




# It's all about the bling! "Price Tag"






**Olga Brochner**  
Clinical Nurse Specialist, ADHB



# Jessie J



It's not about the money money money  
We don't need your money money money  
We just wanna make the world dance  
Forget about the price tag  
Ain't about the uh cha-ching cha-ching  
Ain't about the yeah b-bling b-bling  
Wanna make the world dance  
Forget about the price tag



# Health economics & sustainability of current anti-VEGF injections

- Can we? / Can't we?
- ADHB ophthalmology strategy





# Our ageing population

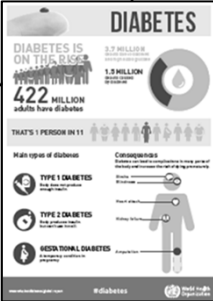
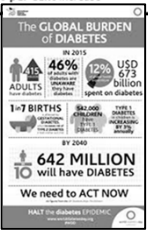
Like most of the developed world, New Zealand has an ageing population.

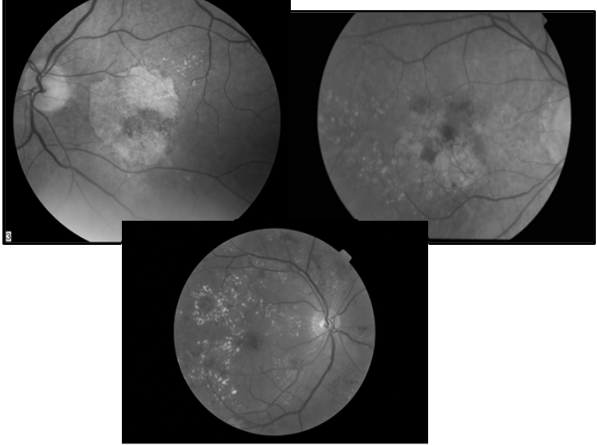
By 2036, it's projected:

- Around one in 4.5 New Zealanders will be aged 65-plus
- That's 1,258,500 million people
- It's an additional 547,300 over 65's, up from a total of 711,200 in 2016.
- Or a 77 per cent increase

Contrast that with the under 14s:

- There will be 991,900 children by 2036
- It's an extra 70,400 under 14s, up from 921,500 in 2016
- It represents only a 7.6 per cent increase





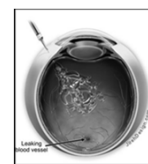


MARK C. GILLIES, MHRB, PhD; FRANCISCO J. RICHARD WALTER, MS; J. LUIS LÓPEZ, BS; JENNIFER L. ARNOLD, MHRB, FRANCISCO J. DAN McALLISTER, MHRB, FRANCISCO ALEX MORILLAS, MHRB, FRANCISCO J. GUYER, MHRB, FRANCISCO J. FORIN, GUYMER, MHRB, FRANCISCO J. JELI KEEPLE, PhD; ROSAN ESKER, MHRB, FRANCISCO J. AMPARO HERRERA BODE, *De Anco for Attorney, B.O.S.*; BRENNY GLASTONBURY, MHRB; JUDY M. SIMPSON, PhD; DANIEL BARTHELMUS, MD, PhD, FRCPC



**Deloitte Access Economics  
2016  
New Zealand**

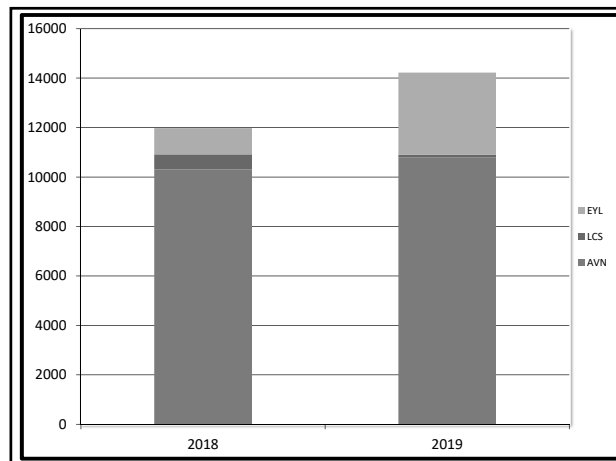
Socioeconomic  
cost of macular  
degeneration in  
New Zealand.

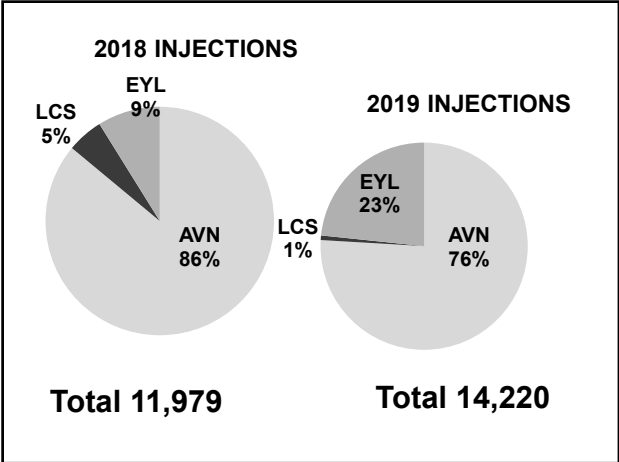


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Source: PHARMAC Annual Report 2015/16. Note that figures include all uses of these medications, not just in AMD.

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**Space!**

- Assessment & / or injection anti VEGFs

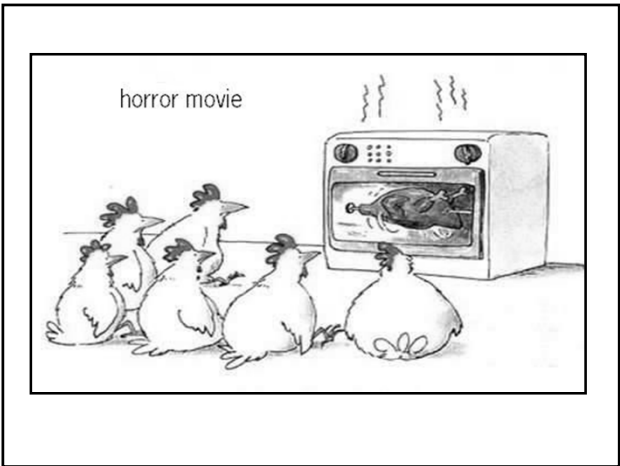
**“Burden”**

Over 5000 at risk of going blind waiting for treatment, Ministry of Health says

Cate Doughton - 18/05, Apr 15, 2018

Ministry of Health says more than 5000 patients deemed 'at risk' of going blind are waiting for specialist treatment in public hospitals in February 2018, says the Ministry of Health says.

- Patient numbers ↑
- Resources demand
- Direct health care system costs
- Hidden costs



**RCOphth Strategic Plan 2020-2022**

The Royal College of Ophthalmologists is calling on the next government to invest in, and adopt, an innovative approach to creating a sustainable eye health service that meets the needs of patients and healthcare staff.

Ophthalmology is at the forefront of transformational change and a leading in areas of workforce, digital and data driven healthcare. Ophthalmology is the fastest growing specialty with a 10% increase in demand predicted over the next 20 years.

A lack of long term planning, investment in the workforce, inadequate hospital systems and poor data collection means that some patients are experiencing an unacceptable level of vision.

Poor vision affects health, economic well-being and productivity of individuals, families and society as a whole.

More than 2 million people have reduced vision in the UK and it is estimated that this figure will double by 2020.

The direct and indirect costs of blindness in the UK are £28 billion per annum.

People with vision impairment are twice as likely to have falls.

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18 Stephenson Way, London NW1 2HD  
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**Disability**

**What is the cost of blindness?**

C Meeds, C Hyde


Br J Ophthalmol: first published as 10.1136/bjo.87.10.1201 on 23 September 2003.

Pezzullo et al. BMC Health Services Research (2018) 18:63  
DOI 10.1186/s12913-018-2836-6

BMC Health Services Research

RESEARCH ARTICLE Open Access

### The economic impact of sight loss and blindness in the UK adult population

Lynne Pezzullo<sup>1</sup>, Jared Streetfield<sup>2</sup> , Philippa Simkiss<sup>2</sup> and Darren Shickle<sup>3</sup>


**Abstract**  
**Background:** To quantify the economic impact of sight loss and blindness in the United Kingdom (UK) population, including direct and indirect costs, and its burden on health.  
**Methods:** Prevalence data on sight loss and blindness by condition. Cause decomposition data on indirect costs, and health costs, and health care costs, and health care costs, and health care costs.  
**Results:** Sight loss and blindness costs were estimated to be around £2.8 billion in 2016, or £19,727 per person with sight loss and blindness. The largest component of health system expenditure represented the largest component (63%) of economic costs.  
**Conclusions:** The total cost of vision loss from AMD was estimated to be \$391.1 million in 2016, or \$19,727 per person with AMD. Of the total cost, the economic costs were \$89.6 million (\$4,521 per person), and the value of lost wellbeing was \$301.5 million (\$15,207 per person). Health system expenditure represented the largest component (63%) of economic costs.  
**Blindness from AMD** was estimated to contribute \$216.6 million, or \$45,677 per person with blindness. This represented 55% of the total costs due to AMD in 2016, and was comprised of \$28.2 million in economic costs as well as \$188.4 million in loss of wellbeing.

**Current barriers to treatment for wet age-related macular degeneration (wAMD): findings from the wAMD patient and caregiver survey**  
Monica Vercano,<sup>1</sup> Nicole Eter,<sup>2</sup> Steve Winyard,<sup>3</sup> Kim U. Wittevoort-Jensen,<sup>4</sup> Rafael Navarro,<sup>5</sup> and Julia Heraghty,<sup>6</sup> On behalf of the wAMD Patient and Caregiver Survey Committee members.

**Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis.**  
Wong WL,<sup>1</sup> Su X,<sup>1</sup> LLY,<sup>2</sup> Cheung CM,<sup>3</sup> Klein R,<sup>4</sup> Cheung CY,<sup>5</sup> Wong TY.<sup>1</sup>

© Author information

VISION 2020's Clear Focus



The Blind Foundation has partnered with VISION 2020 New Zealand to produce Clear Focus in 2009.

Clear Focus identifies that vision loss cost New Zealand society \$2.8 billion in 2009, an effort on preventing sight loss, Clear Focus projects a rise in the number of New Zealanders with vision loss by 2020. Direct health costs alone would more than double to \$523 million by 2020. Conducted by Access Economics, the Clear Focus research looks at the best available New Zealanders with mild to severe vision loss.

September 2010

Report by Access Economics Pty Limited for VISION 2020 Australia in support of the VISION 2020 New Zealand Trust.

Commercial in Confidence

## Sight loss “burden”

- Impact on wellbeing from disability
- Monetary estimate for reductions in quality of life
- DALYs: disability-adjusted life-years: years of healthy life lost due to disability
- QALYs: quality adjusted life years




Deloitte Access Economics

### Socioeconomic cost of macular degeneration in New Zealand

**Key findings:**

- The total health system costs associated with vision loss due to AMD were estimated to be \$56.5 million in 2016, or \$2,849 per person with vision loss due to AMD.
- The largest component of health system expenditure was estimated to be aged care (\$21.1 million), followed by admitted hospital expenditure (\$16.1 million) and non-admitted hospital services (\$9.2 million).
- New Zealand Government bore the majority of health system costs (83.2%), while individuals bore 10.5%, and other parties (such as private health insurers and charities) bore the remaining 6.3%.

 Deloitte


## “Substantial economic & loss of wellbeing cost”

Overall, New Zealand society could expect to avert around 340 DALYs, and receive benefits of approximately \$75.1 million if timely and adequate treatment occurs. Noting that only mild and moderate cases can receive timely and adequate treatment, the costs were estimated to be around \$2.8 million. With current treatment patterns, society may forgo as much as \$72.3 million in net benefits.

The total cost of vision loss from AMD was estimated to be \$391.1 million in 2016, or \$19,727 per person with AMD. Of the total cost, the economic costs were \$89.6 million (\$4,521 per person), and the value of lost wellbeing was \$301.5 million (\$15,207 per person). Health system expenditure represented the largest component (63%) of economic costs.

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Age-Related Macular Degeneration  
Model of care assessment and recommendations  
31 August 2017



**Age-Related MD: Model of Care Assessment & Recommendations**  
31 August 2017

After a number of years consulting with the sector regarding a model of care for eye health, the Ministry of Health commissioned Ernst and Young (EY) to compile a report titled “Age-related Macular Degeneration - Model of Care assessment and recommendations”. The report was finalised in August 2017 and covers 3 broad areas:


- Prevention / detection & risk stratification
- Intravitreal anti-VEGF treatment
- Low vision rehabilitation

### Health outcomes / costs

- Loss independence
- Depression
- Care
- Economic – employment

Recommendation 8 - Given the health benefits able to be gained, and the strong cost-effectiveness of the treatment, consider the adequacy of volumes of treatment delivered based on these protocols

Led by: DHBs



Open

Review

Action on AMD. Optimising patient management: act now to ensure current and continual delivery of best possible patient care

W. Amos, S. Blakney, M. Freeman, R. Galt, R. Johnston, SP Kelly, S. McLaughlin, D. Sehn, and D. Verman, the Action on AMD group

### Model of care “unsustainable”

- ▶ Workforce mix
- ▶ Funding arrangements
- ▶ Treatment approach.

Specifically, the proposed model is intended to:

- ▶ Enable faster access to diagnosis, treatment and rehabilitation for people most likely to benefit
- ▶ Support preventive activities
- ▶ Enable care to be delivered closer to home
- ▶ Make best use of health professionals' skills and time
- ▶ Make best use of technology and other infrastructure within in the New Zealand health system.

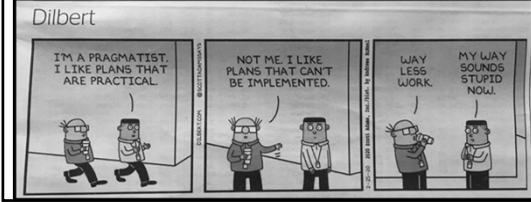
Recommendation 2 - Find the most cost-effective resourcing mix and settings of care to maximise patient benefit and efficiency of AMD diagnosis and care

Led by: DHBs

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### ADHB ophthalmology


- New models of care
- Multi-disciplinary
- Collaboration




#### The Workforce

Create a sustainable workforce now and for the future


The workforce continues to be over stretched and over worked. Ophthalmology is a major service, delivering 6% of all elective surgery and dealing with nine million outpatient appointments every year in the NHS. Patient demand has increased due to an ageing population and improvements in the treatment of eye disease. Our latest workforce survey shows the current effects of government policy and a chronic lack of investment:




A quarter of eye doctors are nearing retirement



47% of hospital eye units are using locum doctors to fill consultant posts, an increase of 52% since 2016



434 extra consultant posts are needed over the next two years



65% of units are undertaking waiting list initiatives and out of hours sessions to manage demand

Multidisciplinary working

Ophthalmology is leading workforce transformation in the NHS by introducing consistent training and standards for the ophthalmic led multidisciplinary teams. This ensures that patients are cared for by skilled non-medical professionals and release ophthalmologists to manage more complex cases.

What needs to change

We urge the government to address critical resource gaps in the workforce. Ophthalmology is an oversubscribed specialty and we can easily fill the additional training places needed to match the demand. But this can only happen if more ophthalmology training places are released by NHS England.

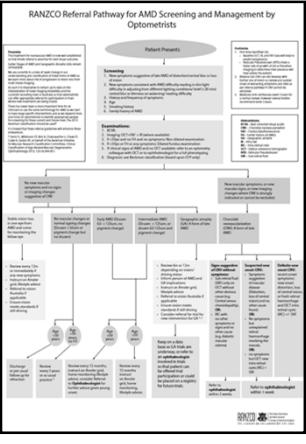
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## Nursing Review

NEW ZEALAND'S INDEPENDENT NURSING JOURNAL

“Nurses step up to meet demand for specialist eye treatment”  
February 2016 Vol 16 (1)

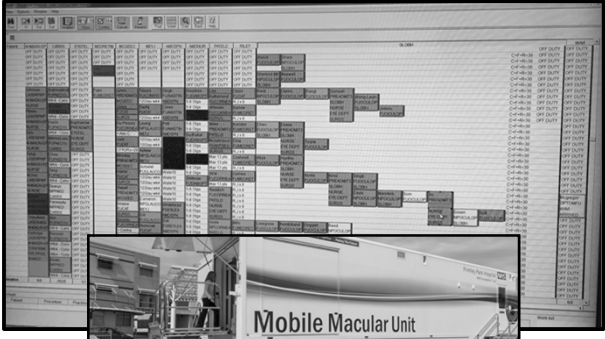
Samalia P, Garland D, Squirrell D. Nurse specialists for the administration of anti-vascular endothelial growth factor intravitreal injections. *N Z Med J* 2016; 129(1438):32-8.



**RANZCO Referral Pathway for AMD Screening and Management by Optometrists**

This flowchart outlines the process for screening and managing Age-Related Macular Degeneration (AMD) by optometrists. It starts with a 'Referral Process' box, leading to 'Screening' and 'Management' sections. The 'Screening' section details the criteria for referral, including visual acuity, visual field, and fundus examination findings. The 'Management' section details the criteria for referral, including visual acuity, visual field, and fundus examination findings. The flowchart is divided into 'Screening' and 'Management' sections, with 'Screening' further divided into 'Referral' and 'Referral criteria'.

**“Rapid access”  
AMD / macula  
clinics**



The screenshot shows a software interface with a large grid of data, likely representing patient records or test results. Below the grid, there is an image of a mobile unit labeled 'Mobile Macular Unit'.

**Mobile Macular Unit**

MOBILE OPHTHALMOLOGY UNITS

EMS MOBILE HEALTHCARE

**New anti-VEGF agents**



**IOVS** Investigative Ophthalmology & Visual Science  
May 2017  
Volume 58, Issue 5

**Topical Delivery of Anti-VEGF Drugs to the Ocular Posterior Segment Using Cell-Penetrating Peptides**


Felicity de Cogan<sup>1</sup>, Lisa J. Hill, Aisling Lynch, Peter J. Morgan-Warner, Judith Lechner, Matthew R. Benwick, Anna E.A. Pearce, Mei Chen, Robert A. H. Scott, Inspiring Au, Alex Logan

Author Affiliations & Notes

Investigative Ophthalmology & Visual Science May 2017, Vol. 58, 2578-2590.  
doi:https://doi.org/10.1167/iovs.16-20072

• Oral delivery ???

**A.I.**



**nature medicine**

ARTICLES  
https://doi.org/10.1038/s41591-018-0107-6

**Clinically applicable deep learning for diagnosis and referral in retinal disease**

Jeffrey De Fauw<sup>1</sup>, Joseph R. Leddam<sup>1</sup>, Bernardino Romera-Paredes<sup>1</sup>, Stanislav Nikolov<sup>1</sup>, Nenad Tomasev<sup>1</sup>, Sam Blackwell<sup>1</sup>, Harry Askham<sup>1</sup>, Xavier Glorot<sup>1</sup>, Brendan O'Donoghue<sup>1</sup>, Daniel Visentin<sup>1</sup>, George van den Driessche<sup>1</sup>, Balaji Lakshminarayanan<sup>1</sup>, Clemens Meyer<sup>1</sup>, Faith Mackinder<sup>1</sup>, Simon Bouton<sup>1</sup>, Kareem Ayoub<sup>1</sup>, Reena Chopra<sup>1</sup>, Dominic King<sup>1</sup>, Alan Karthikesalingam<sup>1</sup>, Cian O. Hughes<sup>1,2</sup>, Rosalind Raine<sup>1</sup>, Julian Hughes<sup>2</sup>, Dawn A. Sim<sup>2</sup>, Catherine Egan<sup>2</sup>, Adnan Tufail<sup>2</sup>, Hugh Montgomery<sup>2</sup>, Demis Hassabis<sup>1,3,4</sup>, Geraint Rees<sup>1,3</sup>, Trevor Back<sup>1</sup>, Peng T. Khaw<sup>1</sup>, Mustafa Suleyman<sup>1</sup>, Julien Cornebise<sup>1,3,4</sup>, Pearse A. Keane<sup>1,2,4</sup> and Olaf Ronneberger<sup>1,4</sup>\*

The volume and complexity of diagnostic imaging is increasing at a pace faster than the availability of human expertise to interpret it. Artificial intelligence has shown great promise in classifying two-dimensional photographs of some common diseases and typically relies on databases of millions of annotated images. Until now, the challenge of reaching the performance of expert clinicians in a real-world clinical pathway with three-dimensional diagnostic scans has remained unsolved. Here, we apply a

**I.T.**

**Recommendation 19 - Improve data collection and analysis according to nationally consistent specifications to allow monitoring of performance and measurement of patient gains made, and to provide a base to continue to improve the management of AMD in New Zealand**

Led by: Ministry

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**PIPELINE TECHNOLOGY**

**Home OCT**

Notal Vision is developing a first-of-its-kind Artificial Intelligence-enabled digital diagnostic for patients with neovascular retina diseases using our patient-operated Home Optical Coherence Tomography device. The first disease in the Home OCT System pipeline is exudative Age-related Macular Degeneration (AMD).



Investigational device not cleared for clinical use.

**Notal OCT Analyzer**

A computational image analysis algorithm providing automated detection, localization and quantification of fluid in exudative retinal diseases. The Notal OCT Analyzer can analyze images from commercial OCTs and forms the backbone of the Home OCT System.



Investigational device not cleared for clinical use.

tvst

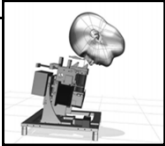
Article

https://doi.org/10.1167/tvst.7.4.8

### Safety and Feasibility of a Novel Sparse Optical Coherence Tomography Device for Patient-Delivered Retina Home Monitoring

Peter Maloca<sup>1,6,13</sup>, Pascal W. Hasler<sup>1,6</sup>, Daniel Barthelmes<sup>2,3</sup>, Patrik Arnold<sup>4</sup>, Mooser Matthias<sup>5</sup>, Hendrik P. N. Scholl<sup>5,6,7</sup>, Heinrich Gerding<sup>8,9</sup>, Justus Garweg<sup>10</sup>, Tjebo Heeren<sup>11</sup>, Konstantinos Balaskas<sup>12,13</sup>, J. Emanuel Ramos de Carvalho<sup>13</sup>, Catherine Egan<sup>13</sup>, Adnan Tufail<sup>13</sup>, and Sandrine A. Zweifel<sup>2</sup>

- New ways to monitor
- Transport / space issues
- Screening ???



Conclusion

Table 4.12 presents total health system costs by component in 2009 and 2020. Overall, health system costs are estimated to rise to \$523 million by 2020 or \$3,008 per person with vision loss. This compares to a total cost of \$198 million in 2009 (\$1,583 per person with vision loss).


Table 4.12: Health system costs - projections to 2020

Cost component	2009 health system costs	2020 health system costs
hospital	\$105,757,892	\$279,773,679
aged care	\$67,401,985	\$178,306,327
optometry	\$6,872,148	\$18,179,694
GP	\$2,329,905	\$6,163,569
research	\$816,894	\$2,161,025
pharmaceuticals	\$14,376,296	\$38,031,291
<b>Total</b>	<b>\$197,555,120</b>	<b>\$522,615,586</b>

Source: Access Economics (2010) calculations using Statistics New Zealand (2010) population growth estimates, using Ministry of Health special request expenditure data 2010, PHARMAC data 2010 and National Health Survey data (Ministry of Health 2008).

Anti-VEGFs

- ↑ burden ophthalmic services
- “Cost” of sight loss
- Change models of care meet demands



Thankyou

Dr Sophie Hill, Carly Henley, Rebecca Stevenson & Peter Lyons