**Point-of-care troponin testing: improvement of the diagnostic process of patients presenting with chest pain?**

Dear general practitioner,

Thank you in advance for participating in this questionnaire. Your answers can contribute to **improving the diagnostic process of chest pain patients in the general practitioner’s office**. The questionnaire concerns the current diagnostic process and the referral decisions for patients with chest pain in the general practitioner’s office and the potential role of **point-of-care troponin tests** in this process. This questionnaire also contains some questions about your preferences and requirements with regard to point-of-care troponin tests.

It will take approximately **10 minutes** to fill out the survey. Of course the answers you provide will be processed **anonymously**. This study is conducted by the University of Twente in collaboration with several general practitioner organizations in the Netherlands. The results are owned by the University of Twente and will only be used for **scientific purposes**. In case you have any questions and/or remarks, you can always contact us via telephone or email. Thank you again for your time and effort.

With kind regards,

A.M. (Maran) Noltes

Master student Health Sciences, University of Twente

Email:

Tel.:

1. Are you currently registered as a general practitioner?
	* Yes
	* No *(in case participants are not registered as a general practitioner, they are not allowed to fill out the survey, and therefore the survey ends)*

**Diagnosing patients with (a)specific chest pain**

This part of the survey contains questions about the referral decisions for patients with (a)specific chest pain and the diagnostic process of those patients in the general practitioner’s office.

1. How many of the 100 patients who present with (a)specific chest pain in the general practitioner’s office, do you on average immediately refer to the hospital?\*

Please fill out your answer over here:

*Per 100 patients, I refer out of 100 patients immediately to the hospital.*

\* by ambulance or by means of own transport

1. What percentage of patients that you immediately refer, do you refer because of a strong suspicion of ACS, uncertainty about the presence of ACS, or when you have no suspicion of ACS (for reassurance)?

Please fill out your answer here:

 *% strong suspicion of ACS*

 *% uncertainty about ACS*

 *% no suspicion of ACS (for reassurance)*

ACS = acute coronary syndrome

1. What percentage of patients with (a)specific chest pain, who present in your general practice, have had complaints for ≥ 6 hours?

You may estimate the answer.

Please fill out your answer here:

*About %*

1. How often do you measure a patients troponin level in a medical laboratory in patients with (a)specific chest pain, in whom you after your anamnesis and physical examination, either have a strong suspicion of ACS, uncertainty about ACS, or no suspicion of ACS?

Choose the appropriate answer for each subquestion:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *Never (0/10)* | *Occasionally (2/10)* | *Regularly (4/10)* | *Often (6/10)* | *Very often (8/10)* | *Always (10/10)* |
| *Strong suspicion of ACS* |  |  |  |  |  |  |
| *Uncertainty about ACS* |  |  |  |  |  |  |
| *No suspicion of ACS* |  |  |  |  |  |  |

1. Do you or your medical assistant in the general practitioner’s office and/or the general practitioners cooperation (occasionally) make an ECG in patients with (a)specific chest pain?

Please choose one of the following answer options:

* *No (if the GP chooses this answer, the questionnaire will continue with question 8)*
* *Only in the general practice*
* *Only in the general practitioners cooperation*
* *Both in the general practice and in the general practitioners cooperation*

ECG = electrocardiogram

1. For what reason(s) do you or your medical assistant perform an ECG in a patient with (a)specific chest pain?

Please select all possibilities:

* *To exclude ACS*
* *To confirm ACS*
* *Performing an ECG is a standard procedure in patients with chest pain*
* *To reassure the patient (and family)*
* *Because I sometimes have time to do this because I have to wait for an ambulance*
* *Because I want to maintain my expertise in this field*
* *To be able to have an informed consultation with the cardiologist on call*
* *Other, namely*
1. To what extent does your gut feeling play a role in deciding whether or not to immediately refer a patient with (a)specific chest pain?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *None* | *Barely* | *To a moderate extent* | *To a high extent* | *To a very high extent* |
| *Gut feeling* |  |  |  |  |  |

**Cases**

In the following part, we will present you two cases of patients presenting with (a)specific chest pain in the general practice. After each case, we will ask you some questions about your treatment policy for this specific patient. Please treat those cases in the same way as you would treat real patients in your general practice. There are no right or wrong answers.

**Case Mr. De Vries**

Mr. de Vries (39 years) presents with chest pain on Monday morning during your consultation hour, at 8 am.

In the last half year, you have seen Mr. De Vries five times because of hay fever, allergic rhinitis, lower back pain, and migraine. Mr. de Vries does not have any other illnesses.

**Medication list:**

* Levocetirizine 1x/day 5 mg
* Fluticasone 50 mg/dose
* Paracetamol 2x/day 500 mg

The symptoms of Mr. De Vries began three days ago during cycle racing and have not fully disappeared since then. Because he remained somewhat worried about the cause of his symptoms, he decided to come to your consultation hour this morning. He experiences chest pain, and assigns it a score of 2/10. The pain is spread all over his chest. He is not able to clearly indicate the type of pain he feels. The pain does not radiate. When Mr. De Vries bends over, his pain somewhat relieves. During palpation of the chest wall, Mr. De Vries slightly panics and the pain worsens. There are no cardiovascular diseases in the patient’s personal history or in his family history. It is known that Mr. De Vries does not smoke, has a healthy diet, and is physically active (cycle racing).

RR 130/80 mm Hg. Pulse: 82 beats/minute (regular). Saturation: 98%. Auscultation heart: no abnormalities (tones, souffles). Auscultation lungs: clean.

*If the GP in question 6 answers to (occasionally) use an ECG, the additional information “ECG does not display any typical abnormalities” is provided. Otherwise “no ECG has been recorded” is shown.*

1. Please estimate the probability that Mr. De Vries is having an ACS.

Please fill in your answer here:

 *%*

1. What will be your treatment policy for Mr. De Vries?

Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*
1. *In case the GP decides to immediately refer the patient to the hospital, he/she is shown the following question, after which the questionnaire continues with question 14. In case the GP decides not to immediately refer the patient, the questionnaire continues with question 12.*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mr. De Vries is 17 ng/L (reference value < 40 ng/L). What would be your treatment policy for Mr. De Vries in case you would have received this additional information immediately? Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*
1. *In case the GP decides not to immediately refer the patient to the hospital, he/she is shown the following question:*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mr. De Vries is 63 ng/L (reference value < 40 ng/L).What would be your treatment policy for Mr. De Vries in case you would have received this additional information immediately? Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*

*In case the GP decides to immediately refer the patient, the questionnaire continues with question 14. In case the patient is not immediately referred, it continues with question 13.*

1. *In case the GP decides in question 12 not to immediately refer this patient to the hospital, he/she is shown the following question:*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mr. De Vries is 200 ng/L (reference value < 40 ng/L). What would be your treatment policy for Mr. De Vries in case you would have received this additional information immediately? Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*

**Case Mrs. Alsahi**

Mrs. Alsahi (50 years) presents with chest pain on Thursday morning during your consultation hour, at 11 am, accompanied by her son.

In the past three years, you have seen Mrs. Alsahi three times because of diabetes type II, acute cough, and for a cholesterol measurement.

 **Mrs. Alsahi does currently not use any medication.**

The symptoms of Mrs. Alsahi began two days ago when she was at work (cleaner). She experiences chest pain and pain in her upper abdomen, but she cannot indicate exactly where the pain is located. She assigns the pain a score of 3/10. The pain does not radiate to her limbs, neck or jaw, etc. She is somewhat short of breath (dyspnea) and is also very tired. Mrs. Alsahi does not look pale and does not sweat. She thinks she feels that the pain relieves when she changes her body position, but she is not able to clearly indicate this. Three months ago her cholesterol level was measured in your general practice. The ratio total cholesterol/HDL was 5.5 (total chol = 6mm/L, HDL = 1.1 mmol/L). By that time it was decided to provide some lifestyle advices and not to start with medication. There are no cardiovascular diseases in her family history. Also, it is known that she does not smoke and does not drink alcohol. She is slightly overweight and has an average diet. Besides her work as a cleaner, she does not engage in any physical activities. Mrs. Alsahi is relatively calm, but her son insisted on consulting you because of the nature of her symptoms. He is worried about the cause.

RR 140/80 mm Hg. Pulse: 76 beats/minute (regular). Saturation: 98%. Auscultation heart: no abnormalities (tones, souffles). Auscultation lungs: clean.

*If the GP in question 6 answers to (occasionally) use an ECG, the additional information “ECG does not display any typical abnormalities” is provided. Otherwise “no ECG has been recorded” is shown.*

1. Please estimate the probability that Mrs. Alsahi is having an ACS.

Your answer should be between 0 and 100.

Please fill in your answer here:

 *%*

1. What will be your treatment policy for Mrs. Alsahi?

Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*
1. *In case the GP decides to immediately refer the patient to the hospital, he/she is shown the following question. After this, the questionnaire continues with question 19*. *In case the GP decides not to immediately refer the patient, the questionnaire continues with question 15.*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mrs. Alsahi is 5 ng/L (reference value < 40 ng/L).

What would be your treatment policy for Mrs. Alsahi in case you would have received this additional information immediately?

Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*
1. *In case the GP decides not to immediately refer the patient to the hospital, he/she is shown the following question:*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mrs. Alsahi is 58 ng/L (reference value < 40 ng/L).

What would be your treatment policy for Mrs. Alsahi in case you would have received this additional information immediately?

Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*

*In case the GP decides to immediately refer the patient, the questionnaire continues with question 19. In case the patient is not immediately referred, it continues with question 18.*

1. *In case the GP decides in question 12 still not to immediately refer the patient to the hospital, he/she is shown the following question:*

There is a point-of-care troponin test device available in your general practice. The troponin concentration of Mrs. Alsahi is 196 ng/L (reference value < 40 ng/L).

What would be your treatment policy for Mrs. Alsahi in case you would have received this additional information immediately?

Please choose one of the following options:

* *No referral.*
* *A short term appointment at the outpatient cardiology clinic.*
* *Immediate referral because of suspicion of ACS*
* *Other, namely*

End of the cases. You have now completed 75% of the questionnaire. You may now continue with the penultimate part of the questionnaire, concerning your preferences and requirements with regard to point-of-care troponin tests.

**Point-of-care troponin tests**

In this part you will be asked some questions about your personal preferences and requirements with regard to point-of-care troponin tests. No right or wrong answers can be given.

1. Which of the following point-of-care tests\* are available in your general practice(s) where you work, for instance in the form of test strips?

Select all answers that apply:

* *CRP (C-reactive protein)*
* *Glucose*
* *Urine (for example: nitrate, leukocytes)*
* *Pregnancy test*
* *Hemoglobin*
* *HbA1c*
* *Cholesterol*
* *Troponin*
* *D-dimer*
* *BNP (brain natriuretic peptide)*
* *Chlamydia*
* *PT-INR*
* *Other, namely:*

\* Point-of-care tests (bedside tests) involve devices or test strips that can be performed at the bedside of patients or in the general practice to rapidly set a diagnosis.

1. To what extent do you think that the point-of-care troponin test has added value for diagnosing patients with (a)specific chest pain in the general practice (office hours) and at the general practitioner cooperation (outside office hours)?

Please choose the most appropriate answer:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *Not at all*  | *Barely* | *To a moderate extent* | *To a high extent* | *To a very high extent* |
| *GP office* |  |  |  |  |  |
| *GPC* |  |  |  |  |  |

1. How often would you perform a point-of-care troponin test in patients with (a)specific chest pain in which, following anamnesis and physical examination, you either have a strong suspicion of ACS, uncertainty about the presence of ACS, and have no suspicion of ACS?

Please choose the most appropriate answer:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *Never (0/10)* | *Occasionally (2/10)* | *Regularly (4/10)* | *Often (6/10)* | *Very often (8/10)* | *Always (10/10)* |
| *Strong suspicion of ACS* |  |  |  |  |  |  |
| *Uncertainty about ACS* |  |  |  |  |  |  |
| *No suspicion of ACS* |  |  |  |  |  |  |

1. For which purposes would you like to use a point-of-care troponin test?

Select all answers that apply:

* *None*
* *To exclude ACS*
* *To confirm ACS*
* *To reassure a patient*
* *To be able to provide better service to patient*
* *To be able to have an informed consultation with the cardiologist on call*
* *Other, namely*
1. Which of the aspects mentioned below would, in your opinion, be positively affected by the implementation of point-of-care troponin tests in your general practice?

Select all answers that apply:

* *Diagnostic certainty*
* *Diagnostic speed*
* *Patient safety*
* *Patient satisfaction*
* *Doctor-patient relationship*
* *Communication with patients*
* *Job satisfaction*
* *Healthcare costs*
* *Substitution to primary care*
* *None of the above*
* *Other, namely*
1. Please indicate which factors play the most important role for your decision to implement a point-of-care troponin test in your general practice, and rank them from 1 to 9.

Please swipe all factors from the left to the right column. Place the factor that you consider the most important on top, and place the factor you consider the least important at the bottom.

* *High diagnostic reliability*
* *High user-friendliness*
* *Perform test with finger prick instead of venous blood withdrawal*
* *Quick availability of test result*
* *Uptake of this test in the Dutch general practitioner guidelines*
* *Small and easy transportable device*
* *Requires little training and maintenance*
* *Integrating it with the general practice information system and other point-of-care devices*
* *Low costs*
1. What do you consider to be the maximum acceptable time between conducting a point-of-care troponin test in general practice and the availability of the test result?

Please choose one of the following answers:

* *1 minute*
* *5 minutes*
* *10 minutes*
* *15 minutes*
* *20 minutes*
* *30 minutes*
* *60 minutes*
* *90 minutes*
* *120 minutes*
1. Is performing the point-of-care troponin test using a finger prick blood sample (instead of a venous blood withdrawal) a requirement for implementing this test in your general practice?
* *Yes*
* *No*
1. Is reimbursement of this point-of-care troponin device by the health insurer or by a medical laboratory (instead of having to pay it as a general practice) for you a requirement for implementing this test in your general practice?
* *Yes*
* *No*

**Personal information**

In this last part of the questionnaire you are asked to provide some personal information, for instance age and gender. Of course, those results will be processed anonymously.

You have now completed 90% of the questionnaire. We will ask for some personal information after which you have completed the survey.

1. What is your gender?
* *Female*
* *Male*
1. What is your age?

Your answer must be between 18 and 100.

Please fill in your answer here:

 *years*

1. For how many years have you already worked as a general practitioner (excluding your time in training)? Please fill in the answer in years.

Your answer must be between 0 and 100.

Please fill in your answer here:

 *years*

1. In what way are you currently working as a general practitioner?

Select all answers that apply:

* *Own general practice*
* *Employed by another general practitioner*
* *Locum general practitioner*
1. In what type of general practice are you currently employed?

Select all answers that apply:

* *None*
* *In a solo practice*
* *In a duo practice*
* *In a group practice*
* *In a “HOED” (multiple general practitioners located in one building, mostly with some form of collaboration)*
1. To what organization(s) are you connected and in which town is your general practice located?

Select all answers that apply:

* *Twentse Huisartsen Onderneming Oost Nederland (THOON)*
* *Federate Eerstelijnszorg Almelo (FEA)*
* *Huisartsenzorg Oost-Achterhoek*
* *Huisartsendienst Arnhem*
* *Huisartsendienst Gelderse Vallei*
* *Chronos Zorggroep*
* *Doktersdienst Groningen (DDG)*
* *Other, namely…*

\* In case you are employed at multiple general practices, please fill out this question for the general practice where you are employed most of your time.

This is the last question of this questionnaire.

1. How far from the nearest hospital and from the nearest coronary intervention center is your general practice located\*? Note: this could be the same hospital.

Choose the most appropriate answer for both subquestions:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *< 2 km* | *2 to 5 km* | *5 to 10 km* | *10 to 20 km* | *20 to 40 km* | *> 40 km* |
| *Distance to nearest hospital* |  |  |  |  |  |  |
| *Distance to nearest coronary intervention center* |  |  |  |  |  |  |

\* In case you are employed by multiple general practices, please fill out this question for the general practice where you are employed most of your time.

**End of the questionnaire**

You have reached the end of this questionnaire. Thank you very much for your participation!

In case you have any questions and/or remarks about the questionnaire or about this study, please write them down in the field below.

In case you would like to receive the results of this study, please leave your email address in the field below.

Thank you very much for your participation. It is highly appreciated if you forward this questionnaire to other GPs. You can do this by forwarding the email you received, or by copying and pasting the link below in your own email.

*(Link to the questionnaire)*

With kind regards,

A.M. (Maran) Noltes

Master student Health Sciences, University of Twente

E-mail:

Tel: