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governance, ethics, evidence, policy, practice

Center for Genomic Medicine Ethics & Policy

Genomics: Governance, Ethics, Policy, Practice – A Monthly Digest

February 2025 – Number 12

Genomics – spanning discovery, preclinical, clinical and translation to daily patient interventions – continues to evolve at an extraordinary pace. Advances in the scientific and technical dimensions of genomics overall are extensively communicated through the peer-reviewed journal literature and supporting grey literature.

Complementing this technical literature is a growing body of research, analysis and commentary addressing the governance, ethics, regulation, and policy dimensions of areas including genomic medicine. Much of this content is communicated through academic journals and grey literature. This digest intends to capture and curate the most substantive examples of this non-technical content.

Further, we intend this digest to provide a useful summary of key strategic and programmatic announcements from across genomics as issued by multilateral agencies, INGOs, governments/regulatory bodies, academic and research institutions, consortiums and collaborations, foundations, investors, and commercial organizations.

Given the complexity and velocity of the field, we are striving to make this digest comprehensive – but we acknowledge it is not exhaustive. We invite suggestions and ideas on how it can evolve to be more useful.

The digest is a program of the GE2P2 Global Foundation which is solely responsible for its content. Questions and comments should be directed to the Editor as below:

Editor
David R Curry, MS
President/CEO; Senior Fellow
GE2P2 Global Foundation
david.r.curry@ge2p2global.org

Month in Review – *Milestones, Strategic Announcements, Analysis, Guidance*

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Trump Administration – Actions Impacting Biomedical/Genomics Research

We continue our global monitoring of new laws, regulations, policies and other actions by governments, UN-system agencies, multilateral organizations, INGOs, civil society, and other institutions and organizations which may impact the integrity of science, and the responsible, ethical conduct of research and evidence generation. In this context, we are also monitoring Executive Orders and other actions by the Trump Administration. While many organizations have commented on the Administration's action on indirect costs rates for grant-based research [see citation below], we have identified only one comment from an organization in the genomics space.

Statement on Changes to NIH Indirect Costs Rates From ASGCT
Position Statements
American Society for Gene and Cell Therapy [ASGCT]
February 10, 2025
Cell and gene therapies are providing patients with treatments for diseases that until recently had few or no therapeutic options. They have revolutionized how we treat certain blood cancers, are curing genetic diseases such as sickle cell anemia and spinal muscular atrophy, and are forging pathways for new therapies in other serious diseases.

The United States is the clear world leader in cell and gene therapies. In 2024, the pipeline of gene, cell, and RNA therapies had 4,238 therapies in development. They are also a significant component of the biotech economy of the United States. Consistent funding over many years from the National Institutes of Health (NIH) has been critical for these advances, providing one of the most efficient returns on investment of federal dollars. **ASGCT views changes that would significantly reduce NIH funding with great concern, including reducing indirect costs to a rate of 15%.**

There are many examples of how NIH funding has supported breakthroughs in cell and gene therapies. The first time a child was cured of leukemia using CAR T cells was in a clinical trial funded by multiple NIH grants, and subsequent breakthroughs, also supported by NIH funding, have saved the lives of patients with other cancers, such as lymphoma and myeloma. Research that led to gene therapy treatments for sickle cell disease included NIH funding to both internal NIH scientists and external institutions. The breakthrough discovery of CRISPR, which has led to multiple innovations in medicine and beyond, was based on foundational research funded by NIH to understand how bacteria fight off viruses. The list is extensive and growing.

A critical component of NIH funding is the indirect costs of research, which are nonspecific funds provided to an institution when a scientist receives a grant. They are not supplemental or insignificant. Instead, they reflect that the direct costs of a grant to the scientist only cover a fraction of the actual cost of doing that research. For example, direct costs cover specific reagents that must be purchased to perform a research project but do not cover the infrastructure necessary to allow that work to happen. This infrastructure includes, but is not limited to, the buildings that house research laboratories and clinical trial units; sophisticated equipment and services needed to support that research; and the personnel at an institution who ensure compliance with budget expenditures, lab safety, and human clinical trials. The total cost of funding needed to support scientific research is an iceberg; a grant's direct costs reflect only the part visible above the water.

Cuts to NIH-covered indirect costs would devastate the infrastructure and support that is critical for research at universities and institutions across the United States.

We urge Congress to reaffirm their prior commitment to continue the current indirect costs arrangement and for the administration to abide by those Congressional actions. In this way, the United States will continue to ensure the development of safe and effective new medicines for everyone.

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Supplemental Guidance to the 2024 NIH Grants Policy Statement: Indirect Cost Rates
Issued by: Office of The Director, National Institutes of Health
Notice Number: NOT-OD-25-068
Release Date: February 7, 2025

...Pursuant to this Supplemental Guidance, there will be a standard indirect rate of 15% across all NIH grants for indirect costs in lieu of a separately negotiated rate for indirect costs in every grant…

…For any new grant issued, and for all existing grants to IHEs retroactive to the date of issuance of this Supplemental Guidance, award recipients are subject to a 15 percent indirect cost rate. This rate will allow grant recipients a reasonable and realistic recovery of indirect costs while helping NIH ensure that grant funds are, to the maximum extent possible, spent on furthering its mission. This policy shall be applied to all current grants for go forward expenses from February 10, 2025 forward as well as for all new grants issued. We will not be applying this cap retroactively back to the initial date of issuance of current grants to IHEs, although we believe we would have the authority to do so under 45 CFR 75.414(c)…

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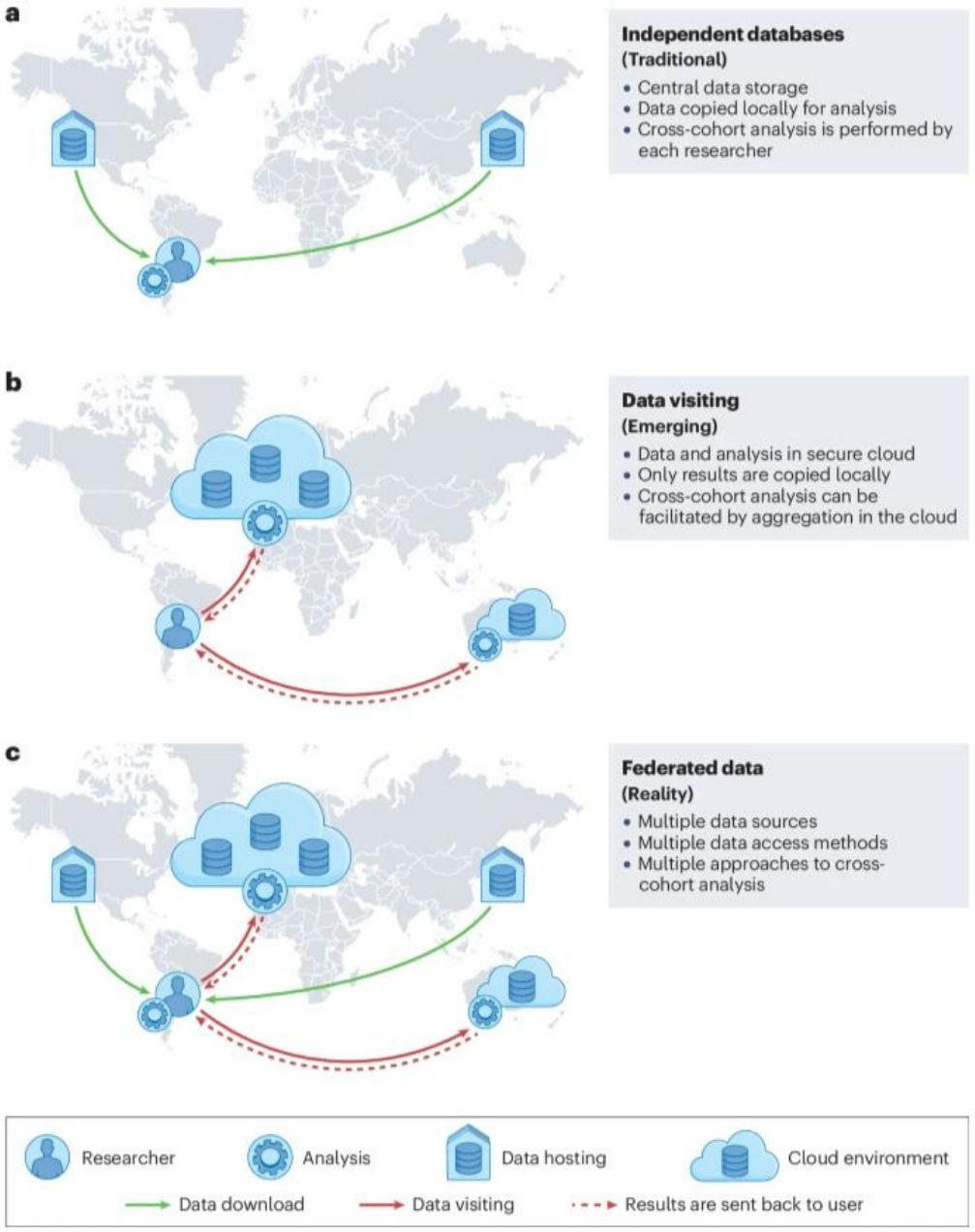
Clinical Genomic Data Sharing

A call to action to scale up research and clinical genomic data sharing
Roadmap 07 Oct 2024
Zornitza Stark, David Glazer, Richard H. Scott
Nature Reviews Genetics, Volume 26 Issue 2, February 2025

Abstract
Genomic data from millions of individuals have been generated worldwide to drive discovery and clinical impact in precision medicine. Lowering the barriers to using these data collectively is needed to equitably realize the benefits of the diversity and scale of population data. We examine the current landscape of global genomic data sharing, including the evolution of data sharing models from data aggregation through to data visiting, and for certain use cases, cross-cohort analysis using federated approaches across multiple environments. We highlight emerging examples of best practice relating to participant, patient and community engagement; evolution of technical standards, tools and infrastructure; and impact of research and health-care policy. We outline 12 actions we can all take together to scale up efforts to enable safe global data sharing and move beyond projects demonstrating feasibility to routinely cross-analysing research and clinical data sets, optimizing benefit.
Conclusions
We can and must do more to enable genomic data sharing. Research participants choose to donate their data to benefit science. Given the choice, most individuals undergoing clinical genomic testing do the same[80]. It is our responsibility to honour this choice while protecting their data. All of us, as

funders, policymakers, health system leaders and members of the genomic data community and global genomics ecosystem, have a responsibility to act (Box 1).

Fig. 1: Data sharing models.



a, Independent databases that allow data download, with data aggregation and analysis undertaken by individual researchers. **b**, Cloud-based environments that allow data visiting, enable analysis and download of results. **c**, Federated approaches that allow multiple data sources to be accessed through different methods to enable cross-cohort analysis.

Genomic data and data sharing infrastructure are critical in driving discovery and generating the evidence to support the adoption of evidence-based innovations in precision medicine, thus optimizing clinical impact. The global genomics community has made great strides over the last decade in the transition to a data-rich world. Genomic data generation is no longer the bottleneck, rather it is our

ability to harmonize, share and derive full benefit from the data we have, in both the research and clinical settings. We now have the standards, tools and experience to move beyond projects demonstrating feasibility. With health systems increasingly mainstreaming genomics in clinical care, our attention needs to focus on scaling up efforts to enable safe data sharing globally to unlock the value of today's and tomorrow's data sets for the benefit of future generations.

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Genomics Research Ethics – Individual and Collectivist Models

Across the academic literature addressing biomedical research and informed consent, there is an active thread arguing *against* ethics frameworks which are anchored in what is pejoratively described as "ethical individualism", and *for* models which are based on various "collectivist" cultural values, typically referencing traditions in Global South contexts. The *Hastings Center Report* below continues that thread. We include it here because it is focused on genomics research. However, we recognize that its limitations include a U.S.-only focus, analysis based only on the Belmont principles to the exclusion of a richer base of ethical frameworks, and use of some inflammatory historical allusions. Still, this voice will be a consistent dimension of genomic research ethics going forward, especially when it is positioned from the Hastings Center context.

The UN Declaration on the Rights of Indigenous Peoples and Genomics: Ethical Complementarity for Just Research

Expanding the Agenda
Ibrahim Garba, Stephanie Russo Carroll
Hastings Center Report, Volume 54, Issue S2 December 2024 Published January 2, 2025
S120–S125. DOI: 10.1002/hast.4937
Abstract
Governance of biomedical research in the United States has been characterized by ethical individualism, a mode of reasoning that treats the individual person as the center of moral concern and analysis. However, genomics research raises ethics issues that uniquely affect certain genetically related communities as collectives, not merely as aggregates of individuals. This is especially true of identifiable populations—including Indigenous Peoples—that are often minoritized, socially marginalized, or geographically isolated. We propose an alternative, complementary framework based on the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (2007), which explicitly recognizes both individual and collective rights. We use the CARE Principles for Indigenous Data Governance as a case study to show how this UNDRIP-based framework can complement the individual-focused national standard for research oversight represented by the *Belmont* principles, thereby better protecting Indigenous Peoples' rights and interests in genomic data.

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Genomic Research – Children's Data Protection

We found these two policy briefs to be concise and well-written, with supporting readings in this important area of genomics governance.

GA4GH Policy Brief: children's data protection and genomic research (part 1: general considerations)

Global Alliance for Genomics and Health, 23 January 2025

Part one of this two-part Policy Brief discusses general considerations related to protecting children's genomic and health data under the General Data Protection Regulation (GDPR). This brief is

published as part of the GA4GH Health Data Sharing, Privacy, and Regulatory Forum's work to explore laws and regulations that have an impact on genomic and related health data sharing.

GA4GH Policy Brief: children's data protection and genomic research (part 2: consent and lawful bases)

Global Alliance for Genomics and Health, 4 February 2025

Following discussion of general considerations related to protection of children's genomic and health data, part two of this two-part Policy Brief further explores considerations with respect to consent and lawful bases under the General Data Protection Regulation (GDPR). This two-part Policy Brief is published as part of the GA4GH Health Data Sharing, Privacy, and Regulatory Forum's work to explore laws and regulations that have an impact on genomic and related health data sharing.

The GA4GH Health Data Sharing, Privacy, and Regulatory Forum publishes Policy Briefs to explore laws and regulations that have an impact on genomic and related health data sharing. Following discussion of general considerations related to protection of children's genomic and health data, published on 23 January, part two of this two-part Policy Brief, by Michael J. S. Beauvais, further explores considerations with respect to consent and lawful bases under the General Data Protection Regulation (GDPR).

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"Genomic Utility for Policy Decisions"

A Standardized Measurement and Valuation Scale of Genomic Utility for Policy Decisions: The GUV Scale

Themed Section: Rare Diseases: Economic Evaluation and Policy Considerations

Ilias Goranitis, et al.

Value in Health, February 2025 Volume 28 Issue 2 p175-322 Open Access

Highlights

- We developed the genomic utility valuation scale to enable a standardized measurement and scoring of genomic utility on a 0% to 100% scale based on 5 key policy priority indicators (clinical, diagnostic, economic, societal, and family utility).
- Improving health outcomes, having high diagnostic yield, being cost saving, improving equity, and enabling reproductive planning were the most preferred levels of the 5 indicators.
- Our work enables consistency in reporting and benchmarking of different genomic test indications, facilitating evidence-based research and policy decisions.

Abstract

Objectives

The multifaceted ways in which genomics can be valuable to clinicians, patients, families, and society are important for informing prioritization decisions by policy makers. This study aims to develop a standardized, cumulative, and preference-weighted genomic utility valuation (GUV) on a scale of 0% to 100%.

Methods

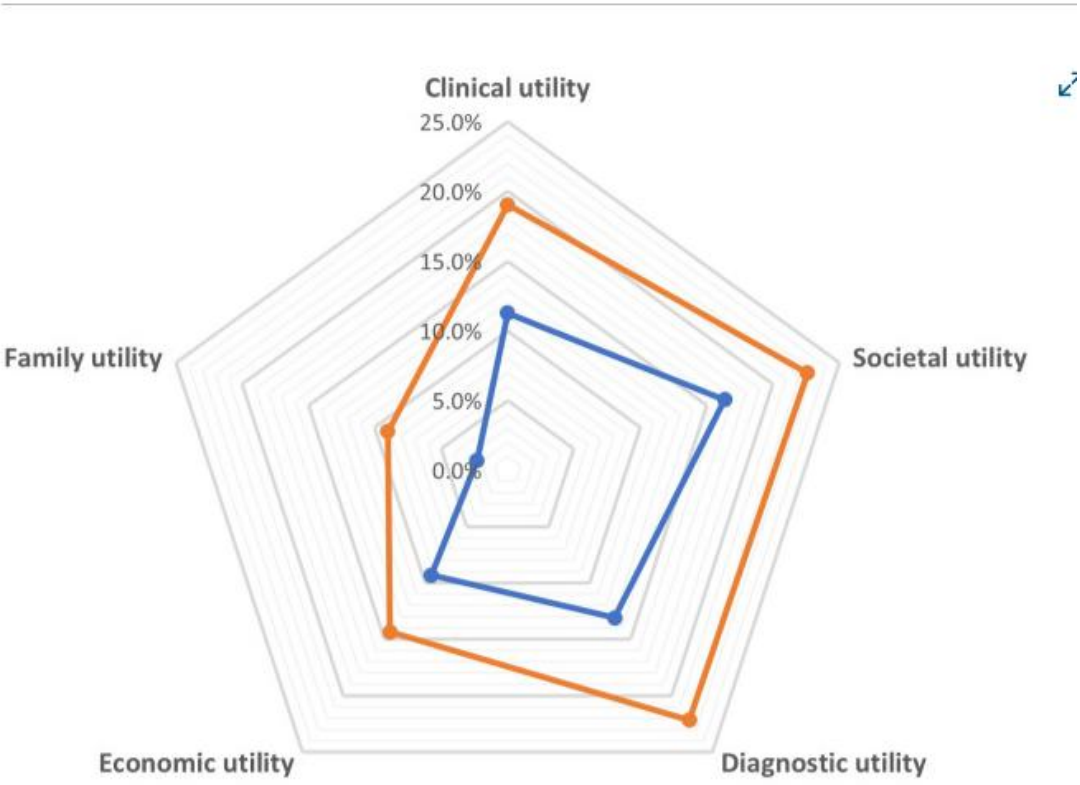
A multicriteria decision analysis was conducted with experts involved in policy, clinical, research, and consumer advocacy leadership in Australia for the valuation of policy priority indicators of genomic utility. The use of the GUV scale to support policy decisions is illustrated through a stylized example, and benchmark scoring thresholds of genomic utility were identified by mapping evidence from real-world health technology assessments leading to the public reimbursement of genomic testing in Australia onto the GUV scale.

Results

In total, 33 (73%) invited experts participated in the study. Clinical utility had the highest priority, followed by societal, diagnostic, economic, and family utilities. Improving health outcomes had the highest preference value (29.5%), followed by improving equity (22.6%), Having high diagnostic yield (22.2%), improving symptom management (15.5%), being cost saving (14.3%), having average diagnostic yield (13.1%), enabling access to clinical trials (12.3%), and enabling reproductive family planning (11.5%). Genomic testing scores from real-world health technology assessments ranged from 46% for syndromic and nonsyndromic intellectual disability to about 60% for mitochondrial conditions and genetic kidney diseases.

Conclusions

Comparisons of genomic utility across different clinical contexts may seem difficult because of the multiple criteria required to be weighted to support policy decisions. This comparison is now facilitated in a standardized manner with the GUV scale.



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Gene Therapy Access/Affordability: Valuations; Payment Systems Approaches

Issues of equity, access and affordability will dominate genomic medicine governance, policy and clinical translation for a generation ahead [at least]. The literature is beginning to focus more precisely on specific diseases where the earliest breakthroughs may emerge [SCD, for example] as well as different valuation models and payer solutions, some in active implementation such as the Cell and Gene Therapy (CGT) Access Model from the U.S. Centers for Medicare & Medicaid Services. This month we identified a cluster of articles/sources which helpful explore this important area.

Pricey sickle cell gene therapies primed for change
News in Brief Published: 17 January 2025
Nature Biotechnology. Volume 43 Issue 1, January 2025

Bluebird Bio and Vertex Pharmaceuticals are the first to participate in a scheme to enable people with sickle cell disease to access treatments they would otherwise not be able to afford. Gene and cell therapies are lifechanging treatments but remain some of the world's most expensive drugs. The developers have agreed to join the, due to launch in early 2025. The model was first announced in February 2023 as part of a Biden administration initiative to lower prescription drug costs…

Casgevy (exagamglogene autotemcel) for treating sickle cell disease, co-developed by Vertex and CRISPR Therapeutics of Zug, Switzerland, was the world's first CRISPR-based gene editing therapy. The benefits from the therapy can last for at least five years, according to recently released data, but at $2.2 million per patient. Bluebird's Lyfgenia (lovotibeglogene autotemcel) was approved in December 2023 by the US Food and Drug Administration as a one-time gene therapy to treat sickle cell disease. It consists of ex vivo engineered, autologous hematopoietic stem and progenitor cells transduced with a lentiviral vector encoding a functional copy of the β-globin gene. Its price is $3.1 million per patient…

Financial Impacts of Paying for Gene Therapy for Sickle Cell Disease Under Alternative Pricing and Financing Mechanisms

Health Policy Analysis - Themed Section: Rare Diseases: Economic Evaluation and Policy Considerations

Anirban Basu

Value in Health, February 2025 Volume 28 Issue 2 p175-322

Highlights

- Over the next decade, many expensive curative therapies will likely enter the US market. Besides assessing their economic value and deriving value-based prices, the growing size of the eligible target population raises challenges to how payers can afford these therapies and yet provide enough returns to signal continued research and development investments.
- Adopting a value-based price or retaining the monopoly price to pay for innovation through insurance has different welfare implications for the payer and manufacturer. Instead, an alternative, the effective monopoly price, was presented, which can guarantee monopoly profits for innovators during their exclusivity period and yet, substantially lower price and budget impact. It can be welfare-enhancing both from a static and dynamic efficiency point of view.
- Determining the appropriate price is more important for a public payer in mitigating affordability concerns than figuring out the mechanism for financing the budget impact of innovation over time. The option of a patent buyout may help negotiate down prices to effective monopoly prices. These concepts were illustrated with a substantive example of pricing gene therapy for sickle cell disease in the United States.

Abstract

Objectives

This study aims to understand the role of alternative pricing and financing mechanisms on the budget impact for payers and the risks and returns of manufacturers for gene therapies.

Methods

This article uses fundamental economic principles to interpret the implications of alternative pricing mechanisms in terms of the share of value appropriated by the manufacturer and how alternative financing mechanisms alter it. It demonstrates these concepts by studying the financial impacts for a payer and the manufacturer across alternative pricing and financing mechanisms that could be used by the US Centers for Medicare and Medicaid Services to pay for gene therapy for sickle cell disease.

Results

Unlike value-based and manufacturer-set monopoly prices, an effective monopoly price can be derived to guarantee monopoly profits for manufacturers during their exclusivity period, thereby providing a high appropriation share and substantially lowering price and budget impact for a payer. For sickle cell disease gene therapy, the 10-year budget impact for the US Centers for Medicare and Medicaid Services would range from US dollar $8.6 billion to $12.8 billion under a value-based price, to $10.2 billion to $15.2 billion under a monopoly price, but reduce to $7.7 billion under an effective

monopoly price. The latter price would still fetch over 50% of the total surplus to the manufacturer while mitigating their risk of sales volume.
Conclusions
Significant budget impacts for funding gene therapy are not mitigated across alternative financing mechanisms at any given price. The price determines most of the budget impact. The option of a patent buyout may help negotiate down prices to effective monopoly prices.

Cell and Gene Therapy (CGT) Access Model

U.S. Centers for Medicare & Medicaid Services
The CGT Model is now accepting state applications through February 28, 2025. Application is open.

The Cell and Gene Therapy (CGT) Access Model aims to improve the lives of people with Medicaid living with rare and severe diseases by increasing access to potentially transformative treatments. Cell and gene therapies have high upfront costs but have the potential to reduce health care spending over time by addressing the underlying causes of disease, reducing the severity of illness, and reducing health care utilization. The initial focus of the model is on access to gene therapy treatments for people living with sickle cell disease, a genetic blood disorder that disproportionately affects Black Americans.

The CGT Access Model is a multi-year voluntary model for states and manufacturers. CMS released a Request for Application (RFA) to manufacturers (PDF) in March 2024 and an RFA to states (PDF) in June 2024. In August 2024, CMS also released a Notice of Funding Opportunity to states. States may choose to participate in the model under a participation agreement with CMS by responding to the state RFA. States may apply for model funding by applying to the NOFO, but they are not required to respond to the NOFO to participate in the model. States may begin participation anytime between January 2025 and January 2026.

Highlights

- Cell and gene therapies can transform the lives of people living with rare and severe diseases that are hard to treat, but gaining access to these potentially life-changing treatments can be difficult because they can cost millions of dollars.
- The Cell and Gene Therapy (CGT) Access Model aims to improve health outcomes for people with Medicaid who could benefit from cell and gene therapies by supporting outcomes-based agreements between states and manufacturers that will provide for treatments within a framework that lowers prices for states and ties payment to outcomes. This framework is intended to make it easier for states to pay for cell and gene therapies.
- By increasing access to transformative therapies, this model can potentially help address the historic disparities, poor health outcomes, and low life expectancy associated with sickle cell disease. Other conditions might be added to the model over time.

Qualifying for Gene Therapy as Part of the Model (PDF)

To be eligible for gene therapy to treat sickle cell disease as part of this model, a person must:

- Have a documented medical diagnosis for sickle cell disease.
- Be enrolled in Medicaid or CHIP (if applicable) in a state participating in the model at time of therapy.
- Have Medicaid as their primary payer.
- Receive a gene therapy from a participating manufacturer.
- Meet standardized prior authorization criteria established through the OBAs.

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Heritable Human Genome Editing [HHGE] – South Africa Law/Regulation/Ethics Guidance 3.0

In our December and January editions, we provided a high-level summary of an ongoing debate around the inclusion of HHGE – as a "matter-of-fact" topic area – in the 2024 *South Africa Ethics in Health Research Guidelines.* We include at bottom selected text from the *Guidelines* and from the important editorial by Ramsey et al. arguing that the "…current wording for HHGE for research purposes in the guidelines should be deleted in its entirety."

This debate has continued. We include excepts just below of an exchange of correspondence in the February edition of the *South African Medical Journal.*

While there are multiple lines of argument in the two letters, we highlight the startling text in the letter from Thalder, et al. concerning the role, asserted lack of consensus, and relevance of "international standards" [WHO, et al.] around HHGE in the context of "unique realities and constitutional imperatives" in South Africa.

This "South Africa exceptionalism" with regard to HHGE is based, they argue, on how the SA constitution addresses the right to access to healthcare and the right to freedom of scientific research. Further, they assess that these are "substantive rights" and that "SA scientists have the freedom to pursue HHGE research, subject only to reasonable and justifiable limitations."

The reply by Ramsey et al. argues that this posture "…reflects a lack of understanding of the purpose of the guidelines, and ignores that they were drafted with the input of several South Africans. Furthermore, it constitutes a failure to intellectually engage appropriately with the issues…" *Perhaps the counter argument here could have been more sharp-edged…*

Of course, this exchange of correspondence involving [with greatest respect] opposing groups of South African academics writing in the *South African Medical Journal* belies its global significance.

We assess that almost two years since the third international summit in London in 2023, the global community needs to take a major next step – with urgency – to refine, strengthen and affirm the London consensus, and chart a way forward towards a binding international instrument.

Failure to do so will, in our view, enable a further drift into "state exceptionalism" and other rationales – triggering us into an era we are not prepared to steward.

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SAMJ: South African Medical Journal
vol.115 n.1 Pretoria Feb. 2025
On-line version: ISSN 2078-5135 Print version" ISSN 0256-9574
Correspondence
In defence of South Africa's National Health Research Ethics Council guidelines on heritable human genome editing

Donrich Thaldar, School of Law, University of KwaZulu-Natal, Durban, South Africa
Sheetal Soni, School of Law, University of KwaZulu-Natal, Durban, South Africa
Larisse Prinsen, Faculty of Law, University of the Free State, Bloemfontein, South Africa
Ntokozo Mnyandu, School of Law, University of the Witwatersrand, Johannesburg, South Africa
Marietjie Botes, Centre for Research on Evaluation, Science and Technology, Stellenbosch University,
Julian Kinderlerer, Faculty of Law, University of Cape Town, South Africa

[Excerpts]

To the Editor:

Ramsay *et al*.[1] critique South Africa (SA)'s National Health Research Ethics Council (NHREC) guidelines[2] on heritable human genome editing (HHGE) and our defence of these guidelines.[3] They claim first that the NHREC guidelines 'permit' live births resulting from HHGE, which they suggest is premature and ethically unsound; and second, that there is no legal certainty surrounding HHGE in SA, particularly in relation to section 57(1) of the National Health Act 61 of 2003 (NHA). Additionally, they question the methodology and relevance of our public engagement study on HHGE policy, which explored SA perspectives.[4]

We address these critiques in three parts…

…The role of international standards

Ramsay *et al*.[1] place significant emphasis on international standards, noting their involvement in drafting World Health Organization (WHO) guidelines on HHGE.[10] **While international standards can provide useful guidance, there is no single global consensus on HHGE. Positions vary widely across declarations and organisations. Moreover, the WHO guidelines appear to be less directly applicable to the SA context, as they may not fully account for its unique realities and constitutional imperatives**.[11,12] Even if a general consensus holds that clinical applications of HHGE are premature, this reflects the current state of technology, not a fixed or universal principle. The NHREC guidelines appropriately anticipate future advancements in safety and efficacy, ensuring that SA remains prepared to evaluate HHGE's potential responsibly…

In SA, the Constitution – not any international standard – is the supreme authority. **Unlike other constitutions, it uniquely includes rights such as access to healthcare and the freedom of scientific research, having profound implications for HHGE governance.** The government is constitutionally obligated to address public health crises, such as the TB epidemic, using all available resources. If HHGE offers a future solution to confer immunity against TB, it must be seriously considered.[13,14] **The right to access to healthcare is complemented by the right to freedom of scientific research.[15] This is a substantive right.[16] SA scientists have the freedom to pursue HHGE research, subject only to reasonable and justifiable limitations.** The rights of persons born because of HHGE clinical trials would certainly be such a limitation[15] – hence the emphasis placed on safety in the NHREC guidelines. **We suggest that the NHREC guidelines align with SA's constitutional values, ensuring that HHGE research is not left unregulated, or banned,** but is conducted responsibly while safeguarding public health and scientific freedom…

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SAMJ: South African Medical Journal
vol.115 n.1 Pretoria Feb. 2025
On-line version: ISSN 2078-5135 Print version" ISSN 0256-9574

Correspondence

Response to: In defence of South Africa's National Health Research Ethics Council guidelines on heritable human genome editing

Michèle Ramsay, Director, Sydney Brenner Institute for Molecular Bioscience, Faculty of Health
Sciences, University of the Witwatersrand, Johannesburg, South Africa
Michael S Pepper, Director, SAMRC Extramural Unit on Stem Cell Research and Therapy, and
Director, Institute for Cellular and Molecular Medicine, Faculty of Health Sciences, University of

Pretoria, South Africa
Jantina de Vries, Director, The EthicsLab, University of Cape Town, South Africa
Safia Mahomed, Department of Jurisprudence, School of Law, University of South Africa, Pretoria,
Eleni Flack-Davison, Head: Research Legal, Compliance and Integrity, University of the Witwatersrand, Johannesburg, outh Africa

[Excerpts]

To the Editor: The repeated attempts by Thaldar *et al*. to establish heritable human genome editing (HHGE) as legal, ethically acceptable and aligned with South African (SA) cultural values are scientifically premature, ill-informed and dangerous…

… Second, SA is part of a global community, **and ignoring international guidelines and recommendations on HHGE or dismissing them** because 'the WHO (World Health Organization) guidelines appear to be less directly applicable to the SA context, as they may not fully account for its unique realities and constitutional imperatives' both reflects **a lack of understanding of the purpose of the guidelines, and ignores that they were drafted with the input of several South Africans.[3,4]** Furthermore, it constitutes a failure to intellectually engage appropriately with the issues…

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South African Ethics in Health Research Guidelines: Principles, Processes and Structures

2024 Third Edition

4.3.2 Heritable human genome editing

Research on heritable human genome editing (HHGE) holds significant potential for addressing genetic diseases and improving human health. It also presents ethical challenges that require careful consideration and deliberation. A framework for analysing the protocol emphasises responsible and cautious practices.

a) Scientific and medical justification

HHGE research must have a clear and compelling scientific and medical rationale, focusing on the prevention of serious genetic disorders and immunity against serious diseases. The potential benefits to individuals and society should outweigh the risks and uncertainties associated with HHGE.

b) Transparency and informed consent

Researchers must maintain transparency throughout the research process, ensuring that participants and stakeholders are well-informed about the goals, methods, and potential implications of HHGE. Informed consent must be obtained from all parties involved, including prospective parents and individuals whose genetic material is used in the research.

c) Stringent ethical oversight

HHGE research should be subject to rigorous ethical review by health research ethics committees to evaluate its ethical implications. Ethical oversight should especially be illuminated by the right to freedom of scientific research, the right to access to healthcare, the best interests of prospective children, and the dignity of all individuals involved.

d) Ongoing ethical evaluation and adaptation

Ethical scrutiny of HHGE research projects should be a continuous process that adapts to evolving circumstances. This entails regular re-evaluation as new information emerges and as the technology progresses.

e) Safety and efficacy

Researchers must prioritize safety in all HHGE experiments, with thorough assessments of potential risks and strategies for mitigating them. The research should demonstrate a high level of scientific rigor and provide evidence of the technique's efficacy.

f) Long-term Monitoring

Researchers should commit to ongoing monitoring of individuals born as a result of HHGE interventions to assess their health, wellbeing, and potential unforeseen consequences.

g) Legal compliance

Researchers must adhere to all relevant laws governing HHGE research. In particular, researchers must adhere to the fourteen-day rule, and must obtain the necessary ministerial permission to conduct research on embryos.

The editorial against which this correspondence was generated is titled Heritable human genome editing in South Africa – time for a reality check [*South Africa Medical Journal, Early Online* -2024-11-29] by Michele Ramsay, Michael Pepper, Jantina de Vries, Safia Mahomed and Eleni Flack-Davison. WE repeat here, the editorial's clear-thinking conclusion:

> ***…What should happen next?***
> Revision of the NHREC guidelines
> The NHREC must clarify its view on HHGE. We note the recent press release that was circulated to ethics committees around the country by the chair of the NHREC on 8 November 2024. But this does not sufficiently address or resolve the controversy, and the press release has no legal standing. **The current wording for HHGE for research purposes in the guidelines should be deleted in its entirety**. The underlying premise of section 4.3.2 of the guidelines appears to rest on the fact that there will be prospective parents, prospective children and individuals born because of HHGE research interventions specifically, which is problematic and inconsistent with the law. In addition, this current ambiguity in wording blurs the line between HHGE research and clinical application

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Public Consultations

In this section we identify relevant public consultations from multilateral organizations, UN system agencies, governments, NGOs, etc. The GE2P2 Global Foundation has a program to actively respond to public consultations where we assess we can make a substantive contribution.

New developments in biotechnology applied to animals: an assessment of the adequacy and sufficiency of current EFSA guidance for animal risk assessment

Public Consultation
EU – European Food Safety Authority :: EFSA Panel on Genetically Modified Organisms
Issue Date: 22 Jan 2025 :: 87 pages **Submissions due 19 March 2025**
PDF:
https://connect.efsa.europa.eu/RM/sfc/servlet.shepherd/document/download/069Tk000008lMi3IAE
Abstract

EFSA received a request by the European Commission (in accordance with Article 29 of Regulation (EC) No 178/2002) **to provide a scientific opinion on new developments in biotechnology, including synthetic biology (SynBio) and new genomic techniques (NGTs), as applied to current or near-market animals for food, feed and other agricultural uses**, with implications for risk assessment methodologies and applicability and sufficiency of the current EFSA risk assessment guidance documents, covering all aspects of molecular characterisation, food and feed safety, animal health and welfare, and environmental safety.

A horizon scanning exercise identified a variety of animals obtained with new genomic techniques (NGT animals), with the potential to reach the EU market in the short, medium and long term, based on the current stage of market development (commercial, pre-commercial, research and development). Site-directed nucleases (SDN) 1 and 2 modify an endogenous DNA sequence without the intended introduction of any foreign genetic material. No novel hazards have been identified that are linked to either the modification process or the newly introduced trait, when these genomic alterations were compared to established genomic techniques (EGTs) and conventional breeding.

Hazards posed by SDN-3 are of the same nature as those posed by EGTs; the targeted insertion may reduce the potential hazards associated with the disruption of endogenous genes and/or regulatory elements in the recipient genome. Hazards posed by the new trait resulting from the introduced transgenic (SDN3) or intragenic DNA sequence are of the same nature as those posed by EGTs. Hazards posed by the new trait resulting from the introduced cisgenic DNA sequence are of the same nature as those posed by conventional breeding. Off-target mutations from genome editing are similar in nature to those from conventional breeding and do not pose novel hazards.

Consequently, no new potential hazards, and thus, no new risks to humans, animals, or the environment are anticipated. A thorough evaluation of existing EFSA guidance documents for the risk assessment of GM animals revealed that their principles and recommendations provide the basis for assessing the risks of NGT animals for food, feed and other agricultural uses; however, **the current text covers only partially the topics in several areas (e.g. animal health and welfare), and might require further updates, adaptations, or enhancements on an ad hoc basis, to address the risk assessment of NGT animals, as outlined in this opinion.**

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The multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources, including a global fund ("The Cali Fund"): Submission of views on possible additional modalities of the multilateral mechanism [Public Consultation]

CBD Convention on Biological Diversity, Notification 2024-114 2024-12-10 **Comments no later than 21 March 2025**

As noted in notification 2024-113, at its sixteenth meeting, by decision 16/2, the Conference of the Parties adopted the modalities for operationalizing the multilateral mechanism for benefit-sharing from the use of digital sequence information on genetic resources, including the global fund, which are set out in the annex to the decision, and decided that the global fund will be known as the Cali Fund for the Fair and Equitable Sharing of Benefits from the Use of Digital Sequence Information on Genetic Resources. By the same decision, Parties also set out some intersessional work.

While the Conference of the Parties, in decision 16/2, adopted the modalities of the multilateral mechanism, it also decided (in paragraph 3 of the decision) to explore possible additional modalities, including, in the context of paragraph 7 of decision 15/9 and the annex to decision 16/2, to take products and services into account.

Parties, other Governments, indigenous peoples and local communities, and relevant organizations are invited to submit their views on this issue as soon as possible …

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The multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources, including a global fund ("The Cali Fund"): Submission of views on possible new tools and models, such as databases, for making digital sequence information on genetic resources publicly available and accessible [Public Consultation]

CBD Convention on Biological Diversity, Notification 2024-115 2024-12-10 **Comments no later than 4 April 2025**

As noted in notification 2024-113, at its sixteenth meeting, by decision 16/2, the Conference of the Parties adopted the modalities for operationalizing the multilateral mechanism for benefit-sharing from the use of digital sequence information on genetic resources, including the global fund, which are set out in the annex to the decision, and decided that the global fund will be known as the Cali Fund for the Fair and Equitable Sharing of Benefits from the Use of Digital Sequence Information on Genetic Resources. By the same decision, Parties also set out some intersessional work.

In particular, the Conference of the Parties, in decision 16/2, decided to explore possible new tools and models, such as databases, for making digital sequence information on genetic resources publicly available and accessible in a transparent and accountable manner to all Parties.

Parties, other Governments, indigenous peoples and local communities, and relevant organizations are invited to submit their views on this issue as soon as possible…

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Organization Watch *– Selected Events*

See list of monitored organizations here

Human Genome Organization (HUGO)
https://www.hugo-international.org/
Upcoming Event
HGM2025 – HUGO Annual Meeting
March 12 - 14, 2025
Southern Sun Elangeni Maharani Hotel, Durban, South Africa

Our scientific program covers a wide range of topics, spanning from system biology and epigenomics to genomic technologies; from drug discovery to gene therapy, pharmacogenomics and genomic medicine; from computation genomics and bioinformatics to genetic and genomic databases; aiming to share most up-to-date research trends, results, information and databases which often sparks off new collaboration opportunities. Apart from generic studies, HGM also provides an arena for presentation and discussion of more focused studies in human genetics and genomics.

ARM [Alliance for Regenerative Medicine]
https://alliancerm.org/press-releases/
Upcoming Event
Cell & Gene Meeting on the Mediterranean
April 15–17, 2025, Rome

The Cell & Gene Meeting on the Mediterranean is the leading conference bringing together the entire cell and gene therapy community from Europe and beyond. Covering a wide range of commercialization topics from market access and regulatory issues to manufacturing and financing the sector, this program features expert-led panels, extensive one-on-one partnering capabilities, exclusive networking opportunities, and 60+ dedicated presentations by leading publicly traded and privately held companies in the space. Join ARM for Europe's premier conference for advanced therapies. Visit the program's website at www.meetingonthemed.com for additional details!

Global Observatory for Genome Editing
https://global-observatory.org/

Upcoming Event
Global Observatory International Summit
May 21 – 23, 2025
The Global Observatory will convene an international summit on May 21-23, 2025 at the American Academy of Arts and Sciences in Cambridge, Massachusetts. Please check back soon for more details…

Global Genomic Medicine Consortium [G2MC]
https://g2mc.org/
Upcoming Event
G2MC 8th International Conference, 2025
DATES TO BE CONFIRMED
The Global Genomic Medicine Consortium (G2MC) 8th International Conference will be held in 2025 in Colombo, Sri Lanka [dates to be confirmed]. The theme of this year's conference is "Collaboration Beyond Borders for Global Implementation of Genomic Medicine" and aims to bring together key stakeholders in the field of genomic medicine to discuss best practices and strategies for implementation, with a particular focus on under-represented regions and low-resource settings.

American Society for Gene and Cell Therapy [ASGCT]
https://asgct.org/
Upcoming Event
ASGCT 28th Annual Meeting
May 13-17, 2025 | New Orleans
Abstract submission is open!
Submit your research for the opportunity to present your cutting-edge work to leaders and colleagues in the field in person during the 28th Annual Meeting in New Orleans, May 13-17, 2025. Submit your research by Jan. 31, 2025, at 11:59 p.m. ET.

American Society of Human Genetics (ASHG)
http://www.ashg.org/
Upcoming Event
ASHG 2025 Annual Meeting
The ASHG 2025 Annual Meeting will be held in Boston from October 14-18. The meeting will feature a wide range of scientific sessions, including plenary lectures, symposia, workshops, and poster presentations.
2025 Key Dates & Deadlines: Scientific Abstract Submissions June 9

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African Society of Human Genetics
https://www.afshg.org/about/
Past Event *[No content/recordings identified as yet]*
15th African Society of Human Genetics Conference and the 1st Ugandan Society of Human Genetics and Bioinformatics
3 to 7 February 2025
Entebbe, Uganda
Theme: Harnessing Data Science and Artificial Intelligence for African Genomics

NIH National Human Genome Research Institute (NHGRI)
https://www.genome.gov/
Past Event – Documentation/Recordings
Genomic Medicine XVI: Host Genomics and Infectious Disease
December 12-13, 2024
YouTube Channel for Session Recordings:
https://www.youtube.com/playlist?list=PL1ay9ko4A8sllNYK4dC6EbFDixnVS5xJv
The meeting aims to identify needs, opportunities, and challenges for applying a patient's genomic information (genome sequence, transcriptomic, epigenomic, etc. data) in the diagnosis, prevention, and treatment of infectious diseases. Persistent barriers and evidence gaps will be examined as opportunities for additional research.
Meeting Objectives
The objectives of the meeting were to:
- Define currently available approaches for using host genomic information in the diagnosis, prevention, and treatment of infectious diseases
- Examine obstacles and potential solutions to incorporating these and on-the-horizon approaches in clinical care (e.g., cost, reimbursement, regulatory, access, education, insufficient guidelines, and sparse ascertainment of underrepresented groups)
- Identify research opportunities for increasing implementation of host genomic information in clinical care of infectious diseases

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Organization Watch – *Selected Announcements*
See list of monitored organizations here.

American Society for Gene and Cell Therapy [ASGCT]
https://asgct.org/
Position Statements
Statement on Changes to NIH Indirect Costs Rates From ASGCT
February 10, 2025

American Society of Human Genetics (ASHG)
http://www.ashg.org/
Events
ASHG 2025 Annual Meeting
The ASHG 2025 Annual Meeting will be held in Boston from October 14-18.

Australian Genomics
https://www.australiangenomics.org.au/
News & Events
New online consent tool for patients
Informed consent is a critical component of genomic and genetic testing. It is a process...
January 23, 2025

Broad Institute of MIT and Harvard
https://www.broadinstitute.org/
Latest
News 01.27.2025
A genome-wide atlas of cell morphology reveals gene functions
PERISCOPE, a technique for genome-wide imaging screens, is helping Broad scientists understand the connections between genes and traits.

News 01.14.2025
Gene editing extends lifespan in mouse model of prion disease
A single-letter edit in DNA reduces levels of the disease-causing prion protein in the brain and could lead to a preventative, one-time treatment for the deadly neurodegenerative disorder.

Center for ELSI Resources and Analysis (CERA)
https://elsihub.org/about/our-mission
Event Recording
January 2025 EFF: Public-Private Partnerships for Gene Therapies: What Does the Public Get?
Publicly-funded researchers frequently transfer their gene therapy and gene-editing medical research to venture capital-funded startups for clinical development. In tandem, the public sector financial crisis in many countries has meant that partnerships with commercial entities are used to leverage the full potential of publicly-held genomic data. However, public-private partnerships in the genomics translational pipeline raise several key questions. Which benefits should be returned to the public, if any? How should products be priced? How should data be managed? Does involvement of publicly funded scientists in the commercial sector conflict with the commitment to deliver societally beneficial innovation?
Moderator: Philip J. Brooks, PhD;
Panelists: John Conley, JD, PhD & Eva Winkler, Prof, Dr.med., Dr.phil.

Chan Zuckerberg Initiative [to 18 Jan 2025]
https://chanzuckerberg.com/newsroom/
News
Feb 6, 2025 · 6 min read
CZI Launches Billion Cells Project With 10x Genomics and Ultima Genomics To Advance AI in Biology
Landmark single-cell dataset of one billion cells will be used to train new AI models to advance researchers' understanding of cellular behavior and gene function.

Francis Crick Institute
https://www.crick.ac.uk/news-and-reports
News & Stories
Claire Hook appointed as Crick COO
News 15 January 2025
… A noted operations leader in healthcare, Claire brings a wealth of experience and expertise in senior leadership within the NHS and will be responsible for all Crick operations, administration and facilities.

Global Alliance for Genomics and Health

https://www.ga4gh.org/
Events
13th Plenary
Uppsala, Sweden from 6 to 10 October 2025
GA4GH 13th Plenary will bring together the global genomics and health community for workshops, presentations, and keynote talks that uncover opportunities to scale genomic and clinical data sharing.
Register for this Event

Genomics England
https://www.genomicsengland.co.uk/
Latest
16 Jan 2025
Genomics England drives Sickle Cell research through the Diverse Data Initiative
… Our Diverse Data Initiative is leading the charge, with a strong focus on Sickle Cell, the most common rare genetic condition in the UK, disproportionally affecting people from Black communities…

Genetics Society of America (GSA)
http://genetics-gsa.org/
News & Events
FASEB releases recommendations for responsible AI use in biological and biomedical research
Jan 24, 2025

Global Genomic Medicine Consortium [G2MC]
https://g2mc.org/
News
Register for HUGO's Human Genome Meeting 2025 (HGM 2025)
2025-01-16

Global Observatory for Genome Editing
https://global-observatory.org/
Convenings
Global Observatory International Summit
Cambridge/Boston, May 21-23, 2025

Human Genome Organization (HUGO)
https://www.hugo-international.org/
Events
Human Genome Meeting
March 2025, Durban SA

Innovative Genomics Institute
https://innovativegenomics.org/about-us/
News
IGI at 10 Years — 10 Key Achievements

February 4, 2025 By Hope Henderson
A look back over an exciting decade for CRISPR and the **IGI**

NIH National Human Genome Research Institute (NHGRI)
https://www.genome.gov/
News & Events
NHGRI appoints Erin Ramos as the next director of the Division of Genome Sciences
January 07, 2025
Ramos to lead the institute's extramural programs in basic genomics research
The National Human Genome Research Institute (NHGRI), part of the National Institutes of Health (NIH), has appointed Erin Ramos, Ph.D., M.P.H., as the director of the Division of Genome Sciences (DGSci).

National Organization for Rare Disorders (NORD)
https://rarediseases.org/news/
News
National Organization for Rare Disorders (NORD) Issues New Report on Lifesaving Newborn Screening Programs
Published February 10, 2025 by NORD
NORD offers comprehensive review on statewide practices related to screening sample retention, and provides policy recommendations

Nuffield Council on Bioethics [to 30 Aug 2023]
https://www.nuffieldbioethics.org/news
News
13th February 2025
New scoping report identifies scientific and ethical challenges in exploring genetic influences on traits related to education
The Nuffield Council on Bioethics and the Nuffield Foundation have published an overview of scientific developments in genomics and education. We urge caution over the use of polygenic indices (PGIs) as predictive tools in educational contexts, highlighting areas where further research and ethical scrutiny is needed to assess the implications of translating PGIs into policy and practice.

4th February 2025
Nuffield Council on Bioethics begin major review of the 14-day rule for research on human embryos
The Nuffield Council on Bioethics (NCOB) has launched a project to provide decision-makers with the independent evidence they need to better understand arguments for and against extensions to the 14-day time limit on human embryo research.

PHG Foundation
https://www.phgfoundation.org
News. Blog
Blog
Pioneering change: how pharmacogenomics is shaping healthcare
5th February 2025
Pharmacogenomics - tailoring drug treatments to individuals based on their genetics - is on the cusp of transforming drug prescribing

News
World's first gene editing therapy now in the UK for sickle cell disease
31st January 2025
For many years, treatment options for sickle cell have been limited, focusing mainly on managing symptoms and preventing complications. The approval by NICE of Exa-cel provides new hope for people living with the disease.

Wellcome Sanger Institute
https://www.sanger.ac.uk/
News
Most engineered human cells created for studying disease
30 Jan 2025
Researchers have engineered and analysed many random versions of human genomes in cell lines to ultimately understand the role of structural changes in disease.

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Month in Review – *Milestones, Strategic Announcements, Analysis, Guidance*
Organization Watch – *Selected Events*
Organization Watch – *Selected Announcements*
Journal Watch – *Spotlight Articles, Thematic Sections*
Journals/Pre-Print Sources Monitored
Institutions/Organizations Monitored

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Journal Watch
In preparing *Journal Watch*, we formally monitor a broad range of academic journals [listed here] and, in parallel, utilize Google Scholar to identify articles aligned with our areas of focus. After careful consideration, a selection of these results appear in the digest, organized under thematic areas to help readers navigate.

Thematic Areas
GENOME EDITING
PRECISION MEDICINE
DISEASE-SPECIFIC GENOMICS
GENOMICS RESEARCH ETHICS, INTEGRITY
GENOMIC DATA, BIOBANKING
PUBLIC AND COMMUNITY ENGAGEMENT/EDUCATION
GENETIC SCREENING/GENETIC COUNSELLING
ANIMALS, PLANTS, MICROORGANISMS

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GENOME EDITING

Taking responsibility: Asilomar and its legacy

Policy Forum
BY J. Benjamin Hurlbut
Science, Volume 387| Issue 6733| 31 Jan 2025
A reappraisal of the constitutional position of science in American democracy is needed
[Excerpts]
… Even efforts to foster deliberation in the tradition of Asilomar like the three international summits on human genome editing have taken steps to broaden deliberation. But displacing old habits and building capacity that fosters new and better ones takes time, practice, and often-uncomfortable self-critique (15).

This spring, the Global Observatory on Genome Editing (of which I am a co-director), itself an experiment in deliberation, will host a summit that, contra Asilomar, radically expands the range of questions and perspectives that societies should take into account. It will begin with diverse understandings of the meaning of being human—cultural, legal, religious, and scientific—and explore their implications for projects in biotechnology. The hope is to start laying the groundwork for a genuinely global social compact that contends with the distribution of benefits and harms and the asymmetries in power and resources that order global science and technology. It will eschew the drive for scientific consensus in favor of cosmopolitan deliberation that affirms disagreement and aspires to mutual understanding and humility over artificial univocality.

That projected meeting is but one small step on a winding pathway. Traveling it requires abandoning Asilomar's ideology of linear progress. We must ask anew what experiments should be done—not merely in the enclaves of science and technology but in the laboratories of democracy worldwide—such that our scientific and technological projects can more truly align with democratically articulated imaginations of the good. Let us celebrate this 50th anniversary of Asilomar by relegating it to the past where it belongs and embracing the hard task of democratic renewal that lies before us.

The Global Governance of Human Genome Editing and the World Health Organization Framework

Book Chapter
Lílian Santos
Governance of Human Gene Editing and Transhumanism. Integrated Science, vol 28. pp 3–13. Springer, Cham. https://doi.org/10.1007/978-3-031-70863-3_1**. 10 Jan 2025**
Abstract
This chapter offers an overview of the global governance of human genome editing. It begins by explaining governance as the process of managing common issues. Governance is a complex process because it includes multiple stakeholders and means, beyond governments and regulations. Specifically, the global governance of human genome editing is still in its infancy. This chapter offers a comparative chart regarding relevant texts for the governance of gene editing, including reports, callings, treaties, declarations and statements between 1975 and 2021. Lastly, the three texts published by the WHO in 2021 (the only global framework for the governance of human genome editing to date) are presented.

A Systematic Review of Challenges and Opportunities in the Implementation of Managed Entry Agreements for Advanced Therapy Medicinal Products

Reviews

Andrea Greco, et al.
Clinical Therapeutics, February 2025 Volume 47 Issue 2 p115-178
Highlights
- Managed Entry Agreements can be classified into 2 main categories: financial-based agreements (FBAs) and outcome-based agreements (OBAs).
- FBA offers short-term relief but may disincentivize investment in Advanced Therapy Medicinal Products (ATMPs).
- For ATMPs targeting rare conditions, limited biological knowledge complicates endpoint selection, prolonging uncertainties in spread payments and outcome-linked payments. Such selection becomes even more challenging when survival is not a driver.
- The fragmentation in the US health care system hinders OBAs, but a new Cell and Gene Therapy Access model enables direct negotiations with the Centers for Medicare & Medicaid Services, streamlining implementation.
- Although no specific challenges or opportunities related to particular types of ATMPs (gene therapy, cell therapy, or tissue-engineered-specific) were identified, some were exacerbated by the intrinsic nature of ATMPs.

ABSTRACT
Purpose
Managed Entry Agreements (MEAs) are agreements between firms and competent authorities for pricing and reimbursement, designed to enable coverage of new medicines while managing uncertainties around their financial impact or performance. Although these agreements can facilitate patient access, their complexity and costs seem to dampen enthusiasm for implementation. Nevertheless, MEAs remain a potential route, particularly for high-cost drugs with uncertain value claims. Given their pivotal role in bridging Advanced Therapy Medicinal Products (ATMPs) to patients, their foreseeable future implementation calls for a specific investigation of their associated challenges and opportunities. Therefore, this work aims to identify challenges and opportunities in implementing MEAs specifically for ATMPs.
Methods
A systematic literature review was conducted on PubMed, MEDLINE, Scopus, and Google Scholar, based on the updated Preferred Reporting Items for Systematic Review and Meta-Analysis. This has been supplemented by a snowball search. Through the thematic content analysis, opportunities and challenges were identified and grouped into themes and subthemes. Afterward, the subgroup analysis was performed to investigate challenges and opportunities with outcome-based agreements (OBAs) versus financial-based agreements (FBAs), jurisdiction, and ATMP type.
Findings
Of the 787 peer-reviewed articles, 42 met the inclusion criteria. Challenges and opportunities were clustered into the mentioned themes: evidence generation and data management, financial and reimbursement, administration and resources, negotiation, and governance, law, and regulations. Of note, no specific challenges or opportunities were found to be cell- or gene-therapy-specific, but certain challenges seem amplified for ATMPs. Several differences emerged per MEA type and jurisdiction. OBAs are described to reward innovative and effective treatments and boost research and development (R&D) returns. FBAs improve cost-effectiveness ratios but can negatively affect curative ATMP's revenues. Still, their versatility facilitates payer engagement in MEA combinations (eg, OBA with spread payments). The US decentralized health care system reported additional implementation challenges to OBAs. Each payer internally decides on reimbursement, and coordination among private payers is hindered by antitrust law. Yet, a new Cell and Gene Therapy Access model has been proposed. This would allow manufacturers to negotiate OBAs directly with the Centers for Medicare & Medicaid Services avoiding individual negotiation with each state. In Europe, there is an evident interest in implementing spread payments, yet accounting rules currently hamper their implementation.
Implications

This work offers insights into challenges and opportunities in MEAs implementation for ATMPs by investigating differences in MEA types and jurisdictions. Our findings provide significant insights that may help move successful MEA implementation forward, improving patient access to ATMPs.

Prenatal gene editing for neurodevelopmental diseases: Ethical considerations

Review

Rami M. Major, Eric T. Juengst

American Journal of Human Genetics, Feb 06, 2025 Volume 112 Issue 2 p199-456

Open Access

Summary

Neurodevelopmental diseases (NDDs) are notoriously difficult to treat because clinical symptoms stem from developmental processes that begin before birth. Prenatal gene editing could fill the treatment gap for NDDs by targeting and permanently correcting the genetic variants that underlie these pathogenic developmental processes. At the same time, there is a risk of unintended edits to the fetus or the pregnant person that could result in serious adverse consequences that are difficult, if not impossible, to undo. This raises ethical concerns that make the development of prenatal gene editing especially challenging. To date, there are no frameworks for considering the steps necessary for an ethical path forward for prenatal gene editing specifically. The 60-year history of *in utero* therapy has included the development of frameworks for other therapies that can provide starting points for addressing the unique issues of prenatal gene editing. We identified 12 themes from 17 ethical frameworks, literature, consensus statements, and government reports on prenatal interventions that could set precedents for prenatal gene editing interventions. In considering these alongside current criteria for postnatal gene therapies for NDDs, we discuss a path forward for prenatal gene editing interventions of NDDs.

Box 1

Emergent considerations in the development of prenatal gene editing

Additional details with references are provided in Table S1.

(1) The targeted disease should be severe.

(2) The disease mechanism should be understood, and there should be clear metrics to assess therapeutic benefit.

(3) There should be validation of treatment efficacy and assessment of off-target risks in a pre-clinical animal model.

(4) There should be a demonstrated advantage to intervening prenatally versus postnatally.

(5) Disease diagnosis should be early and accurate.

(6) The pregnant person should have autonomy and provide informed consent.

(7) Existence of a prenatal therapy should not prevent access to termination options.

(8) Treatment of the disease in question should have buy-in and engagement from the affected population.

(9) The pregnant person should have access to specialized resources associated with prenatal interventions, including a specialized fetal treatment center and a multidisciplinary team of providers, both throughout their pregnancy and in follow-up.

(10) There should be extensive follow-up plans in place to understand long-term effects on the pregnant person and fetus.

(11) The treatment should target somatic cells only.

(12) The benefits of the treatment should outweigh the risks and be considered both independently and jointly for the pregnant person and the fetus.

An assessment of the current state of interdisciplinary CRISPR research Report based on the workshop: The Technology and Ethics of CRISPR

Report

Franziska Bächler and Anina Meier

URPP Human Reproduction Reloaded | H2R, WP (1), 2024, 1–35 H2R Working Paper (1), 2024, 1–35. DOI 10.33058/wpuzh.2024.7110

Abstract

CRISPR/Cas genome editing is a dynamic field of biotechnology that is evolving and establishing itself in diverse fields such as agriculture and human medicine. The rapid development of this technology is accompanied by public debate about its various applications. This article sets out the opportunities and risks of CRISPR/Cas9 technology from an interdisciplinary perspective. The occasion and inspiration for the article was a workshop entitled 'The Technology and Ethics of CRISPR', which was organized in collaboration between the University of Zurich's Human Reproduction Reloaded (H2R) research programme and the University of Basel's Centre for Life Sciences Law (ZLSR) and was held in spring 2024 with presentations by renowned experts from various scientific disciplines. The article outlines the current state of research on CRISPR with an overview of the natural and social sciences, legal and patent law as well as ethical aspects that appear to be essential for the interdisciplinary negotiation of the technology. This review of the application of CRISPR in medicine highlights the first approved CRISPR-based gene therapy for sickle cell anaemia and addresses the challenges of access and regulation that such medical breakthroughs face. The somatic application of gene editing is contrasted with its use in the human germline. The technological uncertainties and open ethical and socio-political questions regarding the latter are also summarised. Key findings from the workshop presentations are embedded in a discussion and analysis of the CRISPR ecosystem, which is characterised by public-private partnerships and a complex patent situation.

The Legal and Ethical Implications of Gene Editing: A Case Study on CRISPR-Cas9 in Healthcare

Preprint

Dr. Nida Malik, Advocate Ali Ahmed, Mariam Rehman, Kazim Mazhar Hasan, Kashan Kashif

Researchgate.net (2025)

Abstract

At this point, the world of biotechnology and the world of law are intricately revealed to each other. Most notably, in matters concerning the revolutionary gene-editing technology CRISPR-Cas9. Using that very exciting technology, it is now possible to make surgical modifications to an individual's genetic architecture at astonishingly low costs. Healthcare and agriculture have been improved without much cost but at very high speed; at the same time, it has reduced the distance between the development of the relevant legal and regulatory frameworks in which those activities take place, challenging their applicability. The present study also discusses the potential legal consequences of CRISPR. Among these debates are some highly debatable intellectual property rights disputes, liability issues for unintentional genetic changes, and how existing legal systems will cope in terms of dealing with pretty complicated bioethical matters such as informed consent and equitable access. In particular, the review illustrates landmark cases such as the patent dispute between the Broad Institute and the University of California as lenses through which to interrogate the other end of this phenomenological spectrum of biotechnology vis-à-vis IP law. The study evaluates contrasting regulatory paradigms by looking at the comparative perspective afforded, along with their strengths and weaknesses, between the United States, which has a relatively more innovation-driven approach, and a precautionary principle such as that of the European Union. Case studies by CRISPR-such as its application in genetic disorders like beta-thalassemia and transformatives like pest-resistant crops-highlight the ethical and legal tensions that surround movement towards such goals. The paper thus contends that gene editing has international ramifications and that what is needed is a harmonized international regulatory framework that encourages innovation while upholding ethical integrity, public health, and environmental sustainability. It calls for an international robust and binding treaty

to solve transnational challenges of hazardous wastes, explicit liability provisions for off-target effects, and access schemes at the venue level regarding gene-editing technologies. Ultimately, this paper underscores the imperative of integrating legal rigor with scientific innovation to govern CRISPR-Cas9 responsibly and equitably.

Ethics and Economics of Genome Editing

Research Article

Srija Chaudhuri

The Stanford Journal of Science, Technology, and Society. Vol. 18 No. 1 (2024). 21 Jan 2025

Abstract

Somatic and germline modifications are the two types of genetic modifications that can be performed on human cells. Somatic modifications have earned ethical approval and are being implemented in healthcare as gene therapy, treating conditions such as sickle cell disease. Germline modifications have not earned the same approval and are highly regulated in the research sector of some countries with multiple countries banning the modification type altogether. Germline editing is criticized for being unsafe, not allowing patients to give informed consent, and promoting ableism. Moreover, if germline editing procedures become available but are not affordable for everyone, having a genetic disease could become an indication of a lower financial status. Regardless, the modification type can offer individuals with incurable genetic diseases a way to eliminate the suffering their future generations may endure. Consistent regulation of germline editing between countries, including outlining the difference between disease treatment and trait enhancement, is critical to avoid the abuse of the treatment through jurisdictional arbitrage. In this review, countries were analyzed based on their number of common monogenic diseases of high occurrence and their GDP per capita to determine which nations may become centers of germline editing exploitation for clinical testing and economic beneficiaries of performing germline editing procedures.

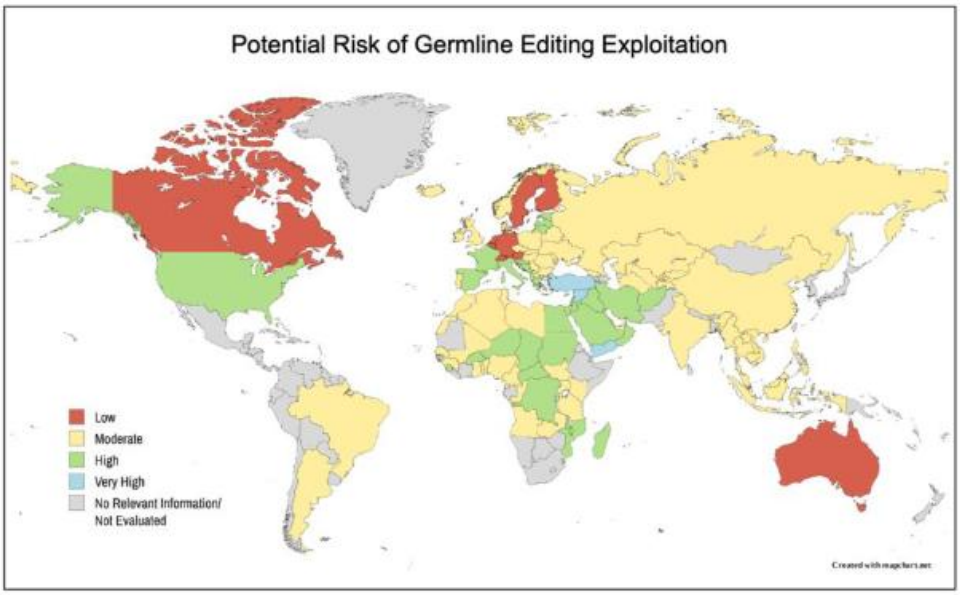

FIGURE 1. Map of countries colored by potential risk of germline editing exploitation for clinical testing. A country's risk increases as the country has a larger number of common monogenic diseases of high occurrence and as the country's GDP per capita decreases. A larger number of monogenic diseases indicates a greater demand for germline editing treatments, and a lower GDP per capita indicates a lesser ability to enforce clinical testing regulations.

The Biopolitics of Human Enhancement

Book

Editors - James Hughes, Steven Umbrello, Cristiano Cali

Vol. 1. Walter de Gruyter GmbH & Co KG, 2025.

Abstract

The study of the social implications of human enhancement is an interdisciplinary work that draws from the fields of political science, sociology, philosophy, and bioethics, among others. It is also a complex and rapidly evolving subject that raises important questions about the potential benefits and risks of these technologies, as well as how society should govern and regulate their development and use. An in-depth exploration of current and future human enhancement technologies, this book delves into the specifics of current and emerging human enhancement technologies, such as cognitive enhancers, brain-computer interfaces, and genetic engineering, discussing the state of the art, the limitations and also the technological developments that one can expect in the future and how they can be regulated and used responsibly. A comprehensive examination of the political and ethical implications of human enhancement An interdisciplinary work, bringing together leading scholars in the field An in-depth exploration of current and future human enhancement technologies.

Designer Organs: Ethical Genetic Modifications in the Era of Machine Perfusion

Review Article

Filz von Reiterdank, Irina and Bento, Raphaela and Hyun, Insoo and Isasi, Rosario and Wolf, Susan M. and Coert, J. Henk and Mink van der Molen, Aebele B. and Parekkadan, Biju and Uygun, Korkut

Annual Review of Biomedical Engineering, Vol. 27 (2025). 28 Jan 2025

https://doi.org/10.1146/annurev-bioeng-062824-121925.

Abstract

Gene therapy is a rapidly developing field, finally yielding clinical benefits. Genetic engineering of organs for transplantation may soon be an option, thanks to convergence with another breakthrough technology, ex vivo machine perfusion (EVMP). EVMP allows access to the functioning organ for genetic manipulation prior to transplant. EVMP has the potential to enhance genetic engineering efficiency, improve graft survival, and reduce posttransplant complications. This will enable genetic modifications with a vast variety of applications, while raising questions on the ethics and regulation of this emerging technology. This review provides an in-depth discussion of current methodologies for delivering genetic vectors to transplantable organs, particularly focusing on the enabling role of EVMP. Organ-by-organ analysis and key characteristics of various vector and treatment options are assessed. We offer a road map for research and clinical translation, arguing that achieving scientific benchmarks while creating anticipatory governance is necessary to secure societal benefit from this technology.

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PRECISION MEDICINE

Human-Precision Medicine Interaction: Public Perceptions of Polygenic Risk Score for Genetic Health Prediction

Yuhao Sun, Albert Tenesa, John Vines

arXiv:2501.19405 [Pre-print]

Precision Medicine (PM) transforms the traditional "one-drug-fits-all" paradigm by customising treatments based on individual characteristics, and is an emerging topic for HCI research on digital health. A key element of PM, the Polygenic Risk Score (PRS), uses genetic data to predict an individual's disease risk. Despite its potential, PRS faces barriers to adoption, such as data inclusivity,

psychological impact, and public trust. We conducted a mixed-methods study to explore how people perceive PRS, formed of surveys (n=254) and interviews (n=11) with UK-based participants. The interviews were supplemented by interactive storyboards with the ContraVision technique to provoke deeper reflection and discussion. We identified ten key barriers and five themes to PRS adoption and proposed design implications for a responsible PRS framework. To address the complexities of PRS and enhance broader PM practices, we introduce the term Human-Precision Medicine Interaction (HPMI), which integrates, adapts, and extends HCI approaches to better meet these challenges.

A national framework for transition to precision medicine

Original Research

Frontiers in Medicine, Published on 27 Jan 2025

Samaneh Karimi Esboei, Sepehr Ghazinoory, Fatemeh Saghafi

Precision medicine (PM) is transforming healthcare by offering tailored interventions that address individual variability, transforming patient care and outcomes. PM is based on providing health-oriented services according to genetic characteristics, individual and family medical history, lifestyle, place of residence, and other personalized characteristics. This study aims to establish an appropriate framework for implementing PM in Iran. First, the global transition framework to PM was drawn by a systematic review, and then a framework for transition to PM in Iran was drawn by a case study through semi-structured interviews, an expert panel, and an analytic hierarchy process (AHP) questionnaire. The statistical sample of the study comprised PM specialists, researchers, and patients whose PM plays a significant role in their diagnosis and treatment. The sampling method was non-random with a combination of purposive and snowball techniques. The results from the systematic review show that for the transition to PM, we must first move from common medicine to stratified medicine and then PM. Moving toward PM requires strong economic, social, political, institutional, industrial, and, most importantly, technological infrastructures. These infrastructures will vary from country to country. In general, coexistence between the health system and PM technologies did not exist in the beginning, but it will emerge with its development. The resistance of the health system to accepting PM will gradually decrease. Furthermore, the government plays a key role in the early phases, while market and PM demand become more prominent during the development. New health actors will also develop PM, and out-of-date actors will be deleted or replaced. But moving toward PM is slightly different in Iran, particularly in the middle phases of transition.

Integrating Genomic Data into Clinical Practice: Implications for Precision Medicine

Review Article

Dr. Muhammad Saeed

Emerging Trends in Medicine: Vol. 1 No. 2 (2024). 31 Dec 2024

Abstract

The integration of genomic data into clinical practice marks a critical shift towards the future of personalized medicine. Precision medicine, an approach that tailors healthcare based on individual genetic profiles, is poised to revolutionize medical treatments. This article explores the implications of incorporating genomic data into clinical workflows, highlighting the potential benefits, challenges, and the evolving role of healthcare professionals. By examining case studies, ethical considerations, and technological advancements, this paper underscores the need for interdisciplinary collaboration to fully realize the potential of genomic integration in clinical settings. Key focus areas include genetic testing, data interpretation, and the importance of patient consent in genomic medicine.

Ethical and Legal Issues of Regenerative Medicine in the UAE

Conference

M. Khalifa, H. M. Mohamed and A. Toumi

2024 International Conference on Decision Aid Sciences and Applications (DASA), Manama, Bahrain, 2024, pp. 1-6, doi: 10.1109/DASA63652.2024.10836164. 17 Jan 2025

Abstract

Decision-making in regenerative medicine involves navigating a complex landscape of ethical and legal issues. These challenges impact healthcare providers, researchers, and patients, requiring careful consideration to ensure responsible practices. This review is a comprehensive overview of regenerative medicine, particularly in the context of stem cell research and its ethical and legal implications in the Middle East, especially the UAE. Indeed, in the UAE, the ethical and legal issues surrounding regenerative medicine significantly influence decision-making among healthcare providers, researchers, and patients. As the country seeks to position itself as a leader in medical innovation, these challenges must be addressed to ensure the responsible development and application of regenerative therapies.

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GENOMICS RESEARCH ETHICS, INTEGRITY

The Precautionary Principle: A Public Policy Tool to Support the Application of Heritable Human Genome Editing?

OC Pandos -

European Society of Medicine – Medical Research Archives, Vol 13, Issue 1, 2025

ABSTRACT

The Precautionary Principle ('PP') is a legal, ethical and regulatory chameleon. It acts as a guide to decision-making, in conditions of scientific uncertainty. Therefore, a fundamental aim of it is to offer some certainty under conditions that are largely uncertain. The advent of Clustered Regularly Interspaced Short Palindromic Repeats ('CRISPR') technology epitomises an emerging technology which does not lend itself to regulatory convenience. Its far-reaching scientific, ethical, social, legal and regulatory implications, renders the task of applying a rigid, uniform framework or decision-making mechanism impossible. Unsurprisingly, the current regulatory approach for Heritable Human Genome Editing ('HHGE') is highly prohibitive, manifested as a blanket moratorium. However, as the technology continues to mature, it is prudent to consider pathways for its eventual legal and regulatory permissibility.

Subsequently, this principle offers a means to formulate future public policy and regulation. The primary aim of this article is to advance an argument for the practical utility of this principle in supporting a therapeutic use of HHGE. Namely, to prevent Huntington's Disease – a fatal monogenic genetic disease. As observed with somatic genome editing, it is feasible to presume the first therapeutic use of HHGE may target fatal monogenic genetic diseases (caused by a single mutation). Through the application of the PP framework provided by the World Commission on the Ethics of Scientific Knowledge and Technology, this article argues that this principle does not necessarily translate to a strict regulatory prohibition. In the context of emerging technologies, its application must be tempered to accommodate for research development, thereby enabling technological advancement.

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GENOMIC DATA, BIOBANKING

Responsible governance of genomics data and biospecimens in the context of broad consent: experiences of a pioneering access committee in Africa (8 February, 2025)

Practice
Ahmed Rebai, Akin Abayomi, P Andanda, R Kerr, Kobus Herbst, J Mabuka, R Wamuyu, Daima Bukini, C Dandara
BMJ Global Health, February 2025 - Volume 10 - 2
Abstract
International collaboration in genomic research is gaining momentum in African countries and is often supported by external funding. Over the last decade, there has been an increased interest in African genomic data. The contribution of this rich data resource in understanding diseases predominant in both African and global populations has been limited to date. There has been some non-governmental funding dedicated to the advancement of genomic research and innovation by African-based and African-led research groups, but the impact of these initiatives is hard to quantify.
However, there is now an opportunity for the global research community to leverage decades of genomic data and biospecimens originating from African populations. The experience we describe in this paper is of an access governance framework established under the Human, Heredity, and Health in Africa (H3A) consortium, given the task of managing wider access to the data and biospecimen resources collected via its various projects.
The function of the Data and Biospecimen Access Committee (DBAC) is to facilitate the advancement of medicine and health while fostering the development of bioinformatics capabilities at Africa-based institutions or regional hubs. Our collective experiences and lessons learnt as a committee provide examples of nuanced considerations when evaluating access to African data. The committee was semi-autonomous in its establishment and had independence in decision-making. The DBAC continually advocates for the responsible use of genomic data and biospecimens that were obtained from African research participants, under broad consent, by primary researchers who no longer have oversight over the future use of these resources.

Public awareness, attitudes, and motivation toward biobanks: a survey of China
Research Article
Mingtao Huang, Lanyi Yu, Xiaonan Wang, Kun Li, Jichao Wang, Xinrui Cheng & Xiaomei Zhai
BMC Medical Ethics 26, 2 (2025). https://doi.org/10.1186/s12910-025-01163-y**. 11 Jan 2025**
Abstract
Background
Biobanks are vital for advancing medical research, and public participation is a crucial determinant of their success. This study uses a survey to assess the awareness, attitudes, and motivation of the public in China with regard to participating in biobanks.
Methods
We conducted an online survey that yielded 616 responses from participants with diverse demographic backgrounds. The survey included questions on the respondents' awareness of biobanks, their attitudes toward them, their preferences with regard to consent, and their concerns.
Results
The results of the survey revealed that 57.95% of the respondents were aware of biobanks. Altruism was the respondents' primary motivation for participation in biobanks. Their preferences for models of consent varied. The respondents raised concerns about the commercialization of biobanks (56.66%) and data privacy (55.84%). Notably, only 37.01% of the respondents were concerned about the risk of discrimination in biobanks, where this was lower compared with the results for populations in Western countries.
Conclusions
This study provides valuable insights into the Chinese public's awareness of and attitudes toward biobanks. To foster public trust and enhance participation, biobanks should prioritize transparent and continual communication to ensure that the participants are well informed about the use and protection of the samples that they have donated. Future research should explore the influence of cultural nuances to develop strategies that address specific concerns and ethical challenges in the context of public participation in biobanks.

Overcoming challenges associated with broad sharing of human genomic data

Perspective

Jonathan E. LoTempio Jr & Jonathan D. Moreno

Nature Genetics (2025). https://doi.org/10.1038/s41588-024-02049-2**. 22 Jan 2025**

Abstract

Since the Human Genome Project, the consensus position in genomics has been that data should be shared widely to achieve the greatest societal benefit. This position relies on imprecise definitions of the concept of 'broad data sharing'. Accordingly, the implementation of data sharing varies among landmark genomic studies. In this *Perspective*, we identify definitions of broad that have been used interchangeably, despite their distinct implications. We further offer a framework with clarified concepts for genomic data sharing and probe six examples in genomics that produced public data. Finally, we articulate three challenges. First, we explore the need to reinterpret the limits of general research use data. Second, we consider the governance of public data deposition from extant samples. Third, we ask whether, in light of changing concepts of broad, participants should be encouraged to share their status as participants publicly or not. Each of these challenges is followed with recommendations.

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GENETIC SCREENING/ GENETIC COUNSELLING

DNA Sequencing in Newborn Screening: Opportunities, Challenges, and Future Directions

Journal Article

Médéric Jeanne, Wendy K Chung

Clinical Chemistry, Volume 71, Issue 1, January 2025, Pages 77–86,
https://doi.org/10.1093/clinchem/hvae180**. 3 Jan 2025**

Abstract

Background

Newborn screening is a public health system designed to identify infants at risk for conditions early in life to facilitate timely intervention and treatment to prevent or mitigate adverse health outcomes. Newborn screening programs use tandem mass spectrometry as a platform to detect several treatable inborn errors of metabolism, and the T-cell receptor excision circle assay to detect some inborn errors of the immune system. Recent advancements in DNA sequencing have decreased the cost of sequencing and allow us to consider DNA sequencing as an additional platform to complement other newborn screening methods.

Content

This review provides an overview of DNA-based newborn screening, including its applications, opportunities, challenges, and future directions. We discuss the potential benefits of expanded DNA sequencing in newborn screening, such as expanding conditions screened and improved specificity and sensitivity of currently screened conditions. Additionally, we examine the ethical, legal, and social implications of implementing genomic sequencing in newborn screening programs, including issues related to consent, privacy, equity, data interpretation, scalability, and psychosocial impact on families. Additionally, we explore emerging strategies for addressing current limitations and advancing the field of newborn screening.

Summary

DNA sequencing in newborn screening has the potential to improve the diagnosis and management of rare diseases but also presents significant challenges that need to be addressed before implementation at the population level.

Genomic findings with familial implications: agenda setting in light of mainstreaming

Open Letter

Phillips A, Van Steijvoort E, Siermann M *et al.*

Open Research Europe 2025, 5:4 (https://doi.org/10.12688/openreseurope.19128.1**). 10 Jan 2025**

Abstract

An international workshop was held in Leuven, Belgium, on June 19–20, 2023, to discuss the communication of genetic risk information within families in the context of personalized prevention. Organized as part of the Horizon Europe project PROPHET (PeRsOnalised Prevention roadmap for the future HEalThcare in Europe), the event gathered interdisciplinary stakeholders to explore the benefits and challenges of various policy approaches for returning genetic test results with implications for family members. Five key themes emerged from the discussions: (1) recognizing family communication as an ongoing process, (2) adopting a family-centered approach rather than an individual one, (3) clarifying roles and responsibilities in the communication process, (4) addressing the lack of clear guidelines and policies, and (5) ensuring sufficient resources. To enhance family communication of genetic risk information, participants emphasized the importance of improving pre-test counseling and follow-up procedures, implementing policies to clarify roles and responsibilities, and providing training for healthcare professionals both within and outside genetic services.

Returning genetic risk information for hereditary cancers to participants in a population-based cohort study in Japan

Article

Ohneda, K., Suzuki, Y., Hamanaka, Y. *et al.*

Journal of Human Genetics (2025). https://doi.org/10.1038/s10038-024-01314-w**. 17 Jan 2025**

Abstract

Large-scale population cohort studies that collect genomic information are tasked with returning an assessment of genetic risk for hereditary cancers to participants. While several studies have applied to return identified genetic risks to participants, comprehensive surveys of participants' understanding, feelings, and behaviors toward cancer risk remain to be conducted. Here, we report our experience and surveys of returning genetic risks to 100 carriers of pathogenic variants for hereditary cancers identified through whole genome sequencing of 50 000 individuals from the Tohoku Medical Megabank project, a population cohort study. The participants were carriers of pathogenic variants associated with either hereditary breast and ovarian cancer ($n = 79$, median age=41) or Lynch syndrome ($n = 21$, median age=62). Of these, 28% and 38% had a history of cancer, respectively. We provided information on cancer risk, heritability, and clinical actionability to the participants in person. The comprehension assessment revealed that the information was better understood by younger (under 60 years) females than by older males. Scores on the cancer worry scale were positively related to cancer experiences and general psychological distress. Seventy-one participants were followed up at Tohoku University Hospital; six females underwent risk-reducing surgery triggered by study participation and three were newly diagnosed with cancer during surveillance. Among first-degree relatives of hereditary breast and ovarian cancer carriers, participants most commonly shared the information with daughters. This study showed the benefits of returning genetic risks to the general population and will provide insights into returning genetic risks to asymptomatic pathogenic variant carriers in both clinical and research settings.

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DISEASE-SPECIFIC GENOMICS

Biotechnology and Gene Therapy: Transforming the Treatment of Genetic Diseases

Article
Dr. Imran Qureshi
Frontiers in Biotechnology and Genetics 1.3 (2024): 229-243. 31 Dec 2024
Abstract
Gene therapy represents a revolutionary approach in biotechnology, aiming to address the root causes of genetic diseases through direct modification of the genome. This article explores the evolution of gene therapy, focusing on the latest advances in biotechnology that have significantly improved its efficacy and safety. We discuss various gene delivery methods, including viral and non-viral vectors, and highlight the applications of gene therapy in treating conditions such as cystic fibrosis, muscular dystrophy, and certain types of cancer. The review also covers ethical considerations, regulatory challenges, and future directions for the field. By examining the transformative potential of gene therapy, this article underscores its role in reshaping the landscape of genetic disease treatment.

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ANIMALS, PLANTS, MICROORGANISMS

From genes to governance: Engaging citizens in new genomic techniques policy debate

Research Article
Michelle G. J. L. Habets, Phil Macnaghten
Plants, People, Planet (2024). 26 Dec 2024 https://doi.org/10.1002/ppp3.10626**.**
Societal Impact Statement
The European Union is in the midst of changing the current regulatory framework for new genomic techniques (NGTs) to accelerate the production of plant varieties, in order to achieve the goals of the European Green Deal. These techniques are highly contested, with divergent views on how they should be governed. So far, there has been little effort to engage citizens in this legislative reform process. By engaging with Dutch citizens, we give the public a voice in shaping the future of agriculture and the food system. By facilitating the exchange of multiple views, we allow for more effective governance arrangements.
Summary
- The European Commission (EC) has proposed a new regulation for plants obtained by new genomic techniques (NGTs). Currently, food crops developed with NGTs are subject to the EU Directive 2001/18/EC on the deliberate release into the environment of genetically modified organisms (GMOs).
- The current proposal for a new regulation differentiates between two categories of NGT plants. Category 1 NGT plants will be subject to the new regulation, whereas Category 2 plants will remain subject to the GMO legislation, although the risk assessment may be adapted.
- In this paper, we analyze the views of Dutch citizens on NGT crops and their governance, prior to the publication of the new proposal. We find significant reservations arising from doubts about NGT crops delivering on their promises, the likelihood of unanticipated consequences, and unnaturalness.
- We extrapolate our findings to anticipate citizen's response to the new proposal and reflect on ways to move forward, both for policy making, and for the plant science community.

Applications and Potential of Genome Editing in Industrial Crop Improvement

Book Chapter
Shubham Rajaram Salunkhe, Shobica Priya Ramasamy, Sakthi Ambothi Rathnasamy, Veera Ranjani Rajagopalan, Raveendran Muthurajan & Sudha Manickam

Sustainable Landscape Planning and Natural Resources Management. Springer, Cham. https://doi.org/10.1007/978-3-031-75937-6_1**. 25 Jan 2025**

Abstract

Genome editing, especially with advance technologies like CRISPR-Cas9, base editing and prime editing, has revolutionized field of plant biotechnology by unprecedented precision in modifying genetic material. CRISPR-Cas9 system, enables precise alterations at specific genomic locations, offering significant advantages over traditional breeding and genetic modification techniques. Industrial crops play a crucial role in the worldwide economy by providing raw materials for an extensive variety of products. They are cultivated primarily for their utility in manufacturing and industry, rather than for food. These include crops like cotton for textiles, rubber for tyres, and oilseeds for biodiesel. Sustainable cultivation practices are essential to mitigate environmental impacts and ensure long-term productivity. Genome editing enhances industrial crop yields by optimizing plant architecture and growth rates, allowing for denser planting and higher productivity. It can also improve nutritional content by altering metabolic pathways to increase essential vitamins, minerals, and amino acids. Additionally, it enhances tolerance to different abiotic stresses like herbicide resistance, drought, salinity and extreme temperatures, helping crops maintain productivity under adverse conditions. The commercial viability of genome-edited crops is increasing as regulatory frameworks evolve to address their unique aspects, potentially accelerating market deployment. In conclusion, genome editing holds significant promise for industrial crop improvement, offering precise, efficient, and sustainable solutions to enhance crop performance and resilience. This chapter gives a comprehensive knowledge on improvement industrial crop by using advanced genome editing tools.

Applications of CRISPR on Improving Plant Growth and Development through Secondary Metabolism

Book Chapter

Amardeep Ray Preethi, Sasikumar Janani, Puliyampatti Gunasekaran Vishnu, Karli Haritha, Sumithran Subhadevi Suhith Mithra, Kannan Vijayarani, Puzhakkal Abhirami, Arumugam Vijaya Anand

Plant Stress Tolerance, 1st Edition (2025). CRC Press. Pg 17.

Abstract

Plant molecular biology has undergone an extreme change with the preface of prokaryote-derived clustered regularly interspaced short palindromic repeats (CRISPR)/Cas genome-editing advancement, which provides unmatched precision, robustness, and programmability. Plant domestication has advanced thanks to the CRISPR/Cas system's capacity to enable loss- and gain-of-function alterations as well as differences in spatiotemporal gene activity. In plant genomics research, this technology – particularly the extensively used CRISPR/Cas9 system – has proven indispensable, especially when it comes to perennial plants. Because of its clarity of operation and adaptability, CRISPR/Cas9 has made it feasible for scientists to carry out effective gene knock-in and knockout procedures, making it a useful tool for functional genomics. Plant biology can be understood by the identification and study of gene modules made possible by the possibility of multiplex genome editing and whole-genome screening. This chapter therefore examines the benefits of CRISPR/Cas on plants and development through secondary metabolism.

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Month in Review – *Milestones, Strategic Announcements, Analysis, Guidance*
Organization Watch – *Selected Events*
Organization Watch – *Selected Announcements*
Journal Watch – *Spotlight Articles, Thematic Sections*
Journals/Pre-Print Sources Monitored
Institutions/Organizations Monitored

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Institutions/Organizations – Monitored

We recognize this listing is incomplete, unbalanced and skewed to the Global North…please help us make it more complete, more inclusive, and more useful by recommending additional organizations/ institutions/programs to monitor.

Academy of Medical Sciences [UK]
https://acmedsci.ac.uk/

Africa CDC - Institute of Pathogen Genomics [IPG]
https://africacdc.org/institutes/ipg/

African Society of Human Genetics
https://www.afshg.org/

Paul G. Allen Frontiers Group
https://alleninstitute.org/news-press/

American Board of Medical Genetics and Genomics (ABMGG)
http://www.abmgg.org/pages/resources_appeal.shtml

American College of Medical Genetics and Genomics
https://www.acmg.net/

American Society for Gene and Cell Therapy [ASGCT]
https://asgct.org/

American Society of Human Genetics (ASHG)
http://www.ashg.org/

ARM [Alliance for Regenerative Medicine]
https://alliancerm.org/press-releases/

ARRIGE
https://www.arrige.org/

Australian Genomics
https://www.australiangenomics.org.au/

Bespoke Gene Therapy Consortium (BGTC)
https://ncats.nih.gov/research/research-activities/BGTC

BMGF - Gates Foundation [
https://www.gatesfoundation.org/ideas/media-center

Bill & Melinda Gates Medical Research Institute
https://www.gatesmri.org/news

Broad Institute of MIT and Harvard
https://www.broadinstitute.org/

CDC – Office of Genomics and Precision Public Health
https://www.cdc.gov/genomics/default.htm

Center for Genetics and Society [USA]
www.geneticsandsociety.org

Center for the Ethics of Indigenous Genomic Research [CEIGR] – University of Oklahoma
https://www.ou.edu/cas/anthropology/ceigr

Center for ELSI Resources and Analysis (CERA)
https://elsihub.org/about/our-mission

Chan Zuckerberg Initiative [to 18 Jan 2025]
https://chanzuckerberg.com/newsroom/

Francis Crick Institute
https://www.crick.ac.uk/news-and-reports

FDA Cellular & Gene Therapy Guidances
https://www.fda.gov/vaccines-blood-biologics/biologics-guidances/cellular-gene-therapy-guidances

The Genomic Medicine Foundation
https://www.genomicmedicine.org

Global Alliance for Genomics and Health
https://www.ga4gh.org/

Genetic Alliance
https://geneticalliance.org/about/news

Genomics England
https://www.genomicsengland.co.uk/

Genetics Society of America (GSA)
http://genetics-gsa.org/

Global Genomic Medicine Consortium [G2MC]
https://g2mc.org/

Global Observatory for Genome Editing
https://global-observatory.org/

HHMI - Howard Hughes Medical Institute [to 30 Aug 2023]
https://www.hhmi.org/news

H3Africa
https://h3africa.org/

Human Genome Organization (HUGO)
https://www.hugo-international.org/

ICH
https://www.ich.org/

Innovative Genomics Institute
https://innovativegenomics.org/about-us/

INSERM [to 30 Aug 2023]
https://www.inserm.fr/en/home/

Institut Pasteur [to 30 Aug 2023]
https://www.pasteur.fr/en/press-area

NIH [to 30 Aug 2023]
http://www.nih.gov/

NIH National Human Genome Research Institute (NHGRI)
https://www.genome.gov/

NIH – All of Us Research Program
https://allofus.nih.gov/news-events/announcements

National Organization for Rare Disorders (NORD)
https://rarediseases.org/news/

Nuffield Council on Bioethics [to 30 Aug 2023]
https://www.nuffieldbioethics.org/news

Penn Center for Global Genomics & Health Equity [University of Pennsylvania]
https://globalgenomics.med.upenn.edu/index.php

PHG Foundation
https://www.phgfoundation.org

The Royal Society
https://royalsociety.org/

UNESCO–The World Academy of Sciences
https://twas.org/

Wellcome Sanger Institute
https://www.sanger.ac.uk/

WHO
https://www.who.int/news

WHO - Human genome editing
https://www.who.int/teams/health-ethics-governance/emerging-technologies/human-genome-editing
[last update on page - July 2021]

World Organisation for Animal Health [OIE]
https://www.oie.int/

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Journals/Pre-Print Sources – Core/Penumbra Journals Monitored

If you would like to suggest other journal titles to include in this service, please contact David Curry at: david.r.curry@centerforvaccineethicsandpolicy.org

AJOB Empirical Bioethics
https://www.tandfonline.com/toc/uabr21/current

AMA Journal of Ethics
https://journalofethics.ama-assn.org/issue/peace-health-care

American Journal of Human Genetics

https://www.cell.com/ajhg/current

American Journal of Infection Control
http://www.ajicjournal.org/current

American Journal of Preventive Medicine
https://www.ajpmonline.org/current

American Journal of Public Health
http://ajph.aphapublications.org/toc/ajph/current

American Journal of Tropical Medicine and Hygiene
https://www.ajtmh.org/view/journals/tpmd/111/4/tpmd.111.issue-5.xml

Annals of Internal Medicine
https://www.acpjournals.org/toc/aim/current

Artificial Intelligence – An International Journal
https://www.sciencedirect.com/journal/artificial-intelligence/vol/336/suppl/C

BMC Cost Effectiveness and Resource Allocation
http://resource-allocation.biomedcentral.com/

BMC Health Services Research
http://www.biomedcentral.com/bmchealthservres/content

BMC Infectious Diseases
http://www.biomedcentral.com/bmcinfectdis/content

BMC Medical Ethics
http://www.biomedcentral.com/bmcmedethics/content

BMC Medicine
http://www.biomedcentral.com/bmcmed/content

BMC Pregnancy and Childbirth
http://www.biomedcentral.com/bmcpregnancychildbirth/content
(Accessed 16 Nov 2024)

BMC Public Health
http://bmcpublichealth.biomedcentral.com/articles

BMC Research Notes
http://www.biomedcentral.com/bmcresnotes/content

BMJ Evidence-Based Medicine
https://ebm.bmj.com/content/29/5

BMJ Global Health
https://gh.bmj.com/content/9/10

Bulletin of the World Health Organization
https://www.ncbi.nlm.nih.gov/pmc/issues/471305/

Cell
https://www.cell.com/cell/current

Clinical Pharmacology & Therapeutics
https://ascpt.onlinelibrary.wiley.com/toc/15326535/current

Clinical Therapeutics
http://www.clinicaltherapeutics.com/current

Clinical Trials
https://journals.sagepub.com/toc/ctja/21/6

Contemporary Clinical Trials
https://www.sciencedirect.com/journal/contemporary-clinical-trials/vol/146/suppl/C

The CRISPR Journal
https://www.liebertpub.com/toc/crispr/7/5

Current Genetic Medicine Reports
https://link.springer.com/journal/40142/volumes-and-issues/11-3

Current Medical Research and Opinion
https://www.tandfonline.com/toc/icmo20/current

Current Opinion in Infectious Diseases
https://journals.lww.com/co-infectiousdiseases/pages/currenttoc.aspx

Current Protocols in Human Genetics
https://currentprotocols.onlinelibrary.wiley.com/journal/19348258

Developing World Bioethics
https://onlinelibrary.wiley.com/toc/14718847/current

EMBO Reports
https://www.embopress.org/toc/14693178/current

Emerging Infectious Diseases
http://wwwnc.cdc.gov/eid/

Ethics & Human Research
https://onlinelibrary.wiley.com/toc/25782363/current

Ethics & International Affairs
https://www.cambridge.org/core/journals/ethics-and-international-affairs/latest-issue

Ethics, Medicine and Public Health
https://www.sciencedirect.com/journal/ethics-medicine-and-public-health/vol/31/suppl/C

The European Journal of Public Health
https://academic.oup.com/eurpub/issue/34/5

Expert Review of Vaccines
https://www.tandfonline.com/toc/ierv20/current

Frontiers in Medicine
https://www.frontiersin.org/journals/medicine/volumes?volume-id=1237

Gene Therapy – Nature
https://www.nature.com/gt/volumes/31/issues/11-12

Genetics in Medicines
https://www.sciencedirect.com/journal/genetics-in-medicine/vol/26/issue/11

Genome Medicine
https://genomemedicine.biomedcentral.com/articles

Global Health Action
https://www.tandfonline.com/toc/zgha20/current?nav=tocList

Global Health: Science and Practice (GHSP)
http://www.ghspjournal.org/content/current

Global Public Health
http://www.tandfonline.com/toc/rgph20/current

Globalization and Health
http://www.globalizationandhealth.com/

Health and Human Rights
https://www.hhrjournal.org/volume-26-issue-1-june-2024/

Health Economics, Policy and Law
https://www.cambridge.org/core/journals/health-economics-policy-and-law/latest-issue

Health Policy and Planning
https://academic.oup.com/heapol/issue/39/9

Health Research Policy and Systems
http://www.health-policy-systems.com/content

Human Gene Therapy
https://www.liebertpub.com/toc/hum/35/19-20

Human Vaccines & Immunotherapeutics (formerly Human Vaccines)
https://www.tandfonline.com/toc/khvi20/20/1?nav=tocList

Immunity
https://www.cell.com/immunity/current

Infectious Agents and Cancer
http://www.infectagentscancer.com/

Infectious Diseases of Poverty
http://www.idpjournal.com/content

International Health
https://academic.oup.com/inthealth/issue/16/6

International Human Rights Law Review
https://brill.com/view/journals/hrlr/13/1/hrlr.13.issue-1.xml

International Journal of Community Medicine and Public Health
https://www.ijcmph.com/index.php/ijcmph/issue/view/118

International Journal of Epidemiology
https://academic.oup.com/ije/issue/53/5

International Journal of Human Rights in Healthcare
https://www.emerald.com/insight/publication/issn/2056-4902/vol/17/iss/4

JAMA
https://jamanetwork.com/journals/jama/currentissue

JAMA Health Forum
https://jamanetwork.com/journals/jama-health-forum/issue

JAMA Pediatrics
https://jamanetwork.com/journals/jamapediatrics/currentissue

JBI Evidence Synthesis
https://journals.lww.com/jbisrir/Pages/currenttoc.aspx

Journal of Adolescent Health
https://www.jahonline.org/current

Journal of Artificial Intelligence Research
https://www.jair.org/index.php/jair

Journal of Community Health
https://link.springer.com/journal/10900/volumes-and-issues/49-5

Journal of Current Medical Research and Opinion
https://www.cmro.in/index.php/jcmro/issue/view/75

Journal of Empirical Research on Human Research Ethics
http://journals.sagepub.com/toc/jre/current

Journal of Epidemiology & Community Health
https://jech.bmj.com/content/78/11

Journal of Evidence-Based Medicine
https://onlinelibrary.wiley.com/toc/17565391/current

Journal of Global Ethics
http://www.tandfonline.com/toc/rjge20/current

Journal of Health Care for the Poor and Underserved (JHCPU)
https://muse.jhu.edu/issue/52935

Journal of Immigrant and Minority Health
https://link.springer.com/journal/10903/volumes-and-issues/26-5

Journal of Medical Ethics
http://jme.bmj.com/content/current

Journal of Patient-Centered Research and Reviews
https://institutionalrepository.aah.org/jpcrr/

The Journal of Pediatrics
https://www.sciencedirect.com/journal/the-journal-of-pediatrics/vol/274/suppl/C

Journal of Pharmaceutical Policy and Practice
https://www.tandfonline.com/toc/jppp20/17/1

Journal of Public Health Management & Practice
https://journals.lww.com/jphmp/pages/currenttoc.aspx

Journal of Public Health Policy
https://link.springer.com/journal/41271/volumes-and-issues/45-3

Journal of the Royal Society – Interface
https://royalsocietypublishing.org/toc/rsif/current

Journal of Virology
http://jvi.asm.org/content/current

The Lancet
https://www.thelancet.com/journals/lancet/issue/current

The Lancet Child & Adolescent Health
https://www.thelancet.com/journals/lanchi/issue/current

Lancet Digital Health
https://www.thelancet.com/journals/landig/issue/current

Lancet Global Health
https://www.thelancet.com/journals/langlo/issue/current

Lancet Infectious Diseases
https://www.thelancet.com/journals/laninf/issue/current

Lancet Public Health
https://www.thelancet.com/journals/lanpub/issue/current

Lancet Respiratory Medicine
https://www.thelancet.com/journals/lanres/issue/current

Maternal and Child Health Journal
https://link.springer.com/journal/10995/volumes-and-issues/28-11

Medical Decision Making (MDM)
http://mdm.sagepub.com/content/current

Molecular Therapy
https://www.cell.com/molecular-therapy/current

Nature
https://www.nature.com/nature/volumes/633/issues/8038

Nature Biotechnology
https://www.nature.com/nbt/volumes/42/issues/11

Nature Genetics
https://www.nature.com/ng/volumes/56/issues/11

Nature Human Behaviour
https://www.nature.com/nathumbehav/volumes/8/issues/10

Nature Medicine
https://www.nature.com/nm/volumes/30/issues/11

Nature Reviews Drug Discovery
https://www.nature.com/nrd/volumes/23/issues/11

Nature Reviews Genetics
https://www.nature.com/nrg/volumes/25/issues/11

Nature Reviews Immunology
https://www.nature.com/nri/volumes/24/issues/11

New England Journal of Medicine
https://www.nejm.org/toc/nejm/medical-journal

NEJM Evidence
https://evidence.nejm.org/toc/evid/current

njp Vaccines
https://www.nature.com/npjvaccines/

Pediatrics
https://publications.aap.org/pediatrics/issue/154/Supplement%203

PharmacoEconomics
https://link.springer.com/journal/40273/volumes-and-issues/42-11

PLoS Biology
https://journals.plos.org/plosbiology/

PLoS Genetics
https://journals.plos.org/plosgenetics/

PLoS Global Public Health
https://journals.plos.org/globalpublichealth/search?sortOrder=DATE_NEWEST_FIRST&filterStartDate=2021-10-01&filterJournals=PLOSGlobalPublicHealth&q=&resultsPerPage=60

PLoS Medicine
https://journals.plos.org/plosmedicine/

PLoS Neglected Tropical Diseases
http://www.plosntds.org/

PLoS One
http://www.plosone.org/

PLoS Pathogens
http://journals.plos.org/plospathoge ns/

PNAS - Proceedings of the National Academy of Sciences of the United States
https://www.pnas.org/toc/pnas/121/46

PNAS Nexus
https://academic.oup.com/pnasnexus/issue/3/10

Preventive Medicine
https://www.sciencedirect.com/journal/preventive-medicine/vol/187/suppl/C

Proceedings of the Royal Society B
https://royalsocietypublishing.org/toc/rspb/current

Public Health
https://www.sciencedirect.com/journal/public-health/vol/236/suppl/C

Public Health Ethics
http://phe.oxfordjournals.org/content/current

Public Health Genomics
https://karger.com/phg/issue/27/1

Public Health Reports
https://journals.sagepub.com/toc/phrg/139/6

Qualitative Health Research
https://journals.sagepub.com/toc/QHR/current

Research Ethics
http://journals.sagepub.com/toc/reab/current

Reproductive Health
http://www.reproductive-health-journal.com/content

Revista Panamericana de Salud Pública/Pan American Journal of Public Health (RPSP/PAJPH)
https://www.paho.org/journal/en

Risk Analysis
https://onlinelibrary.wiley.com/toc/15396924/current

Risk Management and Healthcare Policy
https://www.dovepress.com/risk-management-and-healthcare-policy-archive56

Science
https://www.science.org/toc/science/current

Science and Engineering Ethics
https://link.springer.com/journal/11948/volumes_-and-issues/30-6

Science Translational Medicine
https://www.science.org/toc/stm/current

Social Science & Medicine
https://www.sciencedirect.com/journal/social-science-and-medicine/vol/360/suppl/C

Systematic Reviews
https://systematicreviewsjournal.biomedcentral.com/articles

Theoretical Medicine and Bioethics
https://link.springer.com/journal/11017/volumes-and-issues/45-5

Travel Medicine and Infectious Diseases
https://www.sciencedirect.com/journal/travel-medicine-and-infectious-disease/vol/61/suppl/C

Tropical Medicine & International Health
https://onlinelibrary.wiley.com/toc/13653156/current

Vaccine
https://www.sciencedirect.com/journal/vaccine/vol/42/issue/25

Vaccines
https://www.mdpi.com/journal/vaccines

Value in Health
https://www.valueinhealthjournal.com/current

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