes in the *Advancer* movie. It used descriptive qualitative method and theories of Jackson (1982) and Redman (1997) to analyse the data. This research found 159 derivational words from 9 prefixes and 19 suffixes combination. This research only found three categories of derivational affixes such as Nominalize, Verbalizer, and Adjectivalizer. In the processes of forming word, this research only found suffix –s which indicates the noun and the other words which adjust the context of the sentences in the script. This research did not explain the derivation processes that changed the class of words and basic meaning, so it needs to be studied again by other studies.

The seventh previous study was conducted by Yohana (2021). She studied about the types of derivational affixes in Simple Plan's album "Taking One for the Team" and the meaning after they are formatted into new words. This research used descriptive qualitative method to analyse derivational affixes found in song lyrics. This research found 36 words of derivational affixes, consisting of 9 words of prefixes and 27 words of suffixes. This research did not explain the process of forming word in detail, just explained the word and the suffix not explain how the processes of the formed word. Therefore, other studies have to find out the processes of formed word by derivational affixes.

The eighth previous study was conducted by Dalimunthe (2021). He studied about derivational affixes in the articles of Jakarta Post newspaper. This research used qualitative method and found 20 prefixes and 171 suffixes from three articles. This research only found three types of derivational such as Derivation noun, adjectives,

and adverb. There is no derivational verb and did not explain in detail the processes of derivational affixes in this research, Therefore, the researcher suggested other studies to find out the form and the meaning, and the processes of derivational affixes.

The ninth previous study was conducted by Khaerunisa and Kheryadi (2021). They studied about the types of derivational affixes including prefix and suffix in Obama's speech about education in 2016. This research used descriptive qualitative method and found the derivational affixes; 16 words of prefixes and 47 words of suffixes in the video of Barack Obama's speech. This research did not explain the detail changing derivational affixes but more leads to derivational types. Therefore, the researcher has to explain the detail of changing derivational affixes.

The tenth previous study was conducted by Siregar and Siregar (2021). They studied about the derivational affixes in the *Salam Alaikum, Good Life, I promise* song lyrics. This research used library research and found that there were two kinds of derivational affixes, prefix and suffix in *Salam alaikum* song and the dominant derivational affix is suffix, which is -ness, -y, -ful, -en and -ly. While prefix is only re-, un-, pro- and in-. In three songs there are not many derivational words. The researchers only found one or two words categorized as derivational word. This research did not explain the detail characteristic of suffix. Therefore, the other studies can research again on derivational affixes, especially the characteristic of suffix.

This present research has similarity and difference with the previous studies. This present research also studies about derivational affixes, especially the types of

derivational affixes. However, this research focuses on the types and the processes of forming new words formed by derivational affixes in Science News which provide factual news in the world now and used theory of Katamba (1993) regarding derivational affixes in his book which is a support for explaining the research question of problems in this study. The researcher only chooses two premium articles in Science News magazine. Premium articles are only accessible to users and they are headlines. The articles have the same issue about the Covid-19 outbreak and the researcher wants to know about the derivation affix used in articles of Science News magazine.

## **B. Research Question**

Based on the background of the study, the researcher proposes two research questions:

1. What are the types of derivational affixes used in articles of Science News magazine?
2. How is the process of forming new words formed by derivational affixes in articles of Science News magazine?

## **C. Significance of the Study**

Practically, the result of this research can provide information for the students who are researching about derivational affixes and the others who can get more Morphology knowledge after studying word formation of derivational affixes. It will

help Indonesian readers to be an evaluation their English. This research provides information about the type and form of word formation. Besides, it will help other researchers in conducting the same research. Therefore, they can know the word change of derivational affixes.

#### **D. Scope and Limitation**

The scope of this research is the morphological area on derivational affixes in the articles of Science News. There are two articles taken, entitled “Omicron forces us to rethink Covid-19 testing and treatment” published on 11 January 2022 and “Why being pregnant and unvaccinated against COVID-19 is a risky combo” published on 7 February 2022. The researcher only takes two articles because it has factual news and gets more viewers.

The limitation of this research is the number of the articles. This research only focuses on identifying the types of derivational affixes and the process of forming word on two articles in Science News magazine.

#### **E. Definition of Key Terms**

To avoid misunderstanding or ignorance about the terms used in this research, the researcher explains some terms in this research as follows:

- 1. Derivational affixes:** the formation of a new word or changed a word derived stem from another word, it typically occurs by the additional of an affix. This research studies about the types and process of forming words of derivational affixes in the two articles of Science News Magazine.

- 2. Science News Magazine:** an American magazine devoted to short article about science and technical development and technical journalist published firstly in America 1992 based in Washington, D.C by Society for Science and the Public. The researcher chooses Science News as the data sources to get the articles that use types and process of forming word of derivational affixes.
- 3. Morpheme:** the smallest unit meaning or grammatical function. This research studies about the types of derivational affixes which explained the types and the process of forming word in the articles of Science News Magazine.

## **CHAPTER II**

### **REVIEW OF RELATED LITERATURE**

This chapter provides some theories related to this research which consists of morphology, morpheme, affixes, inflectional affixes, derivational affixes, prefix, and suffix.

#### **A. Morphology**

Morphology is a study that deals with the structure of words formed from the smallest units. Morphology, according to Fromkin (2011), is two words derived from "Morph" which means "form" and "logy" which means "branch of knowledge". In line with his thinking, Haspelmath and Sims (2010) said that morphology is a study that discusses the structure of words or how the word is constructed from the smallest unit.

Haspelmath and Sims (2010) said Morphology is the research of internal structure of words. Morphology is both the oldest and one of the youngest sub disciplines of grammar. Learning about affixes means learning the research of word formation that belongs to the branch of morphological studies, Morphology is one of the linguistics fields that study word formation. According to Katamba (1993, p. 30) morphology is "the research of the formation of words and the internal organization of words"

Carstairs (2002, p. 16) said Morphology is a language arrangement related to the structure of words and the relationship of words that Morphemes involve in their investigation. The process of word formation as well as the way new words is created

in word language and the shape of the word varies depending on the word used in a sentence (Lieber, 2009, p. 2).

Booji (2005) explained that morphology is related to the structure of words that are lexicon, where lexicon re-formed the formation of the word. Morphology in language deals with the structure or shape of words and includes inflection, as well as the formation of compounds. At a basic level, words are made of "morphemes". It is the smallest unit of meaning: roots and affixes (prefixes and suffixes).

From the above explanation, it can be concluded that morphology is the structure of the wording and the way in which words are created in different language, and how they are used in a sentence. It is a study that discusses the formation of words built from the smallest units in accordance with the rules of the word formed. The smallest unit is called "Morpheme".

## **B. Morpheme**

Morpheme is small unit of language in which each sentence consists of one or more morphemes. According to Aronoff and Fudeman (2011), morpheme is the smallest unit of language with a grammar function. It consists of word that cannot be divided into smaller meaningful part. Morphemes are formed into two morphemes: free morphemes and bound morphemes.

## 1. Free Morpheme

Free morpheme is one of the morphemes that can stand on its own without the need for another morpheme as a single word. Therefore, free morpheme can be interpreted as words that consist of one morpheme such as horse and crocodile. Both words are included in free morpheme which cannot be separated. Therefore, free morphemes do not require the presence of other morphemes to be pronounced in isolation in English. According to Sibrani (2001), free morpheme is a morpheme that can stand alone or independently. Meanwhile, Katamba (1993) said that the word of stems roots can stand alone and are able to stand independently, they are called free morpheme.

## 2. Bound Morpheme

Morpheme bound in its variations is where morpheme bound coming before the base of the word and after the base word. It is indicated that morpheme bound means morpheme that cannot stand alone and requires another morpheme (Lieber, 2009). Thus in English, – s plural (more than one) and miss (wrong) is morpheme bound because the form of the word requires another morpheme to be spoken alone.

## C. Affixes

Kalantz and Bill (2012) said that affixes are morpheme that is not free where it must need other morphemes. Another opinion says that affixes are a group of words that are added at the beginning and ending of the word. Affixes consist of derivational

and inflectional. The derivation is one of two functions that can fix the shape of the word, while inflectional is the meaning of grammar that is tense like numbers.

### 1. Inflectional affixes

Inflectional are affixes that attach the root or base of a word that does not change the speech part and does not create a new word. According to Yule (1996), English has just eight morphemes with inflectional, as follows:

a. 2 Adjectives used: -er (comparative) and -est (superlative)

Example: Comparative (The wall is higher than that tree.)

Superlative (She is the prettiest woman)

b. 2 Noun used: -s (plural), -'s (possessive)

Example: Plural (I have some comics)

Possessive (It is Rani's pencil)

c. 4 used with verb: -s (singular third person), -ed (past tense), -en (past part) and -ing (progressive present)

Example: Third person singular (He waits me)

Past tense (I talked to him)

Participle (John has taken the notes)

Progressive (She is bringing the food)

## 2. Derivational affixes

Derivational affixes have two functions: changing a speech or class change and changing the meaning of the root in the sense of class maintenance. Morphologically derivational have the characteristics to produce new words with one or the other (Brinton, 2010). There are two categories of derivational affixes, they are prefix and suffix. Katamba (1993, p. 44) says an affix is a morpheme which only occurs when attached to some other morpheme or morphemes such as a root or stem or base. Obviously, by definition affixes are bound morpheme. No word may contain only an affix standing on its own, like –s, -ed, -al or even a number of affixes together like –al and –s. There are three types of affixes which are prefix, suffix, and infix (Katamba, 1993).

### a. Prefix

Katamba (1993, p. 44) states that a prefix is an affix attached before root, stem or base like re-, un-, and in-.

Prefix	Word-class of input base	Meaning	Word-class of output word	Example
In-	Adjectives	Not	Adjective	In-accurate
Un-	Adjectives	Not	Adjective	Un-kind
Un-	Verb	Reversive	Verb	Un-tie
Dis-	Noun	Not	Noun	Dis-order
Dis-	Adjective	Not	Adjective	Dis-honest
Dis-	Verb	Not	Verb	Dis-approve

Re-	Verb	Again	Verb	Re-write
Ex-	Noun	Former	Noun	Ex-mayor
En-	Noun	Put in	Verb	En-cage

The observed that derivational affixes are used to create a new lexeme by either modifying significantly the meaning of the base to which they are attached, without necessarily changing its grammatical see in the table kind into un-kind it's not change the grammatical but modifying the base of the word.

#### b. Suffix

A suffix is an affix attached after a root (or stem or base) like -ly, -er, -ist, -s, -ing, and -ed.

Suffix	Word-class input base	Meaning	Word-class output word	Example
-hood	Noun	Status	Noun	Child-hood
-ship	Noun	State or condition	Noun	King-ship
-ness	Adjective	Quality, state or condition	Noun	Kind-ness
-ity	Adjectives			

It brings about the shift of grammatical class of a base as well as a possible change in meaning as in the case of kind adjective to kind-ness noun and the shift in grammatical subclass of a word without moving it into a new word class like child (noun) into child-hood (noun).

#### c. Infix

An infix is inserted into the root itself. Infixes are very common in Semitic Language like Arabic and Hebrew. But infixing is somewhat rare in English. Sloat and Taylor (1978) suggest that the only infix that occurs in English Morphology is / -n-/ which is inserted before the last consonant of the root in a few word Latin origin, on what appears to be an arbitrary basis. This infix undergoes place of articulation assimilation. Thus, the root –cub- meaning ‘lie in, or on upon’ occurs without [m] before the [b] in some words containing that root, e.g. *incubate*, *incubus*, *concubine*, and *succubus*. But [m] is infixed before that same root in some other words like *incumbent*, *succumb*, and *decumbent*. This infix is a frozen historical relic from Latin.

## **CHAPTER III**

### **RESEARCH METHOD**

This chapter consists of research design, research instrument, data source, data collection, and data analysis.

#### **A. Research Design**

The researcher used descriptive qualitative research design that aims to provide the factual data and analysis the problem of the topic from data sources. According to Creswell (2009), one of the characteristics of qualitative research is finding the deepest understanding of a particular problem. This research used qualitative design because it explains about the types and rather than number. It describes the derivational affixes on the articles of Science News magazine. Therefore, it is also categorized as a descriptive research.

#### **B. Research Instrument**

The main instrument in this research is the researcher herself. According to Creswell (2012, p. 261), in qualitative research, researchers are the key instrument in carrying out research. The researcher collected and analyzed the derivational affixes on the articles which are published in Science News magazine.

#### **C. Data Source**

The data source of this research is the articles of Science News magazine taken from a website <https://www.sciencenews.org/all-stories/page/2>. There are two

articles which were studied, namely “Omicron Forces Us to Rethink Covid-19 Testing and Treatment” and “Why being Pregnant and Unvaccinated against COVID-19 is a Risky Combo?” Both of the articles were published in Los Angeles in February 2022.

#### **D. Data Collection**

The data collection was done by doing several steps. Firstly, selecting and reading two articles about Covid 19 in Science News magazine at <https://www.sciencenews.org/all-stories/page/2>. The researcher only taken two articles have many viewers and the topic is bumming in this years. The two articles are “Omicron Forces Us to Rethink Covid-19 Testing and Treatment” and “Why being Pregnant and Unvaccinated against COVID-19 is a Risky Combo?” Secondly, identifying the types of derivational affixes in the two articles based on the theory by Katamba (1993). According to him, there are three types of derivational affixes; they are prefix, infix and suffix. After finding the types, the researcher identified how the process of forming new word are formed.

#### **E. Data Analysis**

After getting the data, the data were analyzed using the following steps. Firstly, classifying the types of derivational affixes found on the two articles of Science News magazine based on morphology theory of Katamba (1993) and used oxford dictionary. Secondly, describing the processes of forming new word of derivational affixes based on theory Katamba (1993). Finally, drawing a conclusion to answer the research questions.

**CHAPTER IV**  
**FINDING AND DISCUSSION**

This chapter consists of finding and discussion that explain about the types of derivational affixes and processes of forming word formed by derivational affixes in two articles of Science News magazine based on the theory of Katamba (1993).

**A. Finding**

The data analysis of this research is divided into two parts. The first part explains the types of derivational affixes in articles of Science News magazine. There are two articles used for data collection entitled “Omicron Forces Us to Rethink Covid-19 Testing and Treatment” and “Why being Pregnant and Unvaccinated against Covid-19 is a Risk Combo?” The second part explains about the process of forming new word or the process of derived word for a new one with the same data used in the first part.

**Table 1. Types of Derivational Affixes**

Articles	Prefix	Suffix
Omicron Forces Us to Rethink Covid-19 Testing and Treatment	6 words: a. Un- - <i>Unvaccinated</i> - <i>Unprecedented</i>  b. Under- - <i>Underlying</i>  c. On- - <i>Ongoing</i>  d. Out-	15 words a. -ed - <i>Hospitalized</i> - <i>Reviewed</i> ... b. -ly..... - <i>Mainly</i> - <i>Fortunately</i> - <i>Likely</i> - <i>Quickly</i> - <i>Highly</i> - <i>Recently</i>

	<p><i>-Outbreaks</i></p> <p>e. Trans- <i>- Transmissible</i></p>	<p><i>-Accidentally</i> <i>-Differently</i></p> <p>c. -ers <i>-Researchers</i></p> <p>d. -ment <i>-Treatment</i></p> <p>e. -ful <i>-Meaningful</i></p> <p>f. -st <i>-Economist</i> <i>-Against</i></p>
<p>Why being Pregnant and Unvaccinated against Covid-19 is a Risk Combo?</p>	<p>4 words</p> <p>a. Un- .....<i>-Unlike</i> .....<i>-Uncommon</i> -</p> <p>b. Anti- <i>-Antibodies</i></p> <p>c. Out- <i>-Outcomes</i></p>	<p>11 words</p> <p>a. -ed <i>-Vaccinated</i> <i>-United</i> <i>-Suppressed</i></p> <p>b. -ly <i>-Cumulatively</i> <i>-Rarely</i> <i>-Definitively</i> <i>-Routinely</i></p> <p>c. -ing <i>-Describing</i></p> <p>d. -es <i>-Deliveries</i></p> <p>e. -ion <i>-Recommendation</i></p> <p>f. -ment <i>-Judgment</i></p>

### 1. Prefixes

There are 6 prefixes that the researcher found in the article “Omicron Forces Us to Rethink Covid-19 Testing and Treatment” and 15 prefixes found in the article

“Why being Pregnant and Unvaccinated against Covid-19 is a Risk Combo?” The following is the explanation of the findings of prefixes from the two articles.

*Article I: “Omicron Forces Us to Rethink Covid-19 Testing and Treatment”*

**a. Prefixes Un-:** *unvaccinated, unprecedented*

**The Processes of Forming New Word Formed by Prefixes Un-**

The base word	Prefix	The forming of new word	Meaning
Vaccinated	Un-	Un- + vaccinated (Adj) = Unvaccinated (Adjective)	Not
Precedence		Un + precedence = Unprecedented (Adjective)	never done or known before

There are two words that the researcher found in the article, “unvaccinated” and “unprecedented”. The word “unvaccinated” (Adjective) is derived from the base word “vaccine” (Verb) and the prefix un- with the function is to change the meaning in the base and make new lexeme “unvaccinated”. The meaning of the word “unvaccinated” in sentence “The surge of cases means that vulnerable people, including the *unvaccinated*, immunocompromised, elderly and those with underlying health conditions, are still landing in hospital beds” is “not”. Therefore, the whole

sentence means “People who are not vaccines will make their immunities have health problem“

The word “unprecedented” (Adjective) is derived from the base “precedence” and the prefix un- with the function is to change the meaning of the base and will be a new lexeme “unprecedented”. The meaning of the word “unprecedented” in sentence “The researchers continued testing the employees daily, adding an *unprecedented* look at COVID-19 infection in the early stages and allowing the researcher to determine whether rapid antigen test are still good for pinpointing when people with COVID-19 are infectious to other is “never done or known before.” Therefore, the sentence means “Consequential testing researchers added that the COVID-19 infection had not been ad at first.”

**b. Prefix Under-: *underlying***

**The Processes of Forming New Word Formed by Prefix Under-**

The base word	Prefix	The forming of new word	Meaning
Lying	Under-	Under + lying (Noun) = underlying (Verb)	Significant as a cause or basis of something but not necessarily manifest or obvious

The forming of new word “underlying” (Verb) is derived from the base “lying” (Noun) with the prefix under- in front the base. It can be categorized as derivational affix because prefix under- has function to change the meaning of the base and make a new word “underlying”. The meaning of the word “underlying” in sentence “The surge of cases means that vulnerable people, including the unvaccinated, immunocompromised, elderly and those with **underlying** health conditions are still landing in hospital” is “significant as a cause or basis of something but not necessarily manifest or obvious”. Therefore the meaning of the sentence is “a problem which has happened long ago and continues to this day”

**c. Prefix On-:** *ongoing*

**The Processes of Forming New Word Formed by Prefix On-**

The base word	Prefix	The forming of new word	Meaning
Going	On-	On + going (Noun) = Ongoing	Still in progress

The forming of new word “ongoing” is derived from the base root “going” (Noun) with the prefix on- in front the base root. It can be categorized as derivational affix because prefix on- has function to change the meaning of the base and make new lexeme “ongoing” with the meaning is “still in progress”. The meaning of the word “ongoing” in sentence “In a study conducted to December during the **ongoing**

Omicron surge” is “still in progress” Therefore, the meaning of the sentence is “A study that is in progress during December when the increase of Omicron”.

**d. Prefix Out-:** *outbreaks*

**The Processes of Forming New Word Formed by Prefix *Out-***

The base word	Prefix	The forming of new word	Meaning
Breaks	Out-	Out + break (Verb) = outbreak (Noun)	A sudden occurrence of something

The processes of forming new word “outbreaks” (Noun) is derived from the base root “break” (Verb) with the prefix out- in front the base. It can be categorized as derivational affix because prefix out- has function to change the meaning “a sudden occurrence of something” and make new word “outbreaks”. The meaning of the word “outbreaks” in sentence “Daily PCR testing and rapid antigen tests have helped many employers nip **outbreaks** in the bud by identifying infected employees ” means “a sudden occurrence of something”. Therefore, the meaning of the sentence is “A PCR test and a day’s antigen test can help many employers to identify infected employees”.

**e. Prefix Trans-:** *transmissible*

**The Processes of Forming New Word Formed by Prefix Trans-**

The base word	Prefix	The forming of new word	Meaning
Missible	Trans-	Trans + missible = transmissible (Adjective)	To be passed on from one person or organism to another

The forming of new word “transmissible” (Adjective) is derived from the base “missible” (Verb) with the prefix trans- in front of the base. It can be categorized as derivational affix because prefix trans- has function to change the meaning of the base and make new word transmissible. The meaning of the word “transmissible” in sentence “Omicron is 160 percent to 200 percent more transmissible, one preliminary study from researchers in Germany and the United Kingdom estimates is “to be passed on from one person or organism to another” Therefore the meaning of the sentence is “A study in Germany and United Kingdom says that Omicron can infect faster from 160 percent to 200 percent quickly”.

*Articles II: “Why being pregnant and unvaccinated against Covid-19 is a risk combo”?*

**a. Prefix Un-:** *unlike, uncommon, uncertainty*

**The Processes of Forming New Word Formed by Prefix Un-**

The base word	Prefix	The forming of new word	Meaning

Like	Un-	Un + like (Verb) = Unlike (Adjective)	Not like
Common		Un + common = Uncommon	Out of a ordinary; unusual

There are three prefixes that the researcher found in the second article, namely “unlike, uncommon, and uncertainty”. The forming of the word “unlike” (Adjective) is derived from the base “like” (Verb) with the prefix un- and the function is to change the meaning in the base and make new lexeme “unlike”. The meaning of “unlike” in sentence “In the United States as of January 15, before or during their pregnancies, yet **unlike** when Yohay rolled up her sleeve almost a year ago” is “not like”. Therefore, the meaning of the sentence is “Before or during the pregnancies Yohay notlike to rolled up her sleeve in a year ago.”

The forming of the word “uncommon” (Adverb) is derived from the base “common” (Verb) with the prefix un- and the function is to change the meaning of the base and will be a new word “uncommon”. The meaning of the word “uncommon” in sentence “It was also **uncommon** for the placenta to be infected.” means “out of an ordinary; unusual”. Therefore, the meaning of the sentence is “Placenta is rarely infected with such Omicron.”

**b. Prefix Anti-: antibodies**

**The Processes of Forming New Word Formed by Prefix Anti-**

The base word	Prefix	The forming of	Meaning
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		<b>new lexeme</b>	
Bodies	Anti-	Anti + bodies (Noun) = antibodies	a blood protein produced in response to and counteracting a specific antigen.

The forming of new word “antibodies” is derived from the base “body” (Noun) with the prefix anti- in front the base. It can be categorized as derivational affix because prefix anti- has function to change the meaning of the base and make new word “antibodies.” The meaning of the word “antibodies” in sentence “Getting vaccinated against COVID-19 when pregnant also appears to protect the baby as the post-shot **antibodies** can cross the placenta” means “a blood protein produced in response to and counteracting a specific antigen.” Therefore, the meaning of the sentence is “By vaccinating pregnant can protect the baby with antibodies cross the placenta.”

**c. Prefix Out-: *outcomes***

**The Processes of Forming New Word Formed by Prefix out-**

The base word	Prefix	The forming of new word	Meaning
Comes	Out-	Out + comes (verb) = outcomes (noun)	The way a thing turns out; a consequence.

The forming of new word “outcomes” is derived from the base “comes” (Verb) with the prefix out- in front the base. It can be categorized as derivational affix because prefix out- has function to change the meaning of the base and make new word “outcomes.” The meaning of the word “outcomes in sentence “We’ve all seen terrible **outcomes** with Covid and pregnancy,” says maternal-fetal medicine specialist Cynthia Gyamfi-Bannerman of the University of California San Diego School of Medicine” means “the way a thing turns out; a consequence.” Therefore, the meaning of the sentence is “Cynthia Gyamfi-Bannerman says that they do not accept the results of Covid and pregnancy.”

## 2. Suffixes

Article I: “*Omicron forces us to rethink Covid-19 testing and treatment*”

a. **Suffix -ed:** *hospitalized, reviewed*

### The Processes of Forming New Word Formed by Suffix –ed

The base word	Suffix	The forming of new word	Meaning
Hospital	-ed	Hospitalize + ed = Hospitalized (Adjective)	Admit or a cause
Review		Review + ed = Reviewed (Noun)	A formal assessment of something

The forming of new word “hospitalized” is derived from the base “hospital” (Noun) with the suffix -ed in last of the base word. It can be categorized as derivational affix because suffix -ed has function to change the meaning of the base and make a new word “hospitalized.” The meaning of the word “hospitalized” in sentence “As of January 11, a record breaking total of 145,982 people were **hospitalized** in the united states with confirmed or suspected COVID-19” means “admit or a cause.” Therefore, the meaning of the sentence is “In January 11 in the United States confirmed people who were hospitalized increase.”

The forming of new word “reviewed” is derived from the base word “review” with the suffix -ed and make a new word “reviewed”. The meaning of the word “reviewed” in sentence “Adamson and colleagues report January 4 at medReiv.org. that work has not yet been **reviewed** by other scientists” means “A formal assessment of something.” Therefore, the meaning of the sentence is “Adamson and colleagues say in January 4 at medReiv.org. that there is not a scientists reviewed about Omicron.”

**b.Suffix -ly:** *mainly, fortunately, likely, quickly, highly, recently, accidentally, differently*

**The Processes of Forming New Word Formed by Suffix-ly**

The base word	Suffix	The forming of new word	Meaning
Main		Main (Adjective) + ly	More than anything

		= Mainly (Adverb)	else
Fortunate		Fortunate (Adjective) + ly = Fortunately (Adverb)	Favoured by or involving good luck; lucky
Like		Like (Verb) + ly = Likely (Adverb)	Probably
Quick	-ly	Quick (Adjective) + ly = Quickly (adverb)	At a fast speed
High		High (Adjective) + ly = Highly (Adverb)	At or to a high degree or level
Recent		Recent (Adjective) + ly = Recently (adverb)	At a recent time
Accidental		Accidental (Adjective) + ly = Accidentally (Adverb)	By change
Different		Different (Adjective) + ly= differently (Adverb)	Not the same as another or as before

The forming of new word can be seen on the table. All words on the table are formed by suffix -ly in the last of the base word that change the meaning and make a new word. There are seven word derived from Adjective to Adverb such as main + -ly, fortunate + -ly, quick + -ly, recent + -ly, accidental + -ly, and different + -ly. One word is derived from Verb to Adverb that is like + -ly.

The forming of new word “mainly” is derived from the base “main” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “mainly.” The meaning of the word “mainly” in sentence “That’s **mainly** because Omicron replicates itself in the body and sickens people faster than Delta” means “*More than anything else.*” Therefore, the meaning of the sentence is “Omicron more quickly applies itself to people’s body faster than Delta.”

The forming of new word “fortunately” is derived from the base “fortunate” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “fortunately.” The meaning of the word “fortunately” in sentence “**Fortunately**, Omicron seems less likely than previous versions of the coronavirus to cause deep lung infections that lead to serious complications” means “favoured by or involving good luck; lucky.” Therefore, the meaning of the sentence is “The size of Omicron is smaller than the previous Corona virus which can cause serious complication.”

The forming of new word “likely” is derived from the base “like” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “likely.” The meaning of the word “likely” in sentence “Omicron seems less likely than previous versions of the Corona virus to cause deep lung infections that lead to serious complications” means “probably.” Therefore, the meaning of the

sentence is “The size of Omicron is smaller than the previous Corona virus which can cause serious complication.”

The forming of new word “quickly” is derived from the base “quick” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “quickly.” The meaning of the word “quickly” in sentence “Omicron is spreading **quickly** and tests all kinds are in short supply” means “at a fast speed”. Therefore, the meaning of the sentence is “Omicron is very fast transmitted to the body that is in short supply”

The forming of new word “highly” is derived from the base “high” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “highly.” The meaning of the word “highly” in sentence “PCR test that gave answers within eight hours. And they were **highly** boosted, so they were doing all the right things” means “at or to a high degree or level.” Therefore, the meaning of the sentence is “PCR test is very quickly answered the test, so that they have to do it correctly.”

The forming of new word “recently” is derived from the base “recent” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “recently.” The meaning of the word “recently” in sentence “**Recently**, watcher’s son had COVID-19 symptoms but tested negative on a standart

home nose-swab test” means “at a recent time.” Therefore, the meaning of the sentence is “Wachter’s son get COVID-19 but when he did a nose-swab the result was negative.”

The forming of new word “accidentally” is derived from the base “accidental” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “accidentally.” The meaning of the word “accidentally” in sentence “People might **accidentally** overdose on their other medications” means “by change.” Therefore, the meaning of the sentence is “People are having an overdose on their medications.

The forming of new word “differently” is derived from the base “different” (Adjective) with the suffix -ly in last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make a new word “differently.” The meaning of the word “differently” in sentence “We don’t treat a lung cancer patient **differently** depending on whether they smoked.” means “Not the same as another or as before.” Therefore, the meaning of the whole sentences is “*Not difference in treatment of a lung cancer patient.*”

**b. Suffix -ers: researchers**

**Processes of forming new word formed by suffix -ers**

The base word	Suffix	The forming of new word	Meaning

Research	-ers	Research (Noun) + ers = researchers (Noun)	A person who carries out academic or scientific research.
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The forming of new word “researchers” is derived from the base “research” (Noun) with the suffix -ers in the last of the base. It can be categorized as derivational affix because suffix -ers has function to change the meaning of the base and make new word “researchers”. The meaning of the word “researchers” in sentence “Omicron produces symptoms in about three days, **researchers** have learned from outbreaks in Oslo and Nebraska” means “A person who carries out academic or scientific research.” Therefore, the meaning of the sentence is “In Oslo and Nebraska researchers within three days learned on the symptoms of Omicron outbreaks.”

**c. Suffix-ment: *treatment***

**The Processes of Forming New Word Formed by Suffix -ment**

The base word	Suffix	The forming of new word	Meaning
Treat	-ment	Treat + ment = treatment (noun)	The manner in which someone behaves towards or deals with someone or something.

The forming of new word “treatment” is derived from the base “treat” (Verb) with the suffix -ment in the last of the base. It can be categorized as derivational affix

because suffix -ment has function to change the meaning of the base and make new word “treatment”. The meaning of the word “treatment” in sentence “Omicron’s unique Biology is leading to headaches for both testing and **treatments** designed to keep out of hospitals” means “The manner in which someone behaves towards or deals with someone or something.” Therefore, the meaning of the sentence is “Biology conducts testing the cause of headaches that cause of Omicron.”

**d. Suffix -ful:** *meaningful*

**The Processes of Forming New Word Formed by Suffix -ful**

The base word	Suffix	The forming of new word	Meaning
Meaning	-ful	Meaning + ful = meaningful (Adjective)	logic having a recognizable function in a logical language or other sign system.

The word “meaningful” is derived from the base “meaning” (Noun) with the suffix -ful in the last of the base. It can be categorized as derivational affix because suffix –ful has function to change the meaning of the base and make new word “meaningful.” The meaning of the word “meaningful” in sentence “I’m not longer confident that the negative is as **meaningful** as it was two weeks ago. Says Bob Wachter” means “logic having a recognizable function in a logical language or other

sign system.” Therefore, the meaning of the sentence is “Bob said that he was not sure that the negative Omicron would last as long as two weeks.”

**f. Suffix -st:** *economist, against*

**The Processes of Forming New Word Formed by Suffix -st**

The base	Suffix	The forming of new word	Meaning
Against	-st	Again + -st = against (adverb)	In opposition to
Economist		Economy + -st = economist (Noun)	An expert

The word “against” is derived from the base “again” (Verb) with the suffix -st in the last of the base word. It can be categorized as derivational affix because suffix -st has function to change the meaning of the base and make a new word “against.” The meaning of the word “against” in sentence “What’s more some treatments such as laboratory made monoclonal antibodies, aren’t as effective **against** Omicron” means “in opposition to.” Therefore, the meaning of the sentence is “There are some laboratories which made monoclonal antibodies to treat the body are not as affective of Omicron.”

The word “economist” is derived from the base economy (Noun) with the suffix -st in the last of the base word “economy”. It can be categorized as derivational affix because suffix -st has function to change the meaning of the base and make new

word “economist.” The meaning of the word “economist” in sentence “Joshua Gans an **economist** at the University of Toronto who has been studying COVID-19 testing” means “an expert.” Therefore, the meaning of the sentence is “Joshua Gans is a student from University of Toronto who is studying about COVID-19.”

Article II: “*Why being pregnant and unvaccinated against Covid-19 is a risk combo*”?

**a. Suffix-ed:** *vaccinated, united, suppressed*

**The Processes of Forming New Word Formed by Suffix -ed**

The base word	Suffix	The for ming of new word	Meaning
Vaccine	-ed	Vaccine + ed = vaccinated	Treat a person or animal with a vaccine to produce immunity to a particular infectious disease or pathogen
Unit		Unit (noun) + ed = united (adjective)	Joined together politically, for a common purpose, or by common feelings.
Suppress		Suppress + ed = suppressed	Prevent or inhibit (a process or reaction).

There are three words containing suffix that the researcher found in the second, namely “*vaccinated, united and suppressed*”. The word of “vaccinated” (Adjective) is derived from the last of the base “vaccine” (Noun) with the suffix -ed with the function to change the meaning in the base and make new lexeme “vaccinated”. The meaning of the word “vaccinated” in sentence “*Who had gotten vaccinated right away and given birth to health babies*” means “*treat a person or animal with a vaccine to produce immunity to a particular infectious disease or pathogen.*” Therefore, the meaning of the sentence is “Pregnant people who had gotten vaccinated can give birth health babies.”

The word “**united**” (Adjective) is derived from the last of base unit (Noun) with the suffix -ed with the function to change the meaning of the base and will be a new word “united.” The meaning of the word “united” in sentence “A record-breaking total of 145,982 people were hospitalized in the **United** States with confirmed or suspected COVID-19.” means “joined together politically, for a common purpose, or by common feelings.” Therefore, the meaning of the sentence is “In United States there were 145,982 people who were hospitalized with suspected COVID-19.”

The forming of new word “suppressed” (Noun) is derived from the base “suppress” with suffix -ed in the last of the base, it changes the meaning of the base and make a new word “suppressed.” The meaning of the word “suppressed” in sentence “Certain immune system players are somewhat **suppressed** in order to

tolerate pregnancy” means “prevent or inhibit (a process or reaction).” Therefore, the meaning of the whole sentences is “To tolerate pregnancy a certain immune systems is required.”

**b. Suffix -ly:** *cumulatively, rarely, definitively, and routinely*

**The Processes of Forming New Word Formed by Suffix -ly**

The base word	Suffix	The forming of new word	Meaning
Cumulative	-ly	Cumulative (Adjective) + ly = cumulatively (Adverb)	In a way that increases in quality, degree, or force by successive additions
Rare		Rare (Adjective) + ly = rarely (Adverb)	In often; seldom.
Definitive		Definitive (Adjective) + ly = definitively (Adverb)	Decisively and with authority; conclusively.
Routine		Routine (Adjective) + ly = Routinely (Adverb)	As part of a regular procedure rather than for a special reason.

The forming of word “cumulatively” is derived from the base “cumulative” (Verb) with the suffix -ly in the last of the base word. It can be categorized as derivational affix because suffix -ly has function to change the meaning of the base and make word “cumulatively”. The meaning of the word “cumulatively” in sentence “**Cumulatively**, only 42,6 percent of pregnant people ages 18 to 49 have been fully vaccinated against COVID-19 in the United States” means “*In a way that increases in quality, degree, or force by successive additions*”. Therefore, the meaning of the sentence is “In the United States only 42,6percent people pregnant get vaccinated to avoid COVID-19.”

The forming of new word “rarely” is derived from the base “rare” (Adjective) with the suffix **-ly** in the last of the base word rare It can be categorized as derivational affix because suffix **-ly** has function to change the meaning of the base and make new word “rarely” (Adverb). The meaning of the word “rarely” in sentence “The original SARS-COV-2 and the early variants pregnant individuals **rarely** had detectable virus in their bloodstream during an infection” means “As part of a regular procedure rather than for a special reason.” Therefore, the meaning of the whole sentences is “The original SARS-COV-2 in pregnant is rarely detected in the past their blood flow.”

The forming of new word “definitively” is derived from the base “rare” (Adjective) with the suffix **-ly** in the last of the base word definitive It can be categorized as derivational affix because suffix **-ly** has function to change the

meaning of the base and make new word “definitively” (Adverb). The meaning of the word “definitively” in sentence “In contrast preterm birth, stillbirth, adverse pregnancy outcomes, maternal risk, all have been **definitively** linked to having COVID” means “decisively and with authority; conclusively.” Therefore, the meaning of the sentence is “Babies were born premature, adverse pregnancy outcomes have a definitive risk associated with COVID.”

The forming of new word “routinely” is derived from the base “rare” (Adjective) with the suffix **-ly** in the last of the base word routine. It can be categorized as derivational affix because suffix **-ly** has function to change the meaning of the base and make new word “routinely” (Adverb). The meaning of the word “routinely” in sentence “Other vaccines are **routinely** recommended in pregnancy such as the influenza shot” means “As part of a regular procedure rather than for a special reason.” Therefore, the meaning of the sentence is “Influenza injections are highly recommended in pregnancy.”

**c.Suffix –ing: Describing**

**The Processes of Forming New Word Formed by Suffix ing**

The base word	Suffix	The forming of new word	Meaning

Describe	-ing	Describe (verb) + -ing = describing (noun)	Give a detail account in words of
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The forming of new word “describing” is derived from the base “describe” (Verb) with the suffix -ing in the last of the base word. It can be categorized as derivational affix because suffix -ing has function to change the meaning of the base and make new word “describing” (Noun). The meaning of the word “describing” in sentence “Like what I remember my parents **describing** as the day thy got their polio vaccines” means “give a detail account in words of.” Therefore, the meaning of the sentence is “His parent explain about polio vaccine.”

d. **Suffix –es:** *Deliveries*

**The Processes of Forming New Word Formed by Suffix –es**

The base word	Suffix	The forming of new word	Meaning
Delivery	-es	Delivery + -es = deliveries (noun)	The action of delivering letters, parcels, or goods

The forming of new word “deliveries” is derived from the base “delivery” (Noun) with the suffix -es in the last of the base word. It can be categorized as derivational affix because suffix –es has function to change the meaning of the base and make new word “deliveries” (Noun). The meaning of the word “deliveries” in sentence “There were 273 stillbirths among 21.653 **deliveries** to women with

COVID-19 or 1.26 percent” means “the action of delivering letters, parcels, or goods.” Therefore, the meaning of the sentences is “There were 273 stillbirths’ babies’ deliveries to women who had Covid.”

e. **Suffix –ion:** *Recommendation,*

**The Processes of Forming New Word Formed by Suffix –ion**

The base word	Suffix	The forming of new word	Meaning
Recommend	-ion	Recommend (verb) + -ion = recommendation (noun)	A suggestion or proposal as to the best course of action

The forming of new word “recommendation” is derived from the base “recommend” (Verb) with the suffix -ion in the last of the base word. It can be categorized as derivational affix because suffix -ion has function to change the meaning of the base and make new word “recommendation” (Noun). The meaning of the word “recommendation’ in sentence “COVID-19 vaccines shouldn’t be withheld due to pregnancy but a forceful **recommendation** for vaccination didn’t come until July of 2021” means “a suggestion or proposal as to the best course of action”. Therefore, the meaning of the sentences is “Covid vaccines are not hold for pregnancy and recommendation for vaccines will end in July 2021.”

f. **Suffix –ment:** *Judgment*

### The Processes of Forming New Word Formed by Suffix –ment

The base word	Suffix	The forming of new word	Meaning
Judge (verb)	-ment	Judge + -ment = judgment (noun)	The ability to make considered decisions or come to sensible conclusion

The forming of new word “judgment” is derived from the base “judge” (Verb) with the suffix -ment in the last of the base word. It can be categorized as derivational affix because suffix -ment has function to change the meaning of the base and make new word “judgment” (Noun). The meaning of the word “judgment” in sentence “Fiore had to let go of any **judgment** or discomfort around anybody else’s response to her vaccination.” means “the ability to make considered decisions or come to sensible conclusion”. Therefore, the meaning of the sentence is “Fiore does not really care about people’s responses to her vaccination.”

#### **B. Discussion**

This research studies the types of derivational affixes used in two articles of Science News magazine and process of word formation using theory of Katamba (1993). According to Katamba (1993), there are three derivational affixes, namely, prefix, suffix, and infix. There are two types of derivational affixes found in both

articles, namely prefix and suffix. The researcher does not find infix in the two articles of Science magazine because it is seldom found in English, it is very common in Arabic and Hebrew. Infix is only occurs in British Morphology is –n- that inserted before the final consonant of the root in the few Latin words that appears as the basis of conformity.

There are 10 prefixes found in two articles of Science News magazine. The researcher found 6 prefixes in the first article “Omicron forces us to rethink Covid-19 testing and treatment” and 4 prefixes found in the second article “Why being pregnant and unvaccinated against Covid-19 is a risk combo”. The prefixes found in the first article are prefixed un-, under-, on-, out-, and trans-. Meanwhile, the prefix found in the second article are un-, anti-, and out-. The mostly used prefix in both articles is the prefix un-. The prefix -un means “not.” It is used to give opposite and negative meaning to Adjective, Noun, and Adverb. The example of the words using prefix –un in Science News magazine are *unvaccinated*, *unprecedented*, *unlike* and *uncommon*.

There are 26 suffixes found in the two articles of Science News magazine. In the first article “Omicron forces us to rethink Covid-19 testing and treatment”, the researcher found 15 suffixes, namely –ed, -ly, -ers, -ment, -ful, -st . Meanwhile, in the second article “Why being pregnant and unvaccinated against Covid-19 is a risk combo”, there are 11 suffixes such as –ed, -ly, -ing, -es, -ment, and –ion. Furthermore, the suffix–ly is mostly found in the two articles of Science magazine the suffix -ly means “describing how, or how often, something is done.” The examples of the words using suffix -ly in Science magazine are *mainly*, *fortunately*, *likely*, *quickly*,

*highly, recently, accidentally, differently, cumulatively, rarely, definitively, and routinely.*

There are several processes of forming new words. They are word from Noun to Noun (deliveries), Noun to Adjectives (vaccinated), Adjectives to Adverb (routinely), Adjectives to Verb (transmissible). Verb to Noun (recommendation), and Verb to Adjective (unlike).

From the result of this research, it shows that the findings of this research have similarities with the previous studies. The previous studies with the same topic of derivational affixes (Paramita 2018, Etana and Beletew 2018, Efrina and Barlin 2020, Merciana 2021, Yohana 2021, Dalimuthe 202 and Siregar and Siregar 2021) and also about prefixes un-, in-, out- and suffix -ly, -full in the objects of their studies.

## **CHAPTER V**

### **CONCLUSION AND SUGGESTION**

This chapter consists of conclusion and suggestion. The first conclusion of the research of the types of derivational affixes and the processes of forming new word and the suggestion for further are related to process of forming new word

#### **A. Conclusion**

From the analysis data, the research found 36 words of the derivational affixes in the two articles of Science magazine. There are 10 prefixes and 26 suffixes. The prefixes found are un-, under-, anti-, out-, on-, and trans-. The suffixes found are -ed, -ly, -ment, -est, and -ion. The most commonly prefix found in the articles of Science magazine is the use of the prefix un-.

There are several, processes of forming new words. Firstly, there are words derived from Adjective to Adverb such as Definitive (Adjective) + -ly = definitively. Secondly, there are words derived from Adverb such as “definitively” comes from the base word “definitive” put with suffix -ly becomes a new word. Thirdly, there is a word formed from Verb to Noun, such as Judge (Verb) + -ment = judgment (Noun). Forthly, there is also a word derived from Noun to Adjective, such as the word “vaccine” (Noun) + -ed = vaccinated (Adjective).

## **B. Suggestion**

The researcher gives suggestion to the students of Department of English Literature and further researchers. After studying about derivational affixes, the students are suggested to use Derivational affixes correctly in their writing. Meanwhile, to the further researchers who are interested in researching about derivational affixes, they are suggested to study about derivational affixes in different objects, such as in newspaper, poem, and song lyric since this study has not found all off the types of derivational affixes, such as infix. It is recommended for other research to complete it by using a different object.

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## CURRICULUM VITAE



Ummu Latipa Morani Laitupa was born in Tulehu on September 06, 2000. She was graduated from MAN 1 Maluku Tengah in 2018. During her study at senior high school, she actively participated in OSIS and also joined karateka . She started her study at the Department of English Literature Universitas Islam Negeri Maulana Malik Ibrahim Malang in 2018. During her study at the university, she joined TaeKwondo.

## APPENDIXES

### APPENDIX 1

**TABLE OF CLASSIFICATION OF DATA (PREFIX)**

<b>No</b>	<b>Sentence</b>	<b>Prefix</b>	<b>Meaning</b>
<b>1</b>	The surge of cases means that vulnerable people, including the <b>unvaccinated</b> , immunocompromised, elderly and those with underlying health conditions, are still landing in hospital beds.	Unvaccinated	not
<b>2</b>	The researchers continued testing the employees daily, adding an <b>unprecedented</b> look at COVID-19 infections in the early stages	Unprecedented	Never done or known before
<b>3</b>	In the United States as of January 15, before or during their pregnancies. Yet <b>unlike</b> when Yohay rolled up her sleeve almost a year ago	Unlike	Not like
<b>4</b>	It was also <b>uncommon</b> for the placenta to be infected.	Uncommon	Out of ordinary unusual
<b>5</b>	The surge of cases means that vulnerable people, including the unvaccinated, immunocompromised, elderly and those with <b>underlying</b> health conditions, are still	Underlying	Significant as a cause or basis of something but not necessarily manifest or obvious

	landing in hospital beds.		
<b>6</b>	In a study conducted in December during the <b>ongoing</b> omicron surge	Ongoing	Still in progress
<b>7</b>	Daily PCR testing and rapid antigen tests have helped many employers nip <b>outbreaks</b> in the bud by identifying infected employees	Outbreaks	A sudden occurrence of something
<b>8</b>	“We’ve all seen terrible <b>outcomes</b> with COVID and pregnancy,” says maternal-fetal medicine specialist Cynthia Gyamfi-Bannerman of the University of California San Diego School of Medicine.	outcomes	The way a thing turns out; a consequence.
<b>9</b>	The variant is more <b>transmissible</b> than previous versions of the coronavirus.	Transmissible	To be passed on from one person or organism to another
<b>10</b>	Getting vaccinated against COVID-19 when pregnant also appears to protect the baby, as the post-shot <b>antibodies</b> can cross the placenta.	Antibodies	A blood protein produced in response to and counteracting a specific antigen

**TABLE OF DATA CLASSIFICATION (SUFFIX)**

<b>No</b>	<b>Sentence</b>	<b>Suffix</b>	<b>Meaning</b>
<b>1</b>	As of January 11, a record-breaking total of 145,982 people were <b>hospitalized</b> in the United States with confirmed or suspected	Hospitalized	Admit or a cause

	COVID-19.		
2	Adamson and colleagues report January 4 at medRxiv.org. that work has not yet been peer <b>reviewed</b> by other scientists.	Reviewed	A formal assessment of something
3	Who had gotten <b>vaccinated</b> right away and given birth to healthy babies.	Vaccinated	Treat a person or animal with a vaccine to produce immunity to a particular infectious disease or pathogen
4	More than 194,000 pregnant people in the <b>United</b> States have gotten COVID-19 vaccines as of January 31	United	Joined together politically for a common purpose, or by common feelings
5	Certain immune system players are somewhat <b>suppressed</b> in order to tolerate pregnancy.	Suppressed	Prevent or inhibit ( a processes or reaction)
6	That's <b>mainly</b> because omicron replicates itself in the body and sickens people faster than delta.	Mainly	More than anything else
7	<b>Fortunately</b> , omicron seems less likely than previous versions of the coronavirus to cause deep lung infections that lead to serious complications	Fortunately	Favored by or involving good luck; lucky
8	Omicron seems less <b>likely</b> than previous versions of the coronavirus to cause deep lung	Likely	Probably

	infections that lead to serious complications		
9	Omicron is spreading <b>quickly</b> and tests all kinds are in short supply.	Quickly	At a fast speed
10	PCR test that gave answers within eight hours. And they were <b>highly</b> boosted, so they were doing all the right things,	Highly	At or to a high degree or level
11	<b>Recently</b> , Wachter’s son had COVID-19 symptoms but tested negative on a standard home nose-swab test.	Recently	At a recent time
12	People might <b>accidentally</b> overdose on their other medications.	Accidentally	By change
13	“We don’t treat a lung cancer patient <b>differently</b> depending on whether they smoked.”	Differently	Not the same as another or as before
14	<b>Cumulatively</b> , only 42.6 percent of pregnant people ages 18 to 49 have been fully vaccinated against COVID-19 in the United States as of January 15	Cumulatively	In a way that increases in quality degree, or force by successive additions.
15	the original SARS-CoV-2 and the early variants, pregnant individuals <b>rarely</b> had detectable virus in their bloodstream during an infection	Rarely	In often; seldom.
16	In contrast, “preterm birth, stillbirth, adverse pregnancy	Definitively	Decidively and with authority;

	outcomes, maternal risk, all have been <b>definitively</b> linked to having COVID		conclusively.
17	Other vaccines are <b>routinely</b> recommended in pregnancy, such as the influenza shot.	Routinely	As part of a regular procedure rather than for a special reason
18	Omicron produces symptoms in about three days, <b>researchers</b> have learned from outbreaks in Oslo and Nebraska.	Researchers	A person who carries out academic or scientific research.
19	Omicron's unique biology is leading to headaches for both testing and <b>treatments</b> designed to keep out of hospitals.	Treatment	The manner in which someone behaves towards or deals, with someone or something
20	Fiore had to let go of "any <b>judgment</b> or discomfort around anybody else's response" to her vaccination	Judgment	The ability to make considered decision or come to sensible conclusion
21	"I'm not longer confident that the negative is as <b>meaningful</b> as it was two weeks ago," says Bob Wachter	Meaningful	Logic having a recognizable function in a logical language or other sign system
22	Joshua Gans, an <b>economist</b> at the University of Toronto who has been studying COVID-19 testing,	Economist	An expert
23	What's more, some treatments,	Against	In opposition to

	such as laboratory-made monoclonal antibodies, aren't as effective against omicron as they were <b>against</b> other variants.		
<b>24</b>	There were 273 stillbirths among 21,653 <b>deliveries</b> to women with COVID-19, or 1.26 percent	Deliveries	The action of delivering letter, parcels, or goods.
<b>25</b>	COVID-19 vaccines shouldn't be withheld due to pregnancy, but a forceful <b>recommendation</b> for vaccination didn't come until July of 2021	Recommendation	A suggestion or proposal as to the best course of action
<b>26</b>	Like what I remember my parents <b>describing</b> as the day they got their polio vaccines.	Describing	Give a detail account in words of

## APPENDIX 2

### ARTICLE I: Omicron Forces Us to Rethink COVID-19 Testing and Treatment

New Year, new variant. As 2022 gets under way, omicron, a fast-moving version of the virus that causes COVID-19, is well into its March across the world. **As of January 11, a record-breaking total of 145,982 people were hospitalized in the United States with confirmed or suspected COVID-19.** And hundreds of thousands of people are catching the coronavirus every day.

“There’s a lot of activity right now in the United States, and we’re seeing that in terms of these astronomical numbers of new cases,” says infectious disease physician Preeti Malani of the University of Michigan in Ann Arbor. “Omicron is keeping us busy.”

**Omicron’s unique biology is leading to headaches for both testing and treatments designed to keep out of hospitals.** Researchers are racing to understand omicron and this new phase of the pandemic (SN:12/21/21). Answers can’t come soon enough.

**The variant is more transmissible than previous versions of the coronavirus.** Compared with delta, omicron is 160 percent to 200 percent more transmissible, one preliminary study from researchers in Germany and the United Kingdom estimates. **That’s mainly because omicron replicates itself in the body and sickens people faster than delta.** With delta, it takes about four days after infection for symptoms to appear. **Omicron produces symptoms in about three days, researchers have learned from outbreaks in Oslo and Nebraska.**

**Fortunately, omicron seems less likely than previous versions of the coronavirus to cause deep lung infections that lead to serious complications,** such as admissions to intensive care units, intubation and death. But **the surge of cases means that vulnerable people, including the unvaccinated, immunocompromised, elderly and those with underlying health conditions, are still landing in hospital beds.**

“Health care system are really under stress,” Malani says.

The key of heading off collapse of health care system is to prevent people from needing to visit emergency rooms and be admitted to the hospital in first place. Testing and isolation of infected people has helped to stem the tide of previous waves of infection, but **omicron is spreading quickly and tests all kinds are in short supply.** and as quick as rapid tests are, they may not catch someone with omicron before they become infectious. **What’s more, some treatments, such as laboratory-**

**made monoclonal antibodies, aren't as effective against omicron as they were against other variants.** Other treatments, including new antiviral pills, are scarce.

“It’s going to be a rough couple weeks for sure and maybe longer,” Malani says.

Here’s a look at some of the challenges that omicron present for testing and treatment.

Testing in the time of omicron

**Daily PCR testing and rapid antigen tests have helped many employers nip outbreaks in the bud by identifying infected employees** and isolating them before they could pass the virus on to others, says Blythe Adamson, an infectious disease epidemiologist and economist. She founded infectious Economics, a New York City-based company that helped businesses devise strategies to limit disease spread in workplaces.

But omicron has hampered those efforts. **In a study conducted in December during the ongoing omicron surge,** Adamson and colleagues tested people at five workplaces in New York City, Los Angeles and San Francisco with **PCR test that gave answers within eight hours. And they were highly boosted, so they were doing all the right things,** “Adamson says. Yet employees were still getting infected and spreading the virus.

At the workplaces, “omicron outbreaks looked really different than delta outbreaks were looking before,” she says. “While daily PCR testing previous to omicron worked really well to pick up cases before they were infectious, we started noticing [with omicron] that people were slipping through the cracks. Transmissions were happening faster. People were becoming infectious faster and spreading it to other people.”

So rapid antigen tests were added to the mix. Even after finding a positive test. **The researchers continued testing the employees daily, adding an unprecedented look at COVID-19 infections in the early stages** and allowing the researchers to determine whether rapid antigen tests are still good for pinpointing when people with COVID-19 are infectious to others.

A few weeks ago, rapid antigen tests were considered quite well at saying whether a person is able to infect others, answering the question, “Are you infectious now?”(SN:12/17/21). But new evidence from Adamso’s group and a study conducted at a walk-up test site in San Francisco calls that past stellar performance into question. **“I’m not longer confident that the negative is as meaningful as it was two weeks ago,” says Bob Wachter,** chair of the department of medicine at the University of California, San Francisco.

The trouble seems to be at the front end of an infection. See all our coverage of the coronavirus outbreak. Adamson's group found that on the first two days of infections, PCR tests, which detect viral RNA, diagnosed infections that the rapid antigen tests didn't. That's not unusual. In fact, in previous COVID-19 outbreaks with other variants, Adamson relied on PCR test to catch infections before they became contagious. But in 28 of 30 omicron infectious levels of the virus, but nasal swabs with rapid antigen tests weren't picking up the contagious cases. In fact, in four verified instances, people who had negative rapid antigen tests spread the virus to other, **Adamson and colleagues report January 4 at medRxiv.org. That work has not yet been peer reviewed by other scientists.**

It matches other results, however. At a San Francisco walk-up testing site, the BinaxNow rapid antigen test made by Abbott was able to pick up cases in which people had high levels of virus. But the test didn't do as well when people were on the threshold of infectiousness, researchers at Unidos en Salud, a community partnership with academic institutions including UCSF, the Chan Zuckerberg Biohub and the University of California, Berkeley, report in January 10 preprint posted at medRxiv.org.

One of the characteristics emerging about omicron specifically is where it lives in the body. Compared with previous variants, omicron seems to be more abundant in some upper respiratory areas, such as the throat than in the nose, at least in the early days of an infection. That locale means that a nose swab may be missing omicron early on, before viral levels are high.

Adamson's group found that in the first two days of infection, saliva swabs were better than nasal swabs at picking up infectious cases. By day three, particularly if people had symptoms, there was no difference in the ability of rapid antigen tests to detect the infection, regardless if the swab came from saliva or the nose, Adamson says. That bolsters preliminary evidence in a study from Hong Kong that found that saliva swabs are better for detecting omicron than nasal swabs are. That study appeared December 24 at medRxiv.org. it also has not been vetted by other scientist.

**Recently, Wachter's son had COVID-19 symptoms but tested negative on a standard home nose-swab test.** Given the symptom list, Wachter wasn't convinced. He planned to swab his son's throat next. "As I think about going down to test my son this morning, I think I am going to stick it in his mouth before I stick it in his nose, which is kind of gross," Wachter told Science News. He did anyway, and sure enough, that test was positive.

Available home tests haven't been approved for this use, though, and the throat move isn't endorsed by test makers or the U.S. Food and Drug Administration.

In a January 8 tweet, the agency wrote, “Please don’t go sticking that #COVID19 testing swab down your throat.”

Also, says **Joshua Gans, an *economist* at the University of Toronto who has been studying COVID-19 testing**, “It’s difficult to swab your own throat because you have to swab where your tonsils are.” Not to mention that many people have a gag reflex when their throats are swabbed. Nevertheless, throat swabbing followed by swabbing the nose with that same cotton swab is recommended in the United Kingdom for rapid testing.

Eating or drinking before doing a throat swab may produce false positives on some rapid antigen tests, but has no effect on nasal swabs, researchers reported in October in *Microbiology Spectrum*. But, overall, false positives from antigen tests are rare, Gans and colleagues report January 7 in *JAMA*. Of course, that was with nasal swabs. The researchers didn’t test throat swabbing.

“The antigen tests aren’t perfect,” Malani says. “But they are pretty specific. If it’s positive, you’re positive.”

The problem now comes if you test negative on a rapid antigen test. With omicron, you can no longer be sure you’re not infectious, Adamson says. “You would not want to right now with omicron have a 300-person wedding where you test everyone with a rapid antigen. With the prevalence of omicron in the community, you would absolutely have a super spreading event.” The latest on treatments Just as with previous versions of the virus, most people who are sick with omicron will recover on their own at home with standard hunker-down advice: Rest, fluids and fever-reducing medicine. But some people need more medical help, and omicron has changed that process. With omicron cases flooding hospitals and doctors’ offices, treatments are essential to prevent serious disease.

At first glance, help is at hand. In late December, two new oral pills were authorized by the FDA: molnupiravir from Merck and Paxlovid made by Pfizer. Both drugs and the antiviral drug remdesivir were designed to stop coronaviruses from copying themselves in the body. All three seem to hold up against omicron in lab tests, researchers reported in a preprint posted December 28 at [bioRxiv.org](https://www.biorxiv.org), but there are no data yet to suggest how the drugs work in the real world, especially against the fast-moving variant.

Molnupiravir drops a person’s risk of hospitalization by about 30 percent (SN: 12/2/21). But because the drug works by introducing genetic mutations in viral RNA, there’s a chance molnupiravir might cause mutations in human genes too. That makes it an especially risky choice for women who are pregnant or might become pregnant, says Katherine Seley-Radtke, a medicinal chemist at the University of Maryland, Baltimore County. Lab animal studies have shown that high doses or prolonged use

of the drug may cause genetic mutations or developmental problems in fetuses. There have been no long-term studies of molnupiravir's effect on people.

Other antivirals have their own issues. Remdesivir is approved for use in hospitalized people, but recent evidence has suggested it can help high-risk people stay out of the hospital too, researchers reported December 22 in the *New England Journal of Medicine*. Remdesivir blocks viral replication by inserting a dummy RNA building block that stops RNA copying. The problem with that drug is that it must be given intravenously, though its maker, Gilead Sciences, is reportedly working on pill and inhaled forms of remdesivir.

Remdesivir has another drawback in that it has to be converted in the body to its active form. That works better for some people than others, and can affect how well the drug can keep the coronavirus in check, Seley-Radtke says.

For some people, the best choice for treatment may be Pfizer's new antiviral pill. In clinical trials, Paxlovid, a combination medication which blocks a protein-cutting enzyme that the coronavirus needs to replicate itself, reduced hospitalization and death in high-risk people by 88 percent. It does not have the mutation concerns associated with molnupiravir, but it might introduce problems when given to people taking other drugs.

That's because Paxlovid also contains a drug called ritonavir. Ritonavir blocks the action of enzymes that break down drugs, keeping levels of the virus inhibitor in the body high so that it can fight the virus. But those enzymes that ritonavir inhibits also process other drugs, so **people might accidentally overdose on their other medications**. Doctors and pharmacists need to keep a close eye out for such drug interactions when prescribing Paxlovid to patients, Seley-Radtke says.

There is a bigger hurdle for Paxlovid, though. There isn't enough of it to go around, especially as hospitalizations surge. "It's a classic situation of scarcity," Wachter says. At UCSF, "we have a fair amount of the Merck drug. We have very little of Paxlovid," he says.

"If I have a choice, the Pfizer drug seems like it's better in every regard, better efficacy and easier to take," Wachter says. "But for now, we are highly rationing it." Many of the people who need the treatment the most are unvaccinated – a situation that "raises a whole bunch of moral questions, that they would jump ahead of the line of someone who made a better choice," Wachter says. This rationing framework is "a hard thing to get your arms around, but not inconsistent with the way we do the rest of medicine," he says. **"We don't treat a lung cancer patient differently depending on whether they smoked."**

Another hurdle for the antiviral drugs is that they work best if given very early in the infection, ideally within three days of symptoms starting. But omicron replicates faster than delta or other previous versions of the virus, perhaps making the window for treatment even shorter, Seley-Radtke says.

It's unclear what that accelerated timeline means for another class of treatments, monoclonal antibodies. Omicron's highly mutated spike protein is missing many of the targets that some monoclonal antibodies aim for. Two of the three monoclonal antibody treatments that have been authorized for use in the United States seem to falter with omicron. Of the three, only one, called sotrovimab, seems to incapacitate omicron's spike protein. Derived from a person who survived a SARS-CoV infection in 2003, sotrovimab still recognizes omicron's mutated spike protein and disarms it, laboratory tests suggest. That study, posted December 15 at medRxiv.org, has not been reviewed by other scientists.

But sotrovimab is exceedingly hard to get at the moment, Malani and Wachter say. "We basically have none, so that's not on the list right now," Wachter says. That scarcity and others "make the promise of these drugs potentially more theoretical than real," he says.

Over time, COVID-19 tests and treatments will become more plentiful. The U.S. government has pledged to distribute half a billion rapid tests in the coming weeks, for instance. But omicron isn't waiting.

"We're stuck with now and the next month being quite horrible," Wachter says. And as promising as some tests and treatments seem to be, logistics can still foil the plans. "Can I get a test? Can I find a doctor? Can I get a prescription? Does the pharmacy have the medicine?" Wachter says. "And all of those are like 'No. No. Maybe. Keep calling back. Try a different pharmacy.' In real life, this is all very hard."

## **ARTICLE II: Why Being Pregnant and Unvaccinated against COVID-19 is a Risky Combo**

The coronavirus is a danger to babies and pregnant people, and the vaccines are safe, Snow covered the storied field of Fenway Park in Boston when Kate Yohay, in the second trimester of her pregnancy, arrived. The ballpark had become a COVID-19 vaccination site, and Yohay was getting her first shot. “That’s going to be a historical moment for me,” she says. **“Like what I remember my parents describing as the day they got their polio vaccines.”**

Yohay was about as enthusiastic to get the vaccine in early 2021 as one could be. She felt confident in the shots’ development. She was encouraged by the pregnant health care workers **who had gotten vaccinated right away and given birth to healthy babies.** She did worry whether she would develop a fever afterward and the risk that could pose to her baby. But “it’s still better than getting COVID,” Yohay says. “So for me, it was a small risk, and it was worth the risk.”

Others who’ve been pregnant during the pandemic haven’t been so sure. **Cumulatively, only 42.6 percent of pregnant people ages 18 to 49 have been fully vaccinated against COVID-19 in the United States as of January 15, before or during their pregnancies. Yet unlike when Yohay rolled up her sleeve almost a year ago,** there is now a great deal of data attesting to the safety of COVID-19 vaccination for pregnant individuals and their newborns. “Being vaccinated is one of the best ways that you can keep yourself and your baby safe during this time,” says nurse-scientist Ifeyinwa Asiodu of the University of California, San Francisco.

The risks from developing COVID-19 when pregnant and unvaccinated were demonstrated again in a recent study from Scotland. From December 2020 until the end of October 2021, a period when vaccines were available, there were 4,950 confirmed coronavirus infections among pregnant women. Seventy-seven percent occurred in those unvaccinated, along with 91 percent of the 823 hospital stays and all but two of the 104 intensive care admissions, researchers report January 13 in *Nature Medicine*.

Babies suffered too. The death rate for babies born within 28 days of their mother’s COVID-19 diagnosis was 22.6 deaths per 1,000 births, much higher than the rate for all newborns during the pandemic, 5.6 per 1,000. All of the babies who died over the course of the study were born to women who weren’t vaccinated when they got COVID-19, the researchers found.

Scientists are still unraveling what’s happening behind the scenes during a SARS-CoV-2 infection in pregnancy, and why the delta variant was especially deadly

for those expecting. The highest numbers of U.S. deaths for pregnant individuals, 40 in August and 35 in September, occurred during the delta surge.

There aren't details yet on how pregnant people fare after becoming ill with the now-dominant omicron variant. But experts don't advise a wait-and-see approach. And the vaccines continue to offer protection against severe disease and death.

**“We've all seen terrible *outcomes* with COVID and pregnancy,” says maternal-fetal medicine specialist Cynthia Gyamfi-Bannerman of the University of California San Diego School of Medicine. “And we know how preventable some of those outcomes are.”**

Tough time for infections

Pregnancy can be a risky time to get an infection in general. Influenza and malaria, for example, can be more severe in people who are pregnant than in those who aren't.

That risk is tied to changes in the immune system. “Pregnancy is a very complicated immune state,” says Andrea Edlow, a maternal-fetal medicine specialist at Massachusetts General Hospital and Harvard Medical School in Boston. The immune system needs to defend pregnant individuals and their fetuses against pathogens. But **certain immune system players are somewhat *suppressed* in order to tolerate pregnancy, something that is half self and half non-self.**

Plus, the physiological changes during pregnancy can hinder the body's handling of an infection. “Lots of aspects of your physiology are kind of maxed out,” Edlow says, and “operating at the edge of what your body can do.” For example, the blood clotting system is ramped up to be ready to control bleeding at birth. This already puts pregnant individuals at higher risk for blood clots, which other pathogens, especially SARS-CoV-2, can trigger too.

In the first year of the COVID-19 pandemic, there was evidence that those infected and pregnant fared worse compared with those infected but not expecting. Pregnant women with COVID-19 were three times as likely to require admission to an intensive care unit and need ventilation, two times as likely to use a heart-lung machine and close to two times as likely to die, researchers reported in November of 2020 in *Morbidity and Mortality Weekly Report*. The study included 400,000 U.S. women ages 15 to 44 and covered January to October 2020, before vaccination was available.

An international study of pregnant women covering March 2020 to February 2021 revealed that those with COVID-19 were close to two times as likely to develop preeclampsia — a serious pregnancy complication in which the blood pressure surges and the liver and kidneys don't work properly — as those who didn't have the illness.

Of the 725 pregnant women diagnosed with COVID-19, 59, or 8 percent, developed preeclampsia, compared with 64, or 4 percent, of the 1,459 pregnant women without COVID-19, researchers reported in the September 2021 American Journal of Obstetrics & Gynecology.

And in a study of pregnant individuals in the United States from March 2020 to September 2021, those with COVID-19 had about two times the risk of stillbirth compared with those who didn't have the illness, researchers reported in November 2021 in Morbidity and Mortality Weekly Report. **There were 273 stillbirths among 21,653 deliveries to women with COVID-19, or 1.26 percent**, and 7,881 stillbirths among 1.2 million deliveries to women without the disease, or 0.64 percent.

When the delta variant took over in the summer and fall of 2021, the risk of stillbirth grew, the study found. From March 2020 to June 2021, before delta, the risk was 1.5 times higher for pregnant women with COVID-19. From July to September of 2021, when delta reigned, there were 3,559 deliveries among women with COVID-19, of which 96, or 2.7 percent, were stillbirths. Of the 169,330 deliveries among those without the disease, 1,075, or 0.6 percent, were stillbirths. That's four times the risk.

Some clues have emerged as to why the delta variant raised the stakes. With **the original SARS-CoV-2 and the early variants, pregnant individuals rarely had detectable virus in their bloodstream during an infection**, Edlow says. **It was also uncommon for the placenta to be infected, and even rarer for the virus to spread to the fetus, she says.**

But with the delta variant, the amount of virus in the body, or the viral load, is higher during an infection, researchers have found. That, in turn, could increase the risk of the virus spreading to the bloodstream and infecting the placenta, Edlow says.

That occurred in a study of three unvaccinated pregnant women with delta infections and mild cases of COVID-19 in the third trimester. Within two weeks of their diagnoses, two of the women had stillbirths, and the third woman's baby had to be delivered early by emergency cesarean surgery. The two women who had blood samples taken at delivery had bloodstream infections, and all three women had infected placentas. The organs showed signs of SARS-CoV-2 placentitis, Edlow and her colleagues report January 13 in the Journal of Infectious Diseases. This inflammatory condition damages the placenta and endangers the fetus.

A shot good for two

The first inklings that COVID-19 was especially dangerous for pregnant people came in the first year of the pandemic. Year two brought vaccines and plenty of research that found COVID-19 vaccination was safe during pregnancy.

**More than 194,000 pregnant people in the *United States* have gotten COVID-19 vaccines as of January 31, according to the CDC.** There have been no reported safety concerns. A study of close to 2,500 participants in a CDC COVID-19 pregnancy registry found no increased risk of miscarriage after vaccination, researchers reported in October of 2021 in the *New England Journal of Medicine*.

Nor is there a risk of the baby coming too soon or too small, researchers report January 7 in *Morbidity and Mortality Weekly Report*. The U.S. study of over 40,000 pregnant women found no link between COVID-19 vaccination and preterm birth (a birth before 37 weeks) or small-for-gestational age, when a newborn's birth weight is on the lowest end of the spectrum.

**In contrast, “preterm birth, stillbirth, adverse pregnancy outcomes, maternal risk, all have been *definitively* linked to having COVID,”** Edlow says.

As for post-vaccination reactions, a study of over 17,000 people who were pregnant, nursing or planning pregnancy found that most reported pain at the site of the shot, while close to a third felt fatigue. Study participants who were pregnant were less likely to report a fever than those who were planning pregnancy, the researchers reported in August of 2021 in *JAMA Network Open*. Among participants who were nursing, 339 of 6,815 after the first vaccine dose and 434 of 6,056 after the second dose reported a drop in their milk supply that lasted less than 24 hours.

**Getting vaccinated against COVID-19 when pregnant also appears to protect the baby, as the post-shot *antibodies* can cross the placenta.** For example, a study from November of 2021 analyzed umbilical cord blood from 36 pregnancies during which the moms had gotten shots. All of the newborns had high levels of antibodies against the SARS-CoV-2 spike protein (the protein the vaccines target), researchers reported in the *American Journal of Obstetrics and Gynecology Maternal-Fetal Medicine*. And the antibodies are also found in the breastmilk of those vaccinated while nursing, several studies have found. These antibodies can be passed along to the nursing infant, researchers report in the *February Obstetrics & Gynecology*.

#### Confidence and doubts

Even with the reassuring data on COVID-19 vaccination during pregnancy, it's been hard to stamp out the uncertainty some feel about the shots. **Other vaccines are *routinely* recommended in pregnancy, such as the influenza shot.** But the COVID-19 vaccines were new, and pregnant people — as is standard practice — were excluded from the clinical trials that assessed the shots' safety and efficacy (SN: 5/30/18). Initially, there wasn't strong guidance on getting the shots during

pregnancy. That left pregnant people wondering, “Is this safe? Is this something I should do now, or should I waiting until after I give birth?” Asiodu says.

Excluding pregnant women from the trials can make it seem like “something must be wrong, this must be dangerous,” Edlow says. There were no safety issues among individuals who became pregnant during the trials, nor were there safety concerns in animal studies. Medical organizations said that **COVID-19 vaccines shouldn’t be withheld due to pregnancy, but a forceful *recommendation* for vaccination didn’t come until July of 2021.**

There are also structural barriers to more widespread vaccination, which impact pregnant individuals too, says Asiodu. And these barriers do not impede all equally. Hispanic and Black people are less likely to have access to paid family leave than white people. Having to save days for after birth, or for prenatal appointments, makes it even harder to take time from work to get vaccinated. These issues need structural solutions, Asiodu says.

Increasing vaccination among pregnant people also “takes listening,” Asiodu says, “hearing what their concerns are, and really addressing them.” And meeting people where they are, Edlow says. “When pregnant people aren’t getting the vaccine, it’s not because they want to be sick. They think they’re doing the best thing for their baby.” Plus, pregnant people can be bombarded by relatives and friends skeptical of vaccination. The scrutiny that those expecting face, and the relentless opinions offered about their and their babies’ health, can shake even the resolute.

Caroline Fiore of Lincoln, Mass., knows what that’s like. She was vaccinated against COVID-19 before she became pregnant in the summer of 2021. When boosters were recommended, Fiore didn’t hesitate to sign up. She got her third dose during the second trimester of her pregnancy, in November.

“I was taken aback by how monumental that decision felt when I was sitting in the chair” at her appointment, Fiore says. It felt emotional and powerful to do something that directly benefitted her and her baby. But she was surprised to feel some fear too.

She has family members who chose not to be vaccinated, including a relative who shunned the shots while pregnant. Their views “never changed my mind,” Fiore says, but played into an anxiety response of “well, what if I’m wrong.”

**Fiore had to let go of “any *judgment* or discomfort around anybody else’s response” to her vaccination, she says.** She has no regrets. “After the vaccine dose, you feel a little superhuman, so I’m still kind of riding that wave.”

