Science, communication and integrity in the third millennium

Eva Baranyiová
Czech University of Life Sciences Prague, Czech Republic

APAME 2013, Tokyo, August 2-4, 2012
Outline

- Medical sciences: goals, achievements and failures
- Communication: science lead astray (academic misconduct)
- Integrity in communication: what can we do?
Medical sciences: goals, achievements and failures
Inequities are killing people on grand scale, reports WHO's Commission on Social Determinants of Health (2008)

“No one should be denied access to life-saving or health promoting interventions for unfair reasons, including those with economic or social causes” Margaret Chan, WHO Director-General (Chan, 2008)
“Our children have dramatically different life chances depending on where they were born. In Japan or Sweden they can expect to live more than 80 years; in Brazil, 72 years; India, 63 years; and in one of several African countries, fewer than 50 years. And within countries, the differences in life chances are dramatic and are seen worldwide. The poorest of the poor have high levels of illness and premature mortality. But poor health is not confined to those worst off. In countries at all levels of income, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health. It does not have to be this way and it is not right that it should be like this”.

CSDH (2008)
Gary Null et al.: Death by medicine

- 2.2 mil/yr U.S. hospital patients: adverse drug reactions (ADRs)
- 45 mil/yr antibiotics prescribed for viral infections where they have no effect
- 7.5 mil/yr unnecessary medical/surgical procedures
- 8.9 mill/yr unnecessary hospitalizations
- 7.8 million patients dead in 10 years due to iatrogenic damage
- > 784 000/yr deaths due to modern medicine interventions ("we are only capturing 5-20% of the actual deaths": C. Dean in this book)

(Strunécká and Patočka, 2012)
Inflation of mental disease diagnoses as reflected in Diagnostic and Statistic Manual of Mental Diseases

<table>
<thead>
<tr>
<th>Year</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSM 1962</td>
<td>130</td>
</tr>
<tr>
<td>DSM 1968</td>
<td>134</td>
</tr>
<tr>
<td>DSM 1980</td>
<td>494</td>
</tr>
<tr>
<td>DSM 1994</td>
<td>886</td>
</tr>
<tr>
<td>DSM 2013</td>
<td>&gt;1000</td>
</tr>
</tbody>
</table>

New criteria switch daily problems to mental disturbances.
Millions of people may become “psychiatric cases” overnight.

Data cited from graph on p. 113, in the article by Jörg Blech: Wahnsinn wird normal: Der Spiegel, 4, 2013: 111-119
Incapacity to work due to mental diseases per insured person: number of days missing at work (or reported to unemployment agency)

Unemployed in 2000: approx. 3.5 d  in 2011: approx. 9 d
Employed in 2000: approx 1.5 d, in 2011: approx. 1.9 d

A booming drug market (Germany)

Average daily doses of antidepressants per insured person/year: increased by 296% since 2000:

| Unemployed: | 8.0 g/d in 2000 | 31.7 g/d in 2011 |
| Employed:   | 3.7 g/d in 2000 | 10.0 g/d in 2011 |

Data cited from graph on p. 117 in the article by Jörg Blech: Wahnsinn wird normal: Der Spiegel, 4, 2013: 111-119
Communication: science lead astray (academic misconduct)
The Changing Face of Science

- Growing numbers of scientists in various fields
- International collaboration, interdisciplinary approaches
- Growing competition
- Resources
- Conflicts of interest
- Profit to shareholders
Current Pressures Facing Academic Science (Goldberg, 2011)

- "Non-institutional sources of income
  - Consultants to government and industry
  - Expert legal witnesses
  - Patent development
  - Formation of private companies

- Commercial funding of research
  - Major source for many scientists
  - Loss of control over conduct of research
  - Publication restrictions

- Fame and prestige
  - Media interviews and press interviews
  - University office of public relations
Current Pressures Facing Academic Science (Goldberg, 2011), continued

- Reduced incentives for non-research-related activities
  - Teaching, administration, professional excellence
  - Appointment, tenure, promotion

- Increased role of government
  - Political interference: totalitarian state
  - Full time scientists in gov. depts
  - Government as contractor
  - Space and defence programs"
Problems in Science

- Honest errors (scientific mistakes)
- Errors through negligence
- Misconduct in science
  - involves deception:
    - plagiarism (+ self-plagiarism)
    - fraud: fabrication of data
    - fraud: falsification of data
    - theft of intellectual property and data, illegal use of someone else’s illustrations
Plagiarism

- is the practice of using or copying someone else’s idea or work and pretending that you thought of it or created it
  - (Collins Cobuild English Dictionary, 1995, p. 1254)

- Plagiarism is an idea or a piece of writing or music that has been secretly copied from someone else’s work
  - (Collins Cobuild English Dictionary, 1995, p. 1254)
Web of Science: key word “plagiarism” (EB 30.4.2010 and 23.7.2013)
Plagiarism (Kerans and de Jager, 2010)

- Copy-paste writing or cut-paste writing
- Micro-plagiarism
- Patch writing or mosaic writing
- Plagiarism
- Self-plagiarism
- Duplicate or redundant publication
- Translated plagiarism
Self-plagiarism

- The same hypotheses, identical data, discussion and conclusions, references

- No reference to the original article (Roig, 2006)

- 30% of the identical original text is acceptable (Samuelson, 1994)

- "Fair" use Australian Copyright Act – 10% identical text may be tolerated
Fraud

- Data fabrication, i.e. generation of artificial, made-up data, not obtained in a study
- Theft of data (from a published or unpublished work, with no credit to author); theft of intellectual property (from a grant application, post-graduate program or a peer review)
- Data falsification: changing of data to "fit" the hypothesis
The researcher type who commits fraud (Mutch, 2011)

- "first or senior author who is a repeat offender"
- more frequently publishes with at least one co-author who also has fraudulent publications
- has a greater number of co-authors – suggested as a means to diffuse responsibility
- targets journals with a high IF
- has delayed retraction compared with papers rejected solely on account of errors
- is associated with papers originating from the United States."
Retraction (COPE)

- "The main purpose of retractions is to correct the literature and ensure its integrity rather than to punish authors who misbehave"

- Retraction notices: "be freely available to readers"
  - (E. Wager, P. Williams, 2011) a study for COPE Guidelines
Retraction statement (from WOS):

"Abstract: The following article is retracted because it was brought to our attention that it was heavily plagiarized from an earlier article published in the Asian Journal of Surgery (Chow et al. Asian J Surg. 2005 Jul; 28(3): 179-84. PMID: 16024311). Attempts to contact the corresponding author for an explanation were unsuccessful."
<table>
<thead>
<tr>
<th>Journal</th>
<th>No. of retracted articles</th>
<th>2011 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Journal of Biological Chemistry</td>
<td>37</td>
<td>5.12</td>
</tr>
<tr>
<td>Anesthesia &amp; Analgesia</td>
<td>33</td>
<td>3.07</td>
</tr>
<tr>
<td>Science</td>
<td>32</td>
<td>32.45</td>
</tr>
<tr>
<td>The Journal of Immunology</td>
<td>30</td>
<td>5.86</td>
</tr>
<tr>
<td>Proc. Natl. Acad. Sci.</td>
<td>27</td>
<td>10.47</td>
</tr>
<tr>
<td>Blood</td>
<td>21</td>
<td>9.79</td>
</tr>
<tr>
<td>Nature</td>
<td>17</td>
<td>36.24</td>
</tr>
<tr>
<td>The Journal of Clinical Investigation</td>
<td>17</td>
<td>15.43</td>
</tr>
<tr>
<td>Cancer Research</td>
<td>16</td>
<td>8.16</td>
</tr>
<tr>
<td>Cell</td>
<td>13</td>
<td>34.77</td>
</tr>
</tbody>
</table>

(Corbyn, 2012)
Retracted papers (Steen, 2010)

- A study of 742 retracted English language research papers between 2000 and 2010 (PubMed)
- The number of papers retracted for fraud increased more than sevenfold between 2004 and 2009
- Error (or undisclosed reason): 73.5%, fraud: 26.6%;
- Most common reason: scientific mistake (31.5%)
- Multiple reasons: 9.0%
- Data fabrication (incl. data plagiarism) more frequent than text plagiarism
- The rate of increase in retractions greater than increase in publications
- 31.8% of retracted papers were not noted as retracted in any way; a naive reader would not be alerted to a retracted paper
Integrity in communication: what can we do?
Growing Awareness of the Problem

- Conference on plagiarism, University of Ottawa, September 26-28, 1991
- Colloquium on Documentary Culture, Florence and Rome 1992
- Northumbria University, Newcastle upon Tyne, England:
  - 2004 - first International Conference on Plagiarism
Solutions or “What road should we take?” (Goldberg, 2011)

- “Remain the Servant of One Master
- Decline External Work and Commercial Contracts
- Provide Adequate Research Resources to Academic Staff
- Limit Staff Size of Individual Investigators
- Simplify Grant Application Processes
- Create National or Regional Office of Research Ombudsman”
Solutions suggested (Mutch, 2011)

- "Authorship should only be earned and not awarded"
- Good mentoring and diligent support staff
- Blinded assessment of data
- Data reviewed by all investigators
- Consensus on data interpretation
- A vigorous/independent Research Office
- National Research Integrity Agency"
What we should do

- Alert and educate our authors, editors, reviewers, and editorial board members
- Include definitions of all misconduct forms in Instructions for authors
- Include policies of dealing with misconduct in Instructions for authors
- Use tools available to detect plagiarism where appropriate
- Collaborate with organisations such as COPE, ORI, CSE, WAME, EASE
What we should do

- Educate at all levels:
  - Undergraduate courses on science writing: include interactive seminars on ethical conduct, consequences of fraud
  - example of post-graduate courses: Czech Academy of Sciences, one-week courses, lectures on misconduct included (5 courses/yr, about 70 participants in each)
Thank you

Contact:
Eva Baranyiová
EASE Vice-President (www.ease.org.uk)

Faculty of Tropics and Subtropics
Czech University of Life Sciences Prague
Kamýcká 129
165 21 Prague 6
Czech Republic
E-Mail: ebaranyi@seznam.cz

My sincere thanks are due to my mentor, Professor Antonín Holub for his stimulating support, discussions and critique in preparation of this talk.
References