EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

23 October 2018
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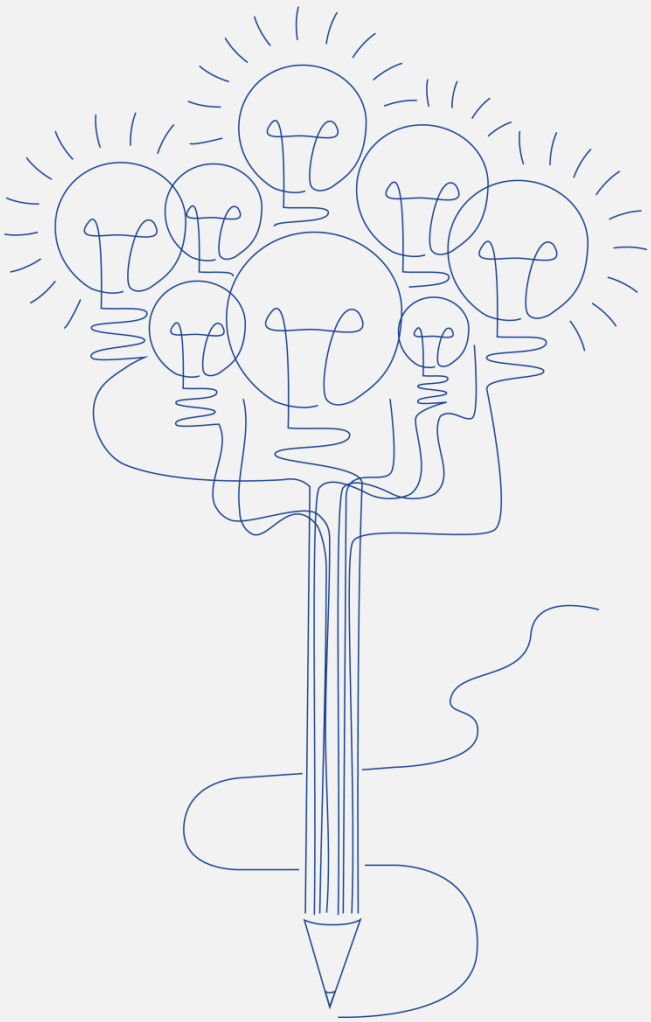
Scientific Committees Regulatory Science Strategy

EMA Regulatory Science to 2025

Reference material



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1. Responding to the needs of the 21st century Patient – Addressing challenges and opportunities across the European Regulatory Framework Enabling and leveraging research and innovation in regulatory science

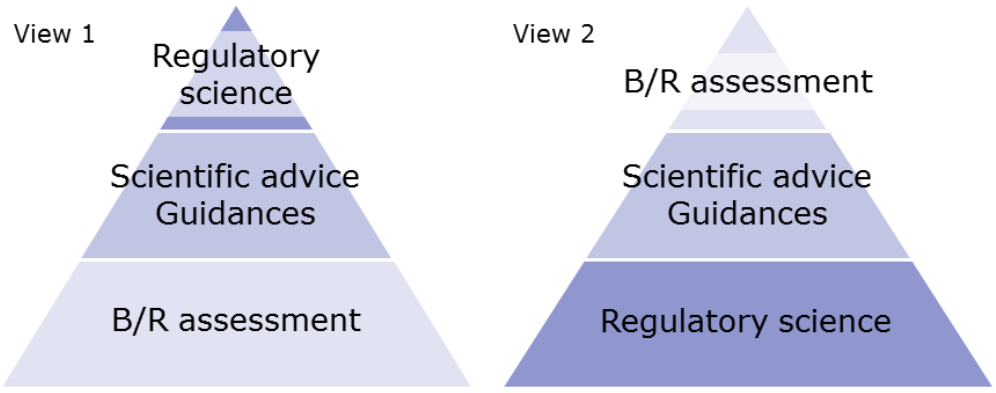
1.1. Why now?

- To monitor and sign-post emerging and future trends in science and technology
- To direct the use of resource and external collaborations to strategically advance regulatory science
- To identify key priorities where new or enhanced engagement is essential to the continued success of the Agency's mission
- To shape and influence the vision for the EU Medicines Agencies Network Strategy in the period 2020–25

1.2. How does EMA define Regulatory Science?

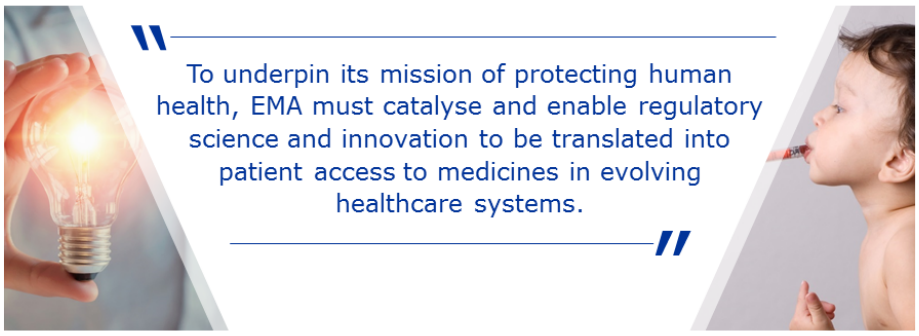
- Regulatory science is defined as a range of scientific disciplines that are applied to the quality, safety and efficacy assessment of medicinal products and that inform regulatory decision-making throughout the lifecycle of a medicine.
- It encompasses basic and applied medicinal science and social sciences, and contributes to the development of regulatory standards and tools.

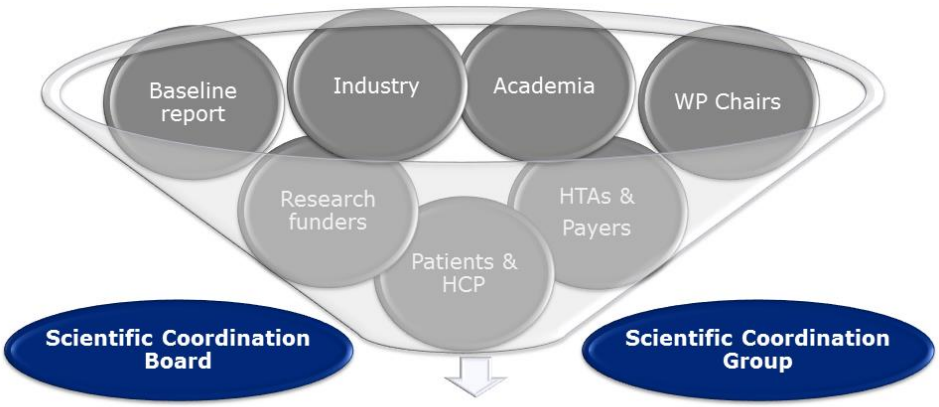
1.3. The role of regulatory science at EMA?



1.4. Case studies in regulatory science

1.5. Vision - EMA Regulatory Science to 2025





Regulatory Science to 2025

1.6. Strategic goals

Strategic goal 1
To catalyse the integration of science and technology in drug development.

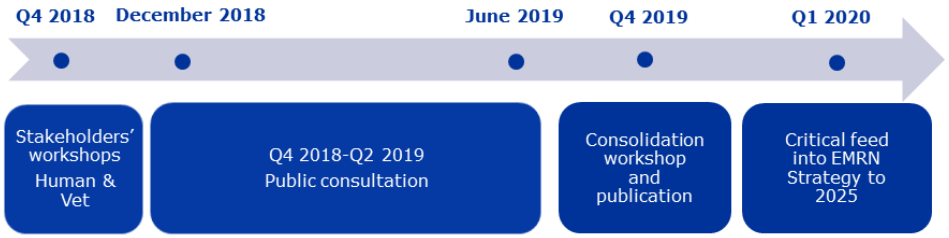
Strategic goal 2
To drive collaborative evidence generation to improve the scientific quality of evaluations.

Strategic goal 3
To advance patient-centred access to medicines in partnership with healthcare systems.

Strategic goal 4
To address emerging health threats and availability/therapeutic challenges.

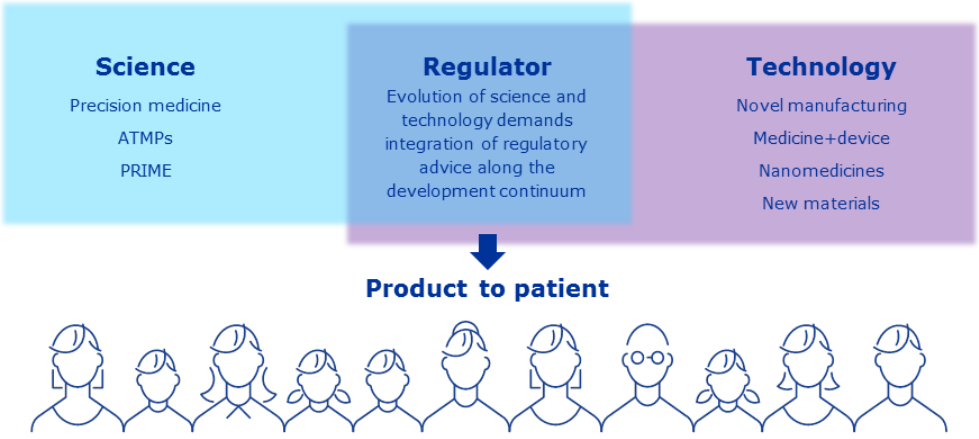
Strategic goal 5
To enable and leverage research and innovation in regulatory science.

1.7. EMA Regulatory Science to 2025 - Timeline



Legislation follows science, not the other way round: implication for future EU legislation?

2. Catalysing the integration of science & technology in drug development



2.1. Support developments in precision medicine, biomarkers and 'omics' - Science

Statement

- In the product development lifecycle, biomarkers are used, for example:
  - to identify target organs for toxicity,
  - to elucidate mechanism of action,
  - to streamline the design of pre- and post-authorisation clinical studies, and to refine dose requirements and regimens, surrogate endpoints, safety/risk minimisation measures, post-license evidence generation, etc.
- Involvement of stakeholders is key to the approval of biomarker-guided medicines that patients can access.
  - specialists in the technologies used to measure biomarkers (e.g., omics, digital, wearables).
  - computer scientists,
  - experts in devices,
  - HTAs, payers and patients.

Underlying actions

- Enhance early engagement with novel biomarker developers to facilitate regulatory qualification.
- Address the impact of emerging 'omics' methods and their application across the development life cycle.
- Evaluate, in collaboration with HTAs, payers and patients, biomarker impact on clinical outcomes.

2.2. Support the translation of cell, genes and tissue based products into patient treatments- Science

Statement

Challenges facing the ATMPs field include:

- consistently manufacturing a product across development, clinical use and commercialisation;
- cell-based products require characterisation and measurements of biological activity;
- definition of critical quality attributes that cell-based products must maintain throughout manufacturing;
- sourcing, consistency and stability of starting material (e.g., biopsies or cadaveric tissue) may necessitate close-to-patient manufacture, shipping and storage;
- use of novel biomaterials, matrices and devices requires regulatory consistency;
- in order to provide a clearer path for bringing ATMPs to market, a common understanding is needed of the hospital exemption route vs MAA.

Underlying actions

- Identify and support concepts, methods and therapies that hold most promise to address unmet medical need (e.g., through PRIME).
- Incentivise translation of ATMPs from 'laboratory to clinic' by providing assistance with early planning, method development and clinical evaluation.
- Catalyse patient access to ATMPs by supporting evidence generation, pertinent to downstream decision-makers, across the development process to market authorisation.
- Address the challenges of decentralised ATMP delivery locations with emphasis on life-cycle data collection to strengthen post-licence monitoring.
- Raise global awareness of ATMPs to maximise knowledge sharing, promote data collection (e.g., registries) and foster controlled - as opposed to rogue - developments.

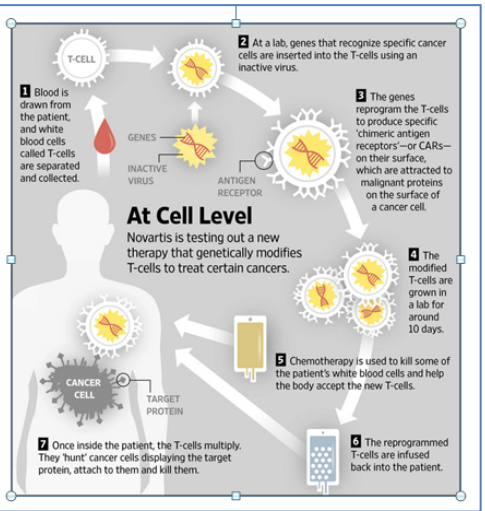
2.3. Promote and invest in the PRIME scheme- Science

Underlying actions

- Invest in an external communication campaign to better explain and promote PRIME.
- Evaluate current capacity and identify areas for increased investment e.g. should PRIME be extended to new therapeutic indications.
- Shorten the time between Scientific Advice, clinical trials and submission of Marketing Authorisation Applications.
- Collaborate with stakeholders to ensure efficient oversight in the post-approval phase of development.
- Leverage collaboration with patients, healthcare professionals, academia and international partners, such as FDA and PMDA.

Case study: Kymriah (tisagenlecleucel)[1]

- Eligibility of Kymriah to PRIME was granted in mid-2016.
- Applicant recommended to address: comparability between manufacturing sites and processes; risk minimization plan (incl. registry to collect long-term safety data); regulatory filing strategy; paediatric investigation plan.
- 3 iterations of Scientific Advice from EMA supported generation of necessary data.
- Centralized procedure started in November 2017, with short time-lapse between initial evidence of efficacy and regulatory submission.
- CHMP's positive opinion for marketing authorization adopted June 2018.
- NHS England's approval 10 days after EC decision in August 2018.



2.4. Facilitate the implementation of novel manufacturing technologies - Technology

Statement

- Pharmaceutical industry is implementing a suite of novel manufacturing technologies to improve cost efficiency and customisation.
  - Opportunity to tailor production to specific medical needs, particularly for innovative products.
- New approaches range from continuous manufacturing, with a full centralised process, to various models of distributed, local manufacturing and point-of-care/bed-side manufacturing.
- Novel technologies include digital process control, additive manufacturing, and bio-printing with new materials.

Underlying actions

- Recruit expertise in novel manufacturing technologies to enhance the assessment process (e.g., to review manufacturing software).
- Identify bottlenecks and propose modernisation of relevant regulations and to facilitate novel manufacturing.
- Address regulatory challenges in point-of-care manufacturing, e.g., responsibility for manufacturing process, concept of batch control, role of the Qualified Person.
- Facilitate a flexible approach in application of Good Manufacturing Practice.

[1] Wall Street Journal, Aug. 30, 2017, https://www.wsj.com/articles/fda-approves-first-gene-therapy-in-u-s-1504108512

2.5. Create an integrated evaluation framework for the assessment of Medical Devices, IVDs and borderline products - Technology

Statement

- There is a clear trend in combining the development and use of medicinal products with medical devices (e.g., digital devices to support adherence to treatment).
- Proportionate implementation of new EU Regulations on *in vitro* diagnostics and medical devices should support innovation while avoiding unnecessary regulatory burden.
- Combination products are regulated as medicinal products or medical devices depending on principal mode of action: physicochemical vs. pharmacological/immunological/metabolic etc.
  - due to greater complexity of newer combination products, it is increasingly difficult to attribute one primary mode of action;
  - need for an integrated competence/expertise in such 'borderline' situations to support development of innovative products.

Underlying actions

- Define, having charted the border between medicines and medical devices, in vitro diagnostics (IVD) and borderline products, how risk-benefit of such products is assessed and communicated.
- Enrich expertise at the interface between medicines, medical devices and borderline products.
- Facilitate the regulatory pathway between notified bodies and medicines' regulators.
- Gain insight in innovation on drug-device combination products via horizon scanning.

2.6. Develop understanding of and regulatory response to nanotechnology and new materials' utilisation in pharmaceuticals - Technology

Statement

- New materials - polymers, biopolymers, poly-functional recombinant proteins, various nano-based constructs - are increasingly proposed as "smart" drug delivery systems or vectors.
  - interact with stimuli by changing their properties or conformational structures in a predictable manner;
  - primarily used as "containers" of medicinal substances for stabilizing, solubilizing and/or ensuring a stealth function;
  - also act as support structures (e.g., for engineered tissue ATMPs).
- Nanomedicines are "purposely designed systems for clinical applications composed of at least one component at nano-scale size resulting in specific properties and characteristics".

Underlying actions

- Raise awareness of new nanomedicines and materials via the EU-Innovation network.
- Generate guidance addressing relevant pharmacokinetic and pharmacodynamic requirements and long-term efficacy and safety assessment.

- Work with medical device regulators and Notified Bodies Organisational Group to develop guidance on regulatory pathways for emerging nanomedicines/new materials to facilitate route-to-market.

2.7. Diversify and integrate the provision of regulatory advice along the development continuum – Regulator

Underlying actions

- Promote more integrated medicines development aligning Scientific Advice, Clinical Trials approval and Good Clinical Practice oversight, harmonising the Network's response to innovation.
  - ensure convergence between Paediatric Investigation Plans and Scientific Advice.
- Create complementary and flexible advice mechanisms to support innovative product development in an ongoing and time-efficient manner; e.g., expand multi-stakeholder /multi-developer consultation platforms.
- Facilitate translation of innovation via a re-engineered Innovation Task Force and synergy with an evolving EU-Innovation Network platform.

3. Driving collaborative evidence generation – Improving the scientific quality of evaluations

3.1. Introductory background

- Emerging science and digital technology impacts data generation and evaluation:
  - Large scientific datasets require collaborative stakeholder involvement e.g., digital endpoints collected through wearable devices
  - Enriches benefit-risk assessment with patient data e.g., PROs, patient's preferences
  - Requires improved communication on the science underpinning regulatory output to patients and healthcare professionals
- A novel approach and strategy is needed to bring safe and effective innovative medicines faster to patients with unmet medical needs

3.2. Core recommendations

- Leverage novel **non-clinical models and 3Rs**
- Foster innovation in **clinical trials** (efficient design, biomarkers, endpoints)
- Expand **benefit-risk (B/R)** assessment and communication
- Invest in **special populations** initiatives
- Optimise capabilities in **modelling and simulation** and extrapolation
- Exploit **digital technology and artificial intelligence** in decision-making

3.3. Leverage novel non-clinical models and 3Rs

Underlying actions

- Stimulate developers to use novel pre-clinical models, including those adhering to the 3Rs
- Re-focus the role of the 3Rs working group to support method qualification
- Encourage implementation of IT tools to exploit the added value of SEND for the re-analyses of non-clinical studies to support both clinical trials authorisation (FIM) and risk minimisation across EU

3.4. Foster innovation in clinical trials

Underlying actions

- Drive adoption of practices that facilitate Clinical Trial Authorisation, GCP and HTA acceptance
- Critically assess the clinical value of new and emerging endpoints and their role in facilitating patients' access to new medicines
- Work with stakeholders to encourage collaborative clinical trials

- Collaborate with international partners in ongoing initiatives such as the Clinical Trial Transformation Initiative.

Case study

Establishment of new endpoints for drug development

Qualification of Stride Velocity 95th Centile measured by a wearable device as outcome measurement in Duchenne muscular dystrophy ➔ acceptability as secondary endpoint for regulatory decision making

Patient-relevant ✓
Use of digital data ✓

Draft guidance for public consultation (until 30 November 2018) ➔ input from HTA/payers invited

Other examples: PUCA index; Dopamine transporter imaging to identify early PD patients

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

20 September 2018
EMA/CHMP/SAWP/527447/2018
Product Development Scientific Support Department

Draft qualification opinion on stride velocity 95th centile as a secondary endpoint in Duchenne Muscular Dystrophy measured by a valid and suitable wearable device*

Draft agreed by Scientific Advice Working Party	12 April 2018
Adopted by CHMP for release for consultation	26 April 2018
Start of public consultation	21 September 2018
End of consultation (deadline for comments)	30 November 2018

Comments should be provided using this template. The completed comments form should be sent to Qualification@ema.europa.eu

Keywords	Activity monitor, Duchenne Muscular Dystrophy (DMD), Real World Data, Stride Velocity, Ambulation

3.5. Develop the regulatory framework for emerging clinical data generation

Underlying actions

- Develop methodology to incorporate clinical care data sources in regulatory decision-making, for example, pragmatic trials, IPD, e-HR, registries, prescriptions etc.
- Modernise the GCP regulatory oversight to enable decentralised models of clinical trials coupled with direct digital data accrual.
- Develop the capability within the network to assess complex datasets derived from the use of medicinal product technology such as wearables.
- Facilitate training and understanding of healthcare professionals and patients to access and participate effectively in such trials.

3.6. Expand benefit-risk assessment and communication

Underlying actions

- Expand the benefit-risk assessment with incorporation of patient preferences.
- Develop the capability to use Individual Patient Data across the scientific committees.
- Develop framework to classify uncertainties, coping strategies, and regulatory actions required. Apply structured benefit-risk assessment across committees to improve communication to the public.
- Improve communication on the regulatory framework for benefit-risk assessment with respect to therapeutic context, comparison vs. placebo or active-control, the patient's point of view, to facilitate HTA and payers decisions.
- Incorporate academic research into evidence-based benefit-risk communication.

3.7. Invest in special populations initiatives

Underlying actions

- Focus on speedy access for patient (sub-)populations in urgent need:
  - Identify areas of highest unmet needs where clinical care data can supplement clinical trial data.
  - Enhance multi-stakeholder advice in collaboration with patients, HCPs, payers and HTAs.
- Progress implementation of the paediatric medicines action plan.
- Progress implementation of the geriatric strategic plan.
- Develop a strategic initiative in maternal-foetal health.

3.8. Optimise capabilities in modelling and simulation and extrapolation

Underlying actions

- Enhance modelling and simulation and extrapolation use across the product lifecycle, develop methodology and leverage the outcome of EU projects e.g. the Drug Disease Model Resources (DDMoRe).
- Promote development of methods and standards via a multi-stakeholder platform. Continue to support international harmonisation efforts e.g. ICH E11(R1).
- Increase capability and redesign the operations of relevant working parties to ensure wider knowledge exchange within an enlarged pool of experts.

Case study

A Model-based Clinical Trial Simulation Tool in Amnestic Mild Cognitive Impairment

Through patient-level data integration, the consortium achieved the first-ever EMA qualification of a "model of disease progression and trial evaluation in mild and moderate Alzheimer disease".

CHMP considered it as a longitudinal model for describing changes in cognition in patients with mild-to-moderate AD, for use in trial designs.

This Clinical Trial Simulation tool is a prime example of integration of patient-level and literature- level data to achieve valid models for clinical trials design.

3.9. Exploit digital technology and artificial intelligence in decision-making

Underlying actions

- Establish a dedicated AI test "laboratory" to gain insight in the use of innovative digital technology to support data-driven decisions and its potential application across the key business processes of the Agency,
- Develop capacity and expertise across the network to engage with digital technology, artificial intelligence, cognitive computing, and its applications in the regulatory system

3.10. Summary

- Evolving science & digitalisation bring opportunities for non-clinical, clinical and post-marketing data generation
- Novel studies and methodologies to more accurately predict safety and efficacy
- Evidence generation and assessment can be enriched with patient input
- Evidence-based B-R communication is key to maximise impact of regulatory output
- Digitalisation paves the way for large datasets and advanced analytics to support decision-making
- EU Network needs to prepare for upcoming scientific challenges and implications (e.g. resources, data protection, cybersecurity)

4. Advancing patient centred access to medicines in partnership with healthcare systems

4.1. Core recommendations

Contribute to **HTAs' preparedness** and downstream decision-making for innovative medicines

Bridge from evaluation to access through collaboration with **Payers**

Reinforce **patient relevance** in evidence generation

Promote use of high quality **real world data** in decision-making

Develop network competencies and specialist collaborations to engage with **big data**

Deliver real-time **electronic Product Information** (ePI)

Promote **availability and the uptake of biosimilars** in healthcare systems

Further develop **external communications** to promote trust and confidence in the EU regulatory system

4.2. Contribute to HTAs' preparedness and downstream decision-making for innovative medicines

Underlying actions

- Ensure the evidence needed by HTAs and payers are incorporated early in drug development plans.
- Enable information exchange with HTAs to support bridging from benefit-risk to relative effectiveness assessment.
- Discuss with HTAs guidance and methodologies for evidence generation and review.
- Contribute to the identification of HTAs' priorities.
- Monitor the impact of decision-maker engagement through reviews of product-specific experience.

- In 2017 the European Cystic Fibrosis (CF) Society Patient Registry requested qualification. This was the first example undertaken by EMA in parallel with Health Technology Assessment Bodies.
- The CHMP considered the registry as an appropriate data source for post-authorisation studies to support regulatory decision making on medicines for the treatment of cystic fibrosis, and adopted the Context of Use for public consultation.

4.3. Bridge from evaluation to access through collaboration with Payers

Underlying actions

- Contribute to the preparedness of healthcare systems by creating opportunities for collaboration on horizon scanning.
- Enable involvement of payers' requirements in the prospective discussion of evidence generation plans.
- Clarify the treatment-eligible patient population included in the labelling, and its scientific rationale.
- Participate in discussions clarifying the concept of unmet medical need, and related initiatives.

4.4. Reinforce patients involvement in medicines development

Underlying actions

- Coordinate Agency's approach to patient reported outcomes (PROs). Update relevant clinical guidelines to include reference to PROs.
- While validating PROs, address patients' needs and leverage patients' expertise.
- Co-develop with EUnetHTA a core health-related quality-of-life PRO to implement in all trials and to bridge the gap with comparative effectiveness assessment.

4.5. Promote use of high quality real world data in decision-making

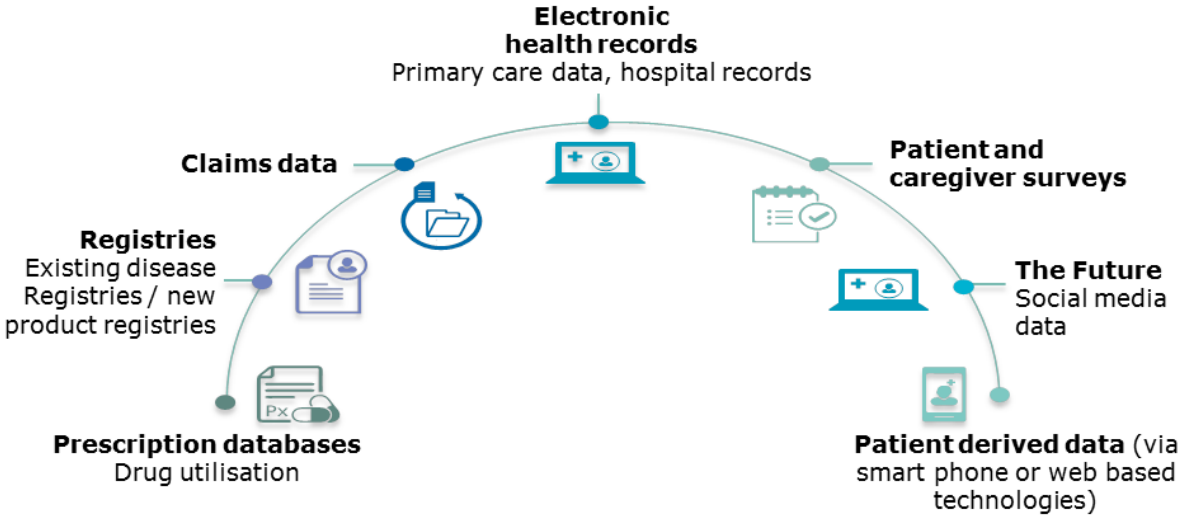
Underlying actions

- Create a sustainable, quality assured, flexible network delivering rapid access to and analysis of representative, longitudinal RWD throughout a product's lifecycle.
- Develop a capability that will enable the Agency to rapidly and securely access and analyse large amounts of healthcare data.
- Accelerate the implementation of a learning regulatory system based on electronic health records and other routinely collected RWD.

4.6. Develop network competences and specialist collaborations to engage with "big data"

Underlying actions

- Implement the core recommendations emerging from the EMA/HMA Taskforce addressing areas such as harmonisation of data standards, characterisation of data quality, and provision of regulatory guidance as to acceptability of evidence.
- Engage proactively with new stakeholders relevant to the Big Data Landscape; e.g., healthcare IT platforms to influence strategy and to ensure regulatory needs are highlighted.
- Invest in capacity building across the network to acquire new skills to engage with these emerging areas.



4.7. Deliver real-time electronic Product Information (ePI)

Underlying actions

- Enable real-time interactivity within the Summary of Product Characteristics and Patient Leaflet.
- In conjunction with Healthcare Providers and patients, develop a strategic plan to deliver ePI programme.
- Enable the reuse of structured medicinal product information by third parties through developing a standardised interface.
- Leverage new channels of social media communication.

4.8. Promote availability and uptake of biosimilars in healthcare systems

Underlying actions

- Further develop strategic communication campaigns to Healthcare Providers and patient organisations to reinforce trust and confidence.
- Enhance training of the network and non-EU regulators in the evaluation of biosimilars with extension to all therapeutic areas.
- Address regulatory challenges in manufacturing such as statistical assessment of Critical Quality Attributes in the comparability exercise and the evolution of multisource biologicals/biosimilars.

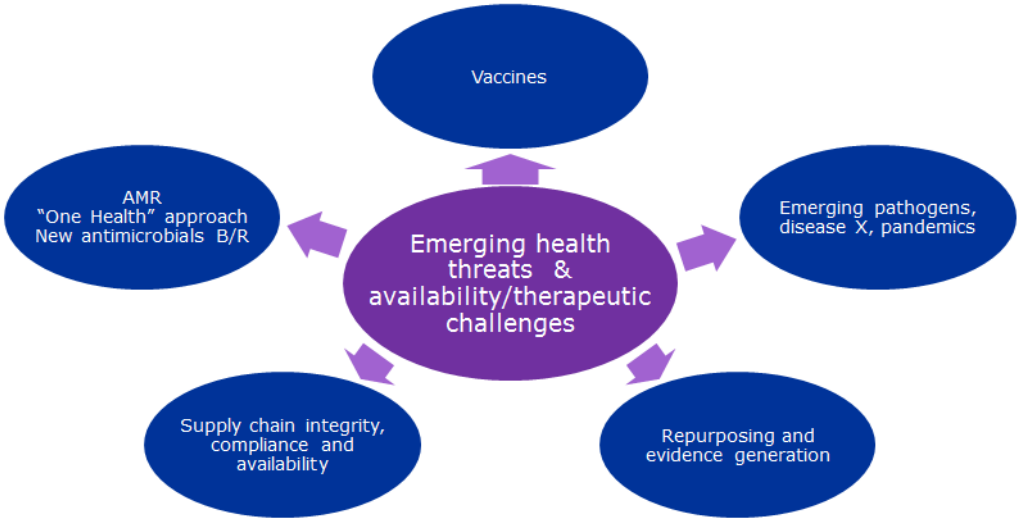
4.9. Further develop external communications to promote trust and confidence in the EU regulatory system

Underlying actions

- Develop content strategy, particularly in key public health areas and hot topics in regulatory science.
- Improve communication and outreach on the science underpinning regulatory output:
  - Enhance professional outreach through scientific publications & conferences.

  - Proactive approach to key public-health areas (e.g. vaccines, biosimilars).
  - Improved communications for patients, HTA and payers.
- Develop more targeted and evidence-based communication facilitated by updated web content and format.

5. Addressing emerging health threats and availability/therapeutic challenges



- EMA is committed to supporting global efforts to respond to existing and emerging public health threats.
- EMA's health threats preparedness strategy encompasses emergency situations, e.g., flu pandemics, outbreaks caused by emergent pathogens, and natural disasters.
- AMR is a natural phenomenon, but an accumulation of factors have transformed this into a serious threat to public health worldwide.
- EMA supports R&D, evaluation and B/R monitoring of antimicrobial agents and is fully committed to the EU Action Plan on AMR requiring a 'One Health' approach (i.e., from both human and veterinary standpoints).
- Unavailability of medicines in the EU impacts not only the supply chain but ultimately healthcare systems and end-users too.
- As causes of unavailability are multifactorial, the problem must be addressed by all stakeholders. EMA is committed to facilitating better prevention, identification, management and communication of shortages to ensure continuity of supply.
- Furthermore, EMA actively supports the initiative to develop a framework to repurpose (well-known/off-patent) drugs for new indications in areas of unmet medical need.

5.1. Core recommendations

- Implement EMA's health threats plan, ring-fence resources and refine preparedness approaches.
- Continue to support development of new antimicrobials and their alternatives.
- Promote global cooperation to anticipate and address supply challenges.
- Support innovative approaches to the development and post-authorisation monitoring of vaccines.
- Support the development and implementation of a repurposing framework.

5.2. Implement EMA's health threats plan, ring-fence resources and refine preparedness approaches.

Underlying actions

- Initiate and coordinate scientific & regulatory activities by involving all interested parties within the EMA and the EU Medicines Regulatory network (EMRN).
- What can we do in peace time to prepare for emerging pathogens, plus "disease X".
- Coordinate discussions on the development, authorisation and post-authorisation follow-up of relevant medicinal products.
- Effectively communicate relevant information to healthcare professionals, patients and regulatory partners.
- Support international partners and stakeholders involved in the R&D of medicinal products.
- Support MS and EC through providing advice and assessment of available data.

Case study: Ebola outbreak 2014-2016

- EMA Task Force established.
- Exploratory review of current investigational products for treatment/prevention of EVD.
- Identification of appropriate regulatory pathway.
- Rapid scientific advice (3-4 weeks).
- Interaction with international regulators.
- Interaction with academia and sponsors/investigators of CTs not funded by industry.
- Involvement of WHO and expert groups including joint review of CTs, e.g. vaccine trials in Africa and AVAREF.
- Support to EC, HSC and MSs; e.g., art. 5.3 referral on evidence from investigational agents for treatment of EVD.

5.3. Continue to support development of new antimicrobials and their alternatives

Underlying actions

- Evolve regulatory guidance and support alternative approaches to antimicrobial drug development.
- Support initiatives, such as the clinical trials network, to facilitate and accelerate clinical development.
- Encourage new business models that provide 'pull' incentives beyond the current "funding research" strategy in the EU.
- In collaboration with HTAs and payers, define the evidence requirements for new antibacterial medicines.
- Support the development and application of rapid diagnostic tools.

Case study: Clinical trial networks for infectious diseases

- Among the recommendations of the 2009 pandemic influenza, the ability to conduct rapidly clinical trials at the emergence of the threat was identified
- With respect to development of new agents to fight AMR, the burden posed by clinical trials has been identified as a bottleneck
- In response, several initiatives are underway (Wellcome Trust, IMI COMBACTE, FP7 COMPARE)
- Reconciliation of these efforts into a single robust platform is important
- Rapidity of EC/NCA approval of protocols/amendments essential
- Opportunity to define Master Protocols allowing standardised investigation of different agents
- Gain in efficiency if a single comparative group used whenever feasible
- New ECRAID project

5.4. Promote global cooperation to anticipate and address supply challenges

Underlying actions

- Implementation the working plan of the HMA/EMA Task Force on Availability of authorised medicines.
- Explore mechanisms to increase manufacturing capacity in Europe and internationally.
- Enhance collaboration with WHO in the area of supply disruptions due to manufacturing quality issues (e.g., vaccines).
- Enhance communication and knowledge exchange with international stakeholders on shortages due to quality and manufacturing issues.
- Develop common definitions and reporting mechanisms for supply shortages.

Case study: Testing for batch release of vaccines

- An Official Medicines Control Laboratory (OMCL) is a public institution performing laboratory testing of most vaccines on behalf of competent authorities.
- In much of the EU, vaccine lots must pass OMLC testing (as well as MAH release testing before marketing.
- Some potency assays in the Ph.Eur. (similar to WHO assays) are *in vivo* based (highly variable and time-consuming) despite an EU commitment to the 3Rs.
- This impacts availability of specific vaccine batches with potential supply disruption.
- New, faster and more precise tests should be explored by all stakeholders
- The need for multiple testing by different OMCLs in different parts of the world requires discussion.

5.5. Support innovative approaches to the development and post-authorisation monitoring of vaccines

Underlying actions

- Advance methods/tools (e.g., biomarkers) to characterise immune response and to support definition of vaccine quality attributes.
- Examine innovative clinical trial approaches to expedite vaccines development.
- Engage with public health authorities and National Immunisation Technical Advisory Groups to better inform vaccine decisions.
- Establish a platform for EU benefit/risk (B/R) monitoring of vaccines post-approval.
- Communicate proactively with key stakeholders on vaccine B/R using evidence-based tools to tackle vaccine hesitancy.

5.6. Support the development and implementation of a repurposing framework

Underlying actions

- Enhance regulatory advice on evidence generation and MAA submission.
- Frame suitability of third party data-pooling, relevant RWD and historical non-clinical datasets.
- Translate experience with EMA's registry pilot to guide RWD collection.
- Explore utility of low-intervention clinical trials for evidence generation.

6. Enabling and leveraging research and innovation in regulatory science

6.1. Introductory background

To catalyse and enable regulatory science and innovation to be translated into patient access to medicines in evolving healthcare systems, we must:

- apply cutting-edge regulatory science to the review and approval process;
- be continuously informed of scientific innovation relevant to regulatory decision-making, and;
- capitalise on EMA's framework for collaboration with academia to articulate regulatory needs and challenges.

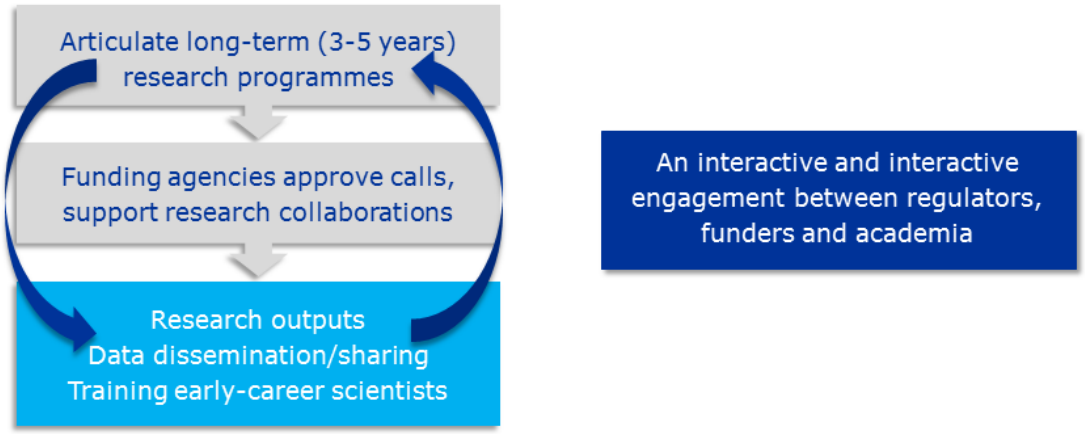
6.2. Core recommendations

- Develop network-led partnerships with academia to undertake fundamental research in strategic areas of regulatory science
- Leverage collaborations between academia and network scientists to address rapidly emerging regulatory science research questions
- Identify and enable access to the best expertise across Europe and internationally
- Disseminate and share knowledge, expertise and innovation across the regulatory network and to its stakeholders

6.3. Develop network-led partnerships with academia to undertake fundamental research in strategic areas of regulatory science

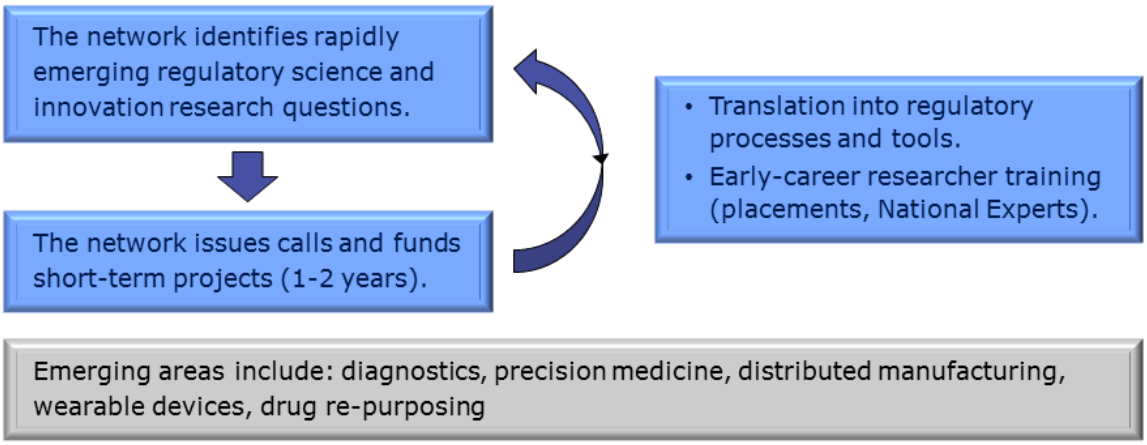
Underlying actions

- Identify, in consultation with academia and relevant stakeholders, fundamental research topics in strategic areas of regulatory science
- Proactively engage with DG Research & Innovation, DG-SANTE, IMI and Member State funding agencies to propose and issue calls to establish research collaborations in regulatory science and innovation.
- Strategically important research areas include: PROs, cell-based therapies, omics-based diagnostics, drug-device combinations, clinical trial design, modelling and simulation, real-world evidence, Big Data, and artificial intelligence.



6.4. Leverage collaborations between academia and network scientists to address rapidly emerging regulatory science research questions

Underlying actions



Case Study: Examples of Regulatory Science research interactions

The Dutch Medicines Evaluation Board (MEB)
- Projects in collaboration with academia are linked to IMI and Horizon 2020 programmes (4% of annual budget investment).

The Federal Institute for Drugs and Medical Devices (BfArM)
- Research on important and contemporary focal points related to marketing authorisation of medicinal products.
- Collaboration with national, EU and international research centres and universities.

The Paul-Ehrlich-Institut (PEI)
- Strategic vision: to exploit synergy of regulation and research and set new standards in the field of vaccines/biomedicines.
- Close interactions with leading research institutes, academia and international organisations such as WHO.

Regulatory Science Centres
- Utrecht/WHO Collaborating Centre for Pharmaceutical Policy and Regulation.
- FDA-funded Centres of Excellence in Regulatory Science & Innovation (CERSIs).

The European Food Safety Agency (EFSA)
- EFSA promotes advances, key to its core business, and encourages cooperation between researchers.
- Supports innovation in regulatory science and leveraging expertise across the EU.

6.5. Identify and enable access to the best expertise across Europe and internationally

Underlying actions

- Invest in a knowledge management system to track innovation, share information, enable linkages and create new insights across the product lifecycle.
- Facilitate more flexible access to expertise in regulatory science and increasingly specialised areas of innovation.

6.6. Disseminate and share knowledge, expertise and innovation across the regulatory network and to its stakeholders

Underlying actions

- Engage with academia to develop regulatory training modules, such as describing innovation of new medicines and their progression from laboratory to patient.
- Increase the prominence of medicinal product development and the regulatory process within undergraduate and postgraduate education.
- Conduct horizon scanning in key areas of innovation via collaborations between academia and the EU-Innovation Network and ICMRA.
- Drive a data-sharing culture to foster open science which is mutually beneficial for all stakeholders.

Case studies: Examples of EMA-led research and training programmes

The European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCePP)

- Facilitates conduct of high quality, multi-centre, independent post-authorisation studies focused on observational research.
- Assembles expertise and resources in pharmacoepidemiology and pharmacovigilance across Europe and providies a platform for collaborations.
- Develops and maintains methodological standards and governance principles for research in pharmacovigilance and pharmacoepidemiology.

The European Network of Paediatric Research at the European Medicines Agency (Enpr-EMA)

- A network of research networks, investigators and centres with recognised expertise in performing clinical studies in children.
- Enpr-EMA's principle objective is to facilitate studies to increase availability of medicinal products authorised for use in the paediatric population.

The EU Network Training Centre (EU-NTC)

- To disseminate and share good scientific and regulatory practice across the EU medicines agencies regulatory network
- Provision of high-quality and relevant training shared through a European central platform.