

The epidemiology and public health of A1/A2 β -casein consumption and IHD and type 1 diabetes

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Overview

- Epidemiology
 - Ecological relationships between A1 milk consumption and ischaemic heart disease & type 1 diabetes
 - Strengths and weaknesses of ecological studies
 - Interpretations
- Public health
 - Positions of main actors: scientists, government, dairy industry (mainstream & A2), dairy farmers, public
 - Precautionary principle
- Conclusions

Seminal paper 2003

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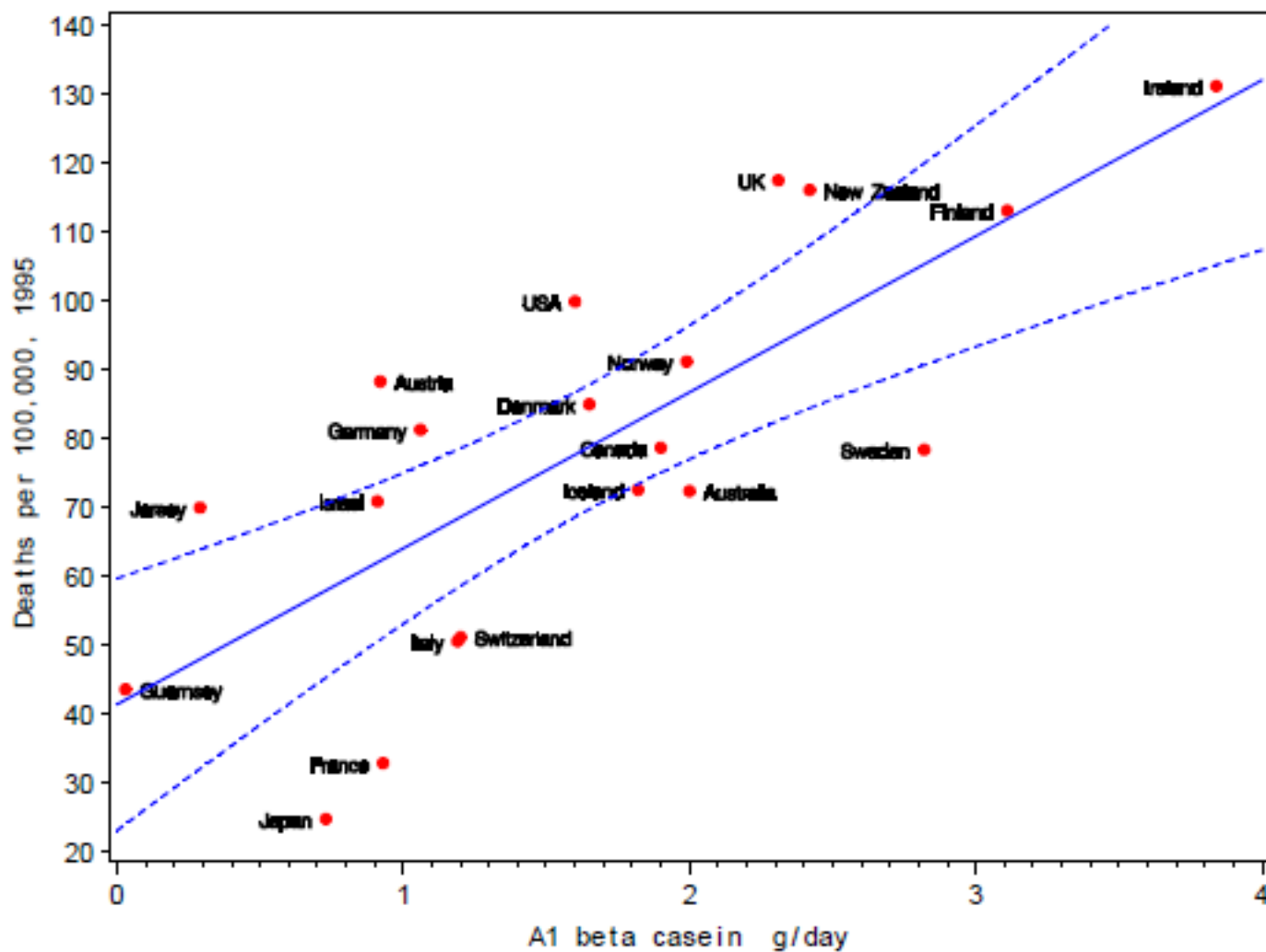
Ischaemic heart disease, Type 1 diabetes, and cow milk A1 β -casein

Murray Laugesen and Robert Elliott

Ecological correlational studies

- ~20 'health care affluent' countries
- FAO data for dairy (milk, cream, butter, cheese) and Food Balance Sheets
- A1/A2 fractions from cow breed data by country
- Ischaemic heart disease mortality (5y lag period)
- Type 1 diabetes incidence

Figure 1. A1 β -casein supply (A1/capita) 1990 and ischaemic heart disease 1995, 20 countries

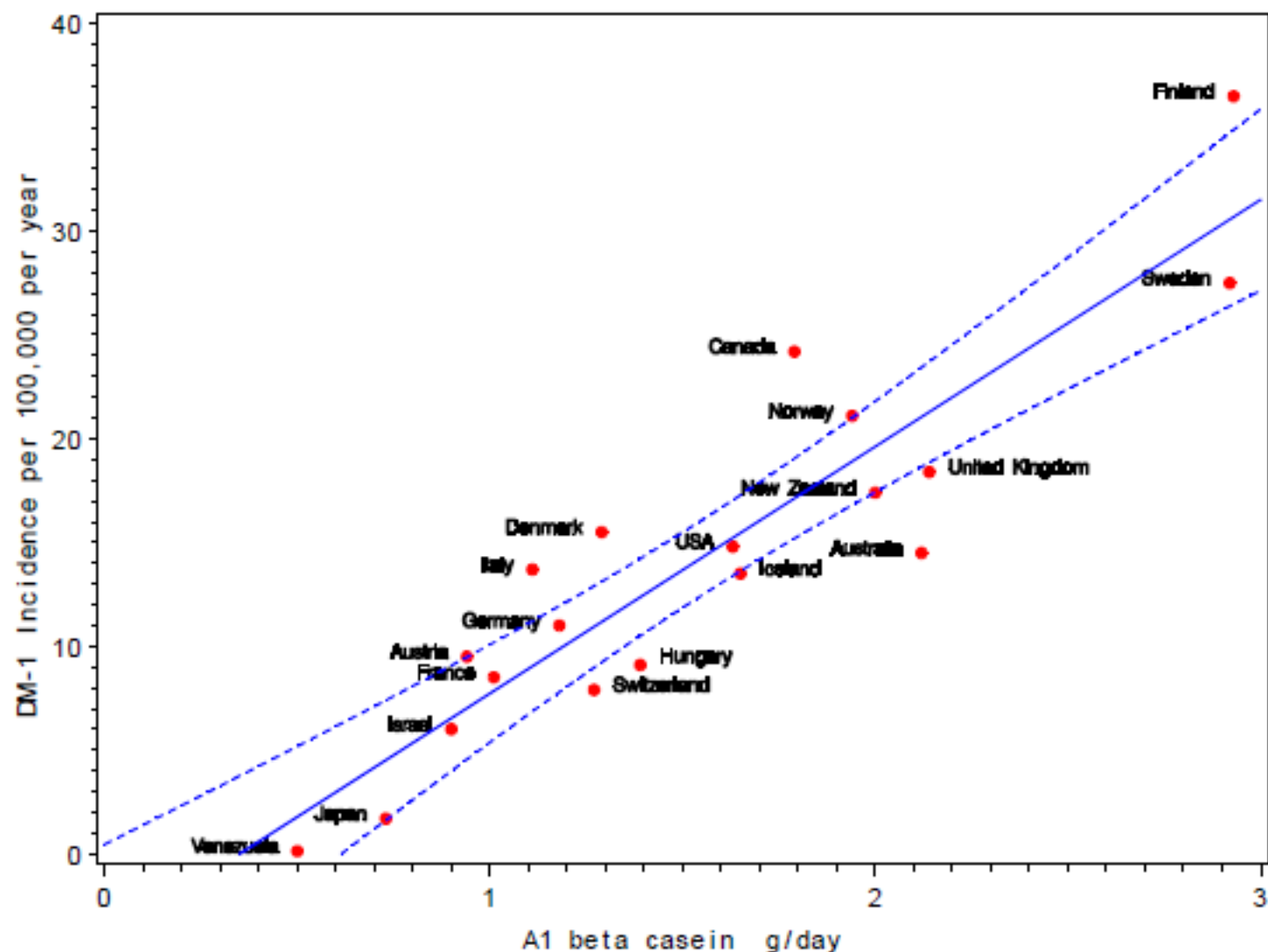


$r=0.76$, (95% CI 0.48-0.90), $p<0.0001$. Dotted lines are the 95% confidence limits of the regression line

Ischaemic Heart Disease mortality

- A1 β casein per capita from milk & cream
 - Strongest correlate of 18 tested (including smoking, alcohol and multiple indicators of dairy, food and nutrient combinations)
 - Consistent over 20 years
 - Explained 58% of the IHD variance
- > 5-fold range in both A1 β casein per capita and IHD mortality

Figure 2. Correlation of A1/capita (A1 β -casein in the per capita milk and cream supply) with the incidence of diabetes mellitus Type 1 at age 0–14 years of age, 1990-94, 19 countries



$r=0.92$ (95% CI 0.72 to 0.97) $p < 0.0001$; dotted lines = 95% confidence limits of the regression line

Type 1 diabetes incidence

- A1 β casein per capita from milk & cream
 - $r=0.92$, $r^2=0.85$ (explained 85% of T1DM variance)
 - Strongest correlate of 15 tested
- > 5-fold range in both A1 β casein per capita but 280-fold range in T1DM incidence
- A2 β casein per capita from milk & cream
 - $r=0.47$ (auto-correlation with A1 consumption)
- Food Balance Sheets
 - 75 food groups, >100 nutrient indicators
 - Milk protein ($r=0.64$), oats ($r=0.70$) [latitude, $r=0.65$]

Ecological studies in general

- Strengths
 - Wider range of exposure between populations than within populations
 - Multiple years → longitudinal studies of countries
- Weaknesses
 - Ecological fallacy (group attributes do not necessarily apply to the individuals of that group)
 - Confounding (the correlation being created because they are both related to a third common factor)
- Measurement errors
 - Blunt – risk of false negative studies
 - Biased – risk of false positive studies

Notable features of these studies

- High correlation for IHD
 - Surprising for such a multifactorial disease
 - Stronger than traditional risk factors
- Very high correlations for diabetes
 - No plausible fallacy or confounding reasons proposed
 - Plausible that T1DM has one or few major triggers
- Multiple assumptions and crude food data
 - Should diminish the correlations
- Dismissed by some commentators who don't understand ecological studies and haven't provided plausible explanations for the results

Main actors: scientists & funders

- Scientists
 - Should be pursuing this plausible hypothesis hard
 - Are humans and tend to hold onto pet theories
 - Challenges of conflicts with commercial interests
 - Variable engagement with other actors
- Science funding agencies
 - Public good agencies: challenges of funding studies which have commercial benefits
 - Commercial funders: challenges of funding studies which potentially enhance or diminish commercial value

Main actors: Government

- Authority and responsibility to act in the public's interest
 - Susceptible to commercial interest lobby
- Acting in the presence of evidence uncertainty
 - Conservative and aversion to act on the Precautionary Principle
- Policy options:
 - Labelling
- Communications options:
 - To the public (dietary guidelines, public advice)
 - To industry (public or private advocacy)

Main actors: dairy industry

- Mainstream dairy industry
 - Research capacity
 - Communication channels to government & farmers
 - Major investments and brands to protect
- A2 dairy industry
 - Limited in claims to differentiate their products
 - Full herd conversion to A2 not in their interests
- Dairy farmers
 - True public health agents (herd change)
 - Where do they get clear, authoritative information & advice?
- Semen suppliers

Main actors: media & the public

- Media
 - Headlines, controversy & click-bait
- Public
 - Right to know the balance of evidence to make individual decisions
 - May opt for a precautionary approach
 - Susceptible to misinformation and misinterpretation

Conclusions

- Epidemiology
 - Compelling correlations, especially for T1DM
 - Ecological studies are too readily dismissed
 - No competing plausible explanations for the correlations
- Public health implications
 - Multitude of actors and agendas
 - For the main public health agents (dairy farmers), there are potential benefits and negligible costs to change herds to A2, but who is talking to them?

