

Thanks for your interest in this survey organized by the researchers in charge of pathological prostatic cancer computational-aided diagnosis (CAD) software development in Project Dr. Answer sponsored by the National IT Industry Promotion Agency of Korea.

Since the global advent of digital pathology and with deep learning technology on the rise, global and local development of medical image analysis and CAD software has occurred, and local hospitals have introduced digital pathology and performed related research and software development. Thus, we – the researchers in Project Dr. Answer as assisted by the Korean Society of Pathologists – are pleased to receive pathologists' opinions on the recognition of and demand for the introduction of digital pathology as well as CAD software.

Regarding Project Dr. Answer, since 2018, this project has developed comprehensive, AI-assisted diagnosis and treatment services using medical 'big data' for 8 core diseases including prostatic cancer, which is what this survey is interested in.

- Find out more about Project Dr. Answer at: (<http://dranswer.kr/disease/cancer1.php>)

Your answers will be collected anonymously – meaning that in no case will you be identified by your answers – and never be used for any other purposes than the research under the governing laws. Your answers to the questions below will comprise a database that will help in introducing digital pathology and developing CAD software at a faster pace. Should you have any questions, please do not hesitate to contact us using the information below. Again, we deeply appreciate your commitment.

Written in June 2020

### ■ Sponsor and Survey Manager

- Sponsor and Survey Manager: Project Dr. Answer, The Korean Society of Pathologists

### ※ Point of Contact

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### ☐ Article 33 (Protection of Secrets), the Republic of Korea Statistics Act

- (1) Matters belonging to the confidential information of individuals, corporations, organizations, etc. that have become known in the course of producing statistics shall be protected.
- (2) Data belonging to the confidential information of individuals, corporations, organizations, etc. that have been produced for the production of statistics shall not be used for any purpose other than that of producing statistics.


## PART A. Recognition of Digital Pathology System Introduction

※ In this part of the survey, you are requested to answer a few questions on your recognition of digital pathology system introduction. For avoidance of doubt, a digital pathology system in this survey means a computer-assisted diagnosis system where a pathologist refers to the high-powered digital image, called a “virtual slide,” instead of microscopic diagnosis based on tissue slides.

**A1.** If your medical institution introduces digital pathology system, what do you think you would expect the most? Choose the top three in order of your expectations.

Answer 1		Answer 2		Answer 3	
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- |   |  |
|---|--|
| 1) Diagnostic accuracy  | 6) Accessibility of multidisciplinary team care and conference |
| 2) Faster work process  | 7) Consultation with an expert                                 |
| 3) Decreased workload   | 8) Collation of big data                                       |
| 4) Higher income due to separate medical fee regulation for digital pathology systems | 9) Ability to browse digital slides                            |
| 5) Education  | 10) Other (please specify :                      )             |

 Always have Answer 10) end the list. Reshuffle the rest.

**A2.** If your medical institution introduces a digital pathology system, what would concern you the most? Choose the top three in order of your concern.

Answer 1		Answer 2		Answer 3	
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- |   |   |
|---|---|
| 1) Increased burden by patients and insurance providers | 5) Increased risk of leaking personal information |
| 2) Not necessary for practical diagnosis                | 6) High initial investment                        |
| 3) Increased workload from new tasks                    | 7) Other (please specify :                      ) |
| 4) Increased turnaround time (TAT)                      |   |

 Always have Answer 7) end the list. Reshuffle the rest.

**A3.** Considering both your expectations and concerns, how much do you think your medical institution is in need of a digital pathology system? Your answer closer to 5/1 indicates your medical institution is in need/in need of a digital pathology system. If you would like to answer close to ‘so so,’ choose 3.

Answers	Not in need at all	Less than in need	Somewhat in need	Quite in need	Very much in need
	1	2	3	4	5

**A4.** Does your medical institution plan to implement a digital pathology system?

- 1) It does not plan to introduce any digital pathology system ► Then, go to A5.
- 2) A necessity exists, but there is no specific plan yet ► Then, go to A5.
- 3) It does plan to introduce a digital pathology system in two or three years ► Then, go to A5.
- 4) It is using a digital pathology system ► Then, go to A4-1.

**A4. Only if you answered 4) to Item A4:**

**A4-1.** How satisfactory is the digital pathology system furnished in your medical institution?

Answers	Not satisfactory at all	Less than satisfactory	Somewhat satisfactory	Quite Satisfactory	Very much satisfactory
	1	2	3	4	5

**A4. Only if you answered 4) to Item A4:**

**A4-2.** What was the biggest hurdle your medical institution has faced when introducing the digital pathology system? Choose the relevant answer(s) in order of significance.

Hurdle	Significance
1) No separate medical fee regulation for the digital pathology system yet	
2) The digital pathology system is expensive.	
3) To me, the image viewer for the digital pathology system is not familiar.	
4) Unsatisfactory technology, such as virtual slides, in terms of quality	
5) Other (please specify : )	

**Always have Answer 5) end the list. Reshuffle the rest.**

**A4. Only if you answered 4) to Item A4:**

**A4-3.** What is the main purpose of your use of the digital pathology system in your medical institution? Choose the top three in order of frequency.

Answer 1		Answer 2		Answer 3	
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- 1) To improve patient safety by digitalized pathological work processes
- 2) To browse and read digital pathology slides
- 3) To collect 'big data' that can be used to research digital pathology
- 4) To improve diagnostic accuracy with quantification of diagnoses such as biomarkers
- 5) To train and educate students and residents
- 6) To conduct telepathology for consultation
- 7) For multidisciplinary team care and conference
- 8) Other (please specify : )

**Always have Answer 8) end the list. Reshuffle the rest.**

**A4. Only if you answered 1), 2) or 3) to Item A4:**

**A5.** How do you think you will use a digital pathology system if it is introduced? Choose the top three in order of frequency.

Answer 1		Answer 2		Answer 3	
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- 1) To improve patient safety by digitized pathological work processes
- 2) To browse and read digital pathology slides
- 3) To collect 'big data' that can be used to research digital pathology
- 4) To improve diagnostic accuracy with quantification of diagnoses such as biomarkers
- 5) To train and educate students and residents
- 6) To conduct telepathology for consultation
- 7) For multidisciplinary team care and conference
- 8) Other (please specify : )

☞ Always have Answer 8) end the list. Reshuffle the rest.

☞ A4. Only if you answered 1), 2) or 3) to Item A4:

A6. What do you think is the most important hurdle your medical institution has faced when introducing a digital pathology system?

Choose the relevant answer(s) in order of significance.

Hurdle	Significance
1) No separate medical fee regulation for the digital pathology system yet	
2) The digital pathology system is expensive.	
3) To me, the image viewer for the digital pathology system is not familiar.	
4) Unsatisfactory technology, such as virtual slides, in terms of quality	
5) Other (please specify : )	

☞ Always have Answer 5) end the list. Reshuffle the rest.

A7. How do you think the medical fee for digital pathology should be regulated?

- 1) Addition of the medical fee for digital pathology to existing medical fees
- 2) Establishing a new medical fee item for digital pathology methods (such as Ki67).
- 3) Addition of fees under the policy to promote pathological digitization (the way the introductory medical fee for PACS in radiology was regulated).
- 4) Other (please specify : )

☞ Always have Answer 4) end the list. Reshuffle the rest.

## PART B. Recognition of CAD software

※ In this part of the survey, you are requested to answer a few questions on your recognition of CAD software, a part of a digital pathology system that assists with reading of digital pathology slides.

B1. When you assess a prostate needle biopsy, how relevant do you think each of the following inconvenience factors is?


☞ Reshuffle the inconvenience factors.

Inconvenience factors	Not inconvenient at all	Less than inconvenient	Somewhat inconvenient	Quite inconvenient	Very much inconvenient
01. Indicating the existence/exact location of lesions	①	②	③	④	⑤
02. Making a pathological diagnosis	①	②	③	④	⑤
03. Defining the Gleason Score/Grade group	①	②	③	④	⑤
04. Counting the number of lesions	①	②	③	④	⑤
05. Measuring the tumor volume	①	②	③	④	⑤

Inconvenience factors	Not inconvenient at all	Less than inconvenient	Somewhat inconvenient	Quite inconvenient	Very much inconvenient
06. Measuring the tumor length and core length	①	②	③	④	⑤

**B1-1.** Other than the abovementioned inconvenience factors, please specify in sufficient detail the inconvenience factors (if any) that you think are relevant when you assess a prostate needle biopsy.

**B2.** Which of the following function(s) do you think is (are) necessary for CAD software to have?

 **Reshuffle the functions.**


Functions	Not necessary at all	Less than necessary	Somewhat necessary	Quite necessary	Very much necessary
01. Indicating the existence/exact location of lesions	①	②	③	④	⑤
02. Making a pathological diagnosis	①	②	③	④	⑤
03. Defining the Gleason Score/Grade group	①	②	③	④	⑤
04. Counting the number of lesions	①	②	③	④	⑤
05. Measuring the tumor volume	①	②	③	④	⑤
06. Measuring the tumor length and core length	①	②	③	④	⑤
07. Analyzing treatment-related biomarkers (PD-L1, EGFR, etc.)	①	②	③	④	⑤
08. Reference to differential diagnoses	①	②	③	④	⑤
09. Reference to rare disease diagnoses	①	②	③	④	⑤
10. Comprehensive interpretation of pathologic diagnosis in terms of prognosis/treatment	①	②	③	④	⑤

**B2-1.** Other than the abovementioned functions, please specify in sufficient detail the functions (if any) that you think CAD software should have.

**B3.** What do you expect from CAD software to be developed? Choose the top three in order of expectation.

Answer 1	Answer 2	Answer 3
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- |  |  |
|--|--|
| 1) Time taken to read and diagnose is decreased                                | 7) Workload is reduced                                 |
| 2) Gleason scoring is more accurate/reproducible                               | 8) Results of pathological diagnosis are more accurate |
| 3) Measurements such as lengths and percentages are more accurate/reproducible | 9) Reading and diagnosis are much more convenient      |
| 4) Measurements are easier   | 10) Diagnosis is much more objective                   |
| 5) Increase in revenue is likely due to insurance coverage                     | 11) Relationship with clinicians is more reliable      |
| 6) Research  | 12) Other (please specify : )                          |

 **Always have Answer 12) end the list. Reshuffle the rest.**

**B4.** What do you think about changes in your workload upon introduction of CAD software?

- 1) I expect a constant increase in workload in terms of both volume and time.
- 2) I barely expect any increase in workload.
- 3) I expect that the software may contribute to easing the workload in terms of both volume and time.
- 4) I expect that the software may contribute to easing the workload in terms of both volume and time despite a temporary increase in workload early on.

**B5.** How much do you think you need CAD software?

Answers	Not in need at all	Less than in need	Somewhat in need	Quite in need	Very much in need
	1	2	3	4	5

### PART C. Preferences for Dr. Answer's CAD software for Prostate Needle Biopsy 'PROMISE-P'

✳ When 'PROMISE-P' –Dr. Answer's CAD software in development for prostate needle biopsy – becomes available, computer-assisted prostate cancer diagnosis will finally be made feasible by way of automatic detection and locating of tumor tissues in 'virtual slides' – H&E stained slides; this is also referred to as a whole-slide image using an AI-based algorithm. Before you take this part of the survey, you are invited to watch what Dr. Answer's CAD software for Prostate Needle Biopsy 'PROMISE-P' is all about.

**C1.** How relevant do you think each of the following compatibility factors of 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy – is for prostate cancer diagnosis? Choose an answer for each of the following compatibility factors that is closest to what you think.

I think 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy:	I do not think so	I scarcely think so	I somewhat think so	I think so	I very much think so
01. will have various functions that are required for prostate cancer diagnosis based on prostate needle biopsy.	①	②	③	④	⑤
02. will be needed for prostate cancer diagnosis based on prostate needle biopsy.	①	②	③	④	⑤
03. will have sufficient functions to perform prostate cancer diagnosis based on prostate needle biopsy.	①	②	③	④	⑤
04. will be suitable for increasing the accuracy of prostate cancer detection based on prostate needle biopsy.	①	②	③	④	⑤

**C2.** How utilizable do you think 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy – will be? Choose an answer for each of the following ideas that is closest to what you think.

I think 'PROMISE-P' – Dr. Answer's CAD software for prostate needle biopsy:	I do not think so	I scarcely think so	I somewhat think so	I think so	I very much think so
01. will help shorten the time taken to perform prostate cancer diagnosis based on prostate needle biopsy.	①	②	③	④	⑤
02. will serve as a uniformly designed CAD software that improves the quality of diagnosis made by prostate needle biopsy.	①	②	③	④	⑤
03. will help perform prostate cancer diagnosis based on prostate needle biopsy efficiently.	①	②	③	④	⑤

04. will make feasible comprehensive diagnostic activities needed for prostate needle biopsy.	①	②	③	④	⑤
05. will help perform diagnostic activities needed for prostate needle biopsy much more conveniently.	①	②	③	④	⑤

**C3.** How utilizable do you think 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy – will be? Choose an answer for each of the following ideas that is closest to what you think.

I think 'PROMISE-P' – Dr. Answer's CAD software for prostate needle biopsy:	I do not think so	I scarcely think so	I somewhat think so	I think so	I very much think so
01. can be used with ease.	①	②	③	④	⑤
02. can be used after simple learning processes.	①	②	③	④	⑤
03. will be used frequently.	①	②	③	④	⑤
04. will help perform prostate needle biopsy diagnosis.	①	②	③	④	⑤
05. can be used conveniently due to availability of the data and resources needed to use it.	①	②	③	④	⑤

**C4.** How likely are you to introduce 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy? Choose an answer for each of the following ideas that is closest to what you think.

With regard to 'PROMISE-P' – the Dr. Answer's CAD software for prostate needle biopsy, I will:	I do not think so	I scarcely think so	I somewhat think so	I think so	I very much think so
01. be implementing it in my medical institution.	①	②	③	④	⑤
02. be able to use it for diagnosing prostate cancer based on prostate needle biopsy.	①	②	③	④	⑤
03. be able to use it for diagnostic accuracy due to the provision of relevant patient data.	①	②	③	④	⑤
04. be able to use it for routinely performing prostate cancer diagnosis based on prostate needle biopsy.	①	②	③	④	⑤
05. be recommending it to other medical practitioners.	①	②	③	④	⑤
06. be using it constantly despite some difficulties involved.	①	②	③	④	⑤
07. be positively sharing the experiences of using it with others.	①	②	③	④	⑤

**C5.** What do you think about the medical fee regulation and support that 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy – is entitled to? Choose an answer for each of the following ideas that is closest to what you think.

To promote use of 'PROMISE-P' – the Dr. Answer's CAD software for prostate needle biopsy, I think:	I do not think so	I scarcely think so	I somewhat think so	I think so	I very much think so
01. administrative supports are in need to help propagate use of it.	①	②	③	④	⑤
02. technological supports are in need to help people gain skills of using it.	①	②	③	④	⑤
03. financial supports, such as separate medical fee regulation on CAD software use, are in need.	①	②	③	④	⑤

**C6.** How would you evaluate 'PROMISE-P' –Dr. Answer's CAD software for prostate needle biopsy – from a numerical standpoint?

**C6-1.** Reduced workload in terms of a percentage of business hours saved: ( )%

**C6-2.** Improved pathological accuracy in terms of a percentage compared to the current pathological accuracy: ( )%

**C6-3.** Improved convenience of readout in terms of a percentage compared to your current practice: ( )%

**C6-4-1.** Time taken to perform a readout in your current practice: ( ) minute(s)

**C6-4-2.** Shortened time taken to perform a readout in terms of a percentage compared to your current practice (that is, your answer to C6-4-1): ( )%

### Demographic survey

**DQ1.** What is your gender?

- 1) Male      2) Female

**DQ2.** What is your age range?

- 1) 20s      2) 30s    3) 40s    4) 50s    5) 60s

**DQ3.** How long is your medical career?

- 1) 10 years or shorter    2) Between 11 and 20 years    3) Between 21 and 30 years    4) 31 years or longer

**DQ4.** Where is your workplace located?

- 1) Seoul      2) Busan      3) Daegu      4) Incheon  
5) Gwangju    6) Daejeon    7) Ulsan      8) Sejong  
9) Gyeonggi   10) Gangwon   11) Chungbuk   12) Chungnam  
13) Jeonbuk   14) Jeonnam   15) Gyeongbuk   16) Gyeongnam  
17) Jeju      18) Other ( )

**DQ5.** What is your position?

- 1) Resident    2) Clinical instructor      3) Paid doctor (but not a professor)    4) Professor  
5) Paid doctor at a professional diagnostic center    6) Management at a professional diagnostic center

**DQ6.** What is your field of practice?

- 1) Surgical pathology      2) Bone-soft tissue pathology    3) Endocrine pathology    4) Craniocervical pathology  
5) Urinary pathology      6) OB-GYN pathology      7) Pediatric pathology    8) Digestive pathology  
9) Neural pathology      10) Renal pathology      11) Cardiopulmonary pathology    12) Mammary pathology  
13) Dermatological pathology    14) Hematological pathology    15) Molecular pathology    16) Cytopathology  
17) Other (please specify: )

**DQ7.** Have you ever used any CAD system (including but not limited to Ki-67 indexing, ER, PR, and c-erbB2 imaging software)?

- 1) I am using such software.  
2) I used to use such software but am not currently.  
3) I have never used such software.

**DQ8.** Is your medical institution furnished with digital pathology equipment?

- 1) My medical institution has no digital pathology equipment.  
2) Slide scanner(s) only.  
3) Slide scanner(s) and server-based slide data storage(s) only.  
4) Fully furnished with slide scanner(s), server-based slide data storage(s), and CAD software.



**Thank you for taking the time to complete this survey.**