ROeS – Nachrichten

Nr. 31
Januar 1995

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No. 31 der Internationalen Biometrischen Gesellschaft

Bulletin de la Région Austro-Suisse de la Société Internationale de Biométrie

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Inhalt

ANKÜNDIGUNG DES PRÄSIDENTEN

Liebe Kolleginnen und Kollegen, liebe ROeSianerinnen und ROeSianer.

Die Vorbereitungen für das nächste ROeS-Seminar, welches vom 25. bis 29. September 1995 in Rapperswil durchgeführt wird, sind schon weit gediehen. Die Koordinatoren der einzelnen Schwerpunktsthemen haben ausgezeichnete Arbeit geleistet. Ich glaube, dass wir Ihnen ein interessantes und anspruchsvolles wissenschaftliches Programm anbieten können. Sie finden das provisorische Programm in diesem Heft abgedruckt.

Eine Kurzinformation zum Tagungsort: Rapperswil ist eine charmante mittelalterliche Kleinstadt, direkt am Zürichsee gelegen. Die öffentlichen Verkehrsmittel - Bahn, Bus und Schiff - sind sehr gut ausgebaut. Zürich - in ca. 30 km Entfernung liegend - ist über 4 verschiedene Verbindungsstrecken erreichbar. Die Tagung findet in der Aula des Technikums statt, welches nahe beim Bahnhof und Zentrum liegt. Durch die räumliche Kompaktheit bietet Rapperswil eine gute Voraussetzung für alle wissenschaftlichen und kollegialen Kontakte.

Die Organisatoren, Koordinatoren und Referenten würden sich freuen, wenn Sie sich durch das Programm und die reizende Lage des Tagungsortes angesprochen fühlen. Bitte reservieren Sie sich den Termin und tragen Sie durch Ihr Erscheinen zum guten Gelingen der Tagung bei.

Mit herzlichen Grüssen

Hans-Rudolf Roth

BIOMETRISCHES SEMINAR DER ROES IN RAPPERSWIL 1995

Internationale Biometrische Gesellschaft — Region Österreich-Schweiz (ROeS)
Biometrisches Seminar 1995 — Rapperswil, 25. bis 29. September 1995

Wissenschaftliche Leitung:	H.-R. Roth, ETH Zürich
Organisation:	Prof. Dr. Theo Gasser, Universität Zürich, Abt. Biostatistik, Sumatrastrasse 30, CH-8006 Zürich Tel: ++41-1-257-6640, Fax: ++41-1-252-5452 email: K320259@CZHRZU1A.BITNET

Vorläufiges Programm:

Montag, 25. September 1995

Modellierung in der Land- und Forstwirtschaft
9:00 - 12:15
Koordination: Christian Hoffmann, WSL Birmensdorf

Roger Mead (Reading): Developments in designing experiments for agronomic and forestry research.

Norbert Kräuchi (Birmensdorf): Succession models - useful tools to cope with climate change?

Neuere Ansätze in der statistischen Modellierung
14:00 - 17:15
Koordinator: Jürg Hüsler, Universität Bern

Hans Riedwyl (Bern): Nichtparametrisch versus Parametrisch.

M.G. Schimek (Graz): Nichtparametrische Regression mittels Glättungsverfahren: Modellübersicht und Anwendungsmöglichkeiten.

B. Seifert (Zürich): Vor- und Nachteile verschiedener Schätzverfahren in der nichtparametrischen Regression.

Dienstag, 26. September 1995

Robuste Methoden in der Biometrie
9:00 - 12:15
Koordination: Werner Stahel, ETH Zürich

Frank Hampel (Zürich): Wozu brauchen wir robuste Statistik?.

Werner Stahel (Zürich): Robuste Regression und Varianzanalyse: Wo stehen wir?

Alfio Marazzi (Lausanne): Robuste Methoden im Bioassay.

Martin Schumacher (Visp): Robuste Analyse geplanter Versuche: Beispiele aus der Industrie.

Meta-Analysen
14:00 - 17:15
Koordination: Theo Gasser, Universität Zürich

Anne Whitehead (Reading): An overview of meta analysis.

Matthias Egger (Bern): Meta-Analysen: klinisch-epidemiologische Sicht

Niels Keiding (Kopenhagen): Evidence from the literature for decreasing quality of semen during past 50 years.

Poster-Präsentation (mit Apéro)
Abend
Koordination: Manfred Borovcnik, Universität Klagenfurt

Mittwoch, 27. September 1995

Statistik in der Gentechnologie
9:00 - 12:15
Koordination: Max Baur, Universität Bonn

Max P. Baur (Bonn): Einführung in die Genetische Epidemiologie

Jürg Ott (New York): Statistical issues in human gene mapping.

Heike Bickeböller und Francoise Clerget-Darpoux (Paris): Modellierung von disponierenden Genen für komplexe Krankheiten durch Assoziation und Segregation: die MASC Methode.

Michael Knapp (Bonn): Möglichkeiten und Grenzen nicht-parametrischer Methoden der Kopplungsanalyse.

Ausflug mit gemeinsamem Nachtessen
14:00

Donnerstag, 28. September 1995

Resampling-Methoden
9:00 - 12:15
Koordination: Karl P. Pfeiffer, Karl-Franzens-Universität Graz

Iris Pigeot-Kübler (Dortmund): Resampling-Techniken und ihre Anwendungen.

Willi Sauerbrei (Freiburg): Resampling-Methoden zur Untersuchung der Komplexität von Regressionsmodellen.

Peter Schlattmann (Berlin): Resampling-Verfahren in der geografischen Epidemiologie.

Freie Vorträge
14:00 - 17:15
Koordination: Manfred Borovcnik, Universität Klagenfurt

Helmut Küchenhoff (München): SIMEX - ein neues Resampling-Verfahren bei Regressionsmodellen mit Fehlern in den Variablen.

Franz Quehenberger (Graz): Schätzung der Kovarianzmatrix in verallgemeinerten linearen Modellen bei Fehlspezifikation

Mustaqu Hussain (Graz): Einige Ideen und Anwendungen in der Clusteranalyse.

Anton Safer (Ludwigshafen): Die Rolle grafisch-statistischer Verfahren in der Verbesserung der In-Prozess-Kontrolle medizinischer Labors.

Freitag, 29. September 1995

Klinische Prüfungen
9:00 - 12:15
Koordination: Jakob Schenker, Ciba Basel

S. Senn (Basel): Clinical trials: purposes and problems.

M. Budde (Basel): Some adaptive designs involving a dose finding part.

G. Rosenkranz (Basel): Klinische Äquivalenz-Studien.

Drug Safety und Drug Monitoring
14:00 - 17:15
Koordination: Peter Bauer, Universität Wien

J. Vollmar (Weinheim): Drug Safety - Konzepte - Probleme.

S. Kristiansen (Basel): Wie beurteilt man "Abnormalität" von Laborparametern in klinischen Studien?

Zweijahresrechnung 1993 + 1994

A. OESTERREICH

Einnahmen:	OeS .
Mitgliederbeiträge 1993 + 1994	81'500.--
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Ausgaben:	
Zahlungen an IBS für Biometrics	24'275.40
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Barfrankaturen	178.40
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Unterstützung für Teilnehmer der 3. Welt an IBS Conf. Hamilton, New Zealand	2'000.--
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BERICHT DES SCHATZMEISTERS

Liebe ROeSianerinnen und ROeSianer,

Wie Sie aus der Zweijahresrechnung 1993+1994 entnehmen können, geht es unserer Kasse sehr gut. Ich möchte allen danken, die ihre Beiträge jeweils in den ersten beiden Monaten jedes Jahres einzahlen und uns das Mahnen der ausstehenden Beiträge ersparen.

Die Beiträge an die Internationale Biometrische Gesellschaft sind wiederum erhöht worden. Da die finanzielle Lage unserer Sektion weiterhin gut ist, glaube ich nicht, dass unsere Mitgliederbeiträge der Teuerung und den höheren Kosten angepasst werden müssen. Einen entsprechenden Antrag werde ich an der diesjährigen Generalversammlung in Rapperswil stellen

Ich wünsche Ihnen viel Erfolg im neuen Jahr und auf Wiedersehen in Rapperswil
mit freundlichen Grüssen

Ihr Schatzmeister Prof. Dr. Jürg Hüsler

Bern, 16. Januar 1995

TAGUNG DER DEUTSCHEN REGION

Wie immer möchten wir über die jährliche Tagung der Deutschen Region informieren und zur Teilnahme ermuntern. Sie findet diesmal vom 13. bis 17. März 1995 an der Universität in Hohenheim bei Stuttgart statt.

Die örtliche Tagungsleitung ist zu erreichen unter:

Fax: ++49-711-459-3030,

H.Thöni, Tel ++49-711-459-2861, E.Schumacher, Tel. ++49-711-459-2149, H.Wiechert, Tel. ++49-711-459-2862

e-mail: schumach@ruhaix1.rz.uni-hohenheim.de

Dienstag, 14. März 1995

KOVARIANZANALYSE / LINEARE MODELLE

11^{00} - 13^{00} und 14^{00} - 15^{45}
Koordination : Sonnemann/Trier, Kaufmann/Berlin

Searle, S.R. (Ithaca, New York): The classical linear model (ERÖFFNUNGSVORTRAG)

Schumacher, M., Antes, G. (Freiburg): Regressionsmodelle zur Analyse von Überlebenszeiten.

Hilgers, R. (Göttingen): Nichtparametrische Kovarianzanalyse.

Lindsey, J. U. (?): Covariance Analysis of Categorical Data

FEHLENDE WERTE in den EINFLUSSGRÖSSEN bei REGRESSIONS-MODELLEN.

16^{15} - 18^{00}
Koordination : Vach/Freiburg.

Vach, W. (Freiburg) : Behandlung von fehlenden Werten in den Einflussgrössen von Regressionsmodellen - Ein Überblick.

Schill, W. (Bremen): Designbetrachtungen zu zweistufigen Studien.

Illi, S. (München): Verzerrte Schätzung von Odds Ratios aus unvollständigen Daten aufgrund einer Verletzung der MAR-Annahme.

Krammer, I., Blettner, M., Schlehofer, B. (Homburg/Saar und Heidelberg): Auswirkungen der Teilnahmebereitschaft in einer epidemiologischen Fall-Kontroll-Studie.

FREIE VORTRÄGE I : SCHÄTZPROBLEME

16^{15} - 18^{00}
Koordination: Rasch/Wageningen, Dörfel/Halle

Christmann, A. (Hamburg) : Estimators with high breakdown points in logistic regression.

Gefeller, O. (Göttingen): Bandwidth selection in kernel estimation of the hazard rate.

Lausen, B., Schumacher M. (Dortmund/Freiburg): Evaluating the effect of optimized cutoff values in the assessment of prognostic factors.

Pritscher, L., Tutz, G. (München/Berlin): Glättung diskreter Verweildauern.

Ziegler, A., Arminger, G. (Marburg/Wuppertal) : Parameter estimating and regression diagniostics using generalized estimating equations.

FREIE VORTRÄGE II

16^{15} - 18^{00}
Koordination : Weiß/Berlin

Büning, H. (Berlin): Adaptive ANOVA.

Wellmann, J. (GSF Oberschleissheim): Robuste statistische Verfahren und Ausreisseridentifikation beim Modell der Einfachklassifikation mit zufälligen Effekten.

Wittkowski, K. (Tübingen):Ein neuer Rangtest für zensierte Daten.

Zeller, G.X. (Essen): Modelling Carcinogenesis.

41. Biometrisches Kolloquium

HOHENHEIM März 1995

	13. MONTAG	14. DIENSTAG
8- 9		
9.00 - 10.45		AG Didaktik
Pause		10.30-11.00 Begrüssungen
11.15 - 13.00		11.00 Eröffnungsvortrag KOVARIANZANALYSE
13-14		
14.00 - 15.45	AG Statistische Methoden in der Medizin	KOVARIANZANALYSE
Pause		
16.15 - 18.00	AG Statistische Methoden in der Medizin	FEHLENDE WERTE in den EINFLUSS-GRÖSSEN | Freie Beiträge I. | II.
18-19	BEIRAT-Sitzung	
19.00	"Begrüssungs-abend"	

15. MITTWOCH	16. DONNERSTAG	17. FREITAG
MODELLIERUNG von SEUCHEN	GEO-STATISTIK | Freie Beiträge III. | IV.	GENOTYP-UMWELT-ANALYSE | META-ANALYSE
BIOMETRISCHE PROBLEME bei der ENTWICKLUNG von ERSATZ- und ERGÄNZUNGSMETHODEN zu TIERVERSUCHEN	GENOM-ANALYSE	GENOTYP-UMWELT-ANALYSE | Freie Beiträge V. | VI.
Poster-Session	Poster-Session	
DOSIS-FINDUNG-STUDIEN | STATIST. METHODEN & SOFTWARE-PRAXIS **AG Phytomedizin**	GENOM-ANALYSE **AG Ökologie**	AG Landwirtschaftl. Versuchswesen
DOSIS-FINDUNGS-STUDIEN | VALIDIERUNG PROGNOST. INDICES **AG Phytomedizin**	ETHIK in der Biometrie 17.30 MITGLIEDER-VERSAMMLUNG	
Gesellschafts-abend		

Mittwoch, 15. März 1995

MATHEMATISCHE MODELLIERUNG von SEUCHEN
9^{00} - 10^{45}
Koordination : Lehmacher/Hannover

Dietz, K. (Tübingen): Übersicht und Einführung

Schenzle, D. (Tübingen): Tollwut

Wittkowski, K. (Tübingen): Ein Kaskaden-Modell zur Ausbreitung von HIV

BIOMETRISCHE PROBLEME bei der ENTWICKLUNG von ERSATZ -und ERGÄNZUNGSMETHODEN zu TIERVERSUCHEN
11^{15} - 13^{00}
Koordination : Pigeot-Kübler/Dortmund
AG Ethik und Verantwortung in der Biometrie

Schneider, B. (Hannover): Biometrische Verfahren zur Evaluation von Ersatz und Ergänzungsmethoden für Tierversuche.

Liebsch, M. (Berlin): Die Bedeutung der Biometrie bei der Validierung tierfreier Methoden als Ersatzmethoden zum Tierversuch in der Toxikologie - ein Erfahrungsbericht.

Diener, W. (Berlin): Die ACUTE-TOXIC-CLASS Methode - Ein gruppensequentielles Verfahren in der akuten Toxikologie

BIOMETRISCHE PROBLEME bei DOSIS-FINDUNGS-STUDIEN
14^{00} - 15^{45} und 16^{15} - 18^{00}
Koordination : Edler/Heidelberg.

Safer, A., Nörtersheuser, P., Blaich, G. (Weisenheim am Sand/?/?): Praktische Aspekte der Dosisfindung in der präklinischen Forschung.

Kopp-Schneider, H. (Heidelberg): Design von Phase I Studien für Krebsbehandlungen

Hasenclever, D., Franklin, J., Loeffler, M. (Köln): Dosisfindung bei mehrzykligen Chemotherapien

Pichlmeier, U., Guiard V. (Hamburg/Dummerstorf): Kritische Bewertung der asymptotischen Varianz der ED50-Schätzung bei binären Dosis-Wirkungs-Analysen.

Guiard, V. (Dummerstorf): Vergleich von LQ-Intervallen für die ED50 in der Logitanalyse.

Koch H.-F., Hothorn L. (Hannover): Eigenschaften von many-to-one Prozeduren bei dichotomen Beobachtungen.

Hothorn L.(Hannover): Einfache Varianten des Abschlusstests bei geordneten Alternativhypothesen.

Neuhäuser M., Hothorn L. (Hannover): Trendtests für dichotome Endpunkte.

Brandt A., Hothorn L. (Hannover): Trendtests für "Location-Scale"-Alternativen.

Mittwoch, 15. März 1995

STATISTISCHE METHODEN und SOFTWARE PRAXIS
14^{00} - 15^{45}
Koordination : Hilgers/Göttingen , AG Nicht-parametrische Methoden

Bernhard, G. (Königstein): Elementare nicht-parametrische Methoden zur Analyse von zensierten und nicht-zensierten Daten in statistischen Auswertungssystemen - Verfügbarkeit und Zuverlässigkeit

Hilgers, R. (Göttingen): k-Stichproben-Probleme für zensierte Beobachtungen - Theorie und Softwarepraxis.

Bender, R. (Düsseldorf): Der FRIEDMAN-Test und statistische Programmpakete: Probleme bei Bindungen und multiplen Vergleichen.

Krumm, B. (Mannheim): Exakte Tests in dreidimensionalen Kontingenztafeln.

Reinhard, I., Krumm, B. (Mannheim): Die Verletzung der Voraussetzungen bei ein- und zweifaktoriellen Varianzanalysen. Alternative Methoden unter besonderer Berücksichtigung des Programmpakets GLIM.

VALIDIERUNG PROGNOSTISCHER INDICES
16^{15} - 18^{00}
Koordination : Sauerbrei/Freiburg

van Houwelingen, H. (Leiden): Validation and updating of survival models - cross-validation, split-sample and new data sets

Schulgen, G., Schumacher, M., Kropec-Hübner, A., Daschner, F. (Freiburg) : Entwicklung und Bewertung von Risiko-Scores für nosokomiale Infektionen in Mehrstadien-Modellen.

Läuter, J., Kropf, S. (Magdeburg): Multivariate Scores zur Prognostik und für statistische Tests.

Graf, E., Schumacher, M. (Freiburg): Erklärte Varianz in der Überlebenszeitanalyse.

Donnerstag, 16. März 1995

GEO - STATISTIK
9^{00} - 10^{45}
Koordination : Kublin/Freiburg

Ries, L. (Umweltbundesamt Berlin): Räumliche Prognose und Prognoseumgebung - Problemstellungen und Lösungswege

Mandallaz, D. (ETH Zürich): Schätzung der residualen räumlichen Auto-Kovarianz in Universal Kriging

FREIE VORTRÄGE III : NICHTPARAMETRISCHE STATISTIK
9^{00} - 10^{45}
Koordination : Hilgers/Göttingen, Lehmacher/Hannover

Brunner, E. (Göttingen): Nichtparametrische Methoden im Zwei-Perioden Cross-Over Design mit fehlenden Werten.

Klinger, H. (Düsseldorf) : Ein Rangsummentest für das Äquivalenzproblem bei zwei unabhängigen Stichproben.

Munzel, U., Munk, A. (Göttingen): Nichtparametrischer Äquivalenznachweis mit der Cramer-von Mises Statistik.

Pralle, L. (Göttingen): Ein Rangtest in einem dreifaktoriellen gemischten Modell.

Wittkowski, K. (Tübingen): Warum brauchen wir zwei Vorzeichentests ?

FREIE VORTRÄGE IV
9^{00} - 10^{45}
Koordination : Läuter/Magdeburg

Antes, G. (Freiburg): Multikollinearität der Einflussgrössen in Regressionsmodellen.

Gieger, Ch. (München): Generalisierte additive Modelle bei kategorialen Daten.

Hilgers, R.-D. (Köln): Neue Resultate zur optimalen Versuchsplanung für verallgemeinerte tic Polynome auf dem Simplex.

Munk, A. (Göttingen): Ein unverfälschter Test für das Bioäquivalenzproblem

Tusch, G. (Hannover): Entwicklung und Validierung von klinischen Scores für Zwecke der partiellen Klasifikation.

Donnerstag, 16. März 1995

GENOM-ANALYSE
11^{15} - 13^{00} und 14^{00} - 15^{45}
Koordination : Simianer/Hohenheim, Köhler/Giessen

Melchinger, A. E., Utz, H. F. (Hohenheim): Biometrische Ansätze und Probleme bei der Genomanalyse komlexer Eigenschaften von Pflanzen

Fernando, R. (Champaign-Urbana, USA): Likelihood analysis of extended pedigrees under mixed inheritance

Simianer, H. (Hohenheim): Analyse kompexer Pedigrees mit dem Gibbs Sampler

Schachtel, G. (Gießen): Statistische Methoden zur Analyse langer DNA-Molekülsequenzen

Plaetke R., Schachtel G. (Salt Lake City, Gießen) : A statistical test for meiotic breakpoint analysis.

Bickeböller, H. (INSERM Paris): The Poisson clumping heuristic and the survival of genome in small pedigrees.

Mathur, P. K. (Berlin): Bias in the estimates of band sharing by scoring limited number of DNA fingerprint bands.

Freitag, 17. März 1995

BIOMETRISCHE PROBLEME der GENOTYP-UMWELT-ANALYSE
9^{00} - 10^{45} und 11^{15} - 13^{00}
Koordination : Herrendörfer/Dummerstorf, Thomas/Berlin

Herrendörfer, G. (Dummerstorf) : Definitionen und Modelle zur Beurteilung der Genotyp-Umwelt Wechselwirkung in der Tierzucht - Auswirkungen auf den Zuchtfortschritt.

Nürnberg G., Herrendörfer G. (Dummerstorf): Versuchsplanung zur Erfassung der Genotyp-Umwelt Wechselwirkung.

Eeuwijk, F. (Wageningen): Review über die Aspekte der Pflanzenzüchtung bei der Genotyp-Umwelt-Analyse.

Hühn, M. (Kiel): Beziehungen zwischen Flächenertrag und Ertragskomponenten im Merkmal "Phänotypische Stabilität" sowie in dessen Heterosis.

Piepho, H.-P. (Witzenhausen): Implication of correlations among some common stability statistics - a monte carlo simulation.

Matur, P.K. (Berlin): Comparison of Univariate and Multivariate Approaches for Estimation of Genotype-Environment-Interaction.

Sumpf, D., Herrendörfer, G. (Dummerstorf): Planung eines vollständigen Diallels zur Schätzung der Effekte im Griffing-Modell.

Brunner E., Gefeller O. (Göttingen): Die Beurteilung der phänotypischen Stabilität mittels nichtparametrischer Rangtests: Probleme existierender Vorschläge.

META-ANALYSE
9^{00} - 10^{45}
Koordination : Blettner/Heidelberg

Friedenreich, C. (Canada): Methodologic Aspects for Pooled Analyses of Observational Epidemiologic Studies

Koch A., Daures J.P., Bouges S. Victor N (Heidelberg und Nimes) : Und noch eine Meta-Analyse im Vergleich von niedermolekularem Heparin mit Standardheparin in der Thromboseprophylaxe ?

Löffler, M. (Köln): Methodische Aspekte der gemeinsamen Analyse prognostischer Faktoren aus vielen Therapiestudien am Beispiel des Hodgkin-Lymphoms

Freitag, 17. März 1995

FREIE VORTRÄGE V
11^{15} - 13^{00}
Koordination : Wernecke/Berlin, Weiß/Berlin

Bregenzer, T. , Lehmacher, W. (Hamburg/ Hannover): WEI-LACHIN- und O'BRIEN-Statistiken zur multivariaten Analyse bei fehlenden Werten - Gemeinsamkeiten und Unterschiede.

Kropf, S. (Magdeburg): Fehlwerte in hochdimensionalen Zwei-Gruppen-Vergleichen.

Rückmann, A. , Windeler, J. (Bochum/Heidelberg): Sensitivität diagnostischer Tests und Selektionsbias.

Fauß-Kessler, Th., Köhler, J., Peichl, L., Tritschler, J. (Oberschleißheim): Ist der Schwefelgehalt von Fichtennadeln ein geeigneter Indikator für die SO2-Belastung der Luft und SO4-Belastung des Niederschlags ?

FREIE VORTRÄGE VI : STATISTISCHE METHODEN in der EPIDEMIOLOGIE
11^{15} - 13^{00}
Koordination : Kreienbrock/München

Brenner, H., Blettner, M. (München/ Heidelberg): Verzerrung epidemiologischer Assoziationsmasse durch zufällige Fehler in der Expositionserhebung. Implikationen für Mehrfachstrategien.

Heuer, C. (Heidelberg): Analyse von Zeittrends in Krankheitsraten mit Regressionssplines.

Kirchgässler, K.U., Oellrich, S. (Sulzbach/ Berlin) : Anwendungsbeobachtungen als Methode zur stratifizierten Analyse von Responsekriterien.

Schulz, K., Vach, W. (Freiburg): Der Nutzen von Markov-Modellen bei der Auswertung longitudinaler Daten.

Steindorf, K., Becher, H. (Heidelberg) : Berücksichtigung von Interaktionsfaktoren in quantitativen Risikoabschätzungen.

POSTER

Krummenauer, F., Hommel, G.(Mainz): Der SIMES-Test bei diskreten Teststatistiken.

Pfahlberg, A., Gefeller, O. (Göttingen), Brenner H. (München): An alternative approach to the quantification of risk factor impact in epidemiologic studies.

Pralle, L., Gefeller, O., Bregenzer, T., Brunner, E. (Göttingen/Hannover): Nonparametric Tests for small samples: an extended software solution.

Internationale Biometrische Gesellschaft
Deutsche Region (DR)

Anmeldung zum Biometrischen Kolloquium Hohenheim

14. bis 17. März 1995

Name: .....

Vorname: ..... Titel: .....

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Tagungsgebühr	**bis 3. Februar 1995**	**nach 3. Februar 1995**	
Mitglieder der IBG	DM 90.-	DM 110.-	..... DM
Nichtmitglieder(*)	DM 130.-	DM 150.-	..... DM
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Wir bitten um Überweisung des **Gesamtbetrages** auf **beiliegendem Überweisungsträger** bzw. auf das Konto

INTERNATIONALE BIOM. GESELLSCHAFT, UNIVERSITÄT HOHENHEIM
BIRKACHER BANK e.G., Kontonr. 32 869 002, BLZ 600 695 69
Verwendungszweck: 41. Biometrisches Kolloquium Hohenheim

Fahrten am Ort: Der Verkehrsverbund Stuttgart (VVS) bietet ein Kongress-Ticket für drei aufeinanderfolgende Tage an, zum Preis von

DM 10.- mit Gültigkeit im Innenraum (einschl. Flughafen)
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Erhältlich im Tagungsbüro. Haben Sie Interesse ? ja (Personenzahl)____ nein ☐

Unterkunft : Individuelle Buchung oder **bis 3. Februar 1995** auf beiliegender Karte der Stuttgart Marketing GmbH

(*) Bei Beitritt zur biometrischen Gesellschaft (Deutsche Region) ist der Jahresbeitrag für 1995 abgegolten !

Örtliche Tagungsleitung Fax: 0711/459-3030
H. Thöni ☎ 0711/459-2861, E. Schumacher ☎ 0711/459-2149, H. Wichert ☎ 0711/459-2862
e-mail: schumach@ruhaix1.rz.uni-hohenheim.de

Gesellschaft für Klassifikation e.V.

19. Jahrestagung – Universität Basel – 8.-10. März 1995

Tagungsankündigung und Einladung zur Anmeldung von Vorträgen

Die Gesellschaft für Klassifikation e.V. (GfKl) veranstaltet ihre 19. Jahrestagung unter dem Rahmenthema:

- LERNEN UND WISSEN -

Strukturelle Aspekte, quantitative Methoden und aktuelle Anwendungen

Das wissenschaftliche Tagungsprogramm sieht Plenar- und Übersichtsvorträge sowie Parallelsitzungen zum Gesamtgebiet von Datenanalyse, Klassifikation und Wissensorganisation vor. Die Interdisziplinarität der GfKl sowie der Tagung soll durch die Betonung der *Anwendungen* und durch die *Kooperation zwischen Theorie und Praxis* zum Ausdruck kommen. Insbesondere sind die folgenden Sektionen geplant (Organisatoren in Klammern):

- Mathematische und statistische Methoden zu Klassifikation und Datenanalyse (Bock, Tutz)
- Empirisches Lernen und Bayes'sches Schließen (Polasek)
- Visualisierung von Daten und Information (Geßler, Mathar)
- Computerintensive Methoden zu Klassifikation und Datenanalyse: Genetische Algorithmen, neuronale Netze, Gibbs-Sampling (Arminger, Polasek)
- Analyse und Klassifikation räumlicher Daten, Geo-Informationssysteme (Pfeifer, Unwin)
- Unscharfe Daten und Fuzzy-Methoden (Kruse)
- Software zu Klassifikation und Datenanalyse, Software-Validierung (Baier, Ostermann)
- Wissensmodellierung und Informationssysteme (Knorz, Radermacher)
- Lernen von Wissen, induktives Schließen, Expertensysteme (Puppe, Schader)
- Wissensstrukturierung in elektronischen Informationsnetzen (Hobohm)
- Semantisches Information Retrieval (Rahmstorf)
- Begriffliche Wissensverarbeitung (Wille)
- Terminologie und Wissensbanken (Ingenerf, Richter)
- Bibliothekarische Sach- und Inhaltserschließung, Wissensorganisation und Thesauri (Havekost, Hermes)
- Linguistik und linguistisch basierte Informationsverarbeitung (Goebl, Köhler)
- Multivariate Methoden und Klassifikation in Medizin und Pharmaindustrie (Riedwyl)
- Datenanalyse und Informationssysteme für Molekularbiologie und Sequenzdaten (Lausen, Ludwig)
- Wissensverarbeitung und Datenanalyse in Psychologie und Sozialwissenschaften (Herfurth, Orth)
- Datenanalyse in Altertumswissenschaften und Archäobotanik (Ihm, Weber)
- Semantische Ordnungssysteme und Computerlinguistik in der Medizin (Fischer, Klar)
- Klassifikation und maschinelles Lernen in Industrie und Technik (Nakhaeizadeh)
- Informationsverarbeitung in Finanzwirtschaft und Marketing (Balderjahn, Trautmann)

Während der Tagung sind (am 10.3.'95) Workshops, Tutorien und Softwaredemonstrationen geplant, u. a.:

- Fortbildungskurs für Bibliothekare: Bibliotheken im INTERNET – ein Ordnungsproblem (Havekost, Wätjen)
- Workshop: Wissensverarbeitung in Sozial- und Geisteswissenschaften (Herfurth)
- Tutorial: Genetische Algorithmen (Mühlenbein)
- Tutorial: Computergestützte Versuchsplanung in der Pharmaindustrie (Seewald, Weihs)
- Workshop: Geographische Informationssysteme (Unwin)

Konferenzsprachen sind Deutsch und Englisch. Weitere Tagungsinformationen können mit beiliegendem Formular angefordert werden. Vortragsanmeldungen werden erbeten

bis zum 1. November 1994.

Sie sind mit einer druckfähigen Kurzfassung des Vortrages an die Tagungsleitung zu senden (1 Seite nach beiliegendem Muster, am besten per E-mail). Bei Aufnahme des Vortrags in das Tagungsprogramm (Mitteilung im Dezember 1994) kann ein Manuskript für den geplanten Tagungsband beim Springer-Verlag (in engl. Sprache) bzw. den zugehörigen Referee-Prozeß eingereicht werden (Info im Dezember).
Wegen anderer Veranstaltungen empfiehlt sich eine frühzeitige Hotelreservation.

Programmkomitee: H.H. Bock (Aachen); W. Gaul (Karlsruhe), H.-J. Hermes (Chemnitz), B. Lausen (Dortmund), G. Nakhaeizadeh (Ulm), B. Orth (Hamburg), D. Pfeifer (Oldenburg), W. Polasek (Basel), F.J. Radermacher (Ulm)
Tagungsleitung: Prof. Dr. W. Polasek.
Institut für Statistik und Ökonometrie; WWZ, Uni-Basel; Petersgraben 51; CH - 4051 Basel, Schweiz.
Telephon: ++41/ +61/ 267 33 11. Fax: ++41/ +61/ 267 33 27. E-mail: gfkl-95@iso.wwz.unibas.ch

First Announcement and Call for Papers

10th International Workshop on Statistical Modelling

Innsbruck, Austria: Monday 10 to Friday 14 July 1995

As in previous years this meeting will focus on the various aspects of statistical modelling, including theoretical developments, applications and computational methods. The workshop aims to concentrate on papers that are motivated by real practical problems and that make a novel contribution to the subject. Theoretical contributions addressing problems of practical importance or related to software developments are also welcome.

The scientific programme will include invited lectures and tutorials, contributed papers, posters and software demonstrations. Contributed papers should be suitable for a 30 minute oral presentation (including discussion) and focus on motivation, statement of key results and conclusions, and emphasize examples, wherever possible.

Papers and posters will be refereed and printed in a proceedings volume. Authors wishing to make a contribution to the workshop are invited to submit an abstract to G.U.H. Seeber, not later than January 15, 1995. Notification upon acceptance will be mailed by February 15, 1995. The final manuscript, ready for reproduction, must reach the organizers by March 31, 1995. The workshop language is English.

When submitting a paper, please make sure that you meet the following guidelines: Abstracts need to include the title of the paper, name(s) of the author(s) (if it is joint work, indicate who will present the paper) and the full address for correspondence (including e-mail address, where applicable). To ensure proper evaluation abstracts should be approximately 3, but not more than 4 pages, and should give up to five keywords describing the content. Abstracts should also include a clear statement of the main results and conclusions, describe the substantive problem and the data analysed, as well as the approach and models used. Also include the most important key references. Indicate whether you wish to give an oral or poster presentation. To prepare abstracts and manuscripts we encourage the use of TEX or LATEX— a template file `abstract.tex` (in directory `/home/user/anonymou`) is available by anonymous ftp from `stat-nov.uibk.ac.at`. Submissions may be sent by e-mail to `workshop@stat-nov.uibk.ac.at`.

Scientific Programme Committee

J. Engel (Eindhoven), L. Fahrmeir (München), A. de Falguerolles (Toulouse), A. Forcina (Perugia), B.J. Francis (Lancaster), P. Gherardini (Roma), R. Gilchrist (London), R. Hatzinger (Wien), P. van der Heijden (Utrecht), J. Hinde (Exeter), E. Lesaffre (Leuven), B. Marx (Stanford), Ch.E. Minder (Bern), G.U.H. Seeber (Innsbruck), G. Tutz (Berlin)

Local Organising Committee

G. Marinell, G.U.H. Seeber, G. Steckel-Berger, C.M. Traweger, H. Ulmer (Innsbruck); R. Dittrich, R. Hatzinger (Wien)

Participation fees, not including accomodation or meals, are fixed at ATS 1.700, if registration and payment are made before May 15, 1995. Full time students are entitled to 50% reduction. Late registration fee is ATS 2.200.

If you would like to submit an abstract or receive further information, please send an e-mail message to `workshop@stat-nov.uibk.ac.at` or contact

Gilg U.H. Seeber
Institut für Statistik, Universität Innsbruck
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Phone: +43 (512) 507-7107 or 507-7101
Fax: +43 (512) 507-2851
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AUS DEN SEKTIONEN

Basler Biometrische Sektion BBS

16. Mai 1994, Basel
Frühjahrsseminar der BBS
Dr. Wolfgang Seewald, Dr. Claus Weihs, STAVEX, An Expert System for Design and Evaluation of Experiments.
Dr. Günther Strehlau, Dr. John Wakefield, POPKAN, Population Pharmaco-Kinetic Modelling and Analysis.

21. Dezember 1994, Basel
Prof. J. , Bern, "Extremwerte und ihre statistischen Verfahren"

25. Januar 1995, Basel
Dr. Werner Vach, Freiburg/Br. Neuronale Netze - eine Alternative zur Biometrie?

Biometrische Sektion Wien WBS

26. Mai 1994, Wien
Biometrisches Kolloquium: Biometrische Probleme der Genomanalyse
H. Simianer, Hohenheim, Überblick über laufende Arbeiten zu biometrischen Problemen der Genomanalyse.
G.B. Hartl, Wien, Empirische Beiträge zur Aussagekraft von genetischen Variabilitäts- und Differenzierungsmaßen bei Säugetierpopulationen
H. Simianer, Hohenheim, Biologische und biometrische Aspekte der genetischen Kopplung

30. Mai 1994, Wien, T.L.Smith, Houston, Some Practical Aspects of Phase 1 Clinical Trial Designs

Biometrische Sektion Steiermark-Kärnten BSSK

15. Februar 1994, Graz
K. Dean, Kopenhagen, From Empirical Observations to Knowledge: The Case of Population Health Research. Are statistical methods enough to understand data?

11. März 1994, Graz
B. Schwarz, Wien, Epidemiologische Trends in Österreich - eine Herausforderung für die Prävention

31. Mai 1994, Graz
J. Hass, Graz, Nichtlineare Regression und ihre Anwendung.
R. Mischak, Graz, Epidemiologische Analysen der Diagnosegruppe „Neoplasien“ auf Grundlage der Spitalentlassungsstatistik 1991.
M. Schimek, Graz, H. Stettner, Klagenfurt, Generalisierte additive Modelle: einige neue Ergebnisse.

Was ist Angewandte Statistik - Festkolloquium
Seggauberg, 11.-12. November 1994

Ein Tagungsbericht von Manfred Borovcnik

> "Die Biometrie (allgemeiner die Angewandte Statistik) wird nicht an den mathematischen Ergebnissen gemessen, sondern an ihrem Beitrag zur Lösung praktischer Probleme." Sir Ronald Aylmer Fisher

Unter diese Devise setzte Prof. Gölles sein jahrzehntelanges Wirken an der Grazer Technischen Universität und an der Joanneum Research Forschungsgesellschaft. Josef K. Gölles war frühzeitig mit den Problemen der Angewandten Statistik konfrontiert worden und hat hier besonders ein Defizit im deutschen Sprachraum empfunden. Während im anglo-amerikanischen Einflußbereich ein ausgeprägtes Statistikverständnis im Sinne einer Angewandten Statistik durch Karl Pearson und R.A. Fisher begründet worden ist, hat sich im kontinentalen Europa eine stark mathematikorientierte Statistik und Entscheidungstheorie breitgemacht. So notwendig theoretische Fortschritte zur Klärung von Begriffen und Eigenschaften von Methoden ist, der Blick auf die Anwendungen, der Blick auf den Prozeß der Anwendung geht dabei doch irgendwie verloren.

In diesen Anwendungen jedoch steckt ein ungeheures Erfolgspotential der Statistik. Die Angewandte Statistik trägt zur Produktivitätssteigerung, größerer Wirtschaftlichkeit und somit zu größerer Konkurrenzfähigkeit bei. Das hat die heimische Wirtschaft im Gefolge der japanischen und US-amerikanischen Erfolge inzwischen auch schon akzeptiert. Viel dazu beigetragen hat lokal die unermüdliche Bereitschaft von Prof. Gölles, den Leuten wirkliche, Angewandte Statistik beizubringen und auf ihre Sachfragen einzugehen. Der Ansatz von ihm ist systemanalytisch geprägt.

Danach geht es in der ersten Phase einer statistischen Untersuchung, der Systemanalyse, um die sachspezifische Aufarbeitung der Fragen sowie um die Festlegung der Untersuchungsmerkmale und deren zuverlässiger Messung. Ein besonderes Augenmerk richtet der Ansatz auf die frühzeitige Erfassung systemischer Störvariabler, welche die eigentlichen Merkmale der Untersuchung in unkontrollierter Weise überlagern können. In der zweiten Phase, der Versuchs- und Erhebungsplanung geht es um die Planung der Gewinnung von Daten. Nur unter sorgfältiger Einhaltung der Bedingungen kann man bei der späteren Analyse gezielte Antworten aus den Daten erhalten. In der dritten Phase, der eigentlichen Datenanalyse betont Gölles den zentralen Wert einer exploratorischen Analyse der Voraussetzungen, der Güte der Daten und weiterer Besonderheiten. So werden Vermutungen und Ideen angeregt, die in einem inferentiellen Teil überprüft werden. Die abschließende vierte Phase mit der sachspezifischen Entscheidungsfindung schließt den Kreis mit einer nochmaligen Kontrolle der verwendeten Modelle und einer sachgerechten Interpretation der Ergebnisse, die oft neue sachspezifische Fragen aufwirft. Die Ergebnisse einer Untersuchung werden damit zum Ausgangspunkt für weitere Analysen, die Erkenntnisse werden zyklisch vertieft.

In dieser Orientierung erfolgten die Bemühungen von Prof. Gölles, die Angewandte Statistik lokal in Österreich und insbesondere im Raum Steiermark-Kärnten zu verbreiten. Dabei hat er intensive Kontakte zu auswärtigen Statistikern gepflegt, die häufig zu Gast an seinem Institut an der Joanneum Research gewesen sind. Eine Tagung, ihm zu Ehren anläßlich seines 65. Geburtstages, konnte nur den Titel "Was ist Angewandte Statistik" tragen.

Das zweitägige Kolloquium stand denn auch unter der Devise Angewandte Statistik; viele der Redner nahmen in ihren Ausführungen auf den systemanalytischen Charakter Bezug. Klar, denn die meisten Vortragenden haben engsten Kontakt mit Anwendungen. Es ist schwer, auf wenigen Zeilen einige der Themen hervorzuheben. Interessierten sei der Tagungsband empfohlen, der als Band 324 der Grazer Mathematischen Berichte (Herausgeber H. Friedl) erschienen ist und am Institut für Statistik der TU Graz angefordert werden kann.

Einige Vorträge waren speziellen Anwendungen gewidmet, wobei meist auch gängige Methoden adaptiert werden mußten. E. Baráth beschäftigte sich mit kreativen Abwandlungen regressionsanalytischer Methoden zur Analyse des klimatischen Einflusses auf Ernteerträge. Nichtlineare Regression kann zur Erfassung der Milchleistung von Kühen beitragen; J. Haas zeigte die verschiedenen Ansätze dazu. R. Dutter nutzte robuste Kovarianzmatrizen zur Suche nach Faktoren, die regionale Unterschiede in der geschriebenen Sprache erklären. K. Fuchs und M. Hussein zeigten die Anwendung geostatistischer Methoden zur Erfassung des Grundwasserspiegels. Ch. Minder ging auf die Probleme der Beurteilung des Zusammenhangs von Radon und Lungenkrebssterblichkeit aufgrund von aggregierten Daten ein.

Einige Vorträge befaßten sich mit der Weiterentwicklung von Methoden für spezifische Probleme aus den Anwendungen. M. Schemper behandelte die Schätzung der Korrelation bei Vorliegen zensierter Daten. J. Hüsler analysierte Extremwerte aus ökologischen Zeitreihen. J. Kunert befaßte sich mit Problemen der Versuchsplanung; er untersuchte Varianzschätzer bei nichtwiederholten Faktorversuchen. In der Anwendung tauchen oft sehr große lineare Gleichungssysteme auf, in deren Lösung große Probleme liegen; H. Stettner stellte iterierte Projektionen zur numerisch stabilen Lösung vor. K.P. Pfeiffer befaßte sich mit der Untersuchung der Stabilität der Klassifikation bei Regression-Trees.

Andere Vorträge können als Übersicht über spezielle Methoden oder Anwendungsgebiete angesehen werden. H. Strelec gab einen Überblick über die Zuverlässigkeitsanalyse von Netzwerken. A. Ferligoj sprach über Methoden der Clusteranalyse. Biometrische Methoden waren explizit Inhalt mehrerer Vorträge. H.R. Roth befaßte sich mit dem Vergleich von Meßmethoden allgemein. H. Weiß behandelte Methoden zur Sicherung der hygienischen Qualität von mikrobiologischen Vorgängen. K.-D. Wernecke skizzierte ein Wechselspiel von statistischer Betreuung und Forschung. K. Pabst hatte in seinem Referat über Bioäquivalenz auch einiges zur Ethik der Anwendungen zu sagen. Viele der Vorträge hatten enge Bezüge zu Computer und Software. Direkt angesprochen hat H. Flühler das Verhältnis von Statistik und Computer für die Anwendungen in der pharmazeutischen Industrie. M. Borovcnik wiederum widmete sich den Auswirkungen des Computers auf die Ausbildung in Angewandter Statistik. A. Safer zeigte graphische Methoden, die sich besonders zur Verdichtung großer Datenmengen eignen, wie sie etwa in der medizinischen Prozeßkontrolle anfallen.

Als Mitveranstalter steht es mir nicht zu, die Organisation der Tagung zu loben. Jedoch freut es mich, von Teilnehmern wohlwollende Rückmeldungen erhalten zu haben. Der Tagungsort "Seggauberg" im Kloster hoch über dem Tal hat sich nach der gemeinsamen Tagung aller deutschsprachigen Regionen zum Thema "Werkzeuge der Explorativen Datenanalyse" nun schon zum zweiten Mal bestens bewährt. Abschließend sei festgehalten: Mathematische Statistik kann man auf unseren Universitäten recht gut studieren, nicht zuletzt wegen der noch immer theoretischen Ausrichtung. Zur Angewandten Statistik finden sich immer mehr gute Bücher, meist aus dem anglo-amerikanischen Bereich; es gibt auch verstärkt gutes Angebot

auf den Universitäten. Statistik anzuwenden jedoch bedarf es eines systemanalytischen Ansatzes, den man eigentlich nur aus der wohldurchdachten und reflektierten Praxis der Statistik lernen kann. Am besten wie ein Lehrling sein Handwerk von einem Meister. Meister der Anwendung von Statistik gibt es leider noch zu wenige.

MITGLIEDERBEWEGUNGEN

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??

Dr. Alfred Panzera
??

ETHIK

Liebe Kolleginnen und Kollegen,

Auch in dieser Nummer möchte ich wieder Grundlagenmaterial zur Diskussion unserer Berufsethik beisteuern. Sie sind ein Ausschnitt aus den Papieren, die bei Herrn Dr. R.J. Lorenz in Tübingen bezogen werden können. Vergleichen Sie die Beiträge in den ROeS-Nachrichten Nr. 30.

Zum Geleit

Bei der Mitgliederversammlung der Deutschen Region der Biometrischen Gesellschaft im März 1990 in Marburg ist der Wunsch geäußert worden, künftig der Frage nach der Verantwortung der Biometriker stärkere Beachtung zu schenken.

Vielen wird dieses Thema, auch wenn es einen sehr konkreten Anlaß zum Ausgangspunkt hatte, eher als ein Zugeständnis an den „Zeitgeist“ erscheinen, das auf längere Sicht unergiebig ist. Andere sehen darin eine Herausforderung, Gedanken zu artikulieren, die sie schon lange hegen, für die sie jedoch bisher keine offenen Ohren finden konnten.

Es wäre ein Irrtum zu glauben, mit der Entdeckung ethischer Aspekte unserer Profession würden wir Neuland betreten. Vor mehr als 40 Jahren schon setzte im International Statistical Institute(ISI) eine Diskussion darüber ein, ob es eines „professional code“ bedürfe, der die Spielregeln sowohl innerhalb der Zunft der Statistiker als auch im Umgang mit deren Klienten formuliert. Die American Statistical Association (ASA) entschloß sich 1949, einen „code of practice“ zu entwerfen. Die Motive für solche Aktivitäten waren primär nicht von hohen moralischen Idealen bestimmt. In vielen Ländern sahen die Statistiker sich einem wachsenden Mißtrauen ausgesetzt, die um sich greifenden verfeinerten Methoden der Datenmanipulation könnten die Intimsphäre oder sogar die bürgerlichen Freiheiten der Bürger bedrohen. Um gesetzlichen Regelungen zuvorzukommen, genügten nicht länger Beteuerungen, daß die Statistiker im Rahmen allgemein akzeptierter, wenn auch ungeschriebener Konventionen arbeiten - es bedurfte ihrer schriftlichen Kodifizierung.

Nach langen Diskussionen wurde schließlich die *Declaration on Professional Ethics* durch die Generalversammlung des ISI verabschiedet. 1983 legte ein „Ad Hoc Committee on Professional Ethics“ der ASA einen Bericht über *Ethical Guidelines for Statistical Practice* vor.

Da diese Dokumente unter den Mitgliedern der Deutschen Region wenig bekannt sind, haben Vorstand und Beirat beschlossen, sie den Teilnehmern des diesjährigen (1991) Biometrischen Kolloquiums zur Verfügung zu stellen. Beigefügt sind außerdem *Proposed Ethics Guidelines for Epidemiologists*, die im August 1990 auf einem Workshop der International Epidemiological Association (IEA) in Los Angeles erarbeitet wurden und zunächst nur maschinenschriftlich vorliegen.

Die Botschaft der Guidelines ist nüchtern: Sie beschreibt Verpflichtungen der Statistiker gegenüber der Gesellschaft, gegenüber Geld- oder Arbeitgebern, Kollegen und den "individuals", d.h. ihren Forschungsobjekten. Sie umfaßt die Beachtung von Regeln sauberen wissenschaftlichen Arbeitens und fairer Konkurrenz unter dem Höchstwert der bestmöglichen Wahrheitssuche und -sicherung. Es handelt sich vor allem um eine Berufsethik, deren soziale Funktion die Aufrechterhaltung gesunder Zustände in einem Beruf ist, also um die "interne Verantwortung" des Statistikers gegenüber seiner Zunft.

Es ist die Frage, ob die Initiatoren der Verantwortungsthematik in Marburg nur solche internen Wertkomponenten im Auge gehabt haben, oder ob es ihnen nicht vielmehr um die gesellschaftliche Rolle ihrer Disziplin als Teil einer schon weitgehend "industrialisierten Wissenschaft" (J.R. Ravetz) geht - und damit auch um die latente Gefahr ihrer Korrumpierung. In den schriftlichen Diskussionsbeiträgen, die das Entstehen der guidelines begleitet haben, finden sich auch hierzu erfrischende Gedanken. Leider verbietet die Fülle dieser Beiträge, diese hier ebenfalls wiederzugeben.

In ihrer sympathischen Schonungslosigkeit erscheinen uns diese Diskussionen sogar viel ergiebiger als die Guidelines selbst. Kaum ein Aspekt wird ausgespart, angefangen von offen bekundetem Verdruß an einem Kodex, der mangels Sanktionen, die keiner will, ohnehin nicht durchsetzbar und daher nutzlos sei. Andere sehen die Bedeutung von Guidelines vor allem darin, daß sie die professionelle Identität der Statistiker untereinander stärken könnten - bei allen divergierenden sonstigen Interessen und Loyalitäten.

Nach der Marburger Tagung ist wohl den meisten von uns klar geworden, daß es die "reine Wissenschaft", fern von gesellschaftlichen Bezügen und eigener Verantwortung nicht mehr gibt - ja wohl nie wirklich gegeben hat. Wo die Grenzen der eigenen wissenschaftlichen Tätigkeit zu ziehen sind, kann ebensowenig von außen festgelegt werden, wie keiner von uns in vollem Umfang vorhersehen kann, wozu Andere - Dritte - unsere Forschungsergebnisse jetzt oder später mißbrauchen könnten. Aber gerade deswegen scheint es uns wichtig zu sein, sich dieser Problematik und der Verantwortung gegenüber den Mitmenschen und der Natur dauernd voll bewußt zu sein.

Die vorliegenden "Guidelines" enthalten Gedanken, die diesen Denkprozess anstoßen und in Gang halten können. Wir möchten Ihnen diese Texte daher zur Lektüre und intensivem Bedenken sehr anempfehlen.

Rolf J. Lorenz *Hanspeter Thöni*

Ethical Guidelines for Statistical Practice: Report of the Ad Hoc Committee on Professional Ethics

PREAMBLE

The American Statistical Association is a scientific, professional, and educational organization. As such it recognizes that the professional integrity of statisticians is dependent not only upon their skills and dedication but also upon their adherence to recognized principles of ethical behavior. Wherein statistics as a science strives toward truth, these guidelines are designed to provide a measure by which both individuals and organizations can avoid compromise of truth and can be protected from the misuse of statistics and statistical data.

The traditional ethical norms of seeking truth and avoiding error are of particular importance in the practice of statistics. Beyond these traditional ethical norms, statisticians have ethical concerns for the privacy of collected data, the open and complete description of the statistical process, and the use and communication of the statistical method.

Therefore, this document proposes ethical principles for the guidance of statisticians. It encourages statisticians to be constantly aware of ethical issues which could influence their professional work and to continually strive to increase their personal competence in the practice of their profession.

I. PURPOSE AND SCOPE

A. The American Statistical Association hereby establishes these Ethical Guidelines for Statistical Practice. These guidelines identify ethical relationships with the public, government, clients or employers, and other professionals. They appear in Section II.

B. This document is open-ended: it establishes procedures for amending its contents and for broadening its Scope. The main vehicle for such changes is the Ad Hoc Committee on Professional Ethics. The structure of this Committee is outlined in Section III.

C. Additional requirements may be incorporated into the body of this document for any of the following specific purposes:

1. to extend the general guidelines;
2. to identify further points of ethical contact between statisticians and the public, government, their clients or employers, and other professionals;
3. to establish ethical principles for the use of statistics in a particular area—medicine, law, or survey research, for example;
4. to set ethical principles for publishing statistical reports; and
5. to document procedures for resolving disputes on questions of professional ethics.

Changing this document is discussed in Section IV, where the initial trial period is specified.

II. GENERAL GUIDELINES

A. Statisticians have a public duty to maintain integrity in their professional work, particularly in the application of statistical skills to problems where private interests may inappropriately affect the development or application of statistical knowledge. For these reasons, statisticians should:

1. present their findings and interpretations honestly and objectively;
2. avoid untrue, deceptive, or undocumented statements;
3. disclose any financial or other interests that may affect, or appear to affect, their professional statements.

B. Recognizing that collecting data for a statistical inquiry may impose a burden on respondents, that it may be viewed by some as an invasion of privacy, and that it often involves legitimate confidentiality considerations, statisticians should:

1. collect only the data needed for the purpose of their inquiry;
2. inform each potential respondent about the general nature and sponsorship of the inquiry, and the intended uses of the data;
3. establish their intentions, where pertinent, to protect the confidentiality of information collected from respondents; try to ensure that these intentions realistically reflect their ability to do so; and clearly state pledges of confidentiality and their limitations to the respondents;
4. ensure that the means are adequate to protect confidentiality to the extent pledged or intended; that processing and use of data are in conformity with the pledges made; that appropriate care is taken with directly identifying information (using such steps as destroying this type of information or removing it from the file when it is no longer needed for the inquiry); that appropriate techniques are applied to control statistical disclosure; and
5. ensure that, whenever data are transferred to other persons or organizations, this transfer is in conformity with the confidentiality pledges established; require written assurance from the recipients of the data that the measures employed to protect confidentiality will be at least equal to those originally pledged.

C. Recognizing that statistical work must be visible and open to assessment in order to advance knowledge, and that such assessment may involve the assumptions, methodology and data processing used, statisticians should:

1. delineate the boundaries of the inquiry as well as the boundaries of the statistical inferences which can be derived from it;
2. emphasize that statistical analysis may be an essential component of an inquiry, and should be acknowledged in the same manner as other essential components;
3. be prepared to document: data sources used in an inquiry; known inaccuracies in the data; steps taken to correct or to refine the data, statistical procedures applied to the data and the assumptions required for their application;
4. make the data sources available for analysis by other responsible parties with appropriate safeguards for privacy concerns;
5. recognize that the selection of a statistical procedure may to some extent be a matter of judgment, and that other statisticians may select alternative procedures; and
6. direct any criticism of a statistical inquiry to the inquiry itself, and not to the individuals conducting it.

D. Recognizing that a client or employer may be unfamiliar with statistical practice and be dependent upon the statistician for expert advice, statisticians should:

1. make clear their qualifications to undertake the statistical inquiry at hand;
2. inform a client or employer of all factors that may affect or conflict with their impartiality;
3. accept no contingency-fee arrangements;
4. fulfill all commitments in any inquiry undertaken;
5. apply statistical procedures without concern for a favorable outcome;
6. state clearly, accurately, and completely to a client the possible consequences if their recommended statistical procedures are overruled; and
7. disclose no private information about or belonging to any present or former client without the client's approval.

III. AD HOC COMMITTEE ON PROFESSIONAL ETHICS

A. The Ad Hoc Committee on Professional Ethics for the American Statistical Association consists of nine members to be selected by the President of the Association. The term of service is 3 years (except for the initial members, one-third of whom serve 1 year, one-third serve 2 years, one-third of whom serve 3 years). The Committee officers consist of a Chair, and a Vice-Chair.

B. To keep the importance of ethical principles before the Membership of the Association, the Ad Hoc Committee on Professional Ethics uses appropriate publication channels to provide information about the ethical issues raised in statistical practice. Materials prepared for this purpose may discuss actual disputes or respond to questions raised by statisticians or by others concerning ethical principles. The Committee may develop a series of case studies of ethical issues in practical settings.

C. The Committee may recommend actions to the Board of Directors that modify the general guidelines to meet changing conditions; or add sections that specify principles of ethical behavior for the collection, preparation, reporting, and use of statistics in individual subject matter areas. Section IV describes the procedures for such modifications.

D. The Committee establishes liaison with groups in other organizations that are concerned with ethical behavior.

E. The Committee serves as a focal point for ethical questions that are raised in statistical research and practice. The Committee may consult, in strictest confidence, with the involved individuals and organizations in order to work out an understanding.

IV. MODIFICATION TO THESE GUIDELINES

A. These guidelines are to have a trial period of 3 years, at the end of which time they will be reexamined in their then current form by the Board of Directors. Recognizing that these guidelines must be allowed to grow and mature through active use, the Ad Hoc Committee on Professional Ethics may, during that period, modify and extend them by a two-thirds vote. Each change is to be submitted to the Board of Directors for their approval.

B. During the trial period, the Committee is to develop and refine procedures for administering the General Guidelines. These administrative procedures are to be submitted to the Board of Directors for their approval.

C. The Committee is to communicate with each Section of the Association concerning amendments to this document which are relevant to the particular Section.

D. Advice from other professional groups is to be sought by the Committee to widen the scope of this document to encompass statistical issues faced by these groups.

International Statistical Review (1986), 54, 2, pp. 227-242. Printed in Great Britain

International Statistical Institute

Declaration on Professional Ethics

Adopted: August 1985

Background note

The involvement of the International Statistical Institute in establishing a declaration on professional ethics has extended over seven years. The Bureau of the Institute, in response to representations by members and a proposal by the Institute's Committee on Future Directions, established a Committee on a Code of Ethics for Statisticians, in 1979, during the 42nd ISI Session in Manila. The Committee worked to prepare a plenary meeting at the subsequent Buenos Aires Session in 1981 during which a consensus in favour of drawing up a code developed: the 'code' was to be prepared for acceptance by the Institute during its Centenary Celebration in 1985.

The Committee was composed of Roger Jowell (Chairman), W. Edwards Deming, Arno Donda, Helmut V. Muhsam and Edmund Rapaport, and it subsequently co-opted Edmundo Berumen-Torres, Gilbert Motsemme and René Padieu.

The Declaration which has emerged is the result of an extensive process of drafting and redrafting, of consultation with the entire ISI membership and with the ISI's Sections, of open meetings and written consultations which occurred between December 1981 and August 1985. The drafting of the Declaration provoked much interest and genuine debate which continued into the week before it was to be placed before the General Assembly of the Institute for adoption.

After due consideration and deliberation the General Assembly adopted the following resolution on 21 August 1985:

'The General Assembly of the International Statistical Institute,

(a) *recognising* that the aim of the Declaration on Professional Ethics for Statisticians is to document shared professional values and experience as a means of providing guidance rather than regulation,

adopts the Declaration as an affirmation of the membership's concern with these matters and of its resolve to promote knowledge and interest in professional ethics among statisticians worldwide;

(b) *determines* to send the Declaration to all members of the ISI and its Sections and to disseminate it, as appropriate, within the statistical profession;

(c) *commends* the Committee responsible for developing the Declaration for its thorough, efficient and successful work during the last five years.'

In accordance with the spirit and letter of the resolution the International Statistical Institute is privileged to present to the reader the ISI Declaration on Professional Ethics with the hope and in the belief that this document will assist colleagues throughout the world in the pursuit of their professional goals and responsibilities.

Preamble

Statisticians work within a variety of economic, cultural, legal and political settings, each of which influences the emphasis and focus of statistical inquiry. They also work within one of several different branches of their discipline, each involving its own techniques and procedures and its own ethical approach. Many statisticians work in fields such as economics, psychology, sociology, medicine, whose practitioners have ethical conventions that may influence the conduct of statisticians in their fields. Even within the same setting and branch of statistics, individuals may have different moral precepts which guide their work. Thus, no declaration could successfully impose a rigid set of rules to which statisticians everywhere should be expected to adhere, and this document does not attempt to do so.

The aim of this declaration is to enable the statistician's individual ethical judgements and decisions to be informed by shared values and experience, rather than to be imposed by the profession. The declaration therefore seeks to document widely held principles of statistical inquiry and to identify the factors that obstruct their implementation. It is framed in the recognition that, on occasions, the operation of one principle will impede the operation of another, that statisticians—in common with other occupational groups—have competing obligations not all of which can be fulfilled simultaneously. Thus, implicit or explicit choices between principles will sometimes have to be made. The declaration does not attempt to resolve these choices or to allocate greater priority to one of its principles than to another. Instead it offers a framework within which the conscientious statistician should, for the most part, be able to work comfortably. Where departures from the framework of principles are contemplated, they should be the result of deliberation rather than of ignorance.

The declaration's first intention is thus to be informative and descriptive rather than authoritarian or prescriptive. Second, it is designed to be applicable as far as possible to different areas of statistical methodology and application. For this reason its provisions are fairly broadly drawn. Third, although the principles are framed so as to have wider application to decisions than to the issues it specifically mentions, the declaration is by no means exhaustive. It is designed in the knowledge that it will require periodic updating and amendment. Fourth, neither the principles nor the commentaries are concerned with *general* written or unwritten rules or norms such as compliance with the law or the need for probity. The declaration restricts itself as far as possible to matters of specific concern to statistical inquiry.

The text is divided into four sections, each of which contains principles or sets of principles followed by short commentaries on the conflicts and difficulties inherent in their operation. The principles are interrelated and therefore need to be considered together; their order of presentation should not be taken as an order of precedence.

At the end of each section, as here, a short annotated bibliography is provided for those who wish to pursue the issues or to consult more detailed texts.

General bibliography

Sjoberg (1967) though now somewhat dated, provides good historical background. Freund (1969) is written under the shadow of the biomedical paradigm, but includes a vigorous statement by Margaret Mead of the differences, on the ethical dimension, between biomedical and social science research. Diener & Crandall (1978) is a general discussion, particularly useful with reference to field experiments. Reynolds (1982) (which is a condensed and updated version of Reynolds (1979)) is a clearly written text aimed mainly at American university students. Bulmer (1979) contains reprinted and new articles on surv[illegible]search and census taking in Britain and America. Barnes (1980) is an attempt to analyse sociologically why [illegible] has become a problem and has a full bibliography of work to 1978. Bower and Gasparis (1978) has a bibliography of works published between 1965 and 1976 with particularly full annotations. Bulmer (1982) contains a good bibliography on covert research and related topics. Jowell (1983) states the case for an educational, rather than a regulatory or aspirational, code, and has a bibliography with many items of special interest to statisticians. Burgess (1984) focusses on ethnographic research by sociologists in Britain. Barnes (1984) argues that ethical compromises are unavoidable in social inquiry. Other attempts have been made to formulate codes of ethics for statisticians: an earlier attempt (Deming 1972) is the outcome of the work of a Committee to Study Problems of Professional Ethics established in 1969 by the ISI; it relates mostly to the relations between the consulting statistician and his or her client. Another attempt (ASA 1980) is fully discussed by 16 authors under the title 'Ethical Guidelines for Statistical Practice: Historical Perspective, Report on the ASA ad hoc Committee on Professional Ethics, and Discussion (ASA 1983)'. More recently, French public statisticians have developed and adopted a code of ethics (AIS, 1984). Similarly, the British Government Statistical Service has produced its own Code of Practice (GSS, 1984).

1 Obligations to society

1.1 Considering conflicting interests

Statistical inquiry is predicated on the belief that greater access to well-grounded information is beneficial to society. The fact that statistical information can be misconstrued or misused, or that its impact can be different on different groups, is not in itself a convincing argument against its collection and dissemination. Nonetheless, the statistician should consider the likely consequences of collecting and disseminating various types of data and should guard against predictable misinterpretations or misuse.

No generic formula or guidelines exist for assessing the likely benefit or risk of various types of statistical inquiry. Nonetheless, the statistician has to be sensitive to the possible consequences of his or her work (see Clause 4.4), in the knowledge that society's entitlement to know about its collective characteristics sometimes conflicts with the individual's entitlement to protect his or her privacy.

All information, whether systematically collected or not, is subject to misuse. And no information is devoid of possible harm to one interest or another. Individuals may be harmed by their participation in statistical inquiries (see Clause 4.4), or group interests may be damaged by certain findings. A particular district may, for instance, be negatively stereotyped by a statistical inquiry which finds that it contains a very high incidence of crime. A group interest may also be harmed by social or political action based on statistical findings. For instance, heavier policing of a district in which crime is found to be high may be introduced at the expense of lighter policing in low crime districts. Such a move may be of aggregate benefit to society but to the detriment of some districts. Statisticians are not, however, in a position to prevent action based on statistical data. Indeed, to guard against the use of their findings would be to disparage the very purpose of much statistical inquiry.

1.2 Widening the scope of statistics

Statisticians should use the possibilities open to them to extend the scope of statistical inquiry, and to communicate their findings, for the benefit of the widest possible community.

Statisticians develop and use concepts and techniques for the collection, analysis or interpretation of data. Although they are not always in a position to determine the scope

of their work or the way in which their data are used and disseminated, they are frequently able to influence these matters. In addition, they are in a position to devise more efficient uses of resources through, say, developing sampling techniques or introducing new uses for existing data (see Clause 4.3c).

Academic statisticians enjoy probably the greatest degree of autonomy over the scope of their work and the dissemination of their results. Even so, they are generally dependent on the decisions of funders on the one hand and journal editors on the other for the direction and publication of their inquiries.

Statisticians employed in the public sector and those employed in commerce and industry tend to have even less autonomy over what they do or how their data are utilised. Rules of secrecy may apply; pressure may be exerted to withhold or delay the publication of findings (or of certain findings); statistical series may be introduced or discontinued for reasons that have little to do with technical considerations. In these cases the final authority for decisions about an inquiry may rest with the employer or client. (See Clause 2.3).

Professional experience in many countries suggests that statisticans are most likely to avoid restrictions being placed on their work when they are able to stipulate in advance the issues over which they should maintain control. Government statisticians may, for example, gain agreement to announce dates of publication for various statistical series, thus creating an obligation to publish the data on the due dates regardless of intervening political factors. Similarly, statisticians in commercial contracts may specify that control over at least some of the findings (or details of methods) will rest in their hands rather than with their clients. The greatest problems seem to occur when such issues remain unresolved until the data emerge.

1.3 Pursuing objectivity

While statisticians operate within the value systems of their societies, they should attempt to uphold their professional integrity without fear or favour. They should also not engage or collude in selecting methods designed to produce misleading results, or in misrepresenting statistical findings by commission or omission.

Science can never be entirely objective, and statistics is no exception. The selection of topics for attention may reflect a systematic bias in favour of certain cultural or personal values. In addition, the employment base of the statistician, the source of funding and a range of other factors may impose certain priorities, obligations and prohibitions. Even so, the statistician is never free of a responsibility to pursue objectivity and to be open about known barriers to its achievement. In particular, statisticians are bound by a professional obligation to resist approaches to data collection, analysis, interpretation and publication that are likely (explicitly or implicitly) to misinform or to mislead rather than to advance knowledge.

Bibliography: Obligations to society

Many books or symposia on professional ethics contain discussions of the broad context in which social inquiry is carried on, but in most cases these discussions are scattered throughout the text. Beauchamp *et al.* (1982) contains, in Part 2, an explicit general discussion of how and when the practice of social inquiry can or cannot be justified. The social researcher's legal and formal social obligations are analysed, in the United States context, in Beauchamp et al. (1982), Part 5. Pool (1979 & 1980) argue the case for not imposing any formal controls. Douglas (1979) does the same, more vigorously. Wax & Cassell (1981) discusses the relation between

legal and other formal constraints and the social scientist's own sets of values. Frankel (1976) refers more specifically to statistics.

1.1 Considering conflicting interests

BAAS (1974) discusses these conflicts in a British, but now somewhat out-of-date, context. Baumring (1972) contrasts the interest of scientists and research subjects, favouring the latter. Ackeroyd (1984), Section 6.3, deals with conflicts of interest in ethnographic inquiry. Muhsam (1985) discusses the conflict between the right to privacy and the right to know.

The usefulness of statistical information is rarely challenged and most of the relevant literature refers merely to ways and means of enhancing its usefulness. At the Centenary Session of the ISI a meeting was devoted to this subject with special reference to developing countries (see: Chakravarty, (1985); Nyitrai, (1985); Williams, (1985)).

1.2 Widening the scope of statistics

Diener & Crandall (1978), Chapter 13, discusses this topic with reference to psychological research. Crispo (1975) presents a discussion of public accountability from a Canadian standpoint. Johnson (1982) deals with the hazards that arise in publishing research findings. Jahoda (1981) demonstrates vividly the ethical and social considerations that limit the conduct of inquiry and the publication of results.

1.3 Pursuing objectivity

Stocking and Dunwoody (1982) outline some of the pressures against the preservation of objective standards that are exerted by the mass media. In more general terms, Klaw (1970) suggests that these standards can never remain untarnished.

2 Obligations to funders and employers

2.1 Clarifying obligations and roles

Statisticians should clarify in advance the respective obligations of employer or funder and statistician; they should, for example, refer the employer or funder to the relevant parts of a professional code to which they adhere. Reports of the findings should (where appropriate) specify their role.

2.2 Assessing alternatives impartially

Statisticians should consider the available methods and procedures for addressing a proposed inquiry and should provide the funder or employer with an impartial assessment of the respective merits and demerits of alternatives.

2.3 Not pre-empting outcomes

Statisticians should not accept contractual conditions that are contingent upon a particular outcome from a proposed statistical inquiry.

2.4 Guarding privileged information

Statisticians are frequently furnished with information by the funder or employer who may legitimately require it to be kept confidential. Statistical methods and procedures that have been utilised to produce published data should not, however, be kept confidential.

An essential theme underlying each of the above principles is that a common interest exists between funder or employer and statistician as long as the aim of statistical inquiry

is to advance knowledge. (See Clause 1.3). Although such knowledge may on occasions be sought for the limited benefit of the funder or employer, even that cause is best served if the inquiry is conducted in an atmosphere conducive to high professional standards. The relationship between funder or employer and statistician should therefore be such as to enable statistical inquiry to be undertaken as objectively as possible (see Clause 1.3) with a view to providing information or explanations rather than advocacy.

The independent statistician or consultant appears to enjoy greater latitude than the employee-statistician to insist on the application of certain professional principles. In his or her case, each relationship with a funder may be subject to a specific contract in which roles and obligations may be specified in advance (see Deming 1972). In the employee's case, by contrast, his or her contract is not project-specific and generally comprises an explicit or implicit obligation to accept instructions from the employer. The employee-statistician in the public sector may be restricted further by statutory regulations covering such matters as compulsory surveys and official secrecy. (See Clause 4.4).

In reality, however, the distinction between the independent statistician and the employee-statistician is blurred by other considerations. The independent statistician's discretion to insist on certain conditions is frequently curtailed by financial constraints and by the insecurity of the consultant's status. These problems apply less to the employee-statistician, whose base is generally more secure and whose position is less isolated. The employee (particularly the government statistician) is often part of a community of statisticians who are in a strong position to establish conventions and procedures that comfortably accommodate their professional goals (see Clause 1.2).

Relationships with funders or employers involve mutual responsibilities. The funder or employer is entitled to expect from statisticians a command of their discipline, candour in relation to limitations of their expertise and of their data (see Clause 3.1), openness about the availability of more cost-effective approaches to a proposed inquiry, discretion with confidential information. Statisticians are entitled to expect from the funder or employer a respect for their exclusive professional and technical domain and for the integrity of the data. Whether or not these obligations can be built into contracts or written specifications, they remain preconditions of a mutually beneficial relationship.

A conflict of obligations may occur when the funder of an inquiry wishes to ensure in advance (say in a contract) that certain results will be achieved, such as particular findings or a minimum response level in a voluntary sample survey. By agreeing to such a contract the statistician would be preempting the results of the inquiry by having made implicit guarantees on behalf of potential subjects as to their propensity to participate or the direction of their response. To fulfil these guarantees, the statistician may then have to compromise other principles, such as the principle of informed consent. (See Clause 4.2).

Above all, statisticians should attempt to ensure that funders and employers appreciate the obligations that statisticians have not only to them, but also to society at large, to subjects, to professional colleagues and collaborators. One of the responsibilities of the statistician's professional citizenship, for instance, is to be open about methods in order that the statistical community at large can assess, and benefit from, their application. Thus, insofar as it is practicable, *methodological* components of inquiries should be free from confidentiality restrictions so that they can form part of the common intellectual property of the profession. (See Clause 3.2).

Bibliography: Obligations to funders and employers

2.1 Clarifying obligations and roles

Appell (1978), Section 8, presents examples from ethnographic inquiri
Deming (1965 and 1972) specifies the roles of the consulting statistician , his or her client.

2.2 Assessing alternatives impartially

Many journal articles and chapters in books discuss this topic in general terms. Schuler (1982), Chapter 3, deals with the difficulties encountered in psychological research. Webb et al. (1966) is the popular source for alternative procedures of inquiry.

2.3 Not pre-empting outcomes

Barnett (1983) discusses this point, with reference to his own local context.

2.4 Guarding privileged information

SCPR Working Party (1974) is a general discussion of privacy in a British context, now somewhat out-of-date. Simmel (1908: 337–402) & (1952: 305–376) is the classic sociological analysis of constraints on the flow of information. Shils (1967) extends Simmel's work to more recent conditions; Tefft (1980) provides exotic case studies of perceptions of privacy and secrecy. Flaherty (1979) discusses the issues posed by the monopolization of data by governments, while Bulmer (1979) looks more broadly at data obtained in censuses and large surveys. Carroll and Kneer (1976) looks, from the standpoint of political science in America, at official pressure on scientists to reveal sources of information. Appell (1979), Section 3, gives a range of dilemmas arising from various kinds of official pressure. Bok (1982) prescribes norms for concealment and revelation.

3 Obligations to colleagues

3.1 Maintaining confidence in statistics

Statisticians depend upon the confidence of the public. They should in their work attempt to promote and preserve such confidence without exaggerating the accuracy or explanatory power of their data.

3.2 Exposing and reviewing methods and findings

Within the limits of confidentiality requirements, statisticians should provide adequate information to colleagues to permit their methods, procedures, techniques and findings to be assessed. Such assessments should be directed at the methods themselves rather than at the individuals who selected or used them.

3.3 Communicating ethical principles

To conduct certain inquiries statisticians need to collaborate with colleagues in other disciplines, as well as with interviewers, clerical staff, students, etc. In these cases statisticians should make their own ethical principles clear and take account of the ethical principles of their collaborators.

Each of these principles stems from the notion that statisticians derive their status and certain privileges of access to data not only by virtue of their personal standing but also by virtue of their professional citizenship. In acknowledging membership of a wider statistical community, statisticians owe various obligations to that community and can expect consideration from it.

The reputation of statistics will inevitably depend less on what professional bodies of statisticians assert about their ethical norms than on the actual conduct of individual statisticians. In considering the methods, procedures, content and reporting of their inquiries, statisticians should therefore try to ensure that they leave a research field in a state which permits further access by statisticians in the future. (See Clause 4.1).

Statistical inquiries frequently collaborative efforts among colleagues of different

levels of seniority and from different disciplines. The reputations and careers of all contributors need to be taken into account. The statistician should also attempt to ensure that statistical inquiries are conducted within an agreed ethical framework, perhaps incorporating principles or conventions from other disciplines, and that each contributor's role is sufficiently defined. The World Medical Association's Declaration of Helsinki (1975), for instance, gives excellent guidance to statisticians working in the field of medicine.

A principle of all scientific work is that it should be open to scrutiny, assessment and possible validation by fellow scientists. Particular attention should be given to this principle when using computer software packages for analysis by providing as much detail as possible. Any perceived advantage of withholding details of techniques or findings, say for competitive reasons, needs to be weighed against the potential disservice of such an action to the advancement of statistical knowledge.

One of the most important but difficult responsibilities of the statistician is that of alerting potential users of their data to the limits of their reliability and applicability. The twin dangers of either overstating or understating the validity or generalisability of data are nearly always present. No general guidelines can be drawn except for a counsel of caution. Confidence in statistical findings depends critically on their faithful representation. Attempts by statisticians to cover up errors (see Ryten, 1981), or to invite overinterpretation, may not only rebound on the statisticians concerned but also on the reputation of statistics in general. (See Clause 1.1).

Bibliography: Obligations to colleagues

3.1 Maintaining confidence in statistics

Reynolds (1975): 598–604 discusses conflicts between, on the one hand, obligations to keep science objective and impartial and, on the other, values held as citizens about trying to change the world.

The problems involved in presenting the limitations on the accuracy of statistical data are discussed at length by Gonzales et al. (1975). A more controversial stance in relation to errors is expressed by Ryten (1981).

3.2 Exposing and reviewing methods and findings

Diener & Crandall (1978), Chapter 9, discusses the need for honesty and accuracy. Powell (1983) outlines the conflicts that arise when an academic merits censure from colleagues because of improper professional conduct.

3.3 Communicating ethical principles

Appell (1978) deals with how to alert ethnographers to ethical issues.

4 Obligations to subjects*

4.1 Avoiding undue intrusion

Statisticians should be aware of the intrusive potential of some of their work. They have no special entitlement to study all phenomena. The advancement of knowledge and the pursuit of information are not themselves sufficient justifications for overriding other social and cultural values.

* This section of the declaration refers to *human* subjects, including individuals, households and corporate entities. For a set of guidelines on animal experimentation, for instance, see the Swiss Academy of Science (1983).

Some forms of statistical inquiry appear to be more intrusive than others. For instance, statistical samples may be selected without the knowledge or consent of their members; contact may be sought with subjects without advance warning; questions may be asked which cause distress or offence; people may be observed without their knowledge; information may be obtained from third parties. In essence, people may be inconvenienced or aggrieved by statistical inquiries in a variety of ways, many of which are difficult to avoid. (See also Clause 1.3).

One way of avoiding inconvenience to potential subjects is to make more use of available data instead of embarking on a new inquiry. For instance, by making greater statistical use of adminstrative records, or by linking records, information about society may be produced that would otherwise have to be collected afresh. Although some subjects may have objections to the data's being used for a different purpose from that intended, they would not be adversely affected by such uses provided that their identities are protected and that the purpose is statistical, not administrative.

As Cassell (1982) argues, people can feel wronged without being harmed by research: they may feel they have been treated as objects of measurement without respect for their individual values and sense of privacy. In many of the statistical inquiries that have caused controversy, the issue has had more to do with intrusion into subjects' private and personal domains, or with overburdening subjects by collecting 'too much' information, rather than with whether or not subjects have been harmed. By exposing subjects to a sense of being wronged, perhaps by the method of selection or by causing them to acquire self-knowledge that they did not seek or want, statisticians are vulnerable to criticism. Resistance to statistical inquiries in general may also increase. (See also Clauses 3.1, 4.3c, 4.5 and 4.6).

4.2 Obtaining informed consent

Statistical inquiries involving the active participation of human subjects should be based as far as practicable on their freely given informed consent. Even if participation is required by law, it should still be as informed as possible. In voluntary inquiries, subjects should not be under the impression that they are required to participate; they should be aware of their entitlement to refuse at any stage for whatever reason and to withdraw data just supplied. Information that would be likely to affect a subject's willingness to participate should not be deliberately withheld.

The principle of informed consent from subjects is necessarily vague, since it depends for its interpretation on unstated assumptions about the amount of information and the nature of consent required to constitute acceptable practice. The amount of information needed to ensure that a subject is adequately informed about the purpose and nature of an inquiry is bound to vary from study to study. No universal rules can be framed. At one extreme it is inappropriate to overwhelm potential subjects with unwanted and incomprehensible details about the origins and content of a statistical inquiry. At the other extreme it is inappropriate to withhold material facts or to mislead subjects about such matters. (See Clauses 4.3d and 4.4). The appropriate information requirement clearly falls somewhere between these positions but its precise location depends on circumstances. The clarity and comprehensibility of the information provided are as important as the quantity.

An assessment needs to be made of which items of information are likely to be *material* to a subject's willingness to participate. The following items are among those from which a selection might be made:

(i) purpose of study, policy implications, etc.;

(ii) identity of funder(s);
(iii) anticipated uses of the data, form of publication etc.;
(iv) identity of interviewer/experimenter and organisational base;
(v) method by which subject has been chosen (sampling frame, etc.);
(vi) subject's role in study;
(vii) possible harm or discomfort to subject;
(viii) degree of anonymity and confidentiality;
(ix) proposed data storage arrangements, degree of security, etc.,
(x) procedures of study (time involved for participant, etc.);
(xi) whether participation is voluntary or compulsory:
  (a) if compulsory, potential consequences of non-compliance;
  (b) if voluntary, entitlement to withdraw consent (and when that entitlement lapses);
(xii) whether material facts have been withheld (and when or if such facts will be disclosed).

In selecting from this list, the statistician should consider not only those items that he or she regards as material, but those which the potential subject is likely to regard as such. Each party may well have special (and different) interests. As a means of supplementing the information selected, the statistician may choose to give potential subjects a declaration of their entitlements (see Jowell, 1981) which informs them of their right to information but leaves the selection of extra details in the subject's control.

Just as the specification of adequate information varies, so does the specification of adequate consent. A subject's participation in a study may be based on reluctant acquiescence rather than on enthusiastic co-operation. In some cases, the statistician may feel it is appropriate to encourage a sense of duty to participate in order to minimise volunteer bias. The boundary between tactical persuasion and duress is sometimes very fine and is probably easier to recognise than to stipulate. In any event, the most specific generic statement that can be made about *adequate* consent is that it falls short both of implied coercion and of full-hearted participation.

On occasions, a 'gatekeeper' blocks access to subjects so that statisticians cannot approach them directly for their participation without the gatekeeper's permission. While respecting the gatekeeper's legitimate interests statisticians should still adhere to the principle of obtaining informed consent directly from subjects once they have gained access to them. In these cases, statisticians should not devolve their responsibility to protect the subject's interests onto the gatekeeper. They should also be wary of inadvertently disturbing the relationship between subject and gatekeeper.

The principle of informed consent is, in essence, an expression of belief in the need for truthful and respectful exchanges between statisticians and human subjects. It is clearly not a precondition of all statistical inquiry. Nonetheless, the acceptability of statistics depends increasingly not only on technical considerations but also on the willingness of statisticians to accord respect to their subjects and to treat them with consideration (see Clause 4.1). Statisticians should attempt to ensure that subjects appreciate the purpose of a statistical inquiry, even when the subject's participation is required by law.

4.3 *Modifications to informed consent*

On occasions, technical or practical considerations inhibit the achievement of prior informed consent. In these cases, the subjects' interests should be safeguarded in other ways. For example:

(a) *Respecting rights in observation studies.* In observation studies, where behaviour patterns are recorded without the subject's knowledge, statisticians should take care not to infringe what may be referred to as the 'private space' of an individual or group. This will vary from culture to culture.

(b) *Dealing with proxies.* In cases where a 'proxy' is utilised to answer questions on behalf of a subject, say because access to the subject is uneconomic or because the subject is too ill or too young to participate directly, care should be taken not to infringe the 'private space' of the subject or to disturb the relationship between the subject and proxy. Where indications exist or emerge that the subject would object to certain information being disclosed, such information should not be sought by proxy.

(c) *Secondary use of records.* In cases where a statistician has been granted access to, say, administrative or medical records or other research material for a new or supplementary inquiry, the custodian's permission to use the records should not relieve the statistician from having to consider the likely reactions, sensitivities and interests of the subjects concerned, including their entitlement to anonymity.

(d) *Misleading potential subjects.* In studies where the measurement objectives preclude the prior disclosure of material information to subjects, statisticians should weigh the likely consequences of any proposed deception. To withhold material information from, or to misinform, subjects involves a deceit, whether by omission or commission, temporarily or permanently, which will face legitimate censure unless it can be justified.

A serious problem arises for statisticians when methodological requirements conflict with the requirement of informed consent. Many cases exist in which the provision of background information to subjects (say, about the purpose or sponsorship of a study), or even the process of alerting them to the fact that they are subjects (as in observation studies), would be likely to produce a change or reaction that would defeat or interfere with the objective of the measurement. These difficulties may lead statisticians to waive informed consent and to adopt either covert measurement techniques or deliberate deception in the interests of accuracy.

The principles above urge extreme caution in these cases and advise statisticians to respect the imputed wishes of subjects. Thus, in observation studies or in studies involving proxies, the principle to be followed is that mere indications of reluctance on the part of an uninformed or unconsenting subject should be taken as a refusal to participate. Similarly, in the case of secondary use of records, statisticians should have regard to any obligations already owed to subjects. Any other course of action in these cases would be likely to demonstrate a lack of respect for the subject's interests and to undermine the relationship between statistician and subject.

Statistical inquiries involving deliberate deception of subjects (by omission or commission) are rare and extremely difficult to defend. Clear methodological advantages exist for deception in some psychological studies, for instance, where revealing the purpose would tend to bias the responses. But, as Diener and Crandall (1978) have argued 'science itself is built upon the value of truth'; thus deception by scientists will tend to destroy their credibility and standing (see Clause 3.1). If deception were widely practised in statistical inquiries, subjects would, in effect, be taught not to 'trust those who by social contract are deemed trustworthy and whom they need to trust' (Baumrind, 1972).

Nonetheless, it would be as unrealistic to outlaw deception in statistical inquiry as i would be to outlaw it in social interaction. Minor deception is employed in many forms o human contact (tact, flattery, etc.) and statisticians are no less likely than the rest of th population to be guilty of such practices. It remains the duty of statisticians and thei collaborators, however, not to pursue methods of inquiry that are likely to infringe human values and sensibilities. To do so, whatever the methodological advantages, would be to endanger the reputation of statistics and the mutual trust between statisticians and society which is a prerequisite for much statistical work. (See Clause 3.1).

For these reasons, where informed consent cannot be acquired in advance, there is a case, where practicable, for seeking it post hoc, once the methodological advantage—of covert observation, of deception, or of withholding information—has been achieved.

4.4 Protecting the interests of subjects

Neither consent from subjects nor the legal requirement to participate absolves the statistician from an obligation to protect the subject as far as possible against potentially harmful effects of participating. The statistician should try to minimise disturbance both to subjects themselves and to the subjects' relationships with their environment.

Harm to subjects may arise from undue stress through participation, loss of self-esteem, psychological injury or other side effects. Various factors may be important in assessing the risk-benefit ratio of a particular inquiry, such as the probability of risk, the number of people at risk, the severity of the potential harm, the anticipated utility of the findings, few of which are usually quantifiable (see Levine, 1975).

When the probability or potential severity of harm is great, statisticians face a more serious dilemma. A statistician may, for instance, be involved in a medical experiment in which risks to subjects of some magnitude are present. If volunteers can be found who have been told of the risks, and if the statistician is convinced of the importance of the experiment, should he or she nonetheless oppose the experiment in view of the risks? In these circumstances, probably the best advice is to seek advice—from colleagues and others, especially from those who are not themselves parties to the study or experiment.

The interests of subjects may also be harmed by virtue of their membership of a group or section of society (see Clause 1.1). So statisticians can rarely claim that a prospective inquiry is devoid of possible harm to subjects. They may be able to claim that, as individuals, subjects will be protected by the device of anonymity. But, as members of a group or indeed as members of society itself, no subject can be exempted from the possible effects of decisions based on statistical findings.

4.5 Maintaining confidentiality of records

Statistical data are unconcerned with individual identities. They are collected to answer questions such as 'how many?' or 'what proportion?', not 'who?'. The identities and records of co-operating (or non-cooperating) subjects should therefore be kept confidential, whether or not confidentiality has been explicitly pledged.

4.6 Inhibiting disclosure of identities

Statisticians should take appropriate measures to prevent their data from being published or otherwise released in a form that would allow any subject's identity to be disclosed or inferred.

There can be no absolute safeguards against breaches of confidentiality, that is the disclosure of identified or identifiable data in contravention of an implicit or explicit obligation to the source. Many methods exist for lessening the likelihood of such breaches, the most common and potentially secure of which is anonymity. Its virtue as a security system is that it helps to prevent unwitting breaches of confidentiality. As long as data travel incognito, they are more difficult to attach to individuals or organisations.

There is a powerful case for identifiable statistical data to be granted 'privileged' status in law so that access to them by third parties is legally blocked in the absence of the permission of the responsible statistician (or his or her subjects). Even without such legal protection, however, it is the statistician's responsibility to ensure that the identities of subjects are protected.

Anonymity alone is by no means a guarantee of confidentiality. A particular configuration of attributes can, like a fingerprint, frequently identify its owner beyond reasonable doubt. So statisticians need to counteract the opportunities for others to infer identities from their data. They may decide to group data in such a way as to disguise identities (see Boruch & Cecil, 1979) or to employ a variety of available measures that seek to impede the detection of identities without inflicting very serious damage to the aggregate dataset (see Flaherty, 1979). Some damage to analysis possibilities is unavoidable in these circumstances, but it needs to be weighed against the potential damage to the sources of data in the absence of such action. (See Finney, 1984).

The widespread use of computers is often regarded as a threat to individuals and organisations because it provides new methods of disclosing and linking identified records. On the other hand, the statistician should attempt to exploit the impressive capacity of computers to disguise identities and to enhance data security.

Bibliography: Obligations to subjects

4.1 Avoiding undue intrusion

Boruch & Cecil (1979 & 1982) describe sampling and statistical techniques for preserving privacy. Hartley (1983) outlines the threats to privacy entailed by various sampling procedures. Michael (1984) is a journalistic account of the threats to privacy from all sources in Britain. Mirvis and Seashore (1982) is a general discussion of research in organisations, where questions about the appropriate extent of intrusion and intervention are particularly pressing. Reeves and Harper (1981) is a text on organisation research in a British industrial context.

The necessity of some intrusion into the privacy of respondents to collect information that can be obtained only by individual interviews is referred to by Bryant and Hansen (1976).

4.2 Obtaining informed consent

Wax (1979 & 1982) argues for the inappropriateness of requiring informed consent in ethnographic inquiry, while Capron (1982) defends the requirement. O'Connor (1976) discusses problems of interpreting consent, or lack of it, in hierarchical field settings such as prisons. Bulmer (1982) presents an extended case against covert social inquiry. O'Connor & Barnes (1983) makes a brief defence of some covert research. Singer (1978) and Jowell (1979) report empirical evidence about the differential effects of seeking informed consent from survey respondents.

The relevance of the principle of informed consent to statistical inquiries is critically discussed by Dalenius (1983) and questioned by Hansen (1983).

4.3 Modifications to informed consent

Douglas (1979) argues against formal requirements to obtain consent. Geller (1982) makes suggestions about how to avoid having to deceive research subjects. Form (1973) deals at length with relations between scientists and gatekeepers.

4.4 Protecting the interests of subjects

Baumrind (1972) is a plea for priority for the interests of research subjects. Klockars (1979) discusses how to handle these interests when they seem to be anti-social and/or illegal. Freidson (1978) argues in favour of the routine destruction of all identifiers of data about individuals. Okely (1984) discusses the hazards in publishing findings on an identifiable social group in Britain. Loo (1982) gives a case study of research aimed at promoting the welfare of a deprived community. Canada Council (1977) discusses the special problems that arise in research on captive populations and on children. Warwick (1983) examines the particular ethical issues that may arise in some developing countries.

4.5, 4.6 Confidentiality and disclosure of identities

Boruch & Cecil (1979 & 1982) provide technical answers. Hartley (1982) discusses the relation between sampling and concealment.

Legal and technical aspects of the protection of statistical data on individuals are presented by Dalenius (1979) and Durbin (1979) in the context of the laws and practices of their respective countries: Sweden and the U.K.

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Proposed Ethics Guidelines for Epidemiologists

1. Definition and purposes of epidemiology

1.1 Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

1.2 The practice of epidemiology - health surveillance and disease control in populations - is integral to public health practice. As a research method, epidemiology is used to test hypotheses about causes of disease, to measure health risks, and to conduct experiments to investigate the efficacy of preventive, diagnostic or therapeutic regimens or procedures.

1.3 The purposes of epidemiology are to enlarge our understanding of factors that influence health-related states or events, so that the health of populations and individuals can be enhanced, protected or restored; to provide information and analyses to guide decisions affecting community health; to evaluate measures taken to enhance, protect or restore health; and to respond to community concerns regarding health.

1.4.1 Epidemiology can be conducted with national or regional populations, with samples, or with subsets of the population such as patients or high-risk groups; it may have broad aims or focus on specialized themes.

1.4.2 These guidelines apply to all aspects of epidemiology and to all kinds of health professionals who practice epidemiology. They are intended primarily to help in identifying ethical issues that arise in epidemiological practice and research, and to promote procedures to deal with these issues. The guidelines should help epidemiologists, ethics review committees, and members of the public such as consumer groups concerned about ethical conduct of health surveillance and research.

2. The nature and values of epidemiology

2.1 Epidemiology is a science, an aspect of public health practice, and the source of facts to aid in advocacy.

2.2 Epidemiology is a basic science of public health and of clinical medicine. We who practice epidemiology are concerned with the health of all population groups. Our role is to identify interventions likely to restore, maintain and improve health. We apply our skills and knowledge from diverse educational and experiential backgrounds. We recognize that other health professionals share the same goals, and we collaborate fully with all others in achieving these goals.

2.3 Our professional activity as scientists focuses on improving the state of knowledge that provides the basis for inferences

about causes and levels of risks to which individuals and population groups have been exposed; and the basis for decisions concerning, for example, efficaceous preventive and therapeutic interventions, health goals and resource allocation.

2.4. As public health professionals, we have an obligation to communities rather than to individuals. We are sensitive to the cultural norms of communities and groups that we study. We have specific professional skills relevant to solving the health problems of communities. Our obligation to these communities and our professional skills place us at the interface of science and public health policy. As public health professionals we provide information for the rational use of resources, and we may also advocate specific solutions to health problems.

2.5 We distinguish between our role as scientists and our role as advocates, and ensure that those with whom we are dealing are also aware of this distinction.

3. Basic principles of biomedical ethics

3.1 Ethics is the branch of philosophy concerned with the distinction between right and wrong, with moral choices, duties and obligations.

3.2 Four principles of biomedical ethics are commonly defined. These are respect for autonomy (human rights, dignity and freedom), non-maleficence, beneficence and justice. Non-maleficence, the principle of not harming, applies in such contexts as not allowing information collected to harm persons or groups providing it. Beneficence is the principle of doing good; it encompasses truth-telling, a tenet of epidemiology. Justice is the principle concerned with equity and fairness.

3.3 Though we strive to observe all these principles, they are occasionally in conflict, as when we have to sacrifice autonomy in the interest of justice.

3.4 These principles are the basis for codes of professional conduct such as the Helsinki Declaration and its revisions. All health professionals in contact with human subjects are expected to abide by the Helsinki Declaration.

4. Obligations to individuals

4.1 When interventions into people's autonomy are planned, their informed consent to the intervention is a necessary prerequisite. This requires that knowledge and understanding of the nature and consequences of the intervention are communicated, that the subjects of the intervention give free and voluntary consent to the intervention and that they retain the right to withdraw. In some situations such as studies involving large data files, it may be impractical to obtain the informed consent of individuals to whom the records relate.

4.2 Epidemiologists respect personal privacy and avoid violation of confidentiality. It is a sine qua non of epidemiological surveillance and research that privacy and confidentiality of individuals, and in some circumstances, of groups or communities, should be preserved. This is important because epidemiology requires collection of information that is private, personal and sometimes potentially harmful to the interests of individuals if divulged. Such information can only be publicly disseminated as statistical tables or displays that do not reveal identities.

4.3 Sometimes the health, safety or wellbeing of others may require that information possessed by epidemiologists is communicated to responsible health authorities, and perhaps to family members or other contacts of persons with communicable diseases that are under surveillance. This has long been a requirement in control of many communicable diseases; it has the support of laws or regulations in many jurisdictions. In these circumstances, privacy can be invaded, confidentiality violated. An example is notifying and counselling partners of persons with sexually transmitted diseases; if possible the epidemiologist should obtain the informed consent of such persons to this necessary loss of their privacy and confidentiality.

4.4 The interventions in both surveillance and research should not harm human subjects. However, as in other aspects of health care, epidemiological studies may sometimes involve painful or even hazardous procedures or regimens. The balance of benefits and risks must always be carefully weighed.

4.5 Epidemiologists may not be able to resolve ethical dilemmas unaided or by seeking advice from colleagues. Therefore means must be developed to allow a broader scrutiny of the issues by all interested parties. Ethical review committees are one mechanism to accomplish this.

5. Obligations to communities

5.1 Epidemiology is primarily concerned with providing service to communities. Epidemiologists have an obligation to communicate with communities directly or through community representatives to explain what they are doing and why, to transmit the results of their studies, to explain their significance, and to suggest appropriate action.

5.2 Health workers including epidemiologists have an obligation to ensure the provision of health care for communities and individuals found to be in need of care. Epidemiologists do not themselves usually provide the care, but in some circumstances, e.g. in developing countries where no other source of care is available, they may have to do so. When they are involved in providing health care, the roles of care-giver and epidemiologist must be distinguished.

5.3 Identification of problems to be studied, and their priority for study, should take into account the perceived importance of the problem to the people living in a community. Notwithstanding this, epidemiologists may perceive that a health problem exists but is being ignored or its existence denied by the people in a community. Examples include the health problems identified in the 1950s as attributable to tobacco addiction, and occupational health problems that workers and their families do not want to be ameliorated because they fear economic repercussions or loss of employment. Epidemiologists are frequently drawn to the problems of disempowered communities, and may require unusual sensitivity in dealing with them, because it can be difficult for people in these communities to clearly articulate their needs.

5.4 Epidemiologists do not conduct studies aimed at protecting the interests of one group in a community at the expense of or to the detriment of others.

6. Access to information

6.1 Concern for personal privacy has led to measures intended to improve the security of information stored in health records; in some countries, this has limited the usefulness of health information systems such as linked medical records. However, the public interest in identifying the causes and control of health problems indicates a need to preserve and enhance the efficacy of health information systems. A conflict may arise between a legitimate desire to enhance personal privacy and the societal benefits of access to personal information for surveillance and research purposes, although this conflict is often more apparent than real. Epidemiologists may need to emphasize to community and political leaders that adequate safeguards of individual interests can almost always be developed in ways that protect research interests as well. Epidemiologists have an obligation not to use health information systems for improper purposes.

6.2 The results of epidemiological studies should generally enter the public domain by publication or dissemination in other ways. Moreover, the raw data and protocols used in epidemiological study should be accessible and available to other epidemiologists in order that findings can be replicated. Clear understanding of this basic principle of good scientific conduct facilitates collegiality and reduces the chance of adversarial or confrontational relationships. Unfettered access to data, protocols and findings applies to all, including special interest groups that may seek to withhold, selectively release or manipulate data in ways that are not in the public interest.

7. Scientific integrity

7.1 Ethical issues arise in the choice of research topics and research methods. Epidemiologists have an obligation to serve community and global needs in exercising these choices.

7.2 Honesty and impartiality are essential components of all sciences, including epidemiology; it is professional misconduct to distort the truth, whether by manipulating data, applying inappropriate methods of analysis, withholding part of the evidence, or by crimes such as misrepresentation or fraud.

7.3 At times, epidemiologists may find themselves in situations where there is a conflict of interest. For example, an employing or research-funding agency may seek to influence the presentation of results of epidemiological study, by manipulating the data, by slanted interpretation or by requiring that some findings be withheld. In such situations, epidemiologists have an obligation to uphold the public interest in full unbiased disclosure, rather than supporting narrow or special interests such as those of pressure groups that may seek to distort the truth. Any conflict of interest must be disclosed.

7.4 Epidemiologists often discover hazards to health that demand correction; they may therefore choose to become advocates. Advocacy for health does not preclude scientific impartiality but is incompatible with neutrality between the interests of health and other, often competing interests. Value-laden statements made and actions taken in the role of advocate should therefore be clearly distinguished from those deriving from the role as scientist. Nevertheless even purely scientific interpretations of factual evidence in epidemiology, as in other sciences, are rarely value-free.

7.5 Such conflicts as those described above are more likely to be resolved in a constructive way by collective rather than individual judgements. It thus becomes an opportunity and an obligation of professional associations, editorial boards, ethics review committees and the like, to provide a forum for presentation and evaluation of these conflicts.

8. Professional standards

8.1 Epidemiologists interact with free-living healthy people, patients, colleagues in their own field and other health professionals, students and others learning epidemiology, health policy makers, research funding agencies, the media, special interest groups of many kinds, and usually an employer. Respect for the dignity, integrity and motivation of other participants in all these interactions is a professional obligation.

8.2 Interactions with the public, clients and patients have been discussed above. Interactions with other epidemiologists should be collegial. Discussion of disagreements about methods, procedures or scientific findings, should be objective and restrained, not confrontational or destructive of reputations. Interactions with the media should clearly distinguish among statements of facts, opinions and advocacy. Any conflict of interest should be disclosed.

8.3 The education and training requirements of epidemiologists are ill-defined; nonetheless, epidemiologists responsible for educating and training entrants to the discipline should communicate to students and demonstrate by example their commitment to the highest possible standards of professional conduct. Education and training of epidemiologists should include discussion of ethical issues.

9. Cultural variations in values

9.1 Epidemiologists may encounter difficulty in acting in accordance with moral values other than their own. It is necessary to respect moral values other than one's own, but without sacrificing basic scientific or ethical principles. Values differ among the major cultures and religious groups, e.g. among Christian, Hindu, Orthodox Islamic societies. The concept of autonomy is different in some communities, such as some tribal communities and some religious sects, where individuals perceive themselves as part of a collective in which essential decisions are taken on their behalf by a tribal headman or religious leader. In some countries and cultures, patients consider that they delegate to their doctor all responsibility for decision-making, including decisions requiring informed consent. However, as much as possible, consent of community or family leaders should not be a substitute for or override consent or choice on the part of individuals.

9.2 Epidemiologists must be cognizant of cultural variations, but may have to face difficult choices if their studies disclose culturally determined hazards to health that can be corrected only by changing behaviors that are deeply rooted in custom or tradition. In such situations, as in all others where the moral and ethical choices are difficult, careful consideration of all the options in discussion with appropriately qualified experts is the correct procedure. Opinions vary about the extent to which western values may be imposed upon other cultures.

10. Conclusion

These guidelines on ethics for epidemiologists are not a formal code of conduct; rather, this document is a starting point for discussions among epidemiologists and other concerned parties who encounter moral or ethical dilemmas in practice or research that uses epidemiological methods and procedures.

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