

Health Scientists at University of Southern Denmark

Evelyne de Leeuw

Tom Bendix

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Kaare Christensen

Claus Fenger



Publications in this series:

"Health Scientists at Odense University - 1"

(Jakob Kragstrup, Jørgen Lange Thomsen,
Merel Ritskes-Hoitinga) May 1998

"Health Scientists at University of Southern Denmark - 2"

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"Health Scientists at University of Southern Denmark"
is a series of publications by the Faculty of Health Sciences. The booklets contain collections of lectures given at seminars marking the appointment of new professors to the faculty.

The texts from the seminars are published for the benefit of university staff as well as other interested persons.

Mogens Hørdér
Dean
Faculty of Health Sciences
May 2002

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Preface

This booklet contains a collection of lectures given at seminars marking the appointment of new professors to the Faculty of Health Sciences, University of Southern Denmark.

Each professor is a specialist within a particular field of knowledge and research. When a professorial seminar is held, the professor invites a guest lecturer within her/his field of interest. The combination of the new professor presenting her/his own research and the invited lecturer describing the field of research from an international point of view is intended to provide a framework for understanding the research area in question.

The texts from the seminars are published for the benefit of University of Southern Denmark staff as well as other interested persons.

Mogens Hørder
Dean
Faculty of Health Sciences

May 2002

Exclusionism and Public Health: an Institutional Perspective

Professorial Seminar
28 September 2001

Evelyne de Leeuw



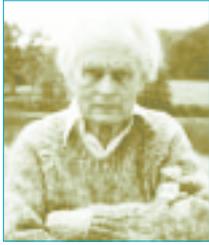
Prof. Evelyne de Leeuw

Evelyne de Leeuw (41) started her educational career as a student in Garden and Landscape Architecture, but failed miserably because creativity is not required in architecture. She then moved on to study Health Sciences at the University in Maastricht, one of the first on the continent to offer public health training outside a medical school. Because of serious existential doubts Evelyne became very active in the student movement, demanding clarification of the notions of health, health sciences, public health etc. She spent her MPH research internship with the WHO European Office, and discovered that public health was a serious profession in the United States. Thus, she decided to get an MPH degree at the University of California at Berkeley, and a subsequent PhD in health policy at the University of Maastricht.

Between 1992 and 1998 she acted as secretary-general of the Association of Schools of Public Health in the European Region (ASPHER) and since 1992 she has been director of the WHO Collaborating Centre for Research on Healthy Cities.

Her research interests are, generally, health. What makes people healthy and why do groups or agencies take decisions adversely impacting on health? Thus, policy she finds the key to health issues. Her own research deals with the evaluation of WHO designated Healthy Cities; her broader research interests covers issues such as urban health and marginalisation, refugee health, community participation in local health policy development, and policy issues in local health equity.

Her family consists of two Golden Retrievers, Pocahontas and Sacajaweah, and Evelyne has so far published two novels. She would hope to be a successful novelist. Once a millionaire, she would fund her own research programme...



Piet Hein (1905-1996) has been a 20th century renaissance man. He worked in mathematics, art and design, and literature. His furniture design has put 'Scandinavian' design on the world map. Of his 'Gruk' the one called TTT is perhaps best known, and sometimes (ab)used by the Danes to justify their laid-back attitude:

T.T.T

*Put up in a place
where it's easy to see
the cryptic admonishment*

T.T.T

*When you feel how
depressingly
slowly you climb,
it's well to remember that
Things Take Time.*

*Jeg har skrevet et sted
hvor jeg dagligt må se,
det manende tankesprog :*

T.T.T

*Når man føler hvor lidet
man når med sin flid,
er det nyttigt at mindes, at
Ting Ta'r Tid.*

To my mind, the Danish Piet Hein is a much greater hero than his Dutch predecessor. I must confess, though, that it took me a while to acknowledge this fact. Something like national pride came in the way; the belief that The Netherlands and its social-cultural history were so unique that a Dane only bearing the same name as a Dutch buccaneer dead for more than 350 years now could not amount to much. Is this ethnocentrism?

As I have never thought of myself as an ethnocentrist, I think not. Moreover, the Danish colleague who so eloquently enlightened me about public health not being the same as folkesundhedvidenskab is a prominent anthropologist who has published insightful work on migration and interculturalisation.

Possibly public health in Denmark does not have the appropriate standing or priority that is required. As a foreigner, I had always believed that the Nordic countries had a great tradition in social welfare and health care provision, including some astounding work in public health. It struck me, then, to read in an evaluation of the prestigious Danish National Institute of Public Health that *'The panel was surprised at the relatively low level of funding for the NIPH. It was noted that most European countries are currently investing much more heavily in public health and that Denmark appeared to be the exception here. The panel considered that Denmark could*

*gain enormously from a greater investment into public health research.'*¹

Perhaps as a lay person I might have had an excuse to be blind to other cultures' accomplishments, but the anthropologist I met certainly had not. Perhaps, therefore, we should label this phenomenon of framing complex and abstract notions (such as 'public health') as alien to the unique context of a certain environment as exclusionism. Note, here, that I am not just talking about countries like Denmark or The Netherlands any longer. For the same exclusionism I have seen in most if not all towns participating in the WHO Healthy Cities Project.

It appears to me it is important to say this, as it defines my public health perspective, as well as the focus I would like to establish in our training and research in Esbjerg.

Typically, I know very few public health professionals who could adequately describe what their trade is about. *'The health of the people,'* at best. But usually public health professionals think of their work in compartmentalised terms. They are health educators (*'educating people on their health'*), epidemiologists (*'studying people's health and disease'*) or policymakers (*'making health policy'*). Exclusionism.

But we are in academia. We should be thinking of more universal theories, and definitions. Interestingly enough, WHO itself only recently published a study which could either be heralded as

the first step toward better understanding what the inclusiveness of public health means, or on the other hand could be a support for further compartmentalisation. In 1998 the organisation issued its list of 'Essential Public Health Functions'². Essential! So, what are students of public health normally taught in their first course ('Public Health 101' or 'Introduction to Public Health')?

Having a more than superficial knowledge of public health curricula in Europe, the Americas and South-East Asia, I can answer this question:

*Public health
is the science and art
of preventing disease, prolonging life
and promoting health
through the organised efforts of society.*

Or, if the person teaching 'Public Health 101' has some more historical perspective, the full 1953 WHO definition – actually first proposed by Winslow in 1923 – is presented (or better, conscientious public health students will discover this version):

*Public health
is the science and art
of preventing disease, prolonging life, and
promoting mental and physical health
and efficiency*

*through the organised community efforts
for the sanitation of the environment,
the control of communicable infections,
the education of the individual in
personal hygiene,
the organisation of medical and
nursing services
for the early diagnosis and preventive
treatment of disease
and the development of social machinery
to ensure to every individual a standard of
living adequate for the maintenance of health,
so organising these benefits
as to enable every citizen to realise his
birthright of health and longevity.*

In most public health training settings, students take note of either one of these two definitions, try to digest the information, and then return to the order of the day, studying some epidemiology here, some health services research there, some behaviour change theories yonder, perhaps topped off with some work on empowerment, community organising and sprinkled with tidbits of political science and sociology.

Obviously, there is a profound danger in such an approach. It increases the probability of exclusionism. The Association of Schools of Public Health in the European Region (ASPHER) is one of very few institutions having established a policy aiming at the reduction of exclusionism

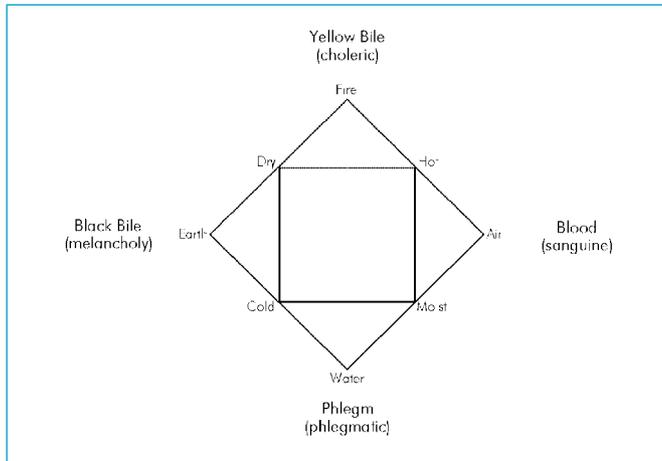
(though not using that word). ASPHER, in its Public Health Education European Review (PEER) mechanism, ascertains that one of the key elements of a public health training institution in order to be a 'Centre of Excellence' as well as a 'Centre of Relevance' is its explicit European dimension.

If I had my way, the complete 'Public Health 101' would deal with a deep reading and textual analysis of Winslow's definition. The students and I would perhaps even want to come up with an updated definition. I can be calm you – this is not what I would want you to work on this after-

to local and global public health needs as is needed in the 21st century.

These elements all fall under the banner of 'institutions'. Now, you may start to think of hospitals, care homes and perhaps health ministries, and right away I will have to warn you that these are just the physical expressions of what I see as institutions. I will explain why I say this after I have taken a necessary detour through the wonderful world of health determinants.

Public health has always been concerned about those things that create ill health. Unlike what many believe, this didn't start with the writings of Hippocrates and those around him, although his perspectives on humours and elements have influenced Western medicine almost through our Renaissance period. The ancient Greeks regarded the human organism as basically a stable system. Disruptions would cause the system to fail, and what the doctor (*iatros*) had to treat was the disease that was its consequence. The outside four 'elements' impacted on the balance between the four 'humours' in the body. So, a bad combination between fire, earth, air and water could cause disease. It comes as no surprise, then, that housing conditions in Hippocratic writing are viewed as important circumstances for the diagnosis as well as treatment of diseases of the occupants. Hippocrates is credited with having written the advice to *iatroi* that a good diagnosis starts with a good look at the patients' dwelling.



Hippocratic elements and humours
(from Porter, 1999)

noon. But I do want to present you with the elements of a teaching curriculum and research programme that endeavour to be not compartmentalised, not exclusionist, and as responsive

The idea of 'balance' in health determinants may have lost its prominence in modern, Western, high-tech medicine, but it is certainly famed in Chinese perspectives on health and wellbeing. Few people would not know about the notion of balance and complementarity between yin and yang. But yin and yang are not the essence. The key to understanding the Chinese perception of health determinants is *qi* ('chi') – energy. Energy creates our universe, the things around us, and our being. Yang qi is outer energy, the forces that circulate in the natural world. Pathogenic yang qi may enter the body, and impact on its interior yin qi. Yin qi nourishes and develops the body, and once it is subjected to yang qi the body may fall into imbalance, and thus ill health. Understanding health thus means understanding the world around us. In modern Western adaptations of these perspectives, the balance involved (sometimes referred to as 'holism' although I do not like that somewhat Aquarian term) is reduced to an individualistic perspective: if a person falls ill, he or she should endeavour to restore his or her balance with the inner and outer world. In ancient Chinese medicine and public health (although the separation between the two was never made there) restoration of balance and proper flows of qi might also involve structural and systemic adjustments. I wanted to present you with these antique perspectives because they teach us something. The

way in which ideas of what determines health are constructed is a product of time, space and culture. They are constructed by society, but also in terms of specific groups within society.

Thus, in order to understand what we, societies of the earlier 21st century, see as public health and the determinants of health, it makes sense to retrace the steps of the fathers – and occasional mother – of 'modern' public health.

The birth of modern public health is typically located by historians somewhere in the early nineteenth century. Colonialism had brought about the industrial revolution, which in turn stimulated the massive confluence of workers employed in cotton mills, shipyards and steel-works, among many of the new industries flourishing. These working masses were housed under often appalling conditions. Families of twelve in one-room apartments without any sanitary appliances were, for instance, considered quite normal in the inner city Stokstraatkwartier of Maastricht, one of the first Dutch cities to be part of this industrial revolution. Health effects were obvious; especially cholera outbreaks in urban environments became phenomena almost as accepted as changes in the weather.

Urbanisation, throughout history, has had enormous repercussions on health conditions. Cohen³ has described how the transition of the human race from nomadic peoples to sedentary



Peter Panum and the Farøer Islands:
the birthplace of Nordic epidemiology

ones created the evolution of entire new classes of endemic disease. The urbanisation process from village to megalopolis in the past has caused a wiping out of entire cities through epidemics of bubonic plague, typhoid and more recently influenza. As Roy Porter⁴ describes, complex geopolitics have been determined by raging disease. The end of the dominance of the Ottoman empire could be attributed to typhoid outbreaks debilitating defensive and offensive capabilities of opposing armies.

The industrial revolution and its associated urbanisation process had another important consequence: the rise of a more influential middle class. Professions like law or medicine were no longer the exclusive territory of an upper class elite, and an education was accessible to more, eventually even women.

All of these developments converged to the rise of a hygienic movement, first in Britain, but soon in most of the Western, industrialised world. Population health and demography, as a special form of statistics⁵, started to shed light on the patterns of disease outbreaks, and explanations for those patterns were pursued. Danish Peter Panum became one of the fathers of the new domain of epidemiology⁶. But it was British John Snow who, in 1854, finally could attribute a cholera outbreak to usage of water from a well on London's Broad Street, a feat that to date is celebrated by a small monument of a bronze

pump without lever in this street of the British capital: Snow taking off the handle of the Broad Street pump is now regarded as the herald of modern public health.

Ashton and Seymour⁷ have described this first stage of modern public health as *the environmental phase*. Public health officers were appointed, public health laws were enacted, and as a result sewage systems, clean water supplies and waste disposal became a public concern. Gradually, public health laws were to cover also the design and building quality of housing estates and entire city quarters.

Toward the late nineteenth century, germ theory as elaborated by famed scientists such as Robert Koch, Louis Pasteur and Ignaz Semmelweis took over. New possibilities emerged to identify groups at risk, and to design public health interventions dealing specifically with those groups. Ashton and Seymour call this *the individualistic phase*, in which vaccination campaigns, school and community health programmes and family planning endeavours took shape.

The early 1940s ushered in the third, *therapeutic phase*. Advances in medical therapy and the discovery of drugs such as insulin, sulfanomides and later penicillin caused a dramatic shift from systemic public health interventions to more individual approaches. There still is a general belief that, in the words of Daniel Ncayiyana⁸

(editor-in-chief of the South African Medical Journal),

(...) Because therapeutic intervention purports to offer instant and individual gratification to patients, providers and politicians, as opposed to the purported longterm benefits of preventive health that may or may not materialize, cure-based medicine also finds greater favour with less-informed societies. In addition, the emphasis on curative medicine is reinforced by the growth of the medical/ pharmaceutical industry and medical associations, which have a powerful influence on governments.

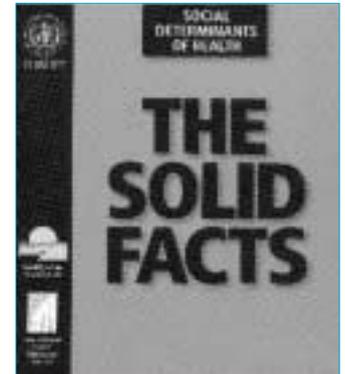
But – should we know, and act, better? We are surely not one of Ncayiyana's 'less-informed societies'? Thomas McKeown⁹ already in 1976 demonstrated that recent advances in human health and average life expectancy could be attributed more to the interventions from the environmental phase than to those from the individualistic or therapeutic phase. Work on the pervasiveness of inequalities in health, most notably by Wilkinson and Marmot^{10 11}, strongly suggests that systemic and structural approaches of the determinants of health which lie outside the realms of the individualistic and therapeutic phase will produce the greatest health gains. In *The Solid Facts*¹² the World Health Organisation describes the existing evidence

about social determinants of health – and perhaps we should call our current state of public health the, fourth, social phase: Ten classes of social determinants of health (namely the social gradient, stress, early life, social exclusion, work, unemployment, social support, addiction, food and transport) are currently held responsible for the largest part of preventable years of life lost and preventable loss of quality of life.

As an aside, I should mention in this context that it is no longer important how long we are expected to live (life expectancy), but how *well* we live our lives. In most industrialised nations, life expectancy is stabilising (or sometimes dropping, such as in Denmark) around the age of 80 or so. But of those years, the number of years spent in ill health is increasing!

The message, then, is that if we are to achieve any significant further gains in public health and not just life expectancy, we would have to invest solidly in addressing these social conditions. Some countries are attempting this. In the new Swedish national health policy social determinants of health feature most prominently¹³. In a recent official Dutch report the government is urged to invest in, among others, employment policies, social and physical work conditions and schooling in order to reduce inequalities in health^{14 15}.

Still, in OECD countries only between 0.1% and 4.0% of the total government health budget is



allocated for public health purposes, in spite of grand intentions and eloquent government memoranda (The *Lalonde Report* from Canada, *The Nations' Health* from the USA, and *Regeringens Folkesundhedsprogram* from Denmark are only examples).

Often, when I or others have voiced this critique, opponents would say that 'People get the politics they deserve', or sometimes more bluntly, that 'People don't really want your so-called systemic interventions. They do want instant gratification.' Such antagonists, I feel, doom public health, and we are supposed to ask better questions and generate better, credible, and feasible answers in order to recreate the role of public health as the central field for the promotion of health.

The first such question one of my Maastricht PhD scholars has been working on dealt with this critique:

OK – so we know what traditional epidemiologists say determines health. We also know what the innovators in that field say about social determinants of health.

But do we know what people perceive to be the determinants of their health?

And do they then actually get the politics and policies they deserve?

Matthew Commers¹⁶ managed to answer those

questions in an awfully thorough yet elegant way. I will spare you the methodological details, but this is what he found:

If people are prompted to list the causes (or determinants) of their health, they almost exclusively list lifestyle related issues. The Dutch and Danish Ministers of Health should be happy, because the general population follows the belief of their official government adage that they should exercise more, smoke less, drink less alcohol, improve their nutrition, and engage in safe sex. Good, but not good enough. We just saw that determinants of health go beyond individualised concerns: addressing social determinants of health require a popular as well as political belief that systemic factors are at work for or against health.

But people are not foolish. When Commers asked them which of a list of determinants of health (which included environmental, social, and genetic factors apart from the lifestyle factors also mentioned) were impacting on health, the structural determinants strongly surfaced in popular belief.

Dr. Commers then reviewed the Dutch newspapers to see to what extent these structural determinants were addressed. For the general idea is that the media have an agenda-setting function for social and political agendas. Much to our surprise, Dutch newspapers did report on those factors – but obviously without the effect desired

by advocates of fourth phase public health: policies remain to restrict themselves to the stimulation of individual health promotion practices. But making policy, taking decisions (politics), is peoples' work¹⁷. So, in a clever last move, Comers approached a handful of people that were beforehand identified by their colleagues through a Delphi-procedure as 'most knowledgeable and influential' in the field of health policy making. And here it gets interesting. These people, confronted with the results of the earlier research, invariably said 'Yes, but...':

*Yes, we need structural health promotion,
but we can't sell it to the people.*

*Yes, we need to look beyond lifestyles,
but there is no epidemiological evidence that
other approaches work.*

*Yes, we need a new public health,
but we can't change the profession from one
day to the other.*

Now we come to the crunch. I took you on a detour through determinant thinking in order to return here on the right path. I have described the various phases of public health development. Most academic public health work, even today, is focussed on the second and third phases (whereas the first phase, as it originated, is still much the realm of engineers). Important work for our understanding of the substance of

the fourth phase cannot be expected from that, still enormously important work. We do need epidemiologists, health services researchers, individual health behaviour changers and a host of biomedical scholars to make us understand the basics, indeed the foundations, of public health. But the basics are not enough: some authors have called for or even observed a paradigm shift in public health thinking^{18 19}. As an aside, an anecdote on 'paradigms'. Thomas Kuhn²⁰, in his seminal *The structure of scientific revolutions*, launched the paradigm notion into popular vocabulary. In the 1970s and 1980s there seemed to be no scholarly discourse without reference to paradigm shifts. Even community health workers were at some point infected by the term. About ten years ago I submitted an article on food and nutrition health promotion, and I argued that we should try to step away from the individualistic paradigm, and embrace a more systemic paradigm for that field. The article was rejected. One of the reviewers was furious for my blasphemy: the Great Kuhn would turn around in his grave could he see such an ignorant use of the term.

I am therefore hesitant to speak of paradigms or paradigm shifts in this context. As Kuhn admitted in an epilogue to his great work, there are scientific domains in which different perspectives are still competing. He uses the term com-

measurability to describe the degree to which different paradigms are in competition or coherent with each other. But I now admit that usage of paradigms in this context is inadequate – inappropriate. What I do see here is public health development. Maybe it is for that very same reason that the British government established an innovative Health Development Agency last year. Or would that be just a play with words – health development being a neologism or euphemism for the worn-out ‘health education’ and ‘health promotion’?

Anyway, we are entering a new stage of public health development that builds on previous accomplishments but which should ask new questions. The most important question, it seems, is how to reconcile the traditional in public health with the innovative.

Or rather, with what is perceived to be innovative. A few weeks ago I attended the meeting of the Scientific Advisory Committee for the Fourth European Conference on Effectiveness in Health Promotion. We were debating how the conference programme should demonstrate the effectiveness of novel approaches. One of the people attending the meeting disgruntled the others by observing consistently that the effectiveness evidence for those novel approaches had already been amassed twenty or thirty years ago in other scientific domains, but never accepted or implemented in the public health field.

The question, rephrased, becomes then: which are the barriers and factors conducive to the adoption of new and existing insights by the public health domain?

I accept that some colleagues would now jump with delight and start reciting the gospel of innovation, so well articulated by Everett Rogers²¹. Others would perhaps stick to policy implementation work, like that of Sabatier and Mazmanian²² which I highly admire. And some would see a connection with work by Mary Douglas²³ or Bruno Latour²⁴, who appropriately place innovation in networked social constructions.

But I need a more overarching notion in order to reconcile the apparent contradictions between ‘old’ and ‘new’ public health, between health knowledge and actual health behaviour, and between plans and practice:

institutions

Basically, institutions are systems of order that create, act on, preserve, and legitimise complex forms of common knowledge. Given the task of stabilising the identity of a society, institutions emerge from what Burke calls an act of constitution: that is, institutions enact norms necessary for social problem-solving²⁵.

So, when an innocent Dutch person like myself is astonished by the Danish custom of downing

a couple of beers early in the morning in front of the local kiosk, or flabbergasted at the routine of serving a cup of salted animal fat to spread across the slice of rye bread before applying the herring (which, actually, is delicious!), I would not start to wave my finger in a warning gesture. Rather, I would like to understand what it is that makes the Danes behave like they are still a rural, agricultural society where you need a good bit of kilojoules, a solid fat intake and a cold Albani øl in order to survive. As soon as I would comprehend what conventions this society shares in (health) behaviour I would feel more confident in trying to change some of that behaviour. Another example. About six weeks after I settled here to become a Dane, Dutch Radio One tracked me down and wanted to interview me for a series of documentaries on European health systems. I agreed with hesitation, because I did not feel sufficiently acclimatised here yet. The radio interviewer had done her homework well. She had the data on the break-down of the Danish health system memorised. Waiting lists, the emergence of private clinics and private health insurance, the dramatic drop of Denmark in the ranking of European life expectancies. She told me she had expected much discontent; she had walked around Copenhagen and Odense in order to interview the common Dane, expecting disheartened people, dissatisfaction with the system, a popular uprising in the making. But gen-

erally, people felt proud of the Danish health and welfare system, expecting this apparent glitch in the system to pass by sooner or later. Hannah Ahrendt²⁶ had an insight which I can't withhold from you in this context. She said that an institution is a body of people and thought that endeavours to make good on common expressions of human purpose. The Chinese believed in the *power of qi*, the Danes in the *system*. If the Danes, through thick and thin, remain to believe in the good of the system (even when it is evident that it is breaking down) the situation has to worsen considerably before action is taken. As John Kingdon²⁷ has pointedly said: 'Only a disaster is guarantee for new policy'. But when the disaster strikes it might be too late.

In fact, the condition is probably even worse than I paint it here. As I stated before, most health gains are probably to be generated not by further investments in the health care system. Those investments very likely produce no significantly prolonged life spans, but on the contrary, prolonged years of suffering. Investments in health require a rethinking of the contributions made by work and employment, friends and family, the natural and aesthetic environment, education and leisure, and perhaps most important of all, the economy, to our experience of health. The health care system is breaking down, and in spite of a Folkesundheds-program public

health will conceivably go down with it. Benjamin Franklin has said "Early to bed and early to rise – makes a man healthy, wealthy and wise." No longer so, I'm afraid. The maxim these days probably read "Dow Jones and FTSE to rise – makes people healthy, wealthy and globalise." This brings me to my last point.

**Dow Jones and FTSE to rise –
makes people healthy, wealthy and globalise.**

Marshall McLuhan²⁸ many decades ago coined the notion of the 'global village'. Friendly and romantic as it may have sounded, only the 'global' part will remain valid in the coming years. Most people in the world of tomorrow will live not in villages, but in megalopolises, megacities. This has enormous consequences, not in the least for public health. Let me highlight just two of those inescapable observations. Whether the participants in 'the Battle of Seattle' and other protests against globalisation are right or not (and I think they are right, but oppose their methods) the world is becoming increasingly interconnected. Global television networks such as CNN or BBC World market, consciously or not, certain lifestyles and perspectives. These impact without a doubt on peoples' health practices²⁹. There used to be a time when little football players in Ouagadougou played barefoot.

These days they aspire to wearing Nikes some day. Nike might be the single largest advocate of healthy exercise in the world. Coca Cola Inc. manages to deliver its products to more places in the world than there are villages with clean, affordable piped water. If any public health professional ever has seen the gigantic Coca Cola refrigerator in a village like Santiago de Texacuangos in El Salvador, he or she should have observed that the same village does not have access to vaccines against the most common childhood diseases. Saskia Stassen has analysed this globalisation in terms of converging characteristics of global cities³⁰. To some extent, Copenhagen is no different from Bangkok than it is from Stockholm.

Globalisation thus also means converging global institutions, in the sociological sense I just described. This observation might explain the global success of the Healthy Cities movement. But much has still to be understood and accomplished³¹. I would propose that using the institutionalisation concept would as yet be more powerful than the current foci on things such as 'social capital' and 'governance'. Even the term 'social epidemiology', coined some twenty years ago by Leonard Syme³² is still subject to much debate, and public health, unfortunately, plays only a peripheral role in influencing the directions and goods of the globalisation process or even the thrust of local public policy.

City; country	Population 1999	% increase expected	City; country	Predicted population 2015
Tokyo, Japan	26.3	2.6	Tokyo, Japan	26.4
Mexico City, Mexico	17.9	15.8	Mumbai, India	26.1
Mumbai, India	17.5	72.7	Lagos, Nigeria	23.2
Sao Paolo, Brazil	17.5	23.4	Dhaka, Bangla Desh	21.2
New York, USA	16.5	6.7	Sao Paolo, Brazil	20.4
Los Angeles, USA	13	13.5	Mexico City, Mexico	19.2
Shanghai, China	12.9	11.2	Karachi, Pakistan	19.2
Lagos, Nigeria	12.8	125.3	New York, USA	17.4
Calcutta, India	12.7	12.7	Jakarta, Indonesia	17.3
Buenos Aires, Argentina	12.4	18.6	Calcutta, India	17.3
Dhaka, Bangla Desh	11.7	124.3	Delhi, India	16.8
Karachi, Pakistan	11.4	97.4	Metro Manila, Philippines	14.8
Delhi, India	11.3	69	Shanghai, China	14.6
Osaka, Japan	11	-0.3	Los Angeles, USA	14.1
Beijing, China	10.8	35.2	Buenos Aires, Argentina	14.1
Jakarta, Indonesia	10.6	88.4	Cairo, Egypt	13.8
Metro Manila, Philippines	10.6	59.4	Istanbul, Turkey	12.5
Rio de Janeiro, Brazil	10.5	16.9	Beijing, China	12.3
Cairo, Egypt	10.3	44.3	Rio de Janeiro, Brazil	11.9
Seoul, South Korea	9.9	-3.2	Osaka, Japan	11

The Worlds biggest cities, 1999 and 2015 estimates in millions. City sizes on basis of urban agglomeration, not administrative boundaries (APEC, 2000)

Thus, I advocate an institutional focus of public health. Such a focus would yield important new questions, but more importantly, I feel, the much needed disciplinary interconnectedness we seem to be lacking in our field³³.

Some examples of the new focus we could bring into our teaching and research here in Esbjerg:

INSTITUTIONAL EPIDEMIOLOGY AND DEMOGRAPHY

Epidemiology traditionally has been concerned with the study of occurrence of disease and ill health in populations, and the attribution of patterns of disease and ill health to certain biomedical and behavioural risk factors. Social epidemiology took the science a step further: it aspired

to relate health phenomena to social contexts and constructs. If we would redefine those social factors as institutions, we would be able to determine how norms and values impact on society's creation of healthful and health damaging situations. Institutional epidemiology and demography would thus not only collect and analyse data on health and attribute those to specific biomedical, environmental and behavioural risk factors, but further endeavour to map the influence of norms, values and social interaction on the creation and maintenance of those social determinants of health. With our new colleague Kim Bloomfield I am confident to have an excellent scholar to develop this field.

INSTITUTIONAL HEALTH PROMOTION

Born in the early 1980s, the realm of health promotion has achieved a lot, and yet is still subject to much scepticism and critique. In some countries the innovative stance of health promotion

Health promotion is the process of enabling individuals, groups and communities to increase control over the determinants of health and thereby improve their health

has even (unfortunately) regressed to more traditional behaviour modification: health education. However, in the mainstream there is increasing recognition of the fact that peoples' choices and peoples' behaviour are not only the attributes of social psychological constructs such as beliefs, attitudes, efficacy, and the black box of 'social norms'. Community action, empowerment strategies, and social capital approaches are finding their way into this field. All of these activities share a focus on institutions: how do neighbourhoods feel capable of influencing health and quality of life? Why is it that work site stress prevention programmes work better when the bosses and executives have participated in similar endeavours first? How does group work with chronically ill people enhance their sense of coherence and coping capacity? The key to understanding these questions, and the first step towards their answers, lies in our insights in the social processes that make groups feel groups, with a shared sense of purpose and implicit or explicit parameters for acceptable social behaviour. Not only as an aside, I would like to stress here that mental health promotion should acquire more prominence in public health generally, and if possible, within the Syddansk Universitet specifically. Flemming Svejstrup, who has been here long before I even knew a place like Esbjerg existed, has been dealing with these and similar questions for over twenty years now.

I have already learned a lot from him, and I am certain that we could further develop this field effectively with his highly valued input.

INSTITUTIONAL HEALTH POLICY

Policy, health policy, is about institutions. Often, policymaking is only codification of already existing consensus. But the kind of health policies we would like to see advocated in the social phase of public health (also called 'healthy public policies', cf. Nancy Milio³⁴) require rather radical institutional rethinking.

For the third time I'm mentioning the WHO Healthy Cities Project, and finally with some substance associated: the drive of the Project since its inception in 1986 has been the development of local health policy. First, the ambitions were described as '...to put health high on social and political agendas'³⁵. In the Second Phase of the Project, cities committed themselves to the production of City Health Plans. And in the current Third Phase the aspiration is to produce City Health Development Plans. Those Plans are strategic endeavours in which all sectors impacting on or responsible for all determinants of health are accountable for local health. All determinants, and all sectors, including communities, businesses, as well as the public sector. This is quite an ambitious approach for Healthy

Cities. It requires true innovation at the institutional level; perhaps the greatest problem I have determined in my research on WHO Healthy Cities is what we could call 'domain exclusionism', or what Joe Gusfield³⁶ has determined as ownership of public problems: as soon as you talk 'health' ownership of related policy is attributed exclusively to the health sector. And often the health sector is perceived to be 'doctors, hospitals and pharmacies', which does not really enhance the possibilities of a broad, inclusive, social public health.

Institutional health policy research should therefore focus on the mechanism to make policies for health inclusive, institutionalising the roles and responsibilities of all sectors I mentioned. My research has shown that two issues are crucially important in successfully doing so: social entrepreneurship, and the capacity to use language as an instrument for change³⁷.

And this is our third research priority: to develop further understanding of the role of people and the language they use in changing institutions, and transcend domain exclusionism. Only then we will really be able to make the health policies people deserve to promote every dimension of their health.

You may have gotten the impression that I have neatly cut up the field of social public health into some interesting research priorities. If this is the

case, I would like you to think again. I would endeavour to reduce exclusionism by taking the institutional perspective. This means that we have to base our research and teaching on solid foundations provided by more traditional public health perspectives. Institutional epidemiology will have to rely on methods, techniques and traditions from mainstream epidemiology and then enhance itself by taking the institutional perspective. That perspective, subsequently, provides the linking pin with other areas in our research and teaching. If we want to investigate health policy, for instance, the elementary infor-

mation we will use comes from both institutional epidemiological research as well as institutional health promotion inquiries. The scene can be reversed, too: institutional epidemiological studies will benefit greatly from insights provided by health policy surveys.

Let me for a moment reflect again on the external evaluation of NIPH which I mentioned at the beginning. The evaluators also stated that increased funding should allow for better strategic and health oriented research priorities. The institutional public health perspective that I have suggested here could possibly serve as a basis for such priorities. Ultimately, in Esbjerg we will also be training the professionals of tomorrow who would contribute to such priority-setting. You might wonder, though, whether I am fantasising perhaps too much. Institutional public health may sound nice, but is it reality-based? In other words, can we make it happen? I would only point at a recent national endeavour in The Netherlands to make data on health and disease, on social, physical and hereditary determinants of health and disease, on socio-economic and demographic qualities of society, available to all communities, health workers and policy makers in just the way that is required for an institutional public health programme.

www.nationaalkompas.nl gives internet users horizontal, vertical, lateral, in-depth as well as

The start page of the Dutch 'National Kompass' (National Compass) website.



popular presentations and interpretations of these data. It can be done!

Perhaps the best fitting metaphor here is the one of building a house. There may have been a time when an unskilled man or woman could fell some logs, and piece together a cabin. Romantic though this still seems, a modern house has other requirements. A logger or carpenter, in North-West Europe in the year 2001, can no longer create the average house with all of its amenities. I can tell you, one needs electricians, plumbers, carpenters, walling specialists, painters, window specialists, and I could just go on and on. And the most peculiar thing is that if those specialists don't work together, you won't really have a house: they'll *have* to collaborate. Similarly, if we are to build a public health house here in Esbjerg, for Southern Jutland, Denmark and the world, we need a vast range of disciplines to collaborate. A roof without walls is only a collection of timber.

I am certain that the Syddansk Universitet campus in Esbjerg is a superb environment to be building that house. I am looking forward to work with most, if not all, of you to make this happen. Even, in the words of Piet Hein, if Things Take Time.

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Low Back Pain

- a behavioral and biological challenge

LBP-Professorial Seminar
October 17, 2000

Tom Bendix



Tom Bendix

Professor, Dr. Med. Sci., Rheumatologist

Tom Bendix was born in 1943, and graduated from University of Copenhagen Medical School in 1972. After a broad-based clinical education, he became a specialist in 'Physical Medicine and Rehabilitation' in 1995. Due to a fusion of specialties, he became a rheumatologist as well.

His professorship at the University of Southern Denmark is attached to the education of clinical biomechanics students, later becoming chiropractors. Therefore, he is also a part-time chief physician at the Back Center, Funen Hospital Ringe. There he has started a Back Research Center, mainly based on private fundings.

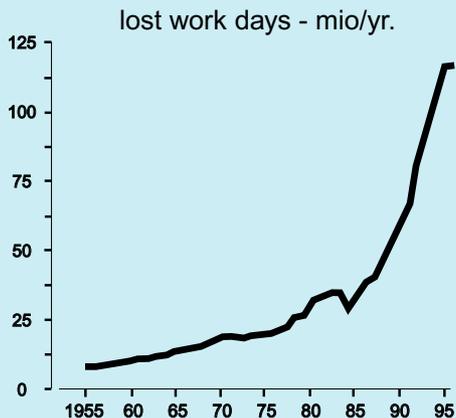
He has published a variety of scientific and review articles on various back issues, his thesis dealing with sitting-posture biomechanics.

LOW back pain (LBP) represents one of the largest health-care problems in the industrialized world today. The LBP-associated costs are estimated at 10 billions Danish Kr. a year.

The most dedicated reason for being serious about this is that the problem in terms of sick listing etc. has increased incredibly through the last 4-5 decades. If this was caused by a deterioration of the low back biology, the reasons for that had to be taken into account to reduce the problem. However, if the main reason is growing awareness of the problem, it should be handled totally differently.

Particularly in Great Britain it has been possible to follow the change on this matter. It seems as though it has culminated, whereas in Sweden and the U.S. the increase leveled off already in the late eighties, but in these countries the level had reached a tremendous height at an early stage.

FIGURE 1



In the 70'es it was believed that the reason was an increase in hours spend sitting each day. Today we know that a study from 1972 was the only one to indicate such conception. All other studies have shown that those people predominantly sitting during the work day, do not suffer more from low back pain than those with more variable postures. A slightly higher level of pain by those with physically loaded jobs is seen, but it is not known whether it is the cause, or if it is reflecting the fact, that if you do have pain you will experience increased problems by performing a physically demanding job.

Also the increasing stature and body weight has been claimed to contribute. However, the enormous increase in sick leave etc. can certainly not be explained by these factors. Only those being *extremely* high/heavy report more back pain.

If our backs had deteriorated more, it is fair to assume that a higher number of people would report back pain. This is however not the case throughout the last 3 decades.

Thus, it does not seem that biological based pathology has changed but those having back pain are more often sick listed and treated than before.

LOW BACK PAIN BIOLOGY / PATHOLOGY

The purpose of the present article is to prioritize the general back problems, whereas pathology

will only be touched briefly.

In spite of an enormous research it is still not clear what the mechanisms behind back pain are in most of the cases. The majority of researchers agree that the disc plays a central role but how much it means to one specific case however, is often hard to say.

For descriptive purposes the following groups are considered:

- specific back pain
- back pain with sciatica
- non-specific back pain

In the first group at least the following situations are included; cancer, spondylitis/ spondylo-discitis and fracture. According to a different group of researchers, the following pathologies are or are not included in the specific group: the question is whether additional cases of degenerative conditions could be included here, e.g.: some cases of discography-positive pain?

Can some cases of facet- or sacroiliac joint-pain be included here, if 2 or 3 repeated diagnostic blocks indicate that the pain origins from these joints?

Included in specific sciatica:

- clinically relevant herniated nucleus pulposus (HNP). This seems to be equal to a MRI/CT-demonstrated "dome" on the disc caused by nuclear material and not just a locally protruded annular tissue or scar tissue following

a healed herniation.

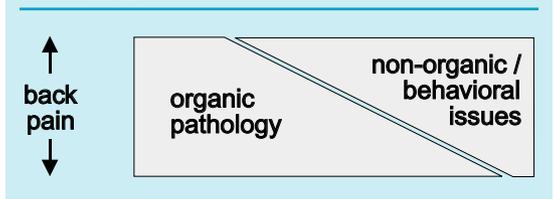
- chronic nerve damage, e.g. caused by an earlier herniation combined with narrow space in the recess;
- spinal or recess stenosis to an extent where the local blood supply is diminished and the nerve tissue is accordingly deteriorated.

The nonspecific LBP represents (in any case) the biggest group irrespective of how liberal pain mechanisms like those above are accepted as being specific. At least between 70 and 90% of the cases with low back pain are included here.

THE BIO-PSYCHO-SOCIAL MODEL

Although physical workload is correlated to LBP, there are not much evidence that biological factors like X-ray, posture, manual tests etc explains LBP very much. The evidence of psycho-social/ behavioral factors seem to be stronger.

FIGURE 2



The interaction between biological and psycho social factors can schematically be presented like

Fig. 2. Different individuals are located along the horizontal part of the model, whereas the height of the rectangle represents the reported pain. At the left part of the rectangle are those with a pure organic cause behind the pain - irrespec-ting if we are able to demonstrate this reason or not. To the very right a small area may represent the pure neurotically caused pain, which is actu-ally very rare. To the left of the middle are the individuals with a major contribution from organic factors, but also a psychological compo-nent. This is almost always the case when the pain is chronic. To the right of the middle are the individuals with a minor part of the cause being organic and where psycho-social factors are the dominant issue.

One of the strongest “proof” of psycho social factors is the issue of working/not working: From countries with workers compensation this has been shown: Those individuals on long term dis-ability (LTD) leave generally suffer from more pain and psychological problems partially and indirectly due to being paid during the sick leave, as compared to those who initially had a compa-rable level of back pain, but returning to work earlier, due to no economic compensation.

Job satisfaction

Those being satisfied with their jobs as well as those having to provide for their families do return to their jobs earlier in spite of back pain.

Physical demanding jobs correlate to more LBP. However, according to a twin study, genetic fac-tors are shown to be much more relevant as cause of disc degeneration than physical loads. The interplay between pain and physical load is not that physical load contributes much to the origin of back pathology (at least disc degenera-tion). However, it does seem that if one has a certain back pain and a job with hard physical loads, it gives more problems as compared to the same pain at a person with a job performed while sitting.

Non-specific fear

It is striking that a fear-avoidance information has demonstrated better effect on having peo-ple return to work than what the several classical LBP treatments have been able to document. Please see the attached chapter of Indahl.

Why has the LBP problem increased?

Any given pain today is most likely experienced as being worse than 50 years or more ago. This is likely because earlier LBP and other pain were a natural part of life and most people were aware that there was not much to do about it. Nowadays however, people with pain have their problems “repaired”: hip replacement, effective treatment of pneumonia, diabetes etc. etc. Therefore, it is more difficult for people to accept back pain because they expect that this

pain can be treated as well. This is however not always the case.

This is not easy to accept, e.g. because many people inside and outside the official health care system advertise their treatment as highly effective.

Earlier on, most people had no problems accepting the diagnosis lumbago, though this just means “back pain” and certainly is not an explanation. Today people are much more critical and demand X-ray, scans etc. But such tests will in most cases not contribute any useful information and in many cases even do the opposite in case of a clinical irrelevant observation, which may only worry some patients. Moreover, the time spent on waiting for these test results may also increase anxiety.

Especially through the seventies it was a general conception that physical loads were almost “dangerous” for the back. In ergonomics, the messages were: “be careful with bending forward, lifting without simultaneously bending the knees, sitting in a hunched posture, etc.” There is no doubt that several people have focused very much on the back and obtained an irrelevant local muscular co-ordination as described in the attached chapter by Indahl. At least the classical back schools that provided such information do

not seem to have had any significant effect, in some large studies actually the opposite.

Increased attention often leads towards treatment. Even though such treatment may often improve the situation, in several other cases it may also work as a contributor to maintaining the focus on the problem.

As a further explanation it should be mentioned again that economical benefits and sick leave also plays a contributing factor in the increasing problem.

TREATMENT / COPING

Today's conceptions are that issues like *activation, information, fear avoidance* should be central in the contact with the patients while components like *multi disciplinary* and *best evidence* should be the headings for which strategy and decisions should be made. *One reason* for a multi disciplinary approach is to avoid the oftenwise several different explanations from different health care providers, which often confuse many patients.

These principles have been used thoroughly in different guide-lines/medical technology assessment reports in the hope of implementing today's knowledge.

Fear avoidance - as described by Indahl - represents very difficult messages for the patient to absorb, but if carried out properly documented to being very effective. The demand for such information to be effective is having sufficient time at the consultation, much more than is spent at a typical health care provider today. One problem that the patient has, is that the pain cannot be "documented" by X-ray or blood samples and this may make those people around the patient distrustful. This again creates the need to show that you really do have pain. The distrust for the health care provider may be particularly strong when the message: "You should ignore the pain" is presented.

Whether activation is effective mainly due to the attached physical issues or because you, while being active, focus less on the pain than if you were sick listed, is not always clear. Many data indicates that "the back can be used much more than we usually believe". Even in case of acute disc herniation people maintaining their work seem to do just as well as those being sick listed for two weeks.

But the option of gradual return to one's usual work loads while the pain is especially serious is obviously preferable. Nachemson has said: *"Let's forget about spinal flexibility, ...and go for workplace flexibility!"*

Medication: NSAID - not muscle relaxation drugs - have a documented effect. Morphine is usually advised not to take.

Manipulation has shown a general documented effect on acute LBP, while physical training did so in case of chronic LBP.

It should be stressed that documentation of these treatments actually means that it helps about one third of those treated and that the average effect, in those who benefit from it, is not impressive.

Other modalities have either very little or no documentation in case of non-specific LBP. In case of sciatica, documentation exists for surgery in herniated nucleus pulposus and for spinal stenosis. Now documentation for fusion surgery in case of some situations with segmental chronic LBP is also available.

Psychology obviously plays an important role but that does not imply that it is relevant to treat people psychologically. At least the way it has been done so far has not shown impressive results.

SOME DILEMMAS

- X-ray, CT/MRI and other paraclinic examinations obviously offer advantages. However

especially if the patients have to wait for such tests it may increase the fear in these cases.

- Patient associations often use the media to encourage people to contact their doctors immediately in case of unclear symptoms, because “it could be the first sign of cancer”. Such messages may be OK, but may also create unnecessary fear in the majority of people who live with back pain, where the cancer diagnosis is not relevant.
- It may be fair not to hide the information if a mistake was made having overlooked a spinal tumor. But if it is made public, however, many other people with back pain may believe that they may have such a tumor as well - especially in connection with the message that the health care providers do not find any certain explanation of the pain.
- Even though treatment certainly helps many cases, most people generally do better by neglecting the pain as much as possible. This is however vanished because there are always many who - with the best intentions - try to recommend various treatments.
- Ergonomic arrangements may be helpful in certain cases but in others it may increase the focus on the problem.
- It is fair enough to receive “economic compensation” after a work injury. Unfortunately it is also documented that such cases very often influence the optimal pain coping in a negative way.
- It is also fair that some people obtain pension because of a chronic back pain. There is however a “grey zone”. In the long run such pensions generally harm more people than it benefits.

SUMMARY

From today's knowledge it is generally best to keep active despite of LBP - thus also keep working. Flexibility in the workplace should have even greater focus than what has already been stated, enabling a

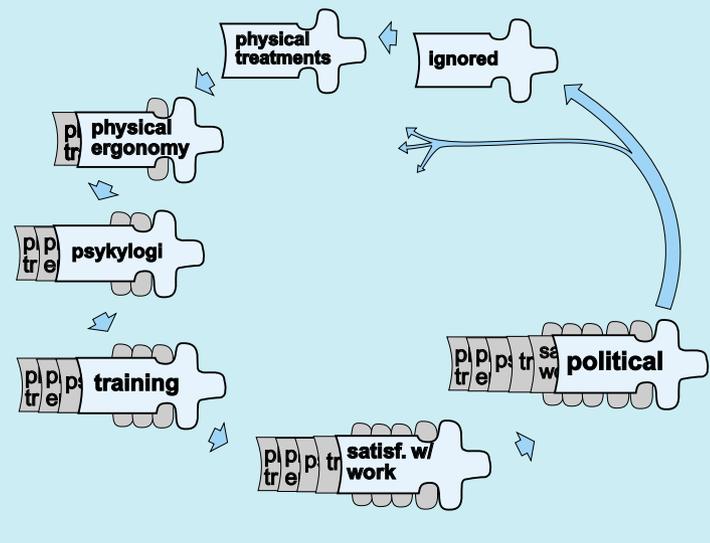
- gradual return to work
- less physical demand when the back pain is flaring up. (or is especially bothersome for the employee)

By creating confidence it seems possible to give people a more relaxed and natural movement pattern. This may physically reduce the risk of awkward movements and thus pain induction. If they are given a fear-avoidance based information that they have understood, it may psychologically make the person “listen” less to the pain.

Throughout the last few decades several modalities aiming to reduce LBP have been accepted with enthusiasm. Unfortunately, several randomized control trials have in many cases reduced this enthusiasm. Even worse: several applied modalities have even increased the LBP problem in society as well as for the individual patient.

What has happened may schematically be presented like on Fig. 3: Historically people have not focused much on back pain. Then a variety of physical treatment modalities showed up that gradually have been supplemented by others. However, now we seemingly should return to the conception that we better focus on neglecting the symptoms as much as possible. But there is still a lot of situations where treatment of back pain offers advantages. It is a hard job to sort out who needs what. It is not less difficult to convince those with back pain to neglect it after decades with the intensive focus on back pain which we have created. But much evidence points towards such a conception being the most optimal and beneficial.

FIGURE 3



FOR REFERENCES:

Those Danes who want to see references are kindly requested to see a Danish article close to the one above: www.rygforskningscentret.dk › Faglig baggrund › 'Ondt i ryggen'.

**To treat or not to treat,
that's the question?**

Aage Indahl



Aage Indahl

Chief Physician, Dr. Med. Sci.

Aage Indahl is a Norwegian, born in 1946, and graduated from University of Bergen, Medical School in 1977. Became a specialist in 'Physical Medicine and Rehabilitation' in 1988. Presently he is working at the Coastal Hospital of Stavern, and also a part time researcher at the National University Hospital, Oslo.

His main contribution to the field of Low Back Pain is studies showing that optimal coping strategies generally seem superior to conventional treatment. The 'fear-avoidance' type of coping is based on data from several studies on back neurology, which are also included in his doctoral thesis from 1999: 'Low Back Pain - a functional disturbance.'

THE increase in disability for chronic low back pain has been described as a western epidemic. Of great concern in Norway is the increase in disability in young people. The increase seems to be highest in areas with high number of health professionals. The thought that there may be a link between these two phenomena seems reasonable.

Looking at the different treatment modalities that are offered for low back pain, the wide range suggests that there is really no very effective treatment. Systematic reviews and meta-analyses all seem to point in that direction. Even if evidence-based medicine confirms some treatments to have “strong evidence” for their positive effect, the clinical effect that is proven is usually small and in several cases only positive when compared to being on a waiting list. If two treatments are compared they usually cancel each other out.

From having a mechanistic view on the origin of low back pain during the past decades, the trend has shifted from ‘bio-’ to ‘bio-psycho-social-’, towards now may be even more seeing ‘psycho-social’ factors as being the cause. At a recent pain meeting 70% of the presenters were psychologists. This suggests to me that the medical profession may be giving up finding the cause.

But this ‘giving up’ should certainly be changed. It may be sufficient to remind you that it is only a short time ago that peptic ulcers were regarded as an important psychosomatic disease. The psychosocial factors may just as well be results rather than causes.

In medicine we like to think that our treatments are based upon knowledge of what is wrong. In the case of low back pain it rather seems that our treatments are more based on hypotheses than on knowledge. Our theories of dysfunction outweighs our knowledge of function. To illustrate this it is sufficient to point to “sacroiliac dysfunction” that was described a hundred years ago, but still the function of the sacroiliac joint is not firmly established.

Can we cause harm if we treat patients with ineffective treatments? A study from England seems to point in that direction. A randomized controlled trial of psychological debriefing for road traffic accident victims with a three-year follow-up was performed (British Journal of Psychiatry 2000; 176, 589-93). Patients hospitalized for road traffic accidents were randomized to intervention or Control. The intervention consisted of psychological debriefing. At 4 months there were no difference. At 3 years the intervention group did significantly worse. Patients who initially had high intrusion and avoidance symp-

toms remained symptomatic if they had received the intervention, but recovered if they did not receive the intervention.

How can we be sure that we are not escalating the problem with our treatments? The increase in chronic low back pain the last 40 years may indicate that. What has happen that has caused this increase? There is no simple answers, but medicalization meaning that the focus from the medical point has increased and made it into a disease rather than a suffering.

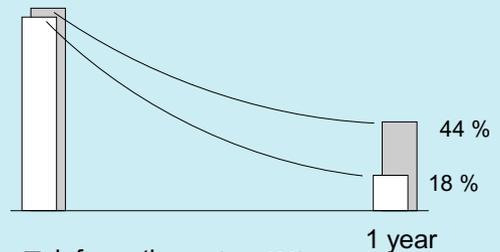
Fear avoidance behavior has been in focus for many years and seems to predict some of the poor outcome. This may sound like there is something wrong with the patient, but it need not be the case. It might be that it is not actual 'fear of pain' that has altered patients' behavior, but rather 'uncertainty'. The health professionals may have caused this uncertainty. Our different and often conflicting hypothesis of the pathology may have left the patients bewildered and uncertain.

In my experience, the patients are usually not afraid of pain, but rather afraid of doing something that may cause more harm. Can we improve the outcome for patients if we take away the uncertainty?

The results from our controlled clinical trial certainly points in that direction. Patients were allocated to either intervention or usual care. The intervention group received a thorough physical examination. CT scans were taken and education was given designed to reduce fear and uncertainty about back pain. At 1 and 5 years follow-up there was a substantial difference in return-to-work in favor of the intervention, as illustrated for the 1-year data on the figure (Spine 1998; 23: 2625-30).

SICK LISTED

Sick listed



Uncertainty may result in more loss of coping that fear. When you are uncertain you do not know what to choose, especially if you have two conflicting choices.

To get an diagnosis, *understandable for the patient*, may be a good contribution to recovery. If patients do not get an answer to their question of where the pain does come from, they are more likely to increasingly listen to their pain. Pain is their only due to what might be wrong.

This is like getting a noise in the car. If we do not find out where it comes from we will keep listening to it with great attention. We might not be too concerned, but we still listen to it when it comes on. You can decide that you are not going to listen to it any more, but eventually you will catch yourself doing it. When you find out where the noise comes from, and if you know that will not influence the car's reliability, you loose interest and don't have to make an effort of not paying any attention to it. This might also be with low back pain. "What gets your attention gets you!"

Keeping the attention on the pain may also decrease descending inhibition in the CNS, and the pain may increase. The pain problem in fibromyalgia may be a lack of descending inhibition. Decreased inhibition may also be part of the phenomenon of pain spreading to other regions, as often seen in back pain and late whiplash patients.

The bottom line will therefore be:

- Do an effort to find out if something serious is causing the pain in the back. If you find no sign of cancer, tell it to the patient, because they are often afraid to ask themselves.
- Explain how you go about looking for pinched nerves. Give them good information designed to reduce uncertainty and give them no restrictions.
- It is not enough to tell them not to worry: you have to give them the reasons not to worry.

Active rehabilitation in low back pain

Claus Manniche



Claus Manniche

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DEAR colleagues. My goal today is to discuss the status of the international clinical guidelines dealing with low back pain. All of these guidelines recommend that we provide active rehabilitation programs for low back pain patients.

I will also provide you with some examples, which illustrate why the implementation of these guidelines is moving along so slowly in most countries.

Passive treatment

In the 70's and 80's passive treatment forms were prescribed again and again. For example, bedrest and physiotherapy in the form of traction and heat /cold for weeks or months was a standard treatment. Now it has been demonstrated in several studies that bed-rest can result in functional loss and the promotion of chronic pain behavior.

Shift in paradigm

In the last decade a significant paradigm shift in the management of back pain has taken place. The scientific background for this shift in treatment strategy has been growing convincingly during the last years. Now most experts agree that the treatments in the new millennium should be based on individual information and activation.

Hot or not

Now, if any treatment is necessary, low cost and low risk- treatment forms should be prescribed, such as analgesics, NSAID and/or manipulation and exercise therapy for limited periods of time. After 2-4 weeks the results of any treatment should be re-evaluated. Only a minority of patients require more sophisticated treatment methods, fx multidisciplinary management programs or surgery.

HTA-report

The Danish Health Technology Assessment Report (HTA) on back pain was published last year and has been a success - printed in 25000 copies (1). This report has initiated many regional and local quality assessment studies throughout the country.

HTA content

Its important to remember that this report is different from most internationally published reports because of the systematic use of the Health technology assessment instrument as the analyzing tool in this report.

Included in the evaluation are a number of different aspects grouped into four main categories: *Technology, patient, organization and economic issues*. The technology category includes all scientific documentation of effectiveness. The other dimensions include ethical

aspects, discussion of primary/secondary health sector roles and cost calculations.

Example

Let us take a look of an example of the differences in the content of different international guidelines: allow me to focus on exercise therapy and the scientific background for its usage. I have considerable scientific experience in this area.

In the latest Cochrane report concerning exercise therapy from this summer (2) the following sentence summarizes the conclusions regarding acute back pain:

Strong evidence that exercise therapy is not more effective than inactive treatments or other active treatments.

These points of view seems to me to be very generalizing and furthermore it is not helpful as far as daily clinical procedures are concerned. The authors do not comment on whether clinicians should return to the good old days of the 1970's. During this period a wide variety of undocumented passive treatment forms which perpetuated treatment dependence and contributed to spiraling health care costs and disabilities were considered to be standard care. The most commonly prescribed treatment for

low back pain patients was bed rest. What is the uniformed reader left to conclude as regards which treatment to recommend to his/her patients

In the Cochrane report conclusions regarding chronic back pain are stated:

Unclear if exercise therapy is or is not more effective than inactive treatment. Still unclear if specific type of exercise is more effective than another. Exercises may be useful within an active rehabilitation program if they facilitate and precipitate increasing ordinary activity and returning to work. Specific back exercises have no clinical effect.

Null-hypothesis

The last statement can be read as if the authors feel that the null-hypothesis has been proven. Can this be the case when the background for this conclusion is based upon 3 statistically insignificant papers and 1 significant trial regarding the effect of exercise therapy on chronic low back pain?

Spine editorial

Unfortunately, in my opinion, the main focus in many clinical guideline has been on the *general effects* of exercise therapy without specific detail and without comparisons to alternative treatments as well as the use of Health technology

assessment instruments.

What we need is much more focus on the specificity of exercises used.

We need to focus on dosage and duration of the exercise program.

Also, focus on patient compliance associated to low cost, low tech and “keep it simple” principles should be maintained.

These points of views were expressed in an editorial published in Spine 1995 (3).

It is my experience that a chronic back pain patient, will not normally experience improvement until at least after 1-2 months of intensive exercise treatment. Therefore its important when dealing with chronic back pain to prescribe the exercise therapy in predetermined dosages and periods, and not to “let the pain be your guide”. Also it is important to prescribe low tech and low cost exercises programs in order to secure patient compliance.

Specificity

Is it logical that exercise therapy is the only treatment form existing without specificity being an important issue?

In order to illustrate this point allow me to using an example from another medical area: Internal medicine:

The treatment of pneumonia.

Of course the treatment of this disease involves the prescription of antibiotics.

When treating a patient suffering from pneumonia. Would you give a prescription such as the following? (illustration 1).

But there are those that are of the opinion that when dealing with exercise therapy in back pain specificity does not matter. One wonders? (illustration 2).

THE NATIONAL GUIDE LINES CONCERNING EXERCISE THERAPY

The Danish HTA-report concludes the following concerning *acute low back pain*:

- There is no evidence that specific exercises introduced in the acute phase of low-back pain will shorten the duration of the episode.
- It is important that patients maintain or improve their physical condition through training after the acute pain has resolved.

It is concluded that the treatment form can not be recommended for patients suffering from low-back pain for 0-6 weeks and may be considered as a preventive effort for patients who have experienced several epi-sodes of low-back pain.

Concerning *back-pain for more than 6 weeks*:

There are studies which indicate that back exercises of a certain intensity should begin after 6 weeks of continued low-back pain and reduced mobility.

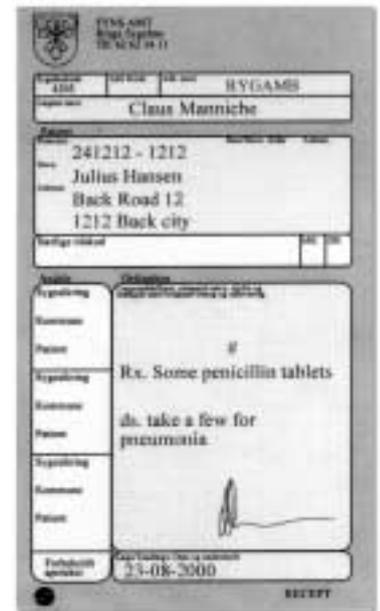


Illustration 1

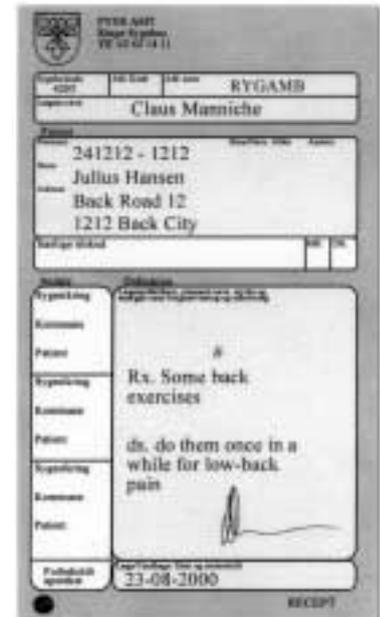


Illustration 2

Several studies document that high-dose exercise therapy (twice a week for a period of 2-3 months) is an effective treatment for chronic low-back pain.

It is concluded that the treatment can be recommended for patients suffering from low-back pain for 6 weeks or more.

NEXT STEP

In the international back pain evaluation process an evaluation process of the internationally published clinical guide-lines should be carried out. Are they worth reading and should they be implemented? This step of quality assurance seems to be a very important issue.

An international work is going on: The Danish HTA-institute participate in an EU-working group dealing with this topic.

Some of the following quality check-points being discussed in this working group are:

It is important that:

- The objectives of the guideline are specifically described
- The guideline group include individuals from all relevant professional groups
- Systematic methods are used to search for evidence
- The criteria for selecting the evidence are clearly described

- The health benefits, side effects and risks have been considered in formulating the recommendations
- The potential organizational barriers in applying the recommendations have been described
- Conflicts of interest of guideline development members have been recorded
- The potential costs of applying the recommendations have been considered
- The guideline is supported with tools for application

Let me express the hope that new initiatives like this will ensure better international clinical guidelines in the future and ensure the implementation of these guidelines in the daily clinic practice.

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A biomechanical perspective on low back pain

Michael Adams



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Michael Adams is a well known basic researcher on spinal biomechanics. He is a physicist with an interest in skeletal tissue biology, and has written many papers on disc pathology and biomechanics. One of these studies won the Volvo Award in 1982.

He has been working for the last 15 years in the Department of Anatomy, University of Bristol, England.

WHERE DOES LOW BACK PAIN COME FROM?

The outer annulus fibrosus of lumbar intervertebral discs is supplied with complex and free nerve endings from the mixed sinuvertebral nerve (1), and can in theory be painful. Pain-provocation studies confirm that the posterior annulus is the most frequent tissue of origin of severe and chronic low back pain (2), although the apophyseal joints and sacroiliac joints are painful in sizeable minorities of patients (3,4). Radiating buttock and leg pain comes primarily from the lumbar nerve roots (2). These studies also emphasise the close links between pain perception, and the mechanical stimulation of sensitised tissues.

FUNCTION AND FAILURE OF INTERVERTEBRAL DISCS

A healthy disc distributes stress evenly on the vertebral body, and allows small inter-segmental movements. The nucleus pulposus acts like a pressurised fluid which is restrained by a “hoop stress” in the annulus fibrosus. The size of the hydrostatic region shrinks with age, and degenerative changes cause the entire disc to resist loading very unevenly, so that high concentrations of compressive stress can occur in the (innervated) posterior annulus (5). Severe disc degeneration can lead to the posterior annulus

being “stress shielded” by the apophyseal joints (5,6). Experiments on cadaveric “motion segments” show that even healthy discs can be made to prolapse when loaded severely (7) or repetitively (8) in bending and compression, and internal disruption of the disc can probably follow compressive damage to a vertebral body endplate (9). Animal and tissue culture experiments indicate that disc cell metabolism is impaired by the uneven stress distributions found in mechanically-disrupted discs (10), suggesting that cell-mediated disc degeneration follows mechanical disruption (Figure 1).

FIGURE 1

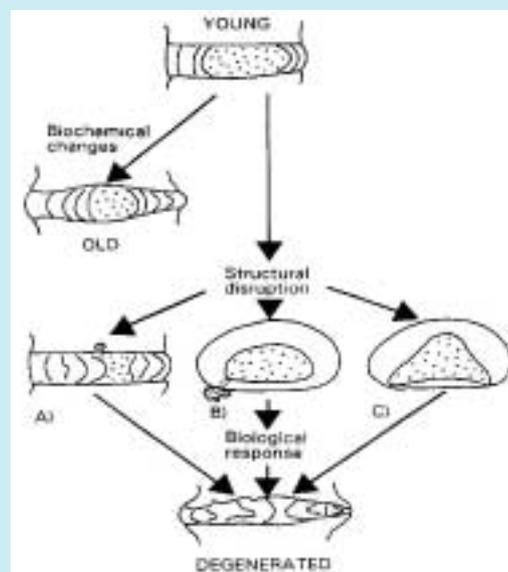


Figure 1. Disc ageing (top left) involves metabolic and biochemical changes. Disc degeneration, on the other hand, involves structural disruption (centre) and probably is caused by some mechanical or nutritional “insult” superimposed on the normal ageing process.

FUNCTION AND FAILURE OF APOPHYSEAL JOINTS AND SACROILIAC JOINTS

The apophyseal joints resist horizontal “sliding” movements of the vertebrae. They can also resist vertical compressive forces if the adjacent intervertebral disc has been narrowed, either by “creep” loading or by degenerative changes. Extremely narrowed discs can result in 70% of the compressive force being resisted by osteoarthritic apophyseal joints (11). The sacroiliac joints move slightly and may function to dissipate impacts applied directly to the pelvis. Their pathology is poorly understood.

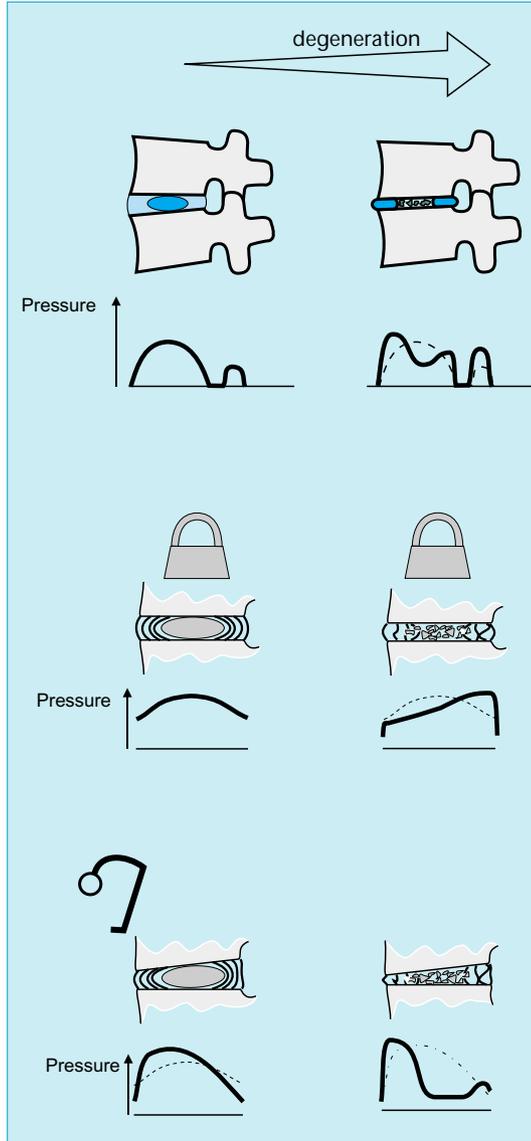
FUNCTIONAL DISORDERS OF THE SPINE: NOCICEPTION WITHOUT TISSUE DAMAGE

Small changes in posture can greatly affect stress distributions in the lumbar spine. “Lordotic” postures such as upright standing generate high compressive stresses within the posterior annulus and in the apophyseal joints. Moderate lumbar flexion (a “flat back”) leads to an even stress distribution within the disc, and minimal loading of the apophyseal joints (6). Sustained compressive loading can generate stress concentrations in the annulus, effectively causing the disc to function like a flat tyre (12). Sustained flexion increases spinal flexion and reduces protection from the back muscles (13).

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Commentary:

This drawing is made by Tom Bendix to further illustrate the data above. It is accepted by Michael Adams.

Why do we age so differently?

Professorial Seminar
Thursday 3 December 1998

Kaare Christensen



Kaare Christensen

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Kaare Christensen was born in 1959. He graduated from Odense University Medical School in 1987. He received a PhD in 1994 and a Dr Med Sci in 1999. His current positions are Research Professor at Epidemiology, Institute of Public Health in 1998, and Senior Research Scientist at the Terry Sanford Institute, Duke University, North Carolina, USA.

His research areas are genetic-epidemiology, twin studies, early life health, and ageing. During the last years he has been research director for an interdisciplinary team of researchers focusing on longitudinal, large-scale, genetic-epidemiological studies of the elderly.

AGE and sex are the most basic characteristics of a human being. Almost any description of an unknown person will by way of introduction mention these two characteristics. In everyday life the attitude to high age will often be ambivalent, reflected in expressions like "Every man desires to live long, but no man would be old" (*Jonathan Swift*). This ambivalent attitude has its parallel in medical science: On the one hand it is impossible to imagine a study of human beings in which the age of the participants is not considered, as age has a marked impact on almost all parameters in this science. On the other hand age research per se was little favoured until a few years ago. In Denmark, the University of Southern Denmark must be recognized for being among those who saw the very large theoretical and practical importance of ageing research and was willing to stake determinedly on it among other things with the establishment of a professorship in ageing research.

THEORIES OF AGEING

One of the most fascinating aspects of ageing is that it is so different from person to person. More than 300 theories of the background of ageing exist, reflecting mainly two things: That the ageing process is very complex, and that few data exist. A great deal of the many theories may

be grouped, though, within three main theories: *Wear and tear*, *biological clock* and *mutation accumulation*.

The *wear and tear theory* is a simple explanation of the variation in the ageing process: Ageing is determined by the wear and tear and the damages which arise throughout a lifetime, and these will vary from person to person. The originators of the many variants of the *wear and tear theory* disagree, though, as to what part of the organism (the immune system, DNA repair systems, cell membranes, etc.) is the most decisive component in the ageing process.

Theories of the existence of a *biological clock* which was set at the beginning of a human's life, have received renewed attention lately. It is a well-known phenomenon that fibroblasts in vitro can undergo only a certain number of cell divisions. A number of findings now indicate that the length of the telomeres on the ends of the chromosomes plays a part in the number of potential cell divisions and thus maybe in ageing. However, no signs of a clock function can be found when going from cell level to population level.

The *mutation accumulation theory* is based on evolutionary theory. According to this theory, ageing will mainly be determined by mutations



Twin studies

accumulated through the evolution of mankind, because there has been no selection against mutations which are effective after the reproductive age. E.g.: If in prehistoric times a mutation was harmful to health already in young age it was unlikely that the bearer of this mutation would be able to have offspring and take care of the children until they could take care of themselves. In other words, a 'negative' mutation with effect early in life would not live long, it would be subject to selection. If, on the other hand, it was a mutation which was harmful late in life (e.g. increased risk of dementia), the mutation would not prevent the bearer in having viable offspring - in other words, a mutation with effect late in life would not be subject to selection. However, mortality data for the oldest-old are not in agreement with the hypothesis.

This short outline of three of the most prominent theories of ageing illustrates the span of the theories: Some attribute the determining part in the ageing process to the environment, others emphasize that genetic factors are the basis of the ageing process. In such a scenario with few concrete clues to a very complex characteristic (ageing), the classic twin study is a very useful tool for having a first glimpse into the relative influence of the importance of genetic and environmental factors.

TWIN STUDIES

The classic twin study is based on the existence of two kinds of twins: monozygotic, who share all their genes, and dizygotic, who share half of their genes on average (like ordinary siblings). The higher degree of resemblance in monozygotic than in dizygotic twins is put down to this larger degree of shared genes in monozygotic twins. In Denmark there are unusually good possibilities for making twin studies of ageing and age related diseases because of the Danish Twin Registry, which is population based and covers more than one century (1870-1982). In addition, every second year all Danish twins aged 70+ years (more than 4,000 individuals) receive an invitation to participate in a survey in their home. Besides a traditional, health related interview, the study comprises a number of objective and cognitive tests, and a sampling of DNA. These studies are complemented by a similar study of all who were born in Denmark in 1905 and their elder siblings (in all approx. 2,500 individuals) plus a study of Danish centenarians. All these studies are conducted from the University of Southern Denmark.

The most concrete measure within ageing research is lifespan. Studies of more than 2,800 twin pairs born in the period 1870-1900 showed that for these cohorts approx. one fourth of the variation in lifespan could be explained by

genetic factors, the remaining part by environmental factors. Danish twin studies of general measures of health such as self-reported health and number of hospitalizations indicate that also a fourth of the variation in these measurements can be explained by genetic factors, while approx. a third to half of the variation in physical ability can be attributed to genetic factors.

These Danish results are supported by Swedish and American twin studies, which have also found that both environmental and genetic factors have impact on the ageing process and on lifespan. Therefore, ageing studies, when possible, should include information on environmental as well as genetic factors.

GENE-ENVIRONMENT INTERACTION AND AGEING

There is hardly any doubt that the understanding of the ageing process and the variation in lifespan must be found in the interaction between genes and environment. The development within biotechnology, where it is now possible by means of cheek swabs or a few drops of blood on a filter paper to decide hundreds of genotypes, has made such studies possible. But it will be no easy task to decide which among the 30,000-40,000 genes and which exposures through a long life to focus one's attention on.

A narrowing down of genetic and environmental factors is necessary before further studies of the interaction is possible. To this purpose monozygotic twins, who are discordant for a given characteristic, are useful as they offer the possibility of studying the effect of environmental factors in a design where genetic factors have been controlled for.

Another area in which twin research may attribute to this is via the study of sex differences. It is a well-known fact that elderly women have a larger morbidity and reduced functional capacity than elderly men, but their mortality is considerably lower! Longitudinal twin studies may shed light on whether this difference is caused by genetic or environmental differences between men and women.

WHAT DOES THE AGEING RESEARCH LEAD TO?

As was mentioned by way of introduction one of the most notable aspects of ageing is that it is so different from person to person. If, in the future, we can have a better understanding of why some people lose their abilities (or life) early, this may open up possibilities to prevent these losses. The prevention may, of course, take as its starting point directly modifiable environmental causes. If genetic factors of importance to the



Twin studies



Twin studies

ageing process are identified, the prevention potential will probably first and foremost consist in exploiting the interaction between genetic factors and environmental factors. Medical experience from the other end of life provides the basis for a certain optimism: Phenylketonuria (PKU) is a well-known genetic disease, which can be treated with a change in diets thus remedying the consequences of the genetic effect. The hope, which is attached to the genetic ageing research, is of course that with similar discoveries it is possible to prevent frequently occurring age-related losses of function.

Genetic-epidemiological ageing research at the University of Southern Denmark is in a position to contribute to new knowledge having a long tradition of large-scale, longitudinal, population-based studies of related individuals, where information on expositions as well as DNA material has been collected.

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Psychological functioning of older adults - insights from twin studies

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Matt McGue was born in 1952. He graduated from University of California, Berkeley in 1975 with a major in psychology and a minor in mathematics. He received his PhD in psychology in 1981 from the University of Minnesota and is now professor at the Department of Psychology and a member of the Institute of Human Genetics at the University of Minnesota.

He has published a large number of scientific papers among which psychological and psychiatric studies based on the Minnesota Twin Register are particularly well known. For nearly a decade Matt McGue has had a close collaboration with the Danish Twin Registry.

ONE of the greatest challenges facing gerontologists as we enter the 21st century is to describe and explicate the physical and psychological sequelae of aging. As has now been well established, the so-called very old (i.e., those age 80 years and older) are the most rapidly growing segment of the populations of most industrialized countries (Vaupel et al. 1998). Although this graying of industrialized societies can be expected to result in increased demand for medical and social services, relatively little is known about the psychological and physical functioning of older individuals. Published studies of septuagenarians, octogenarians, and nonagenarians are more often than not based on samples that have been ascertained in a non-systematic manner, calling into question the generalizability of findings from these studies.

The Danish registry system provides a unique opportunity to address a major limitation of much of the research on older individuals. Specifically, the registry system allows researchers to identify the entire population of individuals born in a given year. Without a resource like this, large-scale studies of older twins, like those we have undertaken in Denmark, would simply not be feasible. Moreover, the relatively high rate at which Danes participate in social-medical research helps to ensure that the sample of individuals who participate in

a given study are representative of the population from whence they were sampled. Importantly, registries like the National Danish Discharge Registry, can be used to compare hospitalization rates of participants and non-participants to further document the generalizability of research findings, as we have done in our studies of older Danish twins (Christensen, Holm, McGue, Corder, & Vaupel, 1999). In short, Denmark provides an ideal research environment for undertaking the important large-scale genetic-epidemiologic surveys that we need to understand the origins and implications of the graying of the Western world.

THE UTILITY OF THE TWIN STUDY APPROACH TO AGING

Twin studies have longed been used by human geneticists to identify and quantify the contribution of genetic and environmental factors to individual differences in a wide range of human characteristics. The rationale for a twin study is based on the existence of two types of twins, identical or monozygotic (MZ) twins who share 100% of their genetic material, and fraternal or dizygotic (DZ) twins who share on average only 50% of their segregating genes. The existence of genetic factors is inferred when MZ twins are more similar than DZ twins on the trait in ques-



Twin studies



Twin studies

tion. Alternatively, because differences between genetically identical MZ twins must be environmental in origin, twin studies also provide a powerful research tool for drawing inferences about the existence of environmental influences.

Twin studies are especially well suited for testing biological theories of why we age. Biological theories of aging that emphasize the importance of genetic factors (e.g., mutation accumulation models) might predict that MZ twins would grow more similar as they age. Alternatively, theories that emphasize the importance of environmental factors (e.g., the so-called wear and tear theories) would predict that MZ twins would grow more dissimilar with age.

An analysis I undertook with my graduate student Crista Carmichael (Carmichael & McGue, 1995) serves to illustrate the utility of twin studies in gerontology. Body mass index (BMI, weight in kilograms divided by height in meters squared), is a widely used measure of relative weight. As individuals age (up to a point) they are at an increased risk for obesity; that is, BMI increases on average with age. Significantly, the extent to which individuals of the same age differ in BMI also increases with age. In our study of more than 2000 male and female twins aged 18 to 81 years, the variance of BMI (a measure of the extent to which individuals differ from one

another in BMI) was 40% to 60% higher among individuals in their 60's and 70's as compared to individuals in their 20's and 30's.

But what are the factors that lead to a greater range of individual differences in BMI in 70 year olds as compared to 20 year olds? Twin studies can help to address this question. If, for example, the increased variance owed to the existence of genetic factors that were expressed among older but not younger individuals (as might be predicted by mutation accumulation theories), then we would expect MZ twin similarity to increase with age. Alternatively, if the increase in variance owed to the increasing importance of environmental factors (as in wear and tear theories), we would expect MZ twin similarity to decline with age. In fact, our data supported the latter rather than the former explanation. In both women and men, MZ twin similarity for BMI declined by approximately 25% from the earliest to the latest ages. It appears that the age-related increase in individual differences in BMI owes primarily to the increasing importance of environmental and not genetic factors.

DANISH TWIN STUDIES OF PSYCHOLOGICAL ASPECTS OF AGING

In 1995, the Longitudinal Study of Aging Danish Twins (LSADT) began by assessing all cooperat-

ing Danish twins aged 75 years and older (a sample of nearly 2500 individuals). The assessment was repeated in 1997 by including all twins who participated in 1995 as well as a sample of previously unassessed twin pairs who were between 73 and 76 years old in 1997. In 1999, an attempt was made to assess all Danish twins aged 70 years and older. By 1999, over 5000 individuals (and over 1000 twin pairs) aged 70 years and older had completed the LSADT intake assessment, nearly 3500 individuals had completed a two-year follow-up assessment, and nearly 1000 individuals had completed both a two- and four-year follow-up assessment. With additional assessments planned for 2001 and 2003, the LSADT promises to be a landmark study of the genetic-epidemiology of aging.

The LSADT protocol includes assessment of psychological as well as physical aspects of aging. With respect to the psychological assessment, two domains, cognitive functioning and depression symptomatology, were included. Cognitive functioning was included because it is predictive of a wide range of late-life social and medical outcomes, including longevity. Moreover, the rate of cognitive impairment increases exponentially after age 60, making it essential that we understand the factors that contribute to individual differences in cognitive functioning late in life. Depression symptomatology was included

both because of its clinical significance and because it provides participants with the opportunity to give their own assessment of an important aspect of their quality of life. We are very much interested in the extent to which psychological aspects of well being in late life are both dependent on and unrelated to physical and medical well being.

Our analysis of the depression data has already produced some interesting and important observations. Not surprisingly, the number of reported depression symptoms increases with age, although, somewhat unexpectedly, the magnitude of this increase is rather modest. Interestingly, because the increase is somewhat more rapid in men than in women, the female excess in depression symptomatology that exists in middle age has all but disappeared by late life (McGue & Christensen, 1997). Approximately 1/3 of the variance in depression symptomatology can be attributed to genetic factors, indicating that environmental factors constitute the major influence on depression symptomatology among older adults. In looking for the source of these non-genetic influences, physical functioning is a strong predictor of depression symptomatology. Nonetheless, the vast majority of older adults who experience a loss in functional abilities are happy and generally satisfied with the lives.



Twin studies



Twin studies

Our analysis of the cognitive data has also yielded some interesting observations. As in other studies, we observed that the rate of cognitive impairment increased exponentially with age. Less than 4% of individuals aged 75 to 79 years but nearly 25% of individuals age 90 years or older were severely cognitively impaired. Apart from age, the strongest predictors of risk of cognitive impairment were educational attainment and genetic factors. The prevalence of severe cognitive impairment was 6 times greater among individuals having less than 7 years of formal education as compared to individuals having more than 8 years of formal education. Genetic factors also exerted a major influence on late-life cognitive functioning, with approximately 50% of the variance in risk of cognitive impairment.

PROSPECTS

Our analyses of the Danish twin studies to the present have necessarily focused on the comparison of differently aged individuals, what epidemiologists call cross-sectional analyses. As we move to analyzing results of the multiple waves of assessment in LSADT, our focus will be on the comparison of the same individuals at different stages in their life, what epidemiologists call longitudinal analyses. To understand aging at the individual level, longitudinal analysis is essential.

Thus, we will be able to extend our analyses showing cognitive functioning differences as a function of educational attainment to determine whether the rate of cognitive decline varies for those with more versus those with less education. Perhaps those with relatively high levels of education are able to maintain high levels of cognitive functioning late into life while those with relatively low levels of education begin to experience cognitive decline early and profoundly. Similarly, we will be able to track those whose depression symptomatology is stable or decreasing over time versus those who experience increased depression in order to identify the factors that underlie psychological well being among older adults. These are issues that can only be addressed with longitudinal observations like those that will come out of the LSADT.

Of course a unique aspect of our Danish studies is that they are based on twins rather than singletons. David Lykken, a colleague of mine at Minnesota, has said that any research that can be done with singletons can also be done with twins. But, studies of twins have the advantage of helping us to understand the genetic and environmental contributions. The unique combination of longitudinal studies on large population-based samples of older twins identified through the Danish registry system positions

LSADT researchers to make important contributions to our understanding of aging over the coming years.

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Pathology in Odense

Professorial Seminar
Thursday, 6 April 2000

Claus Fenger
Institute of Clinical Research
Pathology



Prof. Claus Fenger

Claus Fenger graduated from Copenhagen University in 1967 and had his training in anatomy at Copenhagen University and in pathology at Copenhagen and Aarhus Universities supplemented with studies at St. Mark's Hospital in London. He was appointed chief pathologist at Holstebro Central Hospital in 1978 and at Odense University Hospital in 1981. From 1982 to 1996 he was principal of the postgraduate training in pathology in Denmark. He earned his Dr.Med.Sci. on the thesis "The anal transitional zone" at Odense University in 1987. and was appointed as professor in pathology, january 1998.

His research interests concentrates on colorectal and anal diseases and in particular neoplastic changes, and his publications include around 125 papers and editorship and contributions to several danish and international textbooks including the WHO books on classification of tumours of the digestive system.

THANK you very much for coming to this seminar to spend some of your precious time.

I am of course both honoured and somewhat anxious about the job to which I have been chosen. I think the situation can be visualized by this sculpture by the artist Keld Moseholm (Fig. 1).

I am sure I was not chosen because I am the most intelligent - and I do not expect any objections from my colleagues - but maybe because I am reasonably industrious and have had the luck that the students understand what I am telling them - and I hope just a few will agree on at least that. But I can promise you, that you will hear a real famous colleague in about half an hour. I am most proud that JEREMY JASS would come today, and I shall introduce him in a proper way at the end of my part of this seminar.

I am going to tell you about three things. First a little introduction to pathology in Odense, then about the work with gastrointestinal pathology and my visions for pathology in the future, and finally about teaching pathology. After this JEREMY JASS will give his points of view on the latter two subjects.

It may seem a bit traditional to start with the history of pathology, but I will nevertheless do so. In the first place because it brings pathology into perspective and secondly because I am not

afraid of traditions. But I promise you there will be only this one figure.

TABLE 1

PATHOLOGY CONTRIBUTIONS TO MEDICAL SCIENCE	
Contribution	Start?
Describing organ changes	Ancient times
Describing processes	ca. 1750
Explaining symptoms	ca. 1800
Microscopical appearance of diseases	ca. 1850
Systematic classification of diseases	ca. 1900
Pretreatment diagnosis (biopsy, cytology)	ca. 1950
Detailed cell character in disease	ca. 1975
Objective criteria for diagnosis	ca. 1975
Detailed advice in treatment	ca. 1990

Of course much of the evolution shown was made possible by the technical progress, as the perfection of the microscope around 1850, the construction of endoscopes and tools for different biopsies in the middle of the last century and finally the immunohistochemistry and the molecular methods - including FCM, FISH, SKY, PCR etc. - in the last decades. The term "objective criteria for diagnosis" refers to the introduction of methods for measuring cells and their components and to the study of reproducibility in diagnoses. I will come back to some of these points later.



Fig. 1 Sculpture by Keld Moseholm

I think that one can say that pathology has contributed enormously to the understanding of disease, and most diseases are still defined by their pathological appearance. So the question is: has pathology done its part or is there still new information to get from pathology. As you will see from the following, I am sure we can continue our contributions.

And now to Odense. First of all I will remind you, that the administrative head of the department is not me but MARTIN BAK. And I am really happy about this as we have a very fine collaboration. The department of Odense is one of the biggest in Denmark and we cover all subspecialties. This - together with the close contact to other disciplines you can get at a small university - and the fact that the county of Fyn is a perfect area for epidemiologic studies - gives us unique opportunities to make good pathology and science - if only we had the money and time.

As we cover all fields of pathology it would lead too far to describe our activities in detail, but our production last year was around 40.000 surgical and 60.000 cytology specimens. This makes us able to maintain a prominent place in diagnostic and scientific work in many different fields, illustrated by the fact that we have 115 ongoing scientific projects and that this resulted in 30 publications and 40 papers read last year. Indeed

everybody in the institute do a wonderful work, and - I must say - have done so regardless of which person was the professor.

So what can a professor in pathology do? He can definitely not be a pioneer in all diagnostic or research fields. His power is very limited and his personal financial resources are close to zero. He can only hope that he is reasonably good in his own speciality. But he can be a good teacher, help to increase knowledge and resources, coordinate efforts, facilitate connections to other colleagues and try to foresee the evolution.

Of these points I have listed "being a good teacher" at the top. We all know that candidates for a professorship are judged primarily on the basis of their scientific production, and that their success is estimated on the same basis. But I really believe that teaching is just as important and just as difficult. One of our most prominent tasks is to make the students understand the diseases - and hopefully some of them will feel, that pathology may be fun. That is one of the ways in which to help the declining recruitment of young doctors to the field.

The three next points are more self-evident and many of my colleagues have done this themselves. And the last point, to foresee the evolution, is of course the most difficult. This can only be solved by a close and permanent communi-

cation between not only pathologists but also nearly all other disciplines in natural sciences. And we all have to participate.

I hope that you from this can see, that I do not regard my own field as more important than that of others. But today it is my task also to describe at least parts of that, so in the following I will give you an example of the process by telling in a few words about some of the studies in which I have taken part. I could have chosen others, but these can illustrate the evolution in pathology in the 30 years I have been practicing. The first will be on the anal canal.

TABLE 2

ANAL CANAL

Anal glands	1975
Location and extent of mucosal zones	1977-79
Histochemical characterisation	1977-82
TEM, SEM, FCM	1981
Precancerous changes	1981-86
Neuronal hyperplasia	1990
Origin for malignant melanoma	1991
HPV in anal squamous carcinoma	1999
Reproducibility of WHO tumor typing	2000
Therapy, prognosis, HPV and p53	2001?
New subtyping reproducible?	2001?

Among the studies on the anal canal, the first were done in the era of classical histochemistry.

At that time also electron microscopy was thought to be the way of further understanding disease, but as we all know this method turned up to solve only a limited number of all our questions. When immunohistochemistry entered the battlefield a lot more diagnostic problems could be solved. The most observant of you will see that there is a break between 1991 and 1999. That is because this period was devoted to the study of the far more common colorectal cancer in collaboration with OLE KRO-NBORG. In the last years I have tried to do both.

The last two papers in this series illustrate a very important issue in pathology. I suppose we all agree that the most important job for a pathologist is to predict the biological course, that is in practice - to give a diagnosis that can be used to guide treatment and follow-up. So some of the questions are: How reliable is the pathological diagnosis and does the histological phenotype reflect the biological course?

Let me illustrate these two questions with two papers. The first is on HPV in anal cancer (1). This paper has just appeared in Virchows Archiv and was written in collaboration with some of the most experienced gastrointestinal pathologists namely JEREMY JASS who is here today and GERAIN WILLAMS from Cardiff, Wales, together with a very good statistician JØRGEN HILDEN

and a very good epidemiologist MORTEN FRISCH, both from Copenhagen. And it clearly shows that the present WHO typing of anal tumours is not reliable. I can say that without insulting anyone for I was partly responsible for it myself! To bring this in perspective I shall show you a figure comparing these results with some from other studies:

TABLE 3

REPRODUCIBILITY IN GI-DIAGNOSES

Observer agreement - unweighted kappa

	Interobs.	Intraobs.
Literature		
Gastritis by Sydney system	0.70-0.89	
Helicobacter present	0.39-0.82	
Gastric cancer typing	0.49-0.57	
Colitis parameters	0.00-0.47	
Dysplasia in ulcerative colitis	0.29-0.58	
Adenoma architecture	0.00-0.59	
Colorectal cancer parameters	0.00-0.61	
Dukes' stage	0.93	
Personal		
Helicobacter present	0.60	0.80
Adenoma grading	0.80	0.74
Anal cancer WHO subtypes	0.47	0.61

Of course the diagnosis cancer versus not-cancer has a higher reproducibility than the more complex problems listed here, and for example Dukes staging of colorectal cancer is done very well. But one can be frightened by many of these figures, and I can assure you that similar studies from other disciplines show the same sort of figures. The inaccuracy in clinical diagnoses is for example reflected by the fact, that the often depreciated autopsy - despite all new clinical and imaging progress - still show unexpected and often serious findings in 10-20 % of cases. Indeed we all have problems to solve, and pathologists should restrict their statements to what is reasonably reproducible. But of course one can suggest a good diagnosis.

The second paper illustrates where pathology - in my opinion - stands here at the beginning of the 21st century (2). This paper is about HPV in anal cancer and was again written with MORTEN FRISCH and the molecular biology work was done in Amsterdam by ADRAIN VAN DEN BRULE and his group. This material was published in Cancer Research last year. It is the biggest yet published and cover consecutive series from Sweden and Denmark. In this paper we have shown that most cases of anal cancer are associated with infection with human papilloma virus, - just as cervical cancer - and that this infection influences the histological phenotype.

We must add that at the present time we do not know the clinical consequences of this information, but one could imagine that the prognosis was more severe in HPV-negative cases - as is the case in the corresponding cervical cancer. And very recent and unconfirmed reports indicate that p53 status is related to the benefit from adjuvant therapy, so a natural next step would be to describe the wellknown relation between p53 expression and HPV status in this group of patients. Maybe we in this way or another will be able to elaborate a classification with clinical significance.

This illustrates how pathology is standing in a midstream. No doubt that our histological methods are still the fastest, safest and cheapest way to get a reliable diagnosis. But have some of our efforts to subdivide and subclassify been waste of time? Let me illustrate the situation with this slide (Fig. 2).

Until a few years ago, the histological phenotype was the golden standard, often substantiated by immunohistochemical methods. But now we have to face that molecular biology gives important additional informations. And that - as we see here for anal cancer and as JEREMY JASS will tell you for colorectal cancer - the results from molecular biology may in the future result in new and clinically more relevant classifications.

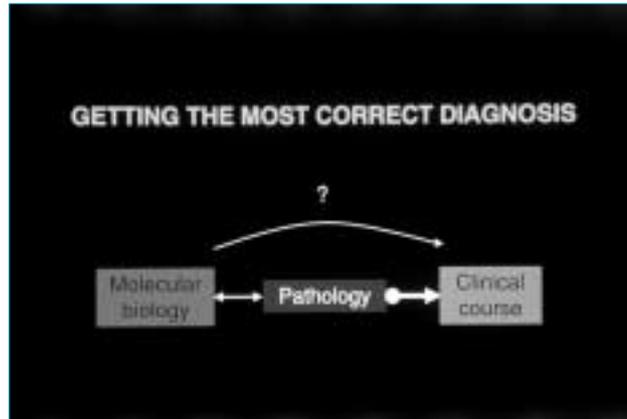


Fig. 2 Getting the most correct diagnosis

Whether this in a foreseeable future will lead to a decline in the number of pathological examinations is hard to say - but personally I believe that the result rather will be that the methods will be combined. We have seen many examples of what started as a complicated molecular biological procedure has been simplified to an immunohistochemical test. This is also true for another example, this time from colorectal cancer, (Fig. 3).

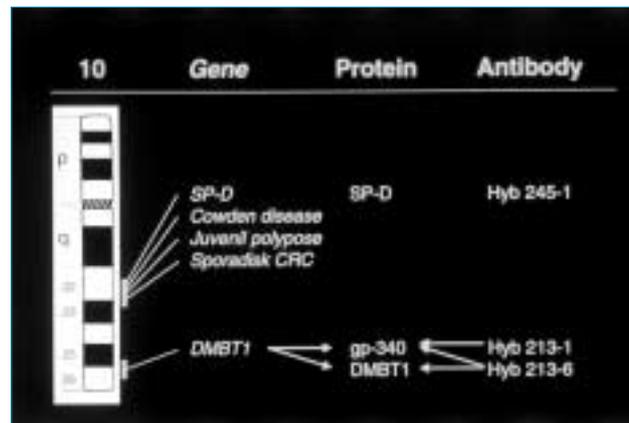


Fig. 3 Chromosome 10 and DMBT -1

This story begins when UFFE HOLMSKOV and co-workers from the institute of immunology at this university, together with a group from Heidelberg, Germany, isolated a new member of the Scavenger receptor subfamily, a glycoprotein called gp340, described the structure of its gene, which is called DMBT1, and finally as the first and only in the world developed antibodies against two different spliced forms of its protein product. We entered this study when it should be demonstrated in which tissues expression could be found. The expression of one of these, Hyb-213-6, is present in normal colonic mucosa and lost in colorectal cancer. In a short preliminary series we have found that this was the case in 7 of 9 tumours. At the present time we do not know what it means, but molecular biologists have published that allelic loss or reduced mRNA expression takes place in other malignant

tumours, so maybe what you see in the picture is the loss of yet another tumour suppressor gene. And again we see that a complicated investigation with the use of a lot of difficult methods in the end turns up to be demonstrable in an ordinary paraffin embedded histological section. And from then on, this is the easiest way to demonstrate the change. We do quite a lot of such things in our laboratory and I wish to express my thanks to all the biotechnicians and not least to our super-technician OLE NIELSEN. They all do an excellent job.

So, as you will understand, in my opinion pathology is as actual as ever, but it shall be combined with molecular biology. This combination becomes even more actual when molecular pathology in the coming years will shift from investigating the genome to investigate the function of gene products in cells. Like in many other departments this proces has of course already started in Odense.

As I see it there are three phases in this proces. The first is the sporadic scientific and diagnostic collaboration and in our department we have already long ago been through this. The second is the systematic teaching of the staff and we have started that this year by arranging a course for our specialists in a fine collaboration with the university institute of molecular biology. But we

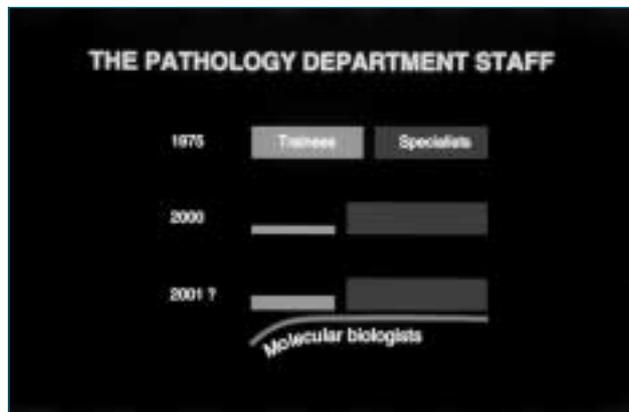


Fig. 4 The pathology department staff

have to go on with phase three, that is introducing the methods in our own laboratory and let me illustrate what I think is the way forward with the following picture showing the changes in the staff at a department of pathology, (Fig. 4).

At the top you see the situation when I started in pathology. The number of trainees was bigger than the number of specialists, the competition was harder than now, and all were busy - some of the specialists most with their private practice, but that is another story. In the middle is the situation we face now, where the increasing workload and the lack of young doctors have lead to an unsatisfactory imbalance with a too high number of specialists, many of which are as old or even older than me, and some are even more tired and have forgotten everything about making science. And at the bottom the situation we should look for, where the recruitment of young doctors have increased, but also - and that is my point - that another group of specialists has joined the staff, namely the molecular biologists. At the present time we are in fact discussing this sort of evolution, and it is my vision that this would make the work at the department even more inspiring and fruitful. All these examples lead naturally to a revision of as well the pathology report as the scientific work in such a department. Let me show this with a somewhat provoking figure: (Tabel 4).

TABLE 4

THE MODERN PATHOLOGY REPORT

Subject	20th century	21st century
Clinical data	Incidental	Systematic
Cutting and staining	Local modifications	Standardized
Report	Inspired and pictorial	Systematic
Classification	Traditional	To be modified
Molecular biology	Sporadic	To be included
Diagnosis and coding	Local or national	International
Clinical relevance	Varying	Evidence based
Quality control	Sporadic	Universal
Reproducibility	Uncertain	Tested
Feed back	Sporadic (conferences)	Systematic (EDB)

I am sure we all do our best already, so I ask my colleagues not to feel insulted. But it is true, that for example the clinical informations are occasionally of poor quality although sometimes amusing. From our side no doubt we are facing the problem of time, but I do believe that the way forward is to communicate not through artistic descriptions of the histological details, but through reproducible observations that can be

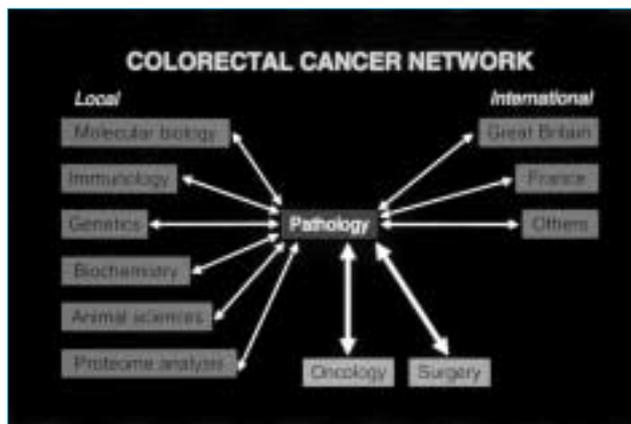


Fig. 5 Colorectal cancer network

put directly into a computerprogram together with informations on molecular biology etc. This evolution will take some time, and surely be felt more natural in some areas than in others. It has already started and for good reasons in particular in the field of haematology, where many of the modern techniques are easiest to applicate. In my own field we have in cases of colorectal neoplasia now minimized most of the reports to the clinical or scientific relevant data. But it will come to all of us.

I am sure that the schematic and computerized pathology report also will facilitate many of our scientific programs, and this is necessary as the scientific groups will become larger and more international and the need for rapid and safe exchange of information will steadily increase.

This is illustrated in the next figure, who shows the network of colorectal cancer research in Odense in the last years (Fig. 5). This still works with paper reports, but imagine the tremendous increase in

speed and safety, that could be obtained if we were linked in a computernetwork, where the necessary original reports - and of course only these - were directly accessible.

You can see pathology is placed in the middle. That is not because we regard ourselves as the most important, but simply to illustrate, that the material in all cases is based on the pathology specimen and report. Of course all these different groups have their own interrelations - but that would make the diagram rather confusing. With a few of all these collegues the work has just begun, but in all fields the prospects are very promising.

And now to teaching pathology. In my opinion pathology has a very important place in the medical study. We can make the students understand the disease proces, we can explain symptoms and findings and the principles for treatment and we can make the coming doctors good users of pathology. We have wonderful tools for teaching. We are able to demonstrate the disease process macroscopically as well as microscopically, and as we all know visualisation is one of the most important elements in the learning proces. Because of the close relation between basic sciences and our own methods and because of the close connections with our clinical colleagues, pathology is the natural meeting point between the early and late parts of the medical study.

But as we all know, something goes wrong. At the present time pathology is by the students regarded as a big and frightening subject, and by some colleagues as something that should be reduced - just like the curriculum in anatomy. And indeed, teaching students the microscopical picture of rare tumours is waste of their time - and ours too. We have therefore already reduced that part and will do more about it in the new study plan, where pathology is incorporated in the clinical part. And we have already this year introduced teaching in understanding pathology reports and are planning courses in taking good specimens for pathological examinations. But we should go even further. Let me show you what I mean, (Fig. 6).

At the top you see the place of pathology as it has been for decades. In the middle the new plan in Odense and at the bottom a suggestion for the next revision. In the recent revision the study is shortened by half a year and pathology is partly integrated in the clinical courses. But is this enough?

I think that all of us has faced the situation, that the students have forgotten all about normal anatomy and histology, and that we have to summarize the necessary facts before we can go on teaching pathology. And at the end of the course the students say, that now they under-

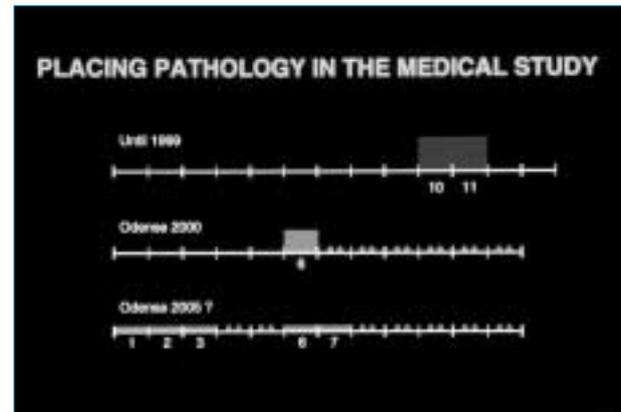


Fig. 6 Placing pathology in the medical study

stand why they should learn anatomy. But they should have understood that years ago! So my suggestion is, that we incorporate pathology in the first part of the study, in fact from the very first day. This will make the teaching meaningful, and the students will feel that they are already on their way to understand disease. Maybe we should also include surgeons as teachers. They can tell such good stories about what happens when you do not know your anatomy.

I will end this short lecture by listing the names of most of those, who got the ideas, made the work and wrote the papers. You may look for a group that I have not mentioned yet. That is the secretaries. Without a good secretary you are lost. And I am happy to end by thanking HELLE BOVIN, who do make my way easier, when the job seems too overwhelming.

Let me illustrate this with the last figure which shows a little sculpture made by my wife Inger de Fine Licht (Fig. 7). I think it shows the situa-



Fig. 7 The Sculpture by Inger

tion of a professor quite well. Sometimes you feel like the person holding the strings, sometimes as the person hanging at the end

And now let me introduce JEREMY JASS to the few of you who do not know him already. JEREMY is professor of pathology at the postgraduate medical school in Brisbane, Australia. I first met him when he was a young doctor in London many years ago, and at that time - that was in 1984 - he was already so promising that he was chosen to be the successor of the founder of gastrointestinal pathology BASIL MORSON at St. Marks Hospital, who was the teacher of many gastrointestinal pathologists including myself. Later JEREMY became professor in Auckland New Zealand from where he came to Australia. JEREMY has written very important papers on nearly all subjects in gastrointestinal pathology and has done a wonderful work not least on colorectal neoplasia. It is a pleasure and honour for me to introduce JEREMY JASS to you.

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PATHOLOGY: International perspectives

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J.R. Jass

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Professor Jeremy Jass received his medical education at the Westminster Medical School, University of London (1969-75) and then trained as a histopathologist at this institution and also the Central Middlesex and Hammersmith Hospitals. He was a consultant pathologist at Westminster Medical School from 1982-4 and then worked as a specialist in gastrointestinal pathology at St. Mark's Hospital, London from 1984-88. From 1988-96 he was Professor of Pathology at Auckland University, New Zealand and from 1996-2002, Professor of Anatomical Pathology at the University of Queensland, Australia. In 2002 he was appointed to a Chair in Pathology at McGill University, Montreal, Canada. His research interests focus on the pathology of neoplasia in the intestinal tract with a particular emphasis on the molecular genetics of colorectal cancer. His publications include around 190 papers and contributions to 50 books or book chapters. These encompass basic, translational and clinical research including the WHO 'Blue Book' histological classifications of gastrointestinal tumours.

WHAT IS PATHOLOGY?

Pathology is, of course, the study of disease. The study of disease has become such a broad subject that the term 'pathology' is no longer easily grasped and means different things to different people. To the general public it often means determining the cause of death - a morbid and somewhat irrelevant activity. To health managers, pathology encompasses laboratory testing as a diagnostic support service. A laboratory test can be costed out and may or may not be purchased by a clinician in the modern market model. To the scientist, pathology is an outmoded discipline that has been overtaken by modern molecular bioscience. To the medical student, pathology is a dry and theoretical subject like anatomy or biochemistry. To the clinician pathology is an academic backwater, divorced from direct patient care. So while the 'study of disease' might appear to be a subject of considerable importance, the discipline that should support this activity is suffering from an identity crisis.

MECHANISMS OF DISEASE

The causes of disease may be crudely classified as natural or man-made. The problems of human behaviour include war, substance abuse, risk-taking and industrial pollution. While these

human behaviours may lead to disease, the study of disease undertaken by the pathologist is primarily (though not exclusively) centred on the problems of nature and not the activities of man. The problems of nature may in turn be divided into the 'large' and 'small'. Large refers to problems that can be experienced with the senses: earthquakes, volcanic eruptions, tidal waves or droughts. However, the pathologist is primarily involved with the small problems of nature operating at the invisible level of cells, molecules and atoms. The small problems of nature causing disease include microbes, genetic mutation, ageing, deficiency of essential nutrients and radiation (ionising and ultraviolet).

The focus on the small problems of nature is one of the reasons why the work of the pathologist lacks popular appeal. The human interest factor is low. The news media cover stories about hundreds of dying in an earthquake or thousands in a war but not about the millions dying as a direct consequence of the small problems of nature. The reasons why this is so include the complexity and obscurity of the invisible world of molecules, our lack of personal control over molecular processes and a resigned or fatalistic attitude to disease. In the mind of the lay person, diseases are often grouped as either self-limiting (e.g. chicken pox) or fatal (e.g. cancer). If a fatal outcome can be prevented, this is only

through suffering a painful and embarrassing set of investigations and treatments.

The lack of interest in the role of the small problems of nature in the causation of disease is therefore understandable but needs to be corrected. Progress in the prevention or cure of potentially fatal diseases will be achieved by studying the earliest steps occurring at the levels of cells and molecules and the investigative techniques and expertise of the pathologist are essential for the growth of new understanding.

TEACHING PATHOLOGY

An understanding of pathology is important to the medical practitioner. It is no longer appropriate to label a patient as 'a case of syphilis' and we should not always expect that the classical textbook description will be met in practice. Nevertheless, the doctor must possess an understanding of disease and its natural history if he/she is to operate in an effective and confident manner. The likely mechanisms underlying a particular set of symptoms and signs must be deduced and tested by relevant investigations. The working hypothesis needs to be communicated in a clear and precise manner to other health care professionals as well as to the patient in a form that is both understandable and

appropriate. The results of laboratory investigations must also be interpreted and acted upon correctly. The steps that precede the implementation of treatment are pathologically-based and are fundamental to the practice of western medicine. We too readily take them for granted.

It is a fact that the volume of pathology in the modern medical curriculum has declined and is continuing to decline. Medical students must nevertheless continue to be taught the language of medicine and the basic mechanisms of disease. They need to be able to correlate clinical signs, radiological images or diseased specimens with processes occurring at the cellular level if practice is to be supported by meaning that is scientifically-based. On the other hand, pathologists no longer need to give detailed lectures on system-based descriptions of disease, particularly when this is not integrated with contributions by other disciplines. Problem-based learning is especially useful for highlighting the relevance of pathology in clinical practice.

An integrated medical curriculum obviates unnecessary repetition by two or more disciplines and highlights the clinical relevance of basic science. Nevertheless, integration is not without cost. It diminishes the autonomy of traditional disciplines, magnifies differences in viewpoints held by basic versus clinical disci-

plines and is costly in terms of the time that must be invested in the development of an integrated curriculum.

An integrated course should be assessed in an integrated manner. The Graduate Medical Course of the University of Queensland has adopted criterion-referenced assessment (Alexander et al., 1999). No question is set unless there is a model answer that indicates the minimum criteria for a pass. The questions are linked to a clinical scenario and incorporate contributions from both basic and clinical Departments that cut across four domains of learning: (1) Basic and Clinical Science, (2) Interpersonal, Clinical Skills and Clinical Reasoning, (3) Preventive and Population Health and (4), Ethics, Personal and Professional Development. The resulting Problem-Based Exercises are similar to Modified Essay Questions (Knox, 1989).

University Departments of Pathology have been affected financially through both the reduction in teaching time and reduced funding of the tertiary sector. At the same time, there is constant pressure to raise the quality of teaching and assessment, to develop flexible forms of course delivery and to evaluate course delivery. Many Pathology Departments have recognised the potential size of the health education sector and introduced courses in pathology for nurses, sci-

entists, physiotherapists and so on. It is a fact, however, that Departments rely heavily on non-University pathologists for teaching. Medically trained pathologists may have relatively little interest in teaching outside the discipline of medicine or in having their teaching methods scrutinised. Therefore courses to non-medical students are increasingly taught by non-medical academics who may lack a global and clinically-relevant perspective. There is certainly an educational need for pathology outside the mainstream medical and allied health professions. Tailoring courses to meet the needs of specific groups and providing high quality teaching will not occur if the exercise is merely conducted as a financial expedient.

PATHOLOGY AND RESEARCH

Pathological research includes basic research into disease mechanisms, clinical research involving classical clinicopathological correlation and translational research in which clinical significance is extracted from novel technological advances. Classification of disease, particularly tumours and tumour-like lesions, and the provision of definitions and diagnostic criteria, generates a gold standard that is useful to both scientist and clinician. There is a general tendency (by clinicians, scientists and sometimes pathologists)

to regard disease classifications as absolute truths, particularly when they are approved by internationally acclaimed panels of pathologists. Non-experts may use such classifications and diagnostic criteria incorrectly or inappropriately. Furthermore, pathologists understand that their classifications are not fixed but are provisional systems based upon the best current evidence available. Pathology, even classical anatomical pathology, is evidence-based. While there is undeniable subjectivity in microscopic observation, it is possible to formulate criteria that are reproducible and to demonstrate consistent patterns of correlation between such observations and clinical behaviour. Publication and further testing by the wider community of pathologists will strengthen and ultimately codify the evidence.

Nevertheless, new molecular insights will transform traditional classifications. Increasingly, we are now finding that lesions once termed hyperplastic, cystic or hamartomatous are clonal and driven by mutations in cancer-associated genes (a definition of neoplasia). Pathologists must not only retain ownership of their disease classifications but also the responsibility for standards of application and for refining classifications as new information comes to light. For example, we are now beginning to conceive of colorectal cancer not as a single disease, but as two or more distinct types of disease (Jass et al., 1999).

PRACTICE OF PATHOLOGY

The advance of pathology in practice (specifically diagnostic histopathology) depends on the combination of organ specialisation and clinically-based research. Pathologists are now able to integrate modern molecular advances with clinicopathological correlation. Investigative tools such as immunohistochemistry and in situ hybridisation allow pathologists to visualise genes, messenger RNA and translated proteins and determine the scientific, clinical or diagnostic meaning of the observations. As noted already, molecular insights will change the way we think about, classify and manage disease. Increasingly, diagnostic reporting will become standardised, evidence-based and clinically relevant - not description for the sake of it. The academic pathologist is ideally placed to facilitate these advances, but to do so effectively he/she must integrate the worlds of diagnostic pathology with clinical medicine and molecular bio-science.

FUTURE OF ACADEMIC PATHOLOGY

The opportunities for research, demands for teaching and requirements for evidence-based practice pose great challenges for the discipline of pathology. Paradoxically, University Departments of Pathology are often contracting at a

time when they should be growing and meeting these challenges head on. This overview has presented some of the difficulties that the discipline must face if it is to survive. The solution to the ever-increasing teaching demands is to exploit the opportunity for the flexible delivery of high quality, interactive teaching material. Standardised curricula to meet the educational needs of different groups should be developed nationally and perhaps internationally. Quality resources including virtual pathology museums, moving images and three dimensional images will inevitably come to eclipse traditional lectures and practicals. Just as textbooks are multi-authored, so should the input into course development require multiple expert authors working cooperatively and across multiple institutions but with editorial overview to ensure balance and homogeneity. Students may interact directly with experts via email.

The pathologist is often able to contribute most effectively to translational or clinical research by interacting with a team that includes (for example) clinicians, basic biomedical researchers and epidemiologists sharing the same field of interest. Basic research that used to be performed in large Institutes or Departments of Pathology is still enhanced by a pathologist's input but is more effectively conducted in dedicated Medical Research Institutes.

To consolidate and strengthen a discipline that must increasingly cut across the traditional boundaries of Departments, Institutions and even countries, there would need to be a rigorous system of evaluation and accountability in which pathologists and non-pathologists (including community representatives) would have input. To survive, the academic pathologist must demonstrate his or her relevance by actively interfacing with science, medicine and society (Jass, 1999).

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