

International Cohorts Summit

Some History

Large-scale cohort studies – studies with hundreds of thousands of participants or more



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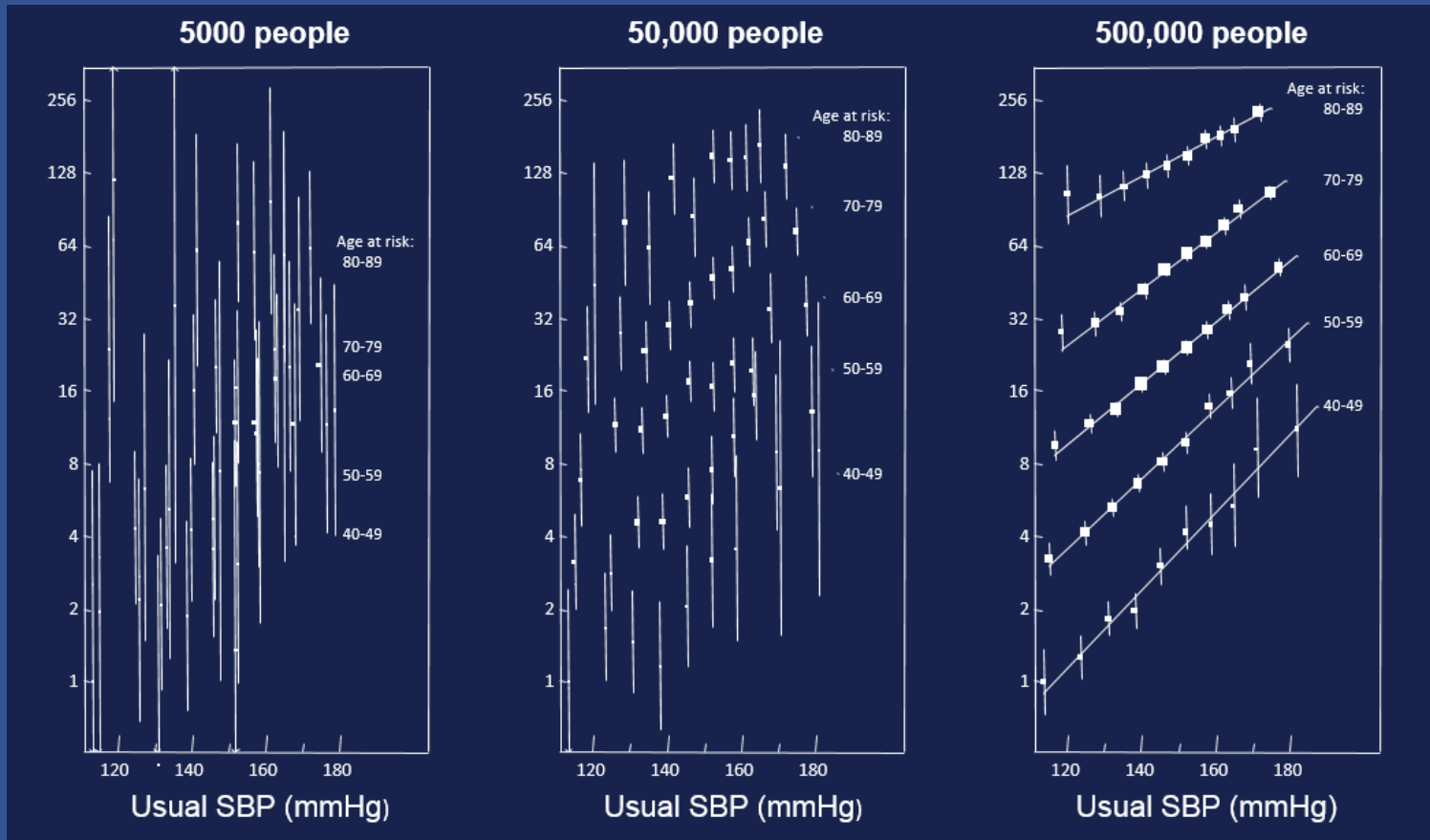
Large-scale cohort studies – studies with hundreds of thousands of participants or more

- Value clearly demonstrated, in
 - **Studies of quantitative traits**



Prospective Studies Need to be Large

Coronary heart disease versus systolic blood pressure



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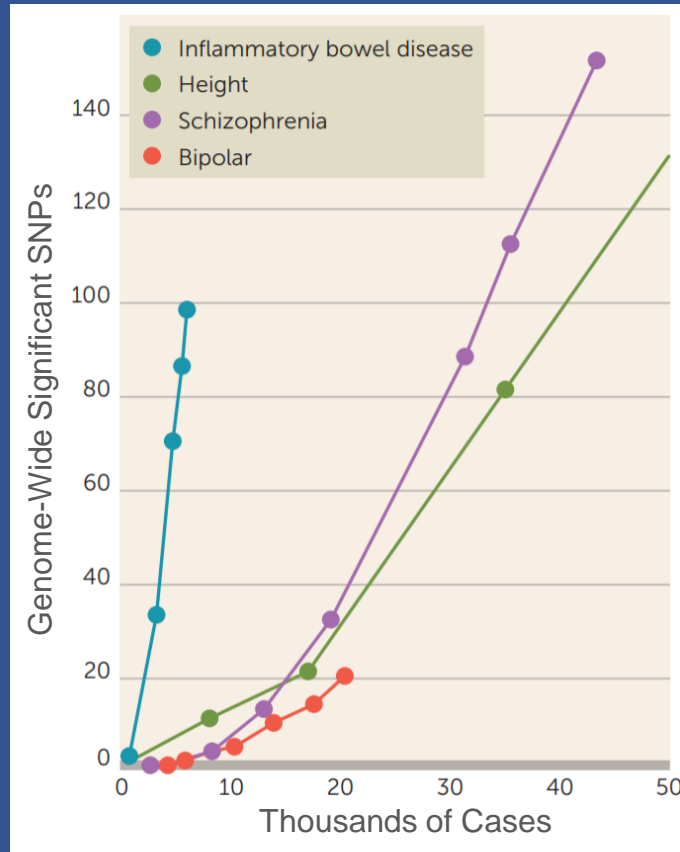
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 - **Genome wide associations**



Sample Size Drives Genomic Discovery



Relation between numbers of cases and genome-wide significant SNPs in GWAS

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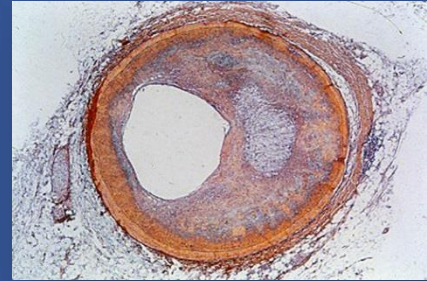
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- Value clearly demonstrated, in
 - Studies of blood pressure
 - Genome wide associations
 - **Rare genotypes: the human knockout project**



Discovering Therapeutic Targets: The Value of Rare Variants

- “Human knock-out” as nature’s way of validating a target
- *PCSK9* mutation results in:
 - Very low LDL levels
 - Dramatic decrease in risk of heart disease
 - No other apparent adverse effects
 - New target for lowering lipids
- Other attractive targets: *SLC30A8* for T2D, *NPC1L1*, *APOC3* for heart disease, *Nav1.7* for pain, ...



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 - Studies of blood pressure
 - Genome wide associations
 - Rare genotypes: the human knockout project
- Many such studies currently in progress, or in planning



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Seeking a Global Perspective

- 2015: NIH compiled information on large cohort programs ($\geq 100K$)
- Results discussed at June 2016 HIROs* meeting; agreed on need to bring cohorts together
 - Encourage data sharing, pooling for improved scientific discovery
 - Improve efficiencies, maximize investments
- Commissioned Global Genomic Medicine Collaborative (G2MC) to organize summit



* Heads of International Research Organizations

Crafting an International Cohort Summit: G2MC Moves Forward

- Identified four criteria (bent somewhat for other compelling reasons) to include cohorts:
 - Of 100,000 participants or more
 - Not selected for disease
 - With available biospecimens
 - With potential for longitudinal follow-up
- Invited cohort programs to send representatives, description (in meeting materials); respond to key questions



Global Genomic
Medicine Collaborative

Toward Global Collaboration Among Large-scale Cohorts

Exceptional opportunities to maximize scientific value and global applicability

- Conduct complementary studies for replication, combined analysis
- Assess variants through genetic heterogeneity among populations
- Study a wider range of environmental exposures
- Accelerate precision medicine



Summit Objectives

- Improve prospects for compatibility of instruments, data formats, phenotype measures, consent, etc.
- Promote data and specimen sharing, open access policies
- Examine potentials for a collaborative sequencing
- Explore feasibility of a searchable on-line global registry of large-scale cohorts
- Create vision: *Where do we want to be in ten years?*

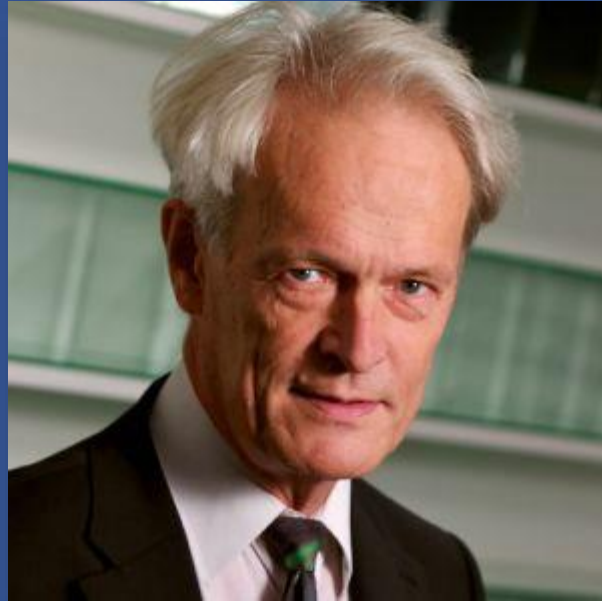


“As for the future, your task is not to foresee it, but to enable it.”

~ *Antoine de Saint Exupéry*



Professor Sir Richard Peto, FRS



“the Mozart of the Clinical Trial”
– Charles Hennekens, 1990



PAPERS AND ORIGINALS

British Medical Journal, 1976, 2, 1525-1536

Mortality in relation to smoking: 20 years' observations on male British doctors

RICHARD DOLL, RICHARD PETO

*Pioneer of Big Data
for Better Health*



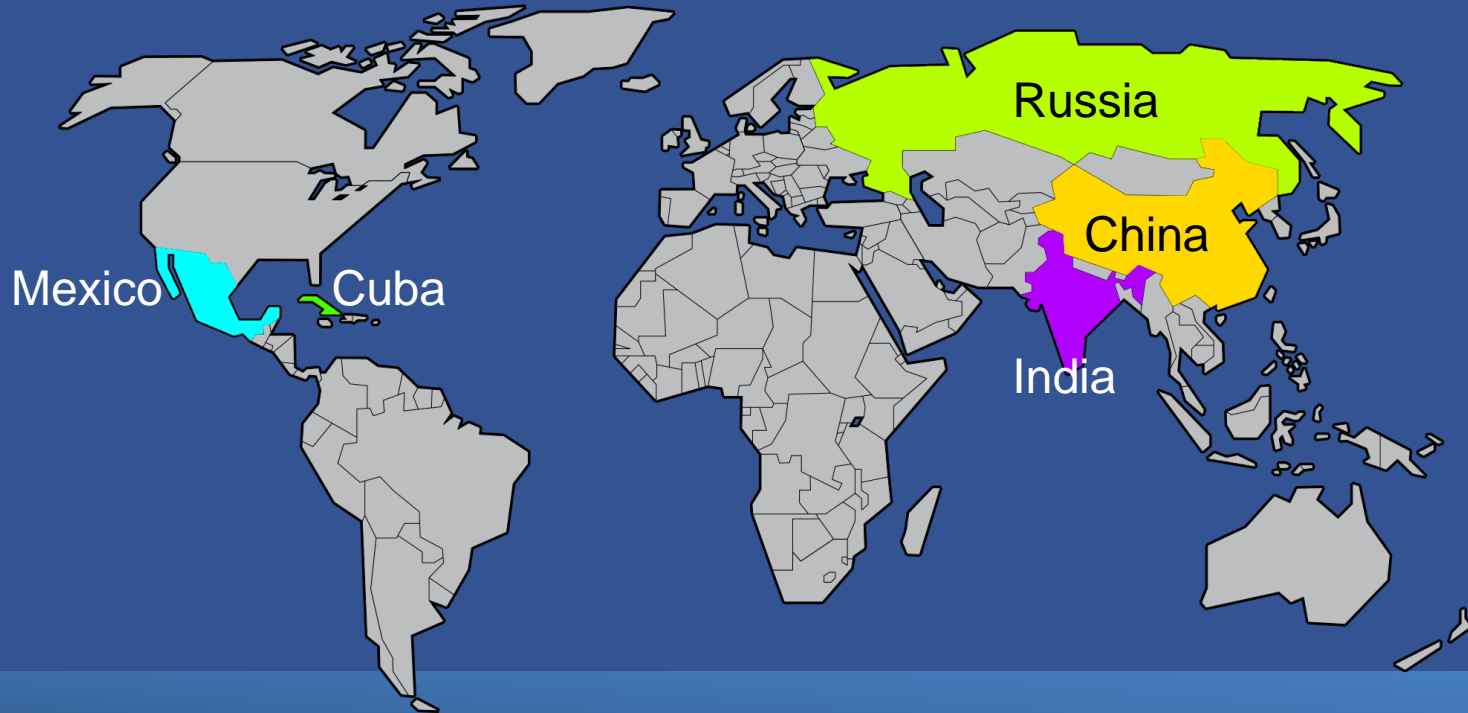
June 1981

The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today

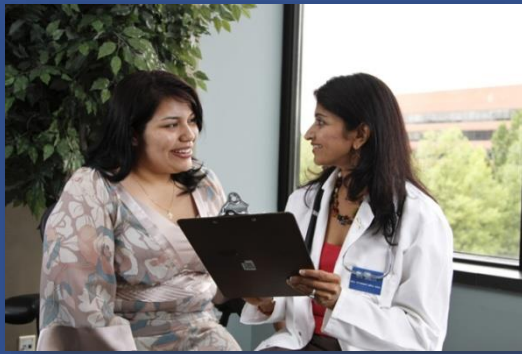
Richard Doll, Honorary Director, Imperial Cancer Research Fund Cancer Epidemiology and Clinical Trials Unit, and Warden of Green College, Oxford, United Kingdom

and **Richard Peto**, Imperial Cancer Research Fund Reader in Cancer Studies, Nuffield Department of Clinical Medicine, University of Oxford, Radcliffe Infirmary, Oxford OX2 8HE, United Kingdom

Prospective Studies of Smoking, Alcohol, Adiposity, and Blood Pressure



Richard Peto's Global Influence



NIH... *Turning Discovery Into Health*

directorsblog.nih.gov

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