

NEW WAVE
in Dermatoscopy &
Dermatooncology
September 28–29, 2018
Jūrmala, Latvia



НОВАЯ ВОЛНА
дерматоскопии &
дерматоонкологии

Optical non-invasive method for skin cancer diagnostics in primary care practice

Оптический неинвазивный метод диагностики рака кожи
в практике первичной медико-санитарной помощи

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Outline of the presentation



1

Basis of the method

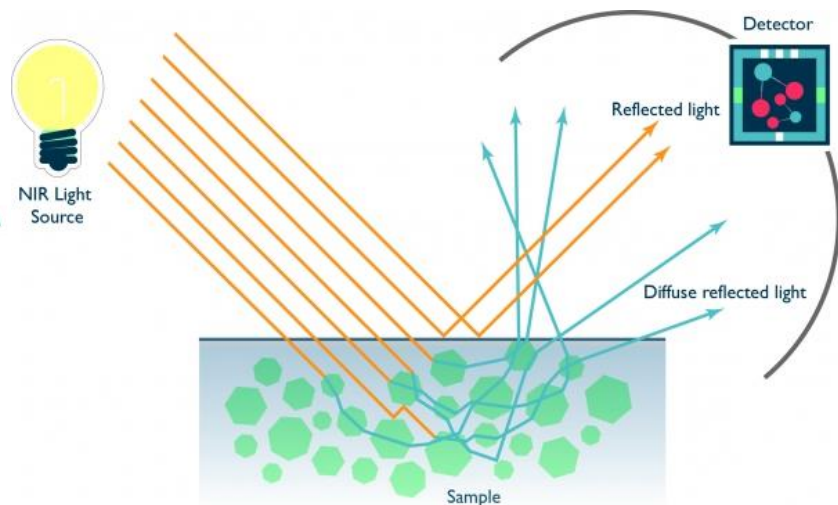
2

Prototype design

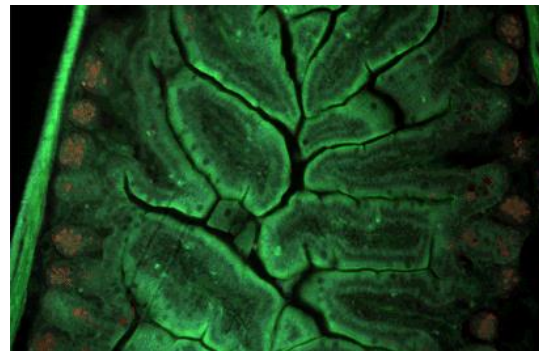
3

Clinical trial results

Basis of the method



Visible light and near-infrared light
diffuse reflectance (DR)¹

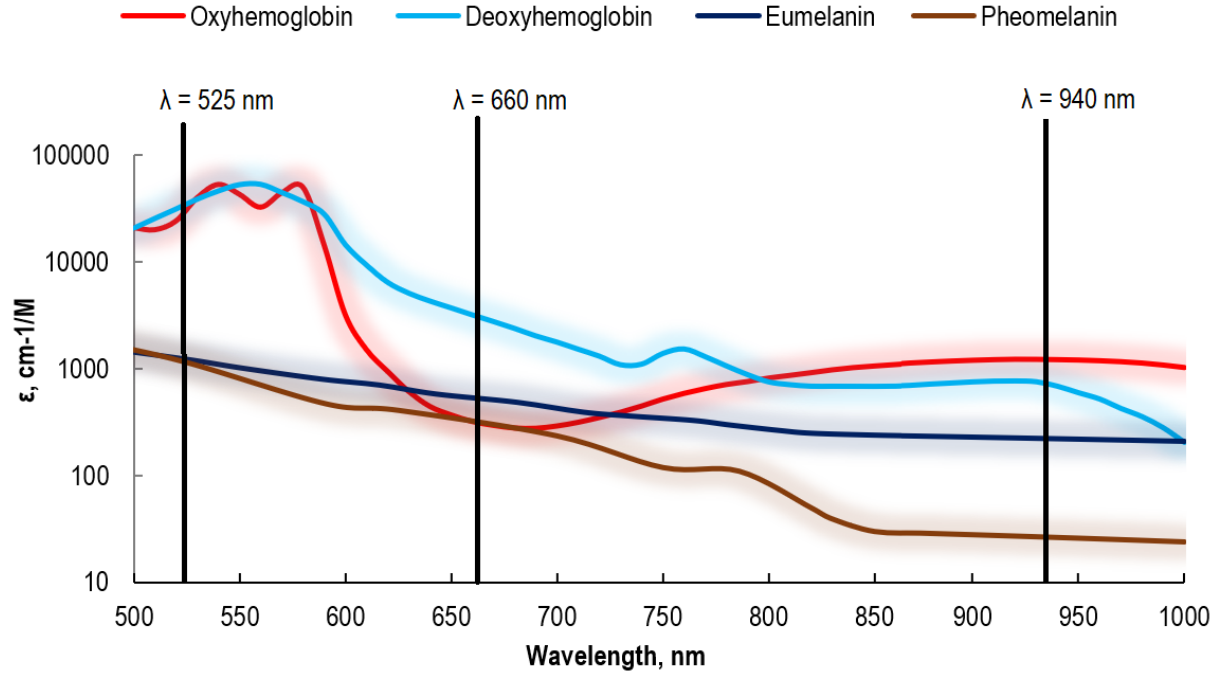


Violet light induced
autofluorescence (AF)²

¹<https://www.pulpandpapercanada.com/news/canadian-mills-opt-for-fitnir-analyzers-1100000232>

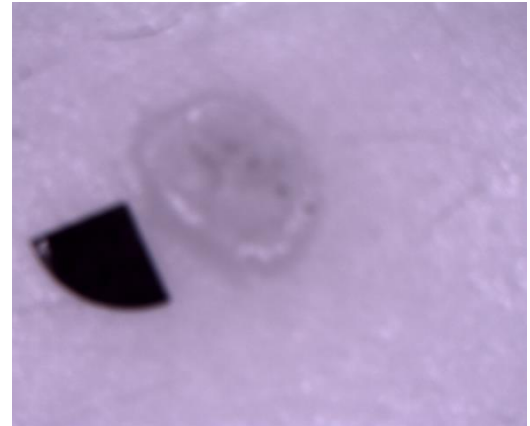
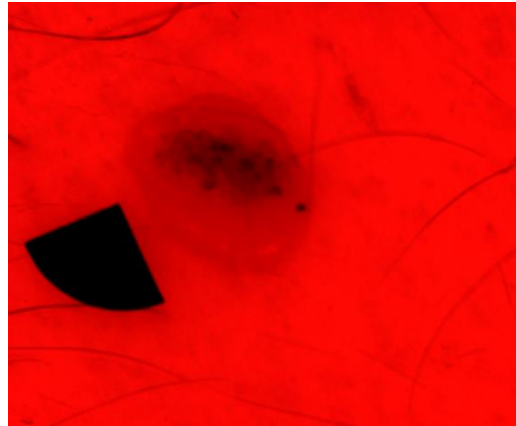
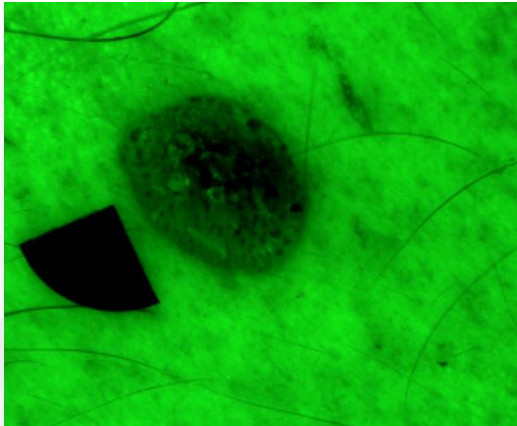
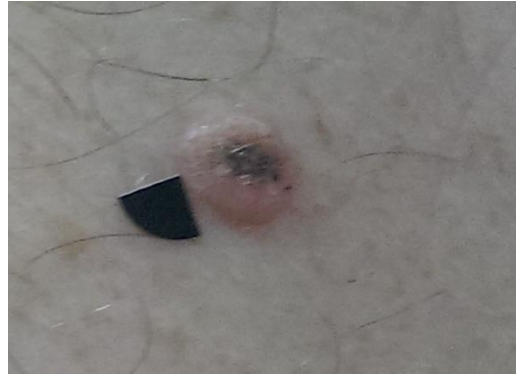
²<http://www.microscopy-uk.org.uk>

Diffuse reflectance of skin



DR example

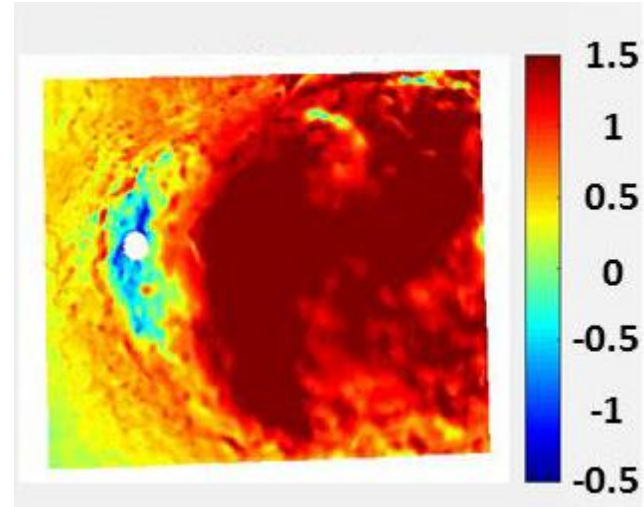
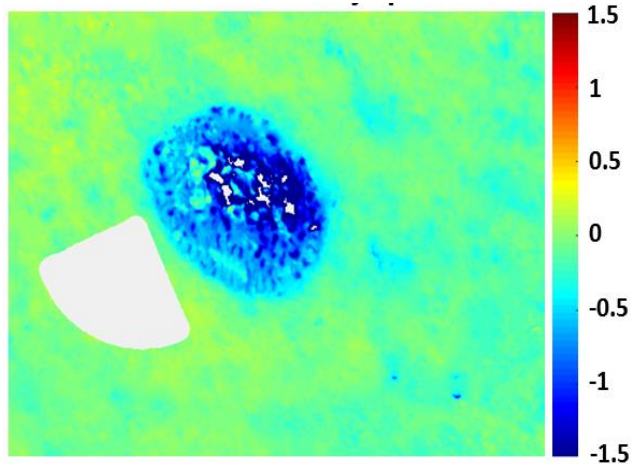
Hyperkeratosis



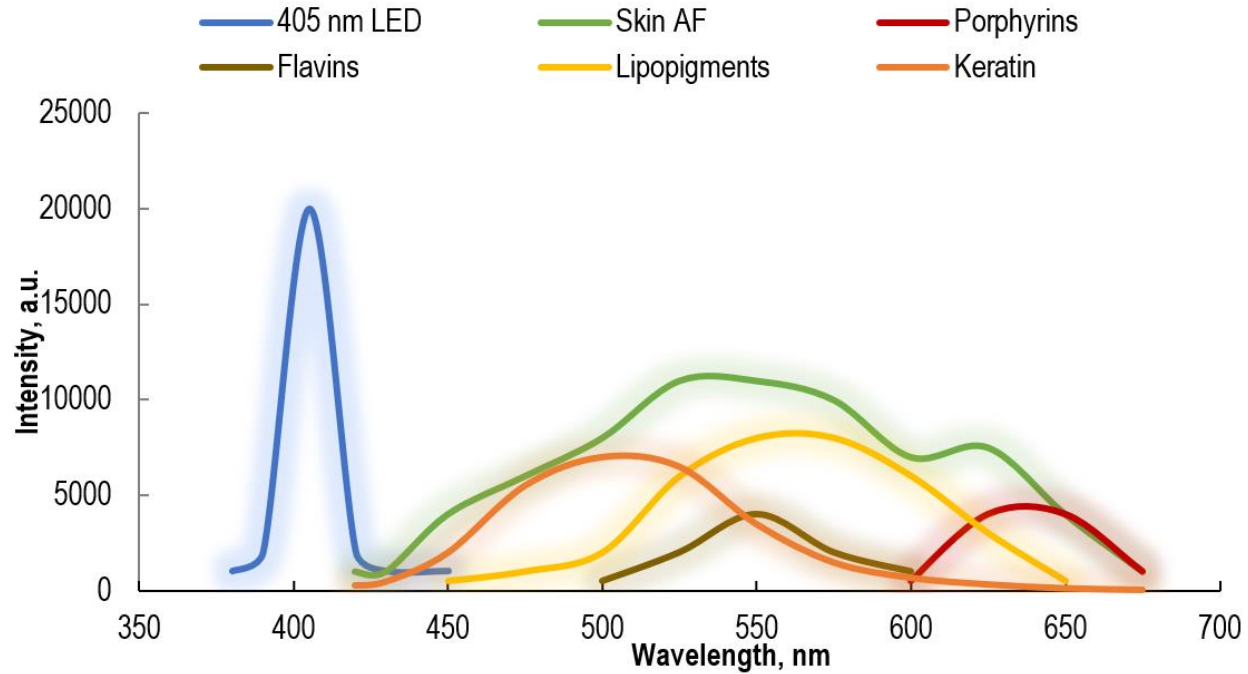
Melanoma criterion

$$p' = \lg \left(\frac{I(526) \cdot I_{skin}(663) \cdot I_{skin}(964)}{I(663) \cdot I(964) \cdot I_{skin}(526)} \right)$$

Criterion for melanoma: $p' > 1$



Autofluorescence of skin



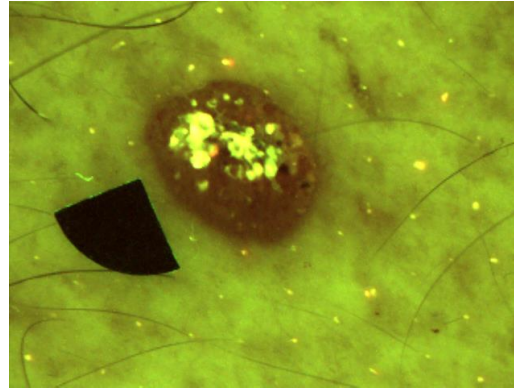
AF example

Hyperkeratosis



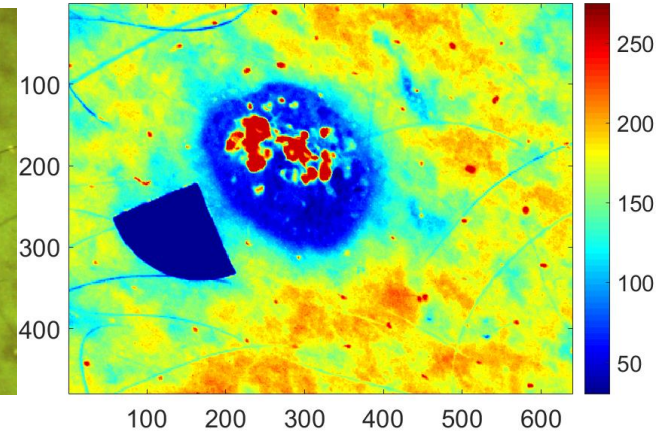
01

Daylight image



02

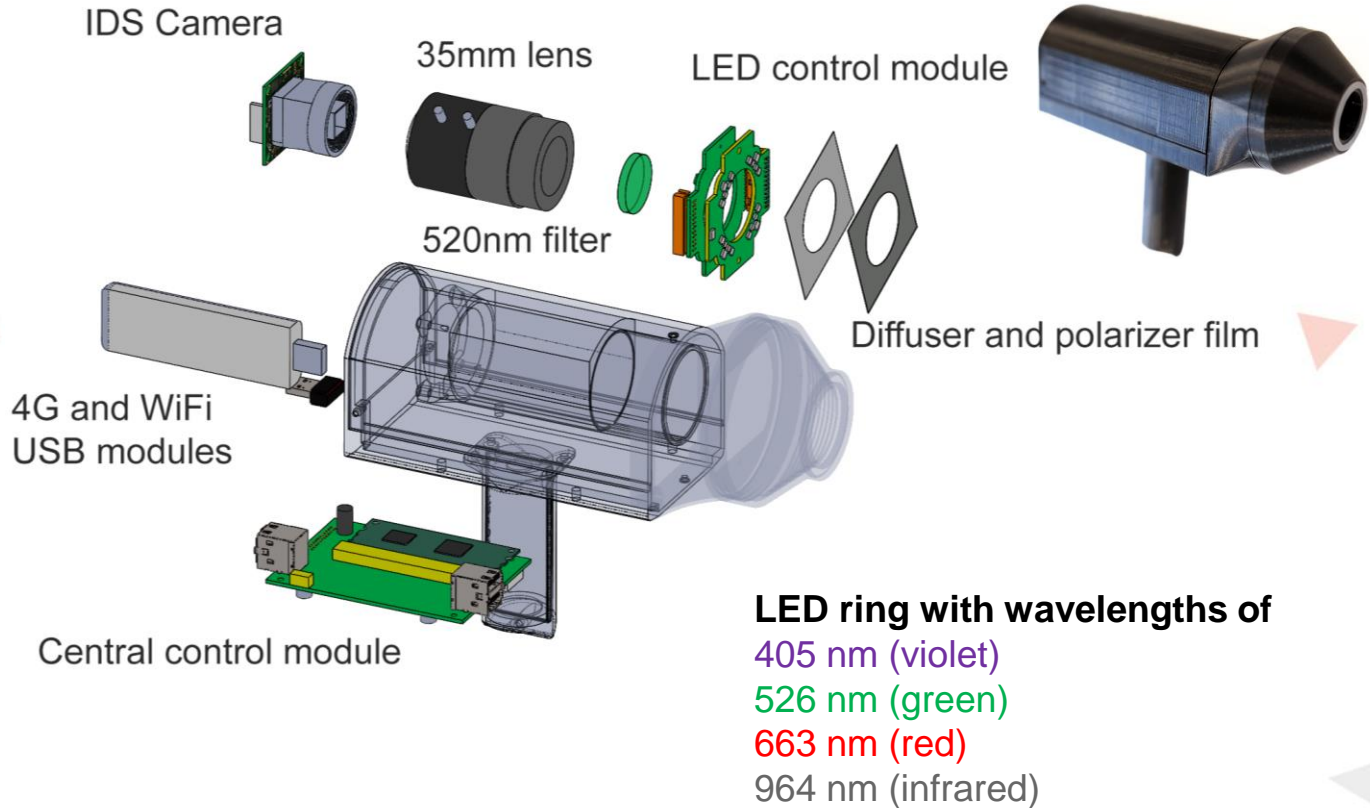
Image under violet light



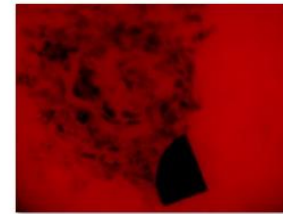
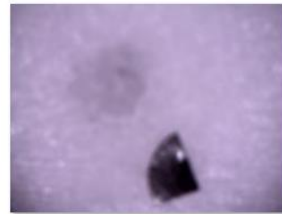
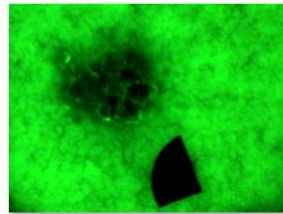
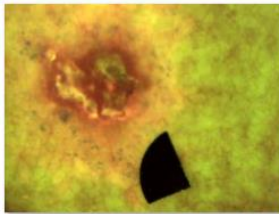
03

AF intensity image

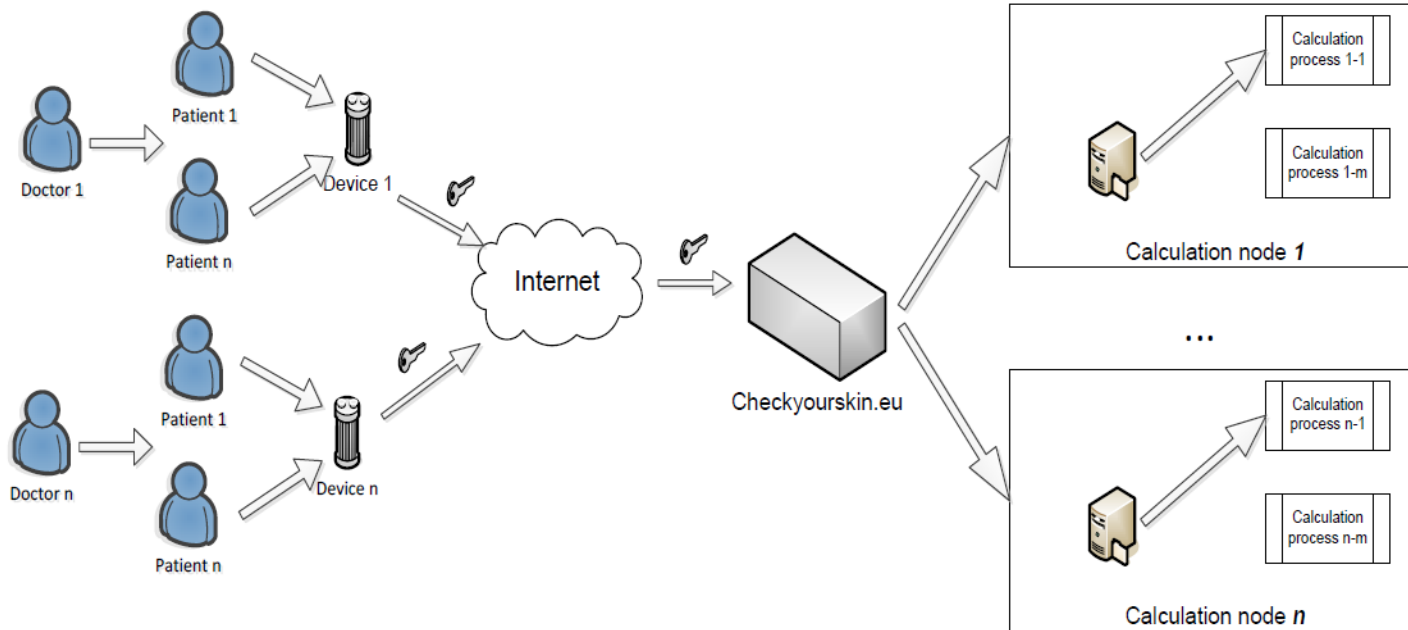
Prototype design



Measurement



Cloud server

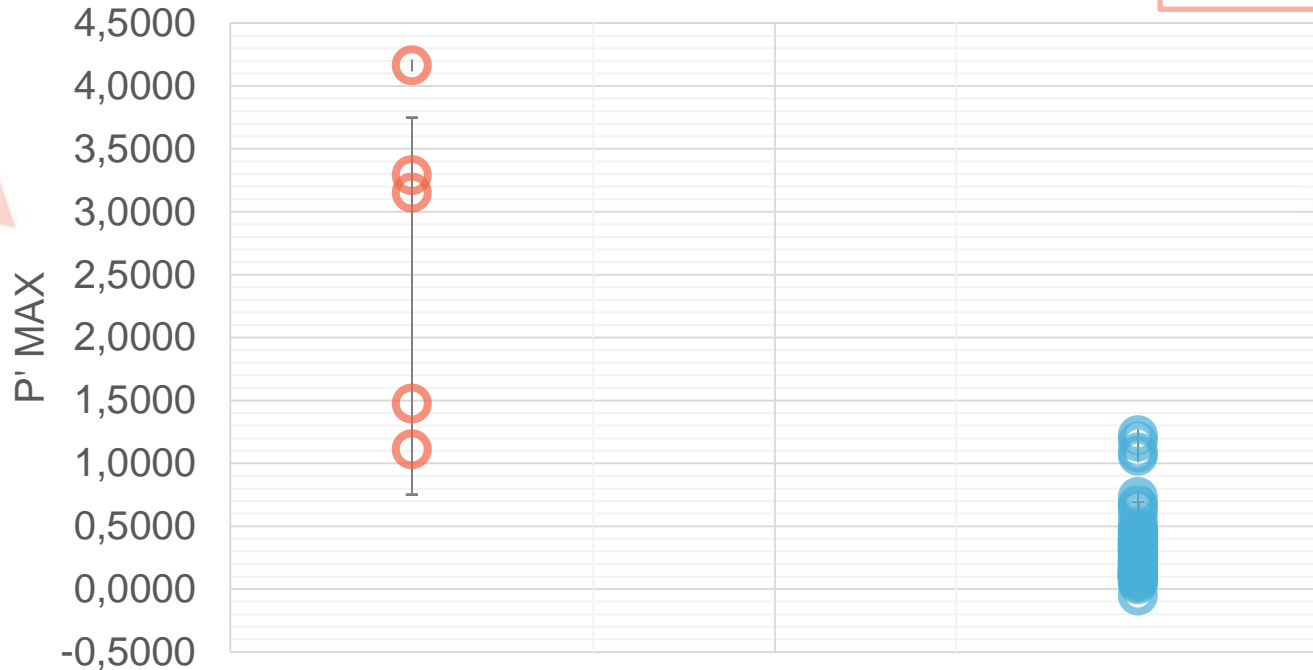


Clinical trial results

Mean p'max of selected area inside lesion

○ Malignant Melanoma ○ Benign Nevus

Specificity 94%

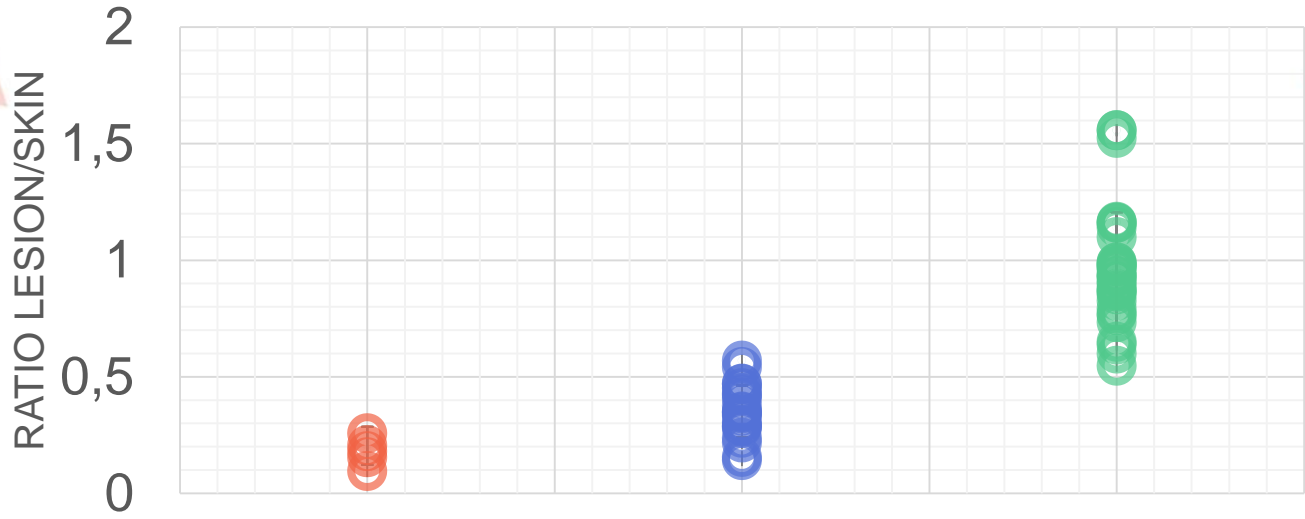


Clinical trial results

Ratio of mean AF of the lesion and the mean AF of the surrounding skin

- Malignant Melanoma
- Basal Cell Carcinoma
- Seborrheic keratosis

Specificity 96%



Conclusions

- Method opens opportunity to screen for skin cancer at primary care level
- Method is **non-invasive, portable, easy to use and cloud based**
- Differentiates benign skin malformations that are commonly mistaken for skin cancer

Thank you for your attention!

Спасибо за внимание!

Acknowledgment

This work has been supported by the European Regional Development Fund project “Portable Device for Non-contact Early Diagnostics of Skin Cancer” under grant agreement 1.1.1.1/16/A/197

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