Overdiagnosis: the rising epidemic of the 21st Century

Professor Paul Glasziou
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Some Proposals for EBHC’s future

1. Don't skip **step 0**: foster doubt, uncertainty and honesty
2. Beware **over-diagnosis**: overdetection & overdefinition
3. Take **non-drug interventions** as seriously as pharmaceuticals
4. It’s the patients decision: teach **Shared Decision Making** alongside Evidence-Based Medicine
5. Build **clinical practice "laboratories"** to study evidence translation and uptake
6. Invest long term in **automated evidence synthesis**
7. …
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Three types of Overdiagnosis

1. **Over-detection**, e.g., cancer screening, incidental MRI findings, etc.

2. **Expanded definitions**, e.g., Diabetes, CKD, ADHD,

3. **Medicalization**, e.g., “female sexual dysfunction”, hypotrichosis,
A. Overdetection: thyroid cancer

Thyroid cancer **tripled** in 25 years; no more deaths

![Graph showing trends in incidence, mortality, and 5-year relative survival of thyroid cancer from 1982 to 2007.](image)

**Notes**

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S26.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.73: Yearly trends in incidence, mortality and 5-year relative survival of thyroid cancer, 1982 to 2007
A. Overdetection: thyroid cancer

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**Screening for Thyroid Cancer**

Since South Korea adopted widespread cancer screening in 1999, thyroid cancer has become the most diagnosed cancer in the country. But if this early detection were saving lives, the already-low death rate from thyroid cancer should have fallen, not remained steady.

**NEW CASES AND DEATHS FROM THYROID CANCER**

*Per 100,000 people*

- New cases in South Korea
- New cases in the U.S.
- Deaths in both countries

Sources: New England Journal of Medicine; National Cancer Institute
By The New York Times
A. Overdetection: 4 cancers

An epidemic of diagnosis, not an epidemic of cancer!

Prostate Cancer

Breast Cancer

Thyroid Cancer

Melanoma

Source: AIHW
Incidentalomas in MRI of spine

% of asymptomatic patients with MRI

- Disc Bulge
- Disc Protrusion

Jensen MC, NEJM, 1994

Disc protrusion in 24 year old with no back pain
Too much testing?

“A well person is someone who has not been completely worked up.”

- Clifton Meador

Thyroid ultrasound uses high frequency sound waves to make a picture of the thyroid gland.
B. Expanding definitions of Diabetes

Impact of Definition Changes on:
• Trial interpretation, eg UKPDS
• Risk Scores, eg Framingham

2003 ADA update
A Tale of Two GDM Definitions

- New criteria for diagnosing Gestational Diabetes (GDM) by International Association of Diabetes in Pregnancy Study Group (IADPSG)
- Increase GDM diagnoses from 6% (WHO) to 18% (IADPSG)
- **Cost** extra $US2.5 billion/year
- Based on risk of adverse outcome
- **NO** evidence treatment of new cases improve outcomes
Declining thresholds; increasing prevalence

LOWERING OF THE CVD RISK THRESHOLD

5-year CVD risk threshold
1990’s New Zealand 15%

CVD Risk Groups: Cumulative % of 30-79yr olds
Declining thresholds; increasing prevalence

Lowering of the CVD risk threshold

5-year CVD risk threshold
1990’s New Zealand 15%
2001 - Australia: 10–15%
2006 - NICE (UK) 10%
2014 – NICE (UK) 5%
2014 – CC-AHA (USA) 3.75%
(* CC-AHA is 7.5% in 10-yrs)
Of 16 publications on 14 common conditions, 10 widened and 1 narrowed definitions.

Widen by 3 methods: (i) “pre-disease”; (ii) lowering thresholds; (iii) earlier or new diagnostic methods.

CONCLUSION:
“research and policy attention might be directed at designing new processes for reviewing disease definitions, free of financial conflicts of interest and informed by rigorous analysis of benefits and harms.”
C. Medicalization

Then you might have
“Body Dysmorphic Disorder by Proxy”
Saving Normal

DSM 5 Is Guide Not Bible—Ignore Its Ten Worst Changes

APA approval of DSM-5 is a sad day for psychiatry.
Post published by Allen J Frances M.D. on Dec 02, 2012 in DSM5 in Distress

This is the saddest moment in my 45 year career of studying, practicing, and teaching psychiatry. The Board of Trustees of the American Psychiatric Association has given its final approval to a deeply flawed DSM 5 containing many changes that seem clearly unsafe and scientifically unsound. My best advice to clinicians, to the press, and to the general public - be skeptical and don't follow DSM 5 blindly down a road likely to lead to massive over-diagnosis and harmful over-medication. Just ignore the ten changes that make no sense.

Brief background. DSM 5 got off to a bad start and was never able to establish sure footing. Its leaders initially articulated a premature and unrealizable goal- to produce a paradigm shift in psychiatry. Excessive ambition combined with disorganized execution led inevitably to many ill conceived and risky proposals.

These were vigorously opposed. More than fifty mental health professional associations petitioned for an outside review of DSM 5 to provide an independent judgment of its supporting evidence and to evaluate the balance between its risks and benefits. Professional journals, the press, and the public also weighed in- expressing widespread astonishment about decisions that sometimes seemed not only to lack scientific support but also to defy common sense.
Saving Normal

DSM 5 Is Guide Not Bible—Ignore Its Ten Worst Changes

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Table 5.1 Six definitions of normal

1. Gaussian: the mean ± 2 standard deviations (SD) — this one assumes a normal distribution for all tests and results in all “abnormalities” having the same frequency.
2. Percentile: within the range, say of 5–95% — has the same basic defect as the Gaussian definition. Implies a specificity of 95% but with unknown sensitivity.
3. Culturally desirable: when “normal” is that which is preferred by society, the role of medicine gets confused.
4. Risk factor: carrying no additional risk of disease; nicely labels the outliers, but does changing a risk factor necessarily change risk?
5. Diagnostic: range of results beyond which target disorders become highly probable; the focus of this discussion.
6. Therapeutic: range of results beyond which treatment does not add value but also to deny common sense.

Sackett’s “Normal”s
What can we do?

1. Raise awareness
2. Inform patients of pros & cons
3. Guidelines for disease definitions
4. Invest in research & policy initiatives
5. ...
1 Raise Awareness: #Overdiagnosis

2013 Dartmouth
2014 Oxford
2015 Washington

Saving normal

Allen Frances, M.D.
Chair of the DSM-IV Task Force

(Launch in April, 6 Colleges)
Inform patients of pros and cons

- Patients overestimate benefits and underestimate harms (of screening, treatments, etc)
- Informing patients often dampens enthusiasm

Two processes

- For individuals: shared decision making
- For policy: community juries
3 Guidelines for disease definitions

Expanding Disease Definitions in Guidelines and Expert Panel Ties to Industry: A Cross-sectional Study of Common Conditions in the United States

Raymond N. Moynihan1*, Georgia P. E. Cooke1, Jenny A. Doust1, Lisa Bero2, Suzanne Hill3, Paul P. Glasziou1

1 Bond University, Robina, Australia, 2 University of California, San Francisco, San Francisco, California, United States of America, 3 Australian National University, Acton, Australia

- Guidelines being developed by GfN, GRADE, WHO collaboration
- 1-day Meeting: August 2014
- Position paper: 2015
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Meniscal tears: MRI vs pain

Before You Go for Surgery...
A study showed that frequent knee pain and stiffness may have nothing to do with the knee injury called a meniscal tear but may be related to arthritis.

PATIENTS WITH EVIDENCE OF OSTEOARTHRITIS

<table>
<thead>
<tr>
<th>Had pain</th>
<th>Patient had one or more meniscal tears</th>
<th>No meniscal tear</th>
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<tbody>
<tr>
<td></td>
<td>63%</td>
<td>37%</td>
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</table>

<table>
<thead>
<tr>
<th>No pain</th>
<th>Patient had one or more meniscal tears</th>
<th>No meniscal tear</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>60%</td>
<td>40%</td>
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</table>

Source: Dr. David T. Felson, Boston University School of Medicine
Beware pseudo-diseases

- **1800’s – diseases**
  - Germ theory; endocrine; etc
- **1900’s – risk factors**
  - Hypertension; hypercholesterolemia; etc
- **2000’s – risk factors for risk factors**
  - Pre-hypertension; pre-diabetes; etc

100% fatality rate!
oh darling... what a pity... 
I think your interesting personality 
has just been classified as 
a personality disorder.
I'm obliged to inform you: you have the right to remain anxious.

Anything you say will be used to further test you.

If you do not already have a diagnosis, one will be provided for you.

Alicia decided the doctor was over-zealous when he recommended Alzheimer screening on her 25th birthday.
Surgery, drug side effects, even death. Yet, most over-diagnosis sufferers are not even aware they're part of this epidemic!

Hum—must be Disease De-Awareness Day

MILLIONS SUFFERING FROM DISEASES THEY DON'T HAVE

Proposed Psychiatrists' Disorders:
1. MANIC AGGRESSIVE DIAGNOSIS (M.A.D.)

Knowing they did not need definitive research, an accurate test or effective treatment made developing new conditions for DSM-6 so much easier.
Too much medicine; too little care
Time to wind back the harms of overdiagnosis and overtreatment

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Too much testing of well people and not enough care for the sick worsens health inequalities and drains professionalism, harming both those who need treatment and those who don’t.”

Margaret McCartney, GP Glasgow, Author of “The Patient Paradox”
Osteoporosis: Prevalence for changed definition

EXHIBIT 3
Comparison Of Prevalence Of Osteoporosis At Different Disease Definitions, With Ten-Year Risk Of Hip Fracture, For Women Age Fifty And Older, United States, 2000

<table>
<thead>
<tr>
<th>Percent</th>
<th>Ten-year risk of hip fracture</th>
<th>Osteopenic definition</th>
<th>Proposed definition</th>
<th>Current definition</th>
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<tbody>
<tr>
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NOTE: For explanation of disease definitions, see text.
M. Brooke Herndon et al. Health Aff 2007;26:1702-1711
Growth in health care spending: Most is more and better (hospital) services

1. Usage of Tests
2. Usage of Treatments
3. Definitions of Disease (Overdiagnosis)

Figure 9: Change in Australian governments’ health expenditure
$ bn, 2002-03 to 2012-13

More, and expanded

Note: ‘Population growth’ models the effect of the increase in population size with no change in the age structure or average per capita health expenditure. ‘Population ageing’ uses age-specific per capita health expenditure data (based on AIHW figures) to model the effect of changes in the population structure. ‘Health inflation above CPI’ uses appropriate AIHW health price indices to model inflation in each category of expenditure. ‘New, improved and more services per person’ is the amount of expenditure that cannot be explained by these three factors.

Source: Grattan analysis of AIHW (2012):AIHW (2012); ABS (2013a) Cat. no. 6401.0 Tables 1 and 2; ABS (2013c) Cat. no. 3101.0 Table 59.