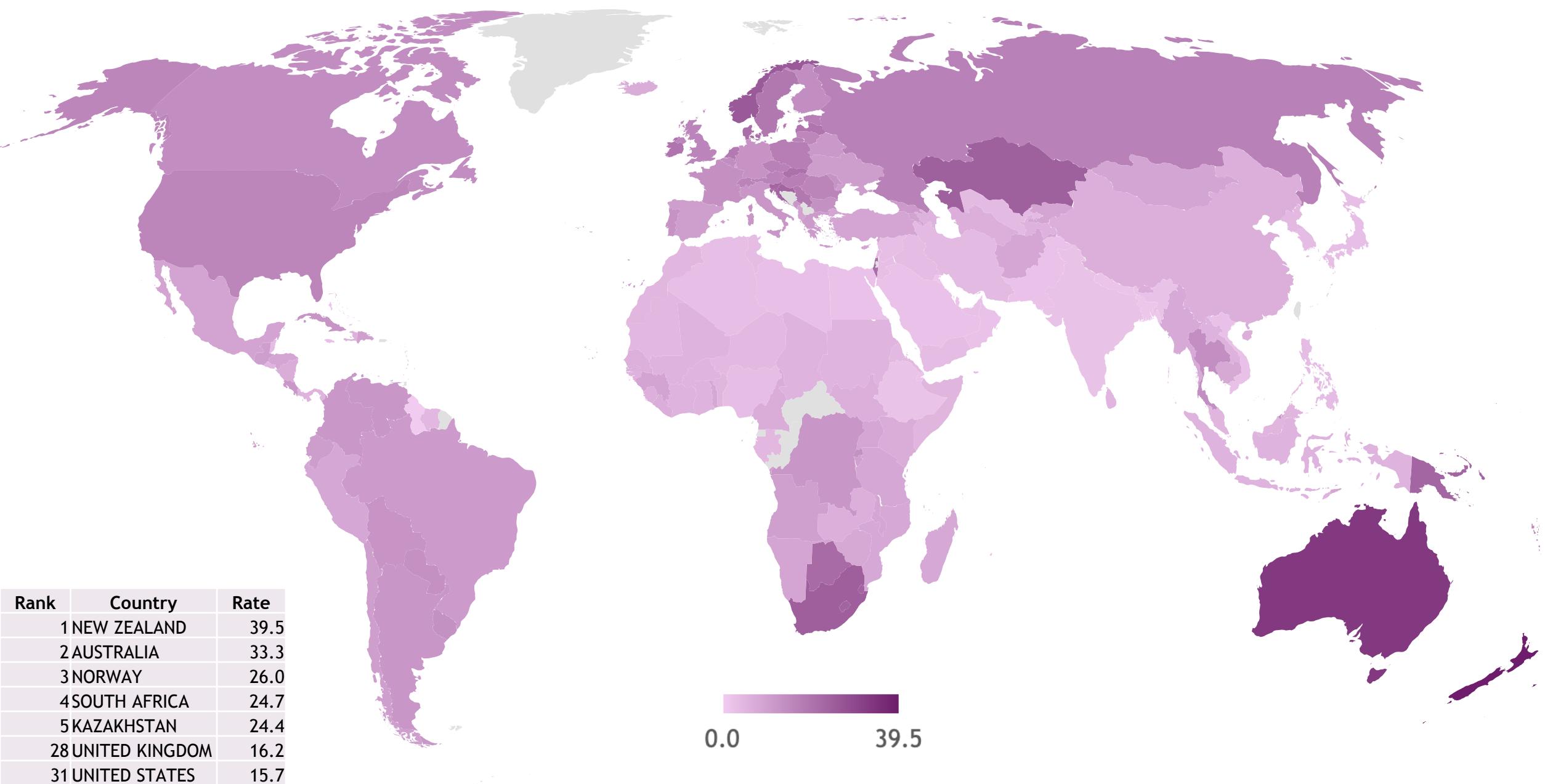


Skin Cancer Detection

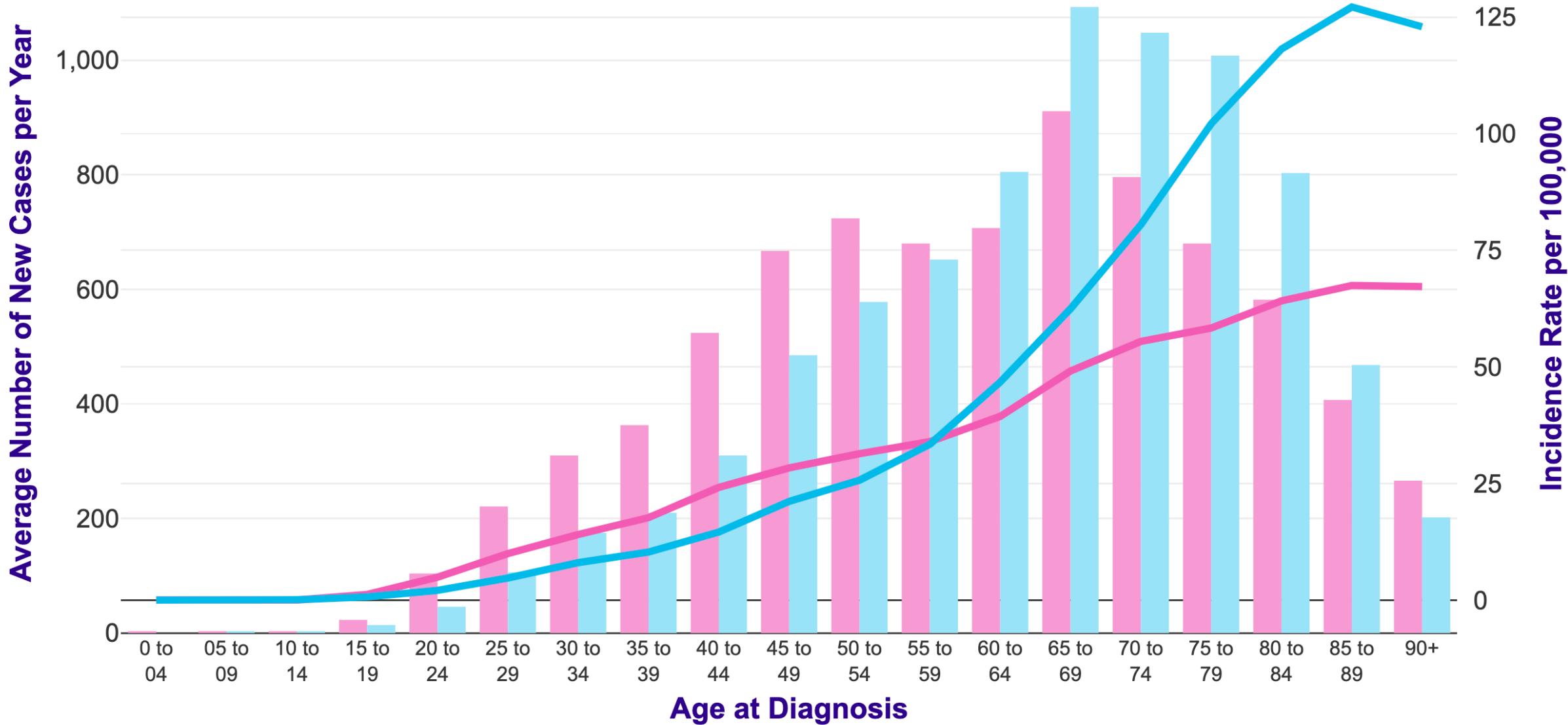
Matthew Newton

Global Skin Cancer Rate per 100,000 People

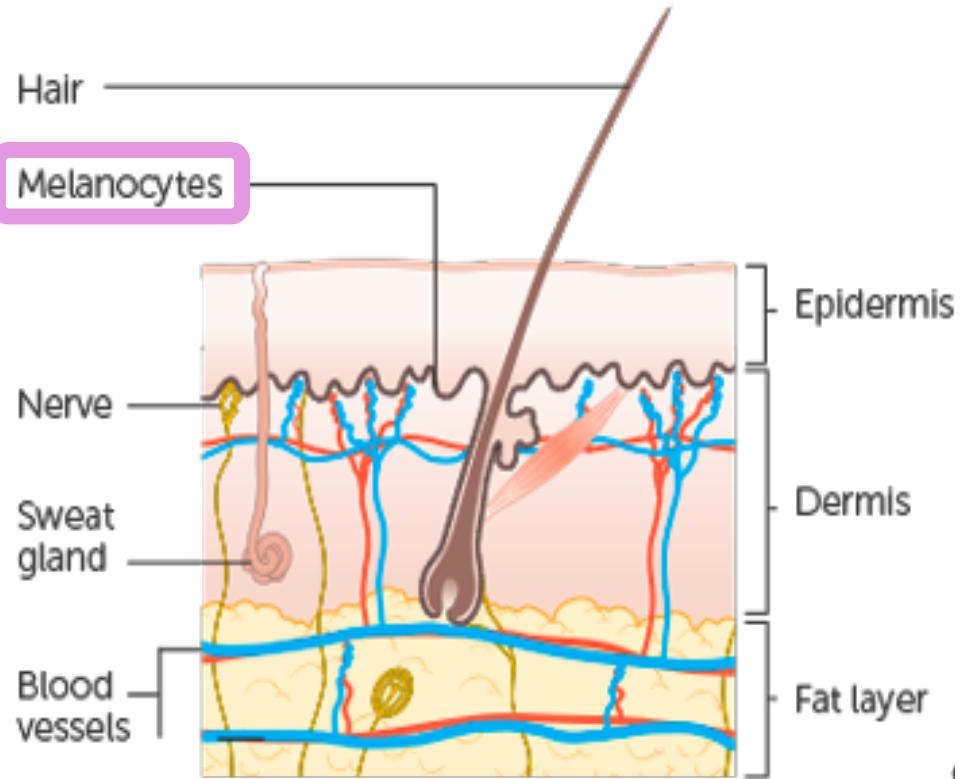


U.K. Melanoma Cancer Rates

Female Cases Male Cases Female Rates Male Rates

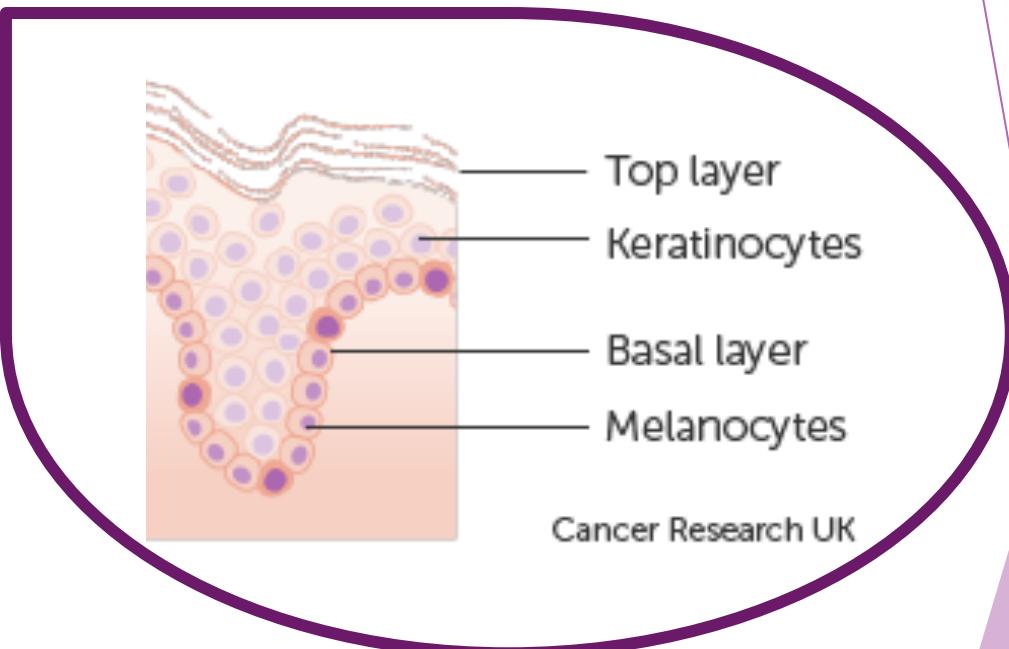


What is Skin Cancer?



There are 2 main types of skin cancer:

- ▶ Melanoma skin cancer
- ▶ Non-Melanoma: Basal Cell (BCC) / Squamous Cell (SCC)



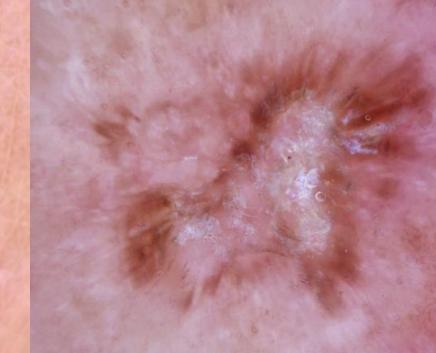
Melanoma skin cancer is the most dangerous type as it does (*metastasise*) spread to other parts of the body.

Types of Skin Cancer

Harmless

Dangerous

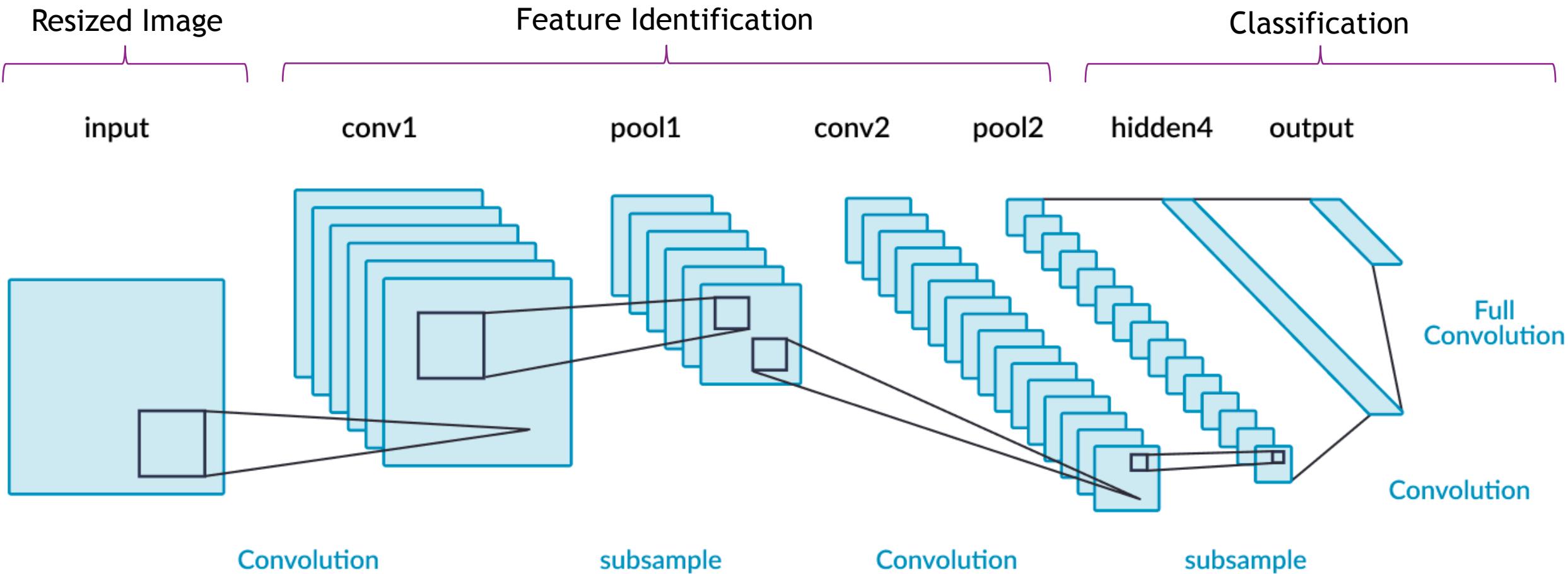


Normal Mole	Dermatofibroma	Actinic Keratoses	Basal Cell Carcinoma	Melanoma/ Melanocytic
				
<ul style="list-style-type: none"> ❖ Standard skin blemish. ❖ Appear first few years of life. ❖ Flat or raise in appearance. ❖ Benign 	<ul style="list-style-type: none"> ❖ Common benign fibrous nodule. ❖ Often occurs on lower legs. ❖ Benign ❖ Similar in appearance to early stage Melanoma skin tumours. 	<ul style="list-style-type: none"> ❖ The most common precancer lesion. ❖ Small crusty bump that vary in colour. ❖ Benign ❖ Can develop into Squamous Cell Carcinoma (SCC). 	<ul style="list-style-type: none"> ❖ Most common skin cancer. ❖ Benign ❖ Most are curable or can be removed. ❖ Non-metastasise, so don't spread. 	<ul style="list-style-type: none"> ❖ Most severe type of skin cancer ❖ Malignant ❖ Metastasise in later stages(III, IV). ❖ Can spread to other organs in the body causing further complications.

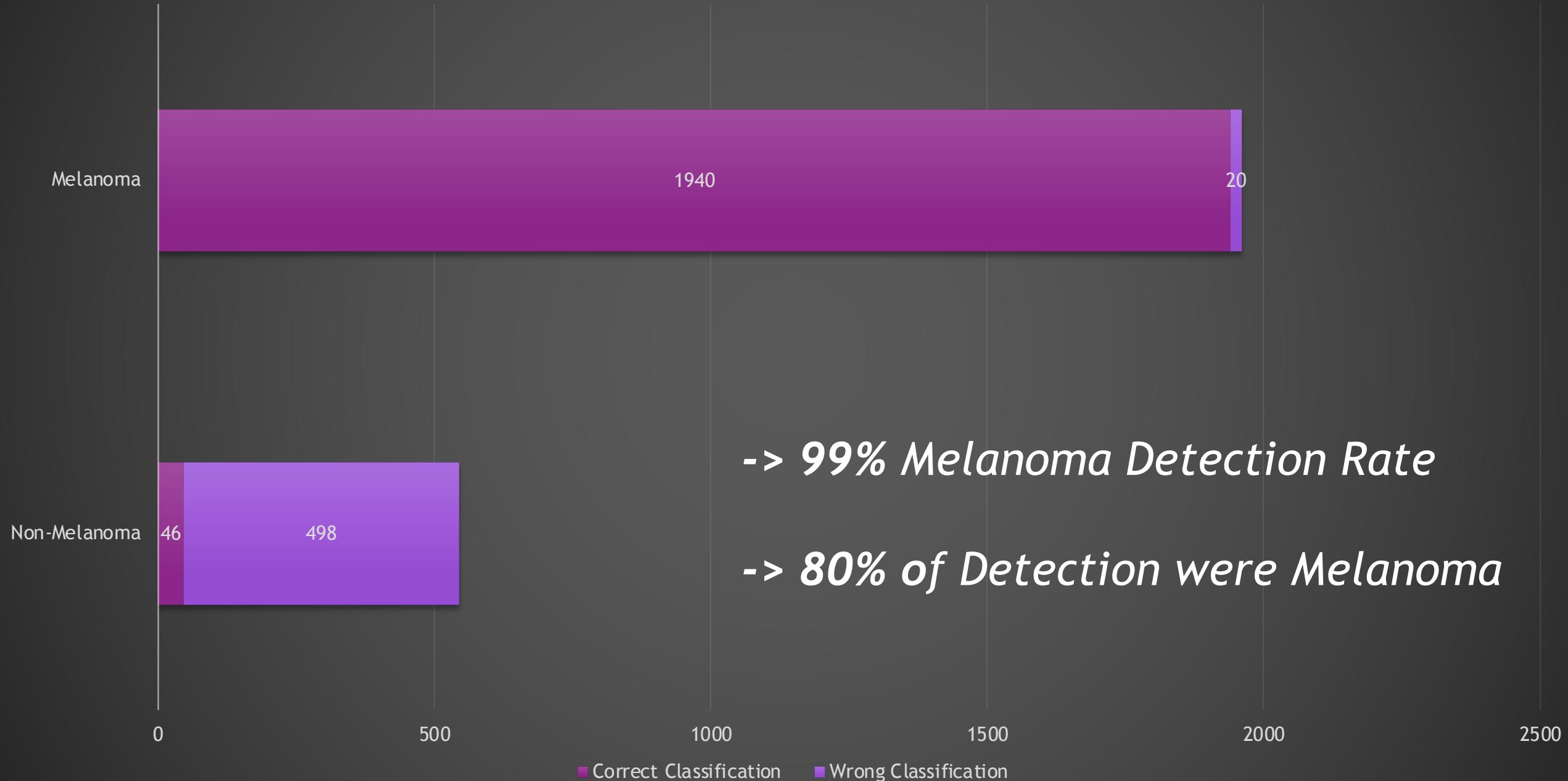
Non-Cancerous

Cancerous

Convolution Neural Network Structure



Melanoma Detection Rate - Unseen Test Data



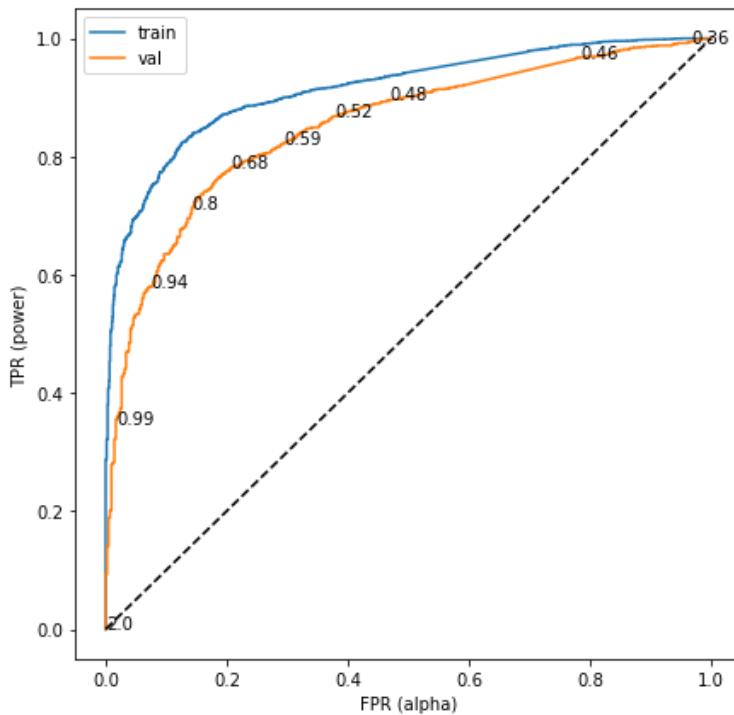
Appendix

Lets get technical...

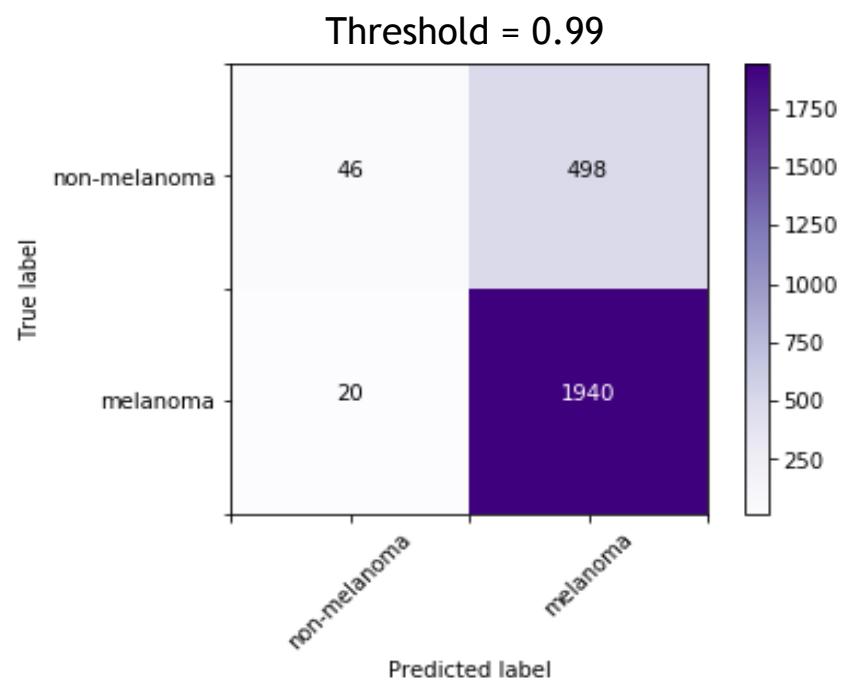
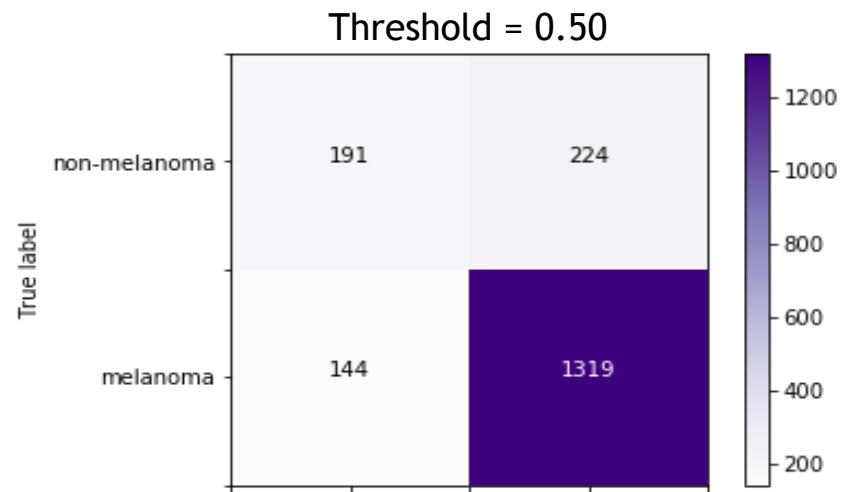
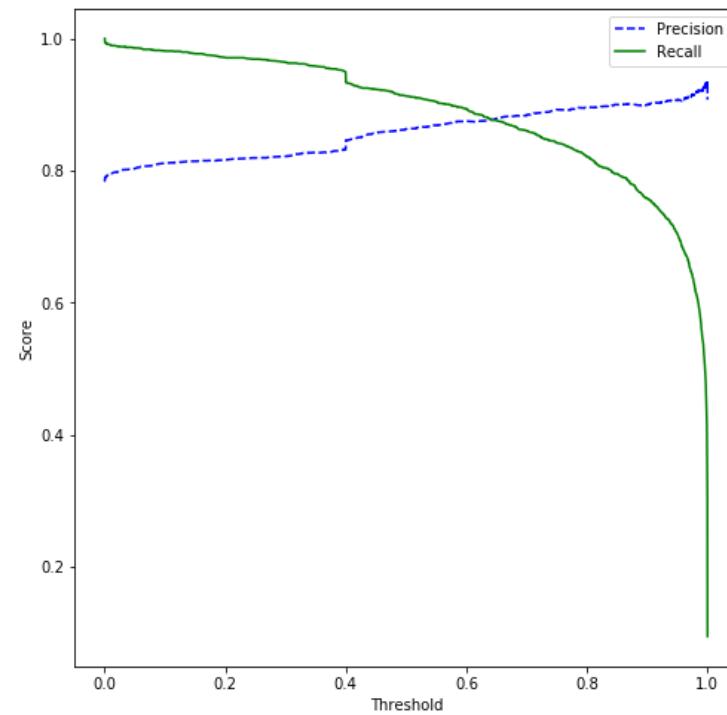
Result Technical Breakdown

Classification	Precision	Recall	F1-Score
Melanoma (1960)	80%	99%	0.88
Non-Melanoma (544)	70%	8%	0.15

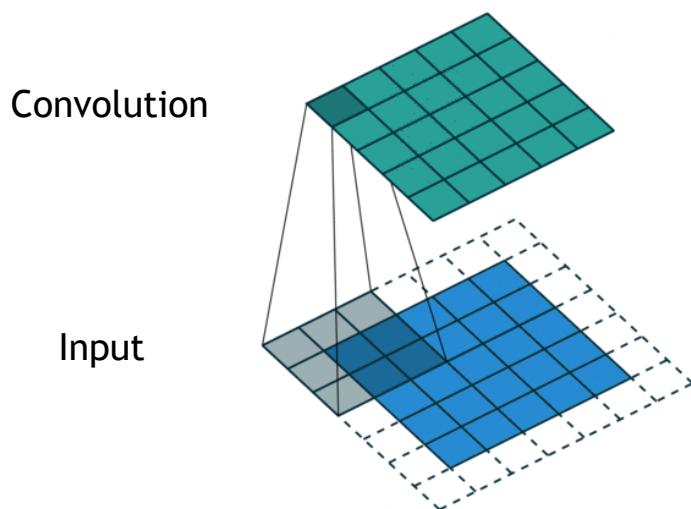
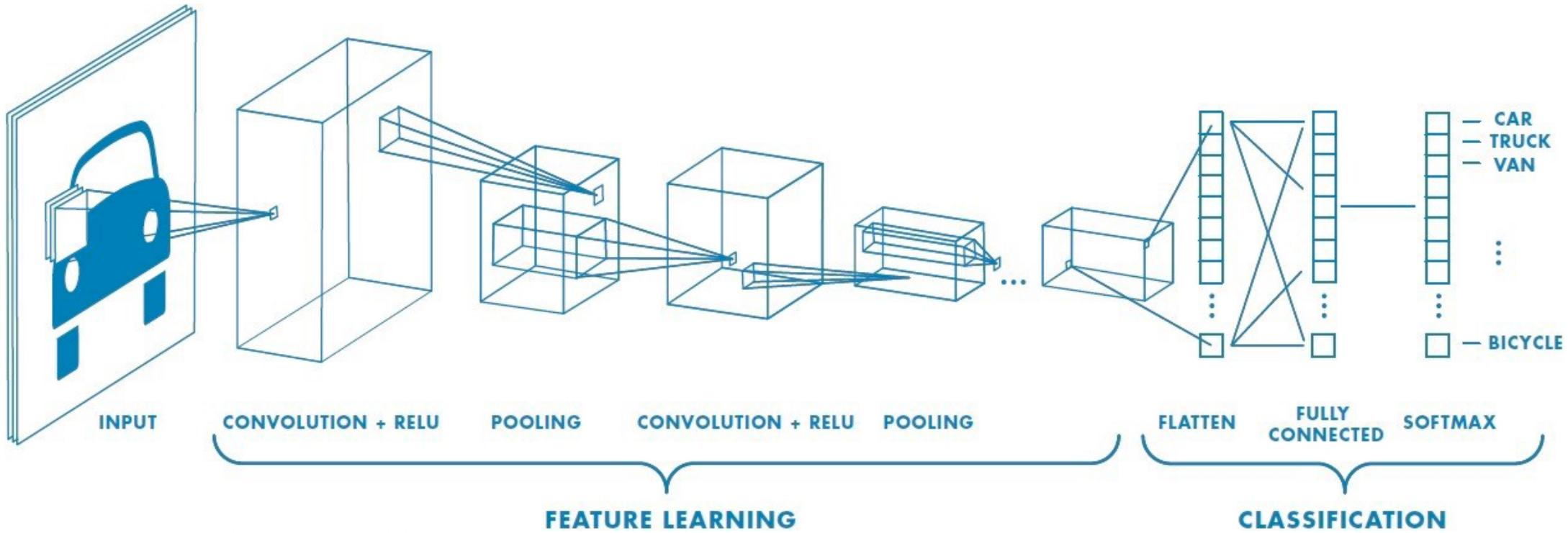
ROC Curve



Precision vs Recall



Convolutional Neural Networks



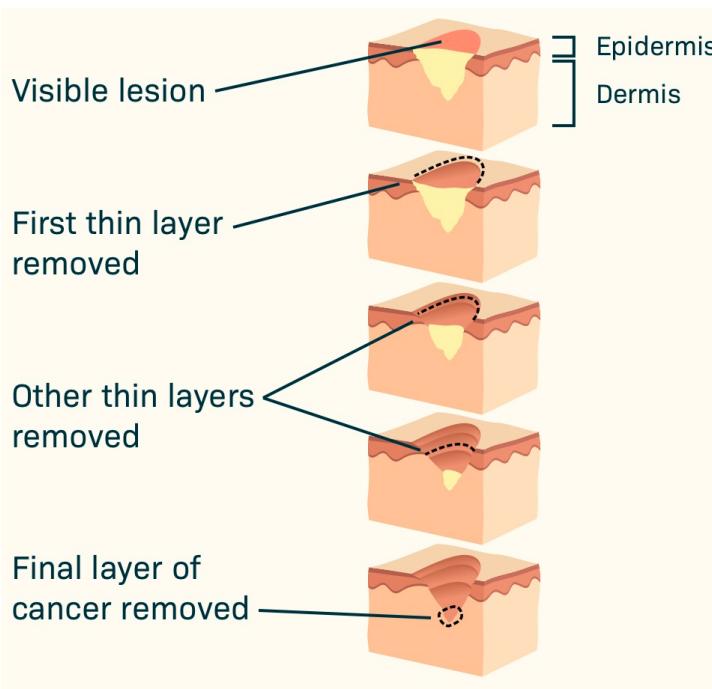
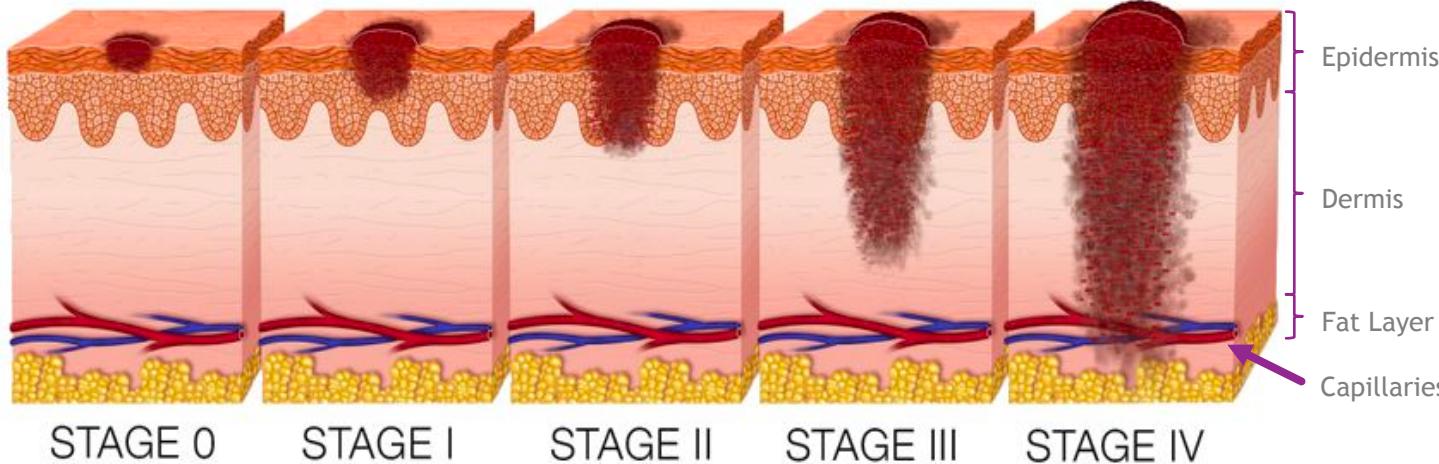
Convolution Layers:

- ▶ Applying different convolutional kernels (filters) to the input image.

Pooling Layers:

- ▶ Max-Pooling: takes the highest value from each window.

Stages of Melanoma Cancer



Treatments:

- ▶ Removal of the effected tissue, with follow up appointments.
- ▶ Ultrasound scans of the lymph nodes to check if the cancer grows.
- ▶ Lymph node biopsy, required for Stage III cases.
- ▶ Laser therapy is used to treat small recurrent melanomas.