

Sustainability Update 2016

Securing our future: Our sustainability journey



AstraZeneca Sustainability Update 2016

At AstraZeneca, we want to be valued and trusted by our stakeholders as a source of great medicines over the long term. Our sustainability commitments are driven by our Purpose and Values and underpin our business model to support the delivery of our business strategy.

Contents

Sustainability at AstraZeneca

About us	2
Our sustainability strategy	3
Our global contribution	5
Goals for securing our future	8
Benchmarking and recognition	12
Materiality	13
Stakeholder engagement	15
Accountable and inclusive governance	19
Sustainability foundations	21

Access to healthcare

Our approach	2
Sustainable access	4
Healthy Heart Africa	6
Health systems development	8
Intellectual property	10

Environmental protection

Our approach	2
Minimising our impacts	6
Protecting natural resources	10
Environmental compliance	23
Pharmaceuticals in the environment	24
About our reporting	26

Ethics and transparency

Our approach	2
Compliance	3
Supply chain management	7
Patient safety and product security	11
Bioethics	14
Antimicrobial resistance	22

Inside

In this update, we provide an overview of our new sustainability strategy for 2017–2025 and the progress we are making to embed sustainability more deeply into the DNA of our organisation.

About this update

To drive continuous improvement across our business, we set targets that are designed to stretch what we achieve. This 2016 update describes our progress against these targets for the period 1 January 2016 to 31 December 2016. All our business activities worldwide are in scope regardless of their function, unless stated otherwise.

Go online for more information on our policies and approach.

www.astrazeneca.com/sustainability

Read our [2016 Annual Report](#) to find out more about our governance and risk management approach.

Welcome

For AstraZeneca, sustainability means operating in a way that recognises the interconnection between business growth, the needs of society and the importance of protecting our planet for the generations to come.

A new roadmap for sustainability

2016 was a crucial year in the second stage of our strategic journey as we manage a transitional phase of patent expiries, drive our Growth Platforms and bring our new medicines to patients. Our Annual Report and Form 20-F Information give the full story behind the emergence of the new AstraZeneca.

This year, we also took important steps to further embed sustainability into our DNA. At the centre of our focus is our new sustainability strategy, 'Securing our future', which was agreed by the Senior Executive Team in November. Our sustainability strategy drives our enhanced efforts, sets a clear path for the years ahead and identifies the ambitious commitments and targets we have set ourselves. As we look ahead to pursuing our science-led strategy in the years up to 2025, we want to ensure that we broaden access to healthcare, minimise our environmental footprint, and ensure ethics and transparency underpin everything we do.

In this update we provide an overview of our sustainability strategy and how we are embedding sustainability into the organisation in line with our Purpose and Values.

Recognition of our progress

As we begin to implement our new sustainability strategy, it is particularly encouraging to have received external recognition in 2016 for the progress we have already made. For example, we were named a sustainability leader within the Pharmaceuticals, Biotechnology and Life Sciences industry of the Dow Jones Sustainability Index (DJSI). Our score of 86% was an improvement of two points over 2015 and positions us just three percentage points behind the industry leader. We were also awarded an A List ranking for climate change, water stewardship and supplier climate change by the non-profit global disclosure organisation, CDP. Finally, we were named the biggest riser in the biennial Access to Medicine

Index, moving from 15th place in 2014 to 7th in 2016. We received particular recognition for our efforts to improve access to our innovative medicines and to healthcare more generally, with multiple best practices and innovations highlighted in the report.

Priority programmes

For us, increasing access to healthcare spans the spectrum of activity from the disease prevention activities of our Young Health Programme to Healthy Heart Africa, which enables greater access to hypertension medication. A highlight in 2016 was our partnership with the US President's Emergency Plan for AIDS Relief to expand access to HIV/AIDS and hypertension services even further, beginning in Kenya. Our access work also includes our new pricing strategy and affordability programmes in countries such as China and Brazil.

Our environmental efforts focus on decreasing our impact on the environment across all our activities, with particular emphasis on carbon emissions, waste and water use. We are making good progress across our targets, but decoupling waste generation from business and employment growth remains a challenge. It is an area that will require both innovation and investment to achieve our targets.

We also continue to apply high standards of bioethics to our research activity, whether conducted by us or by third parties on our behalf. In 2016, we implemented new global standards which give patients and researchers more information about our research, part of our commitment to improving the transparency of our clinical research.

A broader commitment

The focus on our priority areas does not diminish our commitment to other important areas of sustainability. These include further aligning our efforts with the UN Sustainable Development Goals and working to integrate our targets into day-to-day business activities. We are also committed to the United Nations Global Compact and its ten principles. In 2016, we conducted our third global Human Rights Labour Review, which focuses on the International Labour Organization's core themes, including freedom of association and collective bargaining, child labour, discrimination, working hours and wages. The results were encouraging and we are now taking action to address areas where we have room to improve.

“

2017 is set to be a pivotal year as we bring new medicines to patients across the globe. It is an exciting time as we approach a critical inflection point: a return to long-term growth built on the firm foundations of a science-led strategy and with sustainability being embedded into the DNA of our company.”

Making great progress, together

Embedding sustainability requires each and every one of us at AstraZeneca to play their part. It is why I am very grateful to our employees for everything they have done, particularly given the challenges faced in this stage of our strategic journey.

I am also grateful to all those stakeholders who contributed to the development of our new sustainability strategy, particularly the members of our Sustainability Advisory Board for their insight and challenge over the past year. As we have worked to develop our strategy, they have influenced, guided and endorsed our approach.

A turning point in our journey

2017 is set to be a pivotal year as we bring new medicines to patients across the globe. It is an exciting time as we approach a critical inflection point: a return to long-term growth built on the firm foundations of a science-led strategy and with sustainability being embedded into the DNA of our company.

Pascal Soriot, Executive Director and CEO, AstraZeneca



Sustainability at AstraZeneca

Goals for securing our future

Accountable and inclusive governance

About us

Benchmarking and recognition

Sustainability foundations

Our sustainability strategy

Materiality

Our global contribution

Stakeholder engagement

Sustainability at AstraZeneca

As a global biopharmaceutical business, we want to be valued and trusted by our stakeholders as a source of great medicines over the long term. We are committed to operating in a way that recognises the interconnection between business growth, the needs of society and the limitations of our planet. Our sustainability commitments, which are driven by our Purpose and Values, underpin our business model and support the delivery of our business strategy.



Access to healthcare

We aim to improve access to healthcare around the world by tailoring our programmes to the communities they will serve. In some cases this means looking at pricing, in others it involves overcoming other barriers to healthcare.

2.7 million

patients screened for hypertension in Kenya as part of our Healthy Heart Africa programme

+1.6 million

young people engaged through our Young Health Programme since 2010

Highest climber

from 15th in 2014 to 7th in 2016 in the Access to Medicine Foundation global index



Environmental protection

As we push the boundaries of science and develop new medicines, we know how important it is to follow the science and conserve natural resources to protect the planet.

5%

cut in emissions down to 1,657 ktCO₂e since 2015, exceeding our 2016 target

A List

ranking for climate change and water stewardship by CDP

100%

of AstraZeneca supply sites demonstrated safe active pharmaceutical ingredient (API) discharges



Ethics and transparency

We want to be valued for the medicines we provide and trusted for the way we work. That means demonstrating ethical business practices and a high level of integrity in everything we do.

8,977

supplier assessments carried out in 2016

100%

of active employees trained on the Code of Conduct

Signed

the Davos Declaration on Combating Antimicrobial Resistance with over 100 other companies



Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

About us

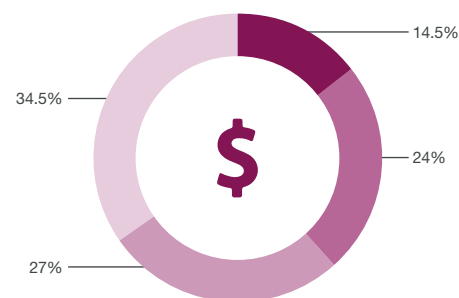
We are a global biopharmaceutical business delivering medicines to patients through innovative science and excellence in development and commercialisation.

Our Purpose

We push the boundaries of science to deliver life-changing medicines

\$23 billion

Total Revenue in 2016



Global commercial presence with strength in Emerging Markets

Product Sales:

Established Rest Of World ¹	\$3,096m
Europe	\$5,064m
Emerging Markets	\$5,794m
US	\$7,365m

Our people

59,700

employees globally

92%

of employees feel able to bring our Values to life in their daily work

R&D

Around 8,400

employees co-locating around three strategic R&D centres: Cambridge, UK; Gaithersburg, US and Gothenburg, Sweden

\$5,890 million

invested in our R&D organisation in 2016

Manufacturing

Approx. 12,200

people employed at 31 Operations sites in 18 countries

132

projects in our pipeline, of which 120 are in the clinical phase of development



¹ Established Rest Of World comprises Japan, Canada, Australia and New Zealand.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Our sustainability strategy

To achieve long-term success, we aim to deliver our business strategy in a way that delivers wider value to society and the planet. To do this, we focus on maintaining ethics and transparency in everything we do, increasing access to healthcare for more people and minimising the environmental impact of our products and processes.

In 2016, we embarked on a robust process to re-focus our sustainability programme and embed it deeper into our core business. We worked with an independent think-tank to complete a [sustainability materiality assessment](#) to shape our priorities. It identified 27 sustainability issues that are most relevant to AstraZeneca. These became the basis for benchmarking analysis, engagement with external and internal stakeholders and an internal review that examined our areas of strength, weakness and opportunity. We undertook a process to begin aligning our new priorities and commitments with the [UN Sustainable Development Goals](#).

Our new strategy has been shaped through broad engagement with stakeholders and sustainability experts including socially responsible investors, non-governmental organisations (NGOs), trade organisations and others.

Securing our future priorities for 2017–2025



*Access to
healthcare*



*Environmental
protection*



*Ethics and
transparency*

Given their alignment with our business strategy, we have identified these three priorities as the areas that will allow us to have the most impact in creating value for our patients, our company, broader society and the planet.

Our focus on these areas does not diminish our commitment to other areas of our sustainability agenda, which we refer to as our Sustainability foundations and which include:

- > Ensuring diversity, in its broadest sense, is reflected in our leadership and people strategies
- > Continuing to develop and embed a consistent approach to human rights across our worldwide activities
- > Promoting the safety, health and wellbeing of all our people worldwide.

[See the full picture of our strategy and priorities >](#)



What science can do

At AstraZeneca, we believe that science should be the driver for everything we do and the design and delivery of our sustainability strategy is no exception. Science can change the way we see the world, help us understand our challenges and unlock our opportunities. It ensures we monitor and manage our social, economic and environmental impacts.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Securing our future 2017–2025

Our strategic business priorities

1

Achieve scientific leadership

2

Return to growth

3

Be a great place to work

Our Purpose

We push the boundaries of science to deliver life-changing medicines.

Our Values



We follow the science



We put patients first



We play to win



We do the right thing



We are entrepreneurial

Our sustainability priorities



Access to healthcare

Through collaboration and innovation we strive to address global health issues by:

- > Exploring innovative ways of increasing access to healthcare for more people, tailored to meet differing patient needs and circumstances
- > Making a positive contribution to our local communities around the world, through community support programmes consistent with improving health and promoting science.



Environmental protection

We follow the science to protect the planet by:

- > Managing our impact on the environment, across all our activities, with a particular focus on greenhouse gas (GHG) emissions, waste and water use
- > Minimising the environmental impact of our products.



Ethics and transparency

We will maintain integrity in everything we do by:

- > Working to consistent global standards of ethical sales and marketing practices in all our markets
- > Working only with suppliers who have standards consistent with our own
- > Working on continued transparency with our data in clinical trials
- > Enhancing the understanding of how our medicines work and benefit patients
- > Applying sound bioethics to all our work
- > Maintaining a strong focus on patient safety.

Sustainability foundations

Beyond our three priorities, we will continue to ensure strong performance in core areas such as: diversity; human rights; workplace health and safety; product quality and security; and public policy and advocacy.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Our global contribution

Launched in September 2015, the United Nations 2030 Agenda for Sustainable Development is a global action plan for people, planet and prosperity. As a healthcare company, we have an important role in contributing to the delivery of the UN Sustainable Development Goals (SDGs).

Below and throughout the report we highlight some of the ways we are currently contributing to delivering the SDGs. As we move forward with our strategy we will look to deepen our alignment and commitment to the SDGs.



Ensure healthy lives and promote well-being for all at all ages

Our contribution: Our three main therapy areas focus on: eliminating cancer as a cause of death through scientific discovery and collaborations; addressing multiple risk factors to reduce cardiovascular morbidity, mortality and organ damage; and transforming the treatment of respiratory disease.

Increasing [access to healthcare](#) for more people is one of our strategic priorities and a key focus of our sustainability strategy. We tailor our activity according to local issues, making it easier for people to afford our medicines. We also focus on developing strong collaborations with

a wide range of partners to strengthen healthcare capabilities, particularly in developing economies.

Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.

A key target of this SDG is to reduce premature mortality from non-communicable diseases (NCDs) through prevention and treatment by one third by 2030. Launched in October 2014, Healthy Heart Africa is our flagship programme which aims to help combat NCDs. It has already delivered over 2 million hypertension screenings in the community and local healthcare facilities. In 2016, we

expanded into Kenya and launched Phase III of the programme in India with commitments to 2020. To improve access to our medicines, we have been exploring how we can use economic data to link an individual's ability to pay with the price of our medicines, supporting our work with lifestyle and disease awareness advice. This latest approach builds on our [Faz Bem](#) programme, which has helped some 2.5 million patients since it was launched in 2008. We have also reached more than 1.6 million people and worked with over 30 expert organisations through our Young Health Programme (YHP), which targets the four most prevalent risk factors for NCDs: tobacco use, harmful use of alcohol, lack of exercise and unhealthy eating.



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Our contribution: As a company built on science and the skills of our scientists, we've supported science, technology, engineering and maths

(STEM) education since 2014 through our [partnership with Career Ready](#) in the UK and we aim to inspire more young people around the world to take up STEM education and careers. Bahija Jallal, Executive Vice-President, MedImmune, is president of the [Association for Women in Science](#), the largest multi-disciplinary organisation

for women in STEM. In 2016, she gave a [speech](#) at the second annual International Day of Women and Girls in Science conference in New York (also relates to SDG 5 Gender Equality).



Achieve gender equality and empower all women and girls

Our contribution: We continue to focus on diversity and inclusion with a goal to increase the presence of women on our leadership teams. Women comprise 49.9% of our global workforce and, in 2016, there were

three women on our Board (30%). [Representation of women in senior roles](#) increased to 43.2% in 2016. To ensure our senior leadership reflects our diverse geographic footprint, we track the country of origin of senior leaders and reflect this in our diversity targets. In 2016, 14.5% of leadership roles that reported to our Senior

Executive Team (SET) had a country of origin that is an Emerging Market or Japan (up from 5% in 2012). In Europe, we have piloted a European Women as Leaders programme to support the accelerated development of high-potential women in AstraZeneca.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement



Ensure availability and sustainable management of water and sanitation

Our contribution: We are committed to achieving scientific leadership to help our industry and the scientific community understand the risks of pharmaceuticals in the environment. This includes setting safe thresholds

for discharges of APIs and leading industry understanding of the impacts of pharmaceuticals on the aquatic environment. We completed 81 supplier assessments to ensure safe discharges of APIs across our global supply chain in 2016 and 100% of AstraZeneca supply sites demonstrated safe API discharges. We recognise the need to ensure water sources are used

responsibly and equitably, as a shared public resource. Managing our impact on water resources in one of the key aspects of our environmental strategy. This year, we were included on CDP's Water A List, placing us among the leading 25 companies in the world for water stewardship.



Ensure access to affordable, reliable, sustainable and modern energy for all

Our contribution: Our commitment is to source 100% renewable power globally by 2025. We are committed

to RE100. Compared with 2015, our sourcing of certified zero carbon power from renewable sources quadrupled in 2016 and accounted for 58% of our global imported power. Our commitment is also inspiring our sites to substitute imported energy

with on-site renewables, such as at Macclesfield in the UK and at Frederick in the US. Further on-site projects are planned in the US and Australia in 2017.



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Our contribution: Being a great place to work is one of our three strategic priorities. We directly employ around

59,700 people globally and we are dedicated to building an inclusive, open and trusting organisation that embraces the skills, knowledge and unique abilities of our employees. Ensuring there is no modern slavery or human trafficking in any part of our business or supply chain is a key commitment and our standards comply

with all national and international laws, regulations and codes for preventing trafficking and slavery. We are an accredited Living Wage Employer in the UK and we partner with others to address manufacturing skills gaps at the industry level, for example our partnership with Tianjin University in China.



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Our contribution: Our science-led innovation strategy aims to push the boundaries of science to create life-changing medicines. In 2016, \$154 billion was invested in pharmaceutical R&D worldwide and we made a significant contribution to

this by accelerating our \$5.9 billion investment in key R&D programmes. We are focused on delivering innovative medicines by investing in Emerging Market capabilities, such as China and other leading markets.



Ensure sustainable consumption and production patterns

Our contribution: We are committed to effective environmental management across the product life cycle. We take a whole life-cycle view and work with

all those involved throughout the lifespan of a product – from discovery and development through to patient use and end-of-life disposal. In 2016, we committed around \$25 million to natural resource efficiency projects to reduce environmental impacts at our sites. These projects are expected

to accelerate our resource efficiency performance. We plan to invest another \$22 million in resource efficiency in 2017 and will ensure all sites have natural resource plans that align with our environmental targets.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement



Take urgent action to combat climate change and its impacts

Our contribution: Climate change has many negative health impacts for society. We make it a priority to contribute towards the united global effort that involves business, governments, NGOs and communities working together. Measuring and reporting emissions, and setting and achieving science-based targets to manage our direct and indirect contribution, are central to

our approach. We are making good progress: in 2016, we were listed on the Climate A List by CDP, placing us among the top 9% of corporations participating in CDP's climate change programme. Our efforts to measure and manage our supply chain footprint also led to our inclusion in CDP's Supply Chain Climate A List and, as of October 2016, AstraZeneca was one of only four FTSE 350 companies to have had its climate change targets approved by the Science Based Targets (SBT) initiative.

The extra energy in the climate system is likely to increase the incidence and severity of some extreme weather events. As well as managing our impacts, we partner with others such as the British Red Cross to respond to natural catastrophes when and where emergency medical need is greatest. In 2016, we donated \$200,000 to the Kuala Lumpur Emergency Response Unit and \$25,000 towards hygiene kits following Hurricane Matthew.



Protect, restore and promote sustainable use of terrestrial ecosystems and halt biodiversity loss

Our contribution: Although our land holdings are relatively small, we manage our sites to support sustainable ecosystems for the benefit of our employees, the communities that surround them and wildlife. We actively support the principles of the

Convention on Biological Diversity and we continue to apply best practice, actively managing biodiversity on our sites through local biodiversity action plans. We sometimes use genetic resources that occur naturally on the planet to help deliver life-changing medicines. We acknowledge our responsibilities under the Nagoya Protocol to access and use this material in a transparent and fair way. In 2016, we joined the Prince of

Wales at the Cambridge Institute for Sustainability Leadership's (CISL's) Natural Capital Leaders Platform. We are exploring the value that Natural Capital Assessments might bring to our business decisions by integrating the financial impacts of our investments that are associated with natural capital into our financial analysis. We will report on the outcomes of our trial in 2017.



Promote peaceful and inclusive societies and build effective, accountable and inclusive institutions at all levels

Our contribution: We aim to lead our industry in demonstrating ethical business practices and integrity in everything we do. It is why human rights, safety and health, and business ethics are core to AstraZeneca's

approach to sustainability. We are committed to the United Nations Global Compact and its ten principles. In 2016, we conducted our third global Human Rights labour review, which focuses on the International Labour Organization's (ILO's) core themes. We also strive to deliver consistently high standards of sales and marketing practices worldwide and we only work with those third parties who

embrace the same high standards of ethical behaviour as our own. We do not tolerate any form of bribery and corruption, either among our own employees or the third parties we work with.



Partnership for the goals

Our contribution: We cannot solve these challenges alone, so we strive to develop long-term, collaborative partnerships that support our own sustainability commitments and help to deliver the SDGs.

Examples of the global partnerships and initiatives we are involved in include:





- > Healthy Heart Africa partnerships including with the Federal Ministry of Health in Ethiopia and the US President's Emergency Plan for AIDS Relief (PEPFAR)
- > YHP and other coordinating groups that promote adolescent health within the broader NCD agenda
- > Partnerships for climate change, including the SBT initiative and RE100
- > Industry bodies such as the Coalition for Sustainable Pharmaceuticals and Medical Devices and the Pharmaceutical Supply Chain Initiative
- > UN Global Compact.

Goals for securing our future

As we embark on our new strategy, our sustainability targets aim to drive continuous improvement and stretch what we achieve across our business. This year, we made good progress in a number of areas. In others, we faced challenges and we continue to look for ways to expand our positive impact.

Here, we provide an overview of our approach and the progress we have made against our commitments in 2016.

Key





-  Target exceeded
-  Full target achieved
-  Ongoing progress
-  Target not achieved, some progress



Our access to healthcare strategy aims to increase access to healthcare for under-served patient populations and comprises three elements: providing high-quality, effective and appropriate medicines to those who need them; improving affordability, particularly among the growing middle class in Emerging Markets; bringing down healthcare barriers, particularly in developing countries.

Our strategy helps us to address affordability and other healthcare barriers, while ensuring we continue to provide high-quality medicines to those who need them. We are reviewing our goals in the light of the Access to Medicine Index Report and our new strategy.

Access to healthcare

Goals	Target progress	Progress highlights
Expand sustainable patient access to our medicines to reach 3 million patients by 2016		4.49 million patients in Emerging Markets served by patient access programmes
Young Health Programme After exceeding initial goal to reach 1 million people through the Young Health Programme by 2015, aim to renew in five markets and expand into three markets by 2018		Renewed in Canada, Germany, China and India and expanded into Kenya Total reach in 2016 of 166,000 and 1.6 million youth since 2010 Proposals for expansion are in development for Brazil and Australia and for renewal in Portugal
Healthy Heart Africa Reach 10 million hypertensive patients across Sub-Saharan Africa by 2025		Since 2014, we have conducted over 2.7 million screenings and started treatment for over 100,000 hypertensive patients
Healthy Heart Africa Screen over 1.4 million people for hypertension by end of 2016		

For more information please see [Access to healthcare](#)



We follow the science to protect the planet. We are committed to operating in a way that respects and protects our climate and natural resources through a science-based approach that drives continuous improvement across our value chain. In 2016, we embarked on a new strategy that set ambitious commitments up until 2025:

Protecting natural resources by improving the environmental performance of our operations and supply chain, including reducing our GHG footprint. This includes limiting our 2025 extended operational GHG footprint to 2015 levels.

Ensuring the environmental safety of our products by reducing environmental impacts throughout the entire life cycle of our medicines, including understanding and minimising the long-term effects of PIE.

Key



Target exceeded



Full target achieved



Ongoing progress



Target not achieved, some progress

Environmental protection

Goals	Target progress	Progress highlights
Reduce operational GHG footprint ² by 2% (against a 2015 baseline) to 1,708,335 tonnes CO ₂ e by 2016		Our operational GHG footprint totalled 1,656,917 metric tonnes in 2016, a 5% reduction from our 2015 baseline
Have our climate change targets approved by the SBT initiative by 2016		We attained verification that our climate change targets are science based
Set out a target for 100% renewable power by 2016		We launched our commitment to 100% renewable power consumption globally by 2025 and in the US and Europe by 2020 through the RE100 initiative
Publicly disclose information associated with our climate change performance by 2016		We increased the scope of our operational carbon footprint reporting in 2016
Reduce waste generation by 2% (against a 2015 baseline) to 36,760 tonnes by 2016		In 2016, our total waste was 37,923 metric tonnes, a 1% increase on 2015
Reduce water use by 2% to 4.13 million m ³ (against a 2015 baseline) by 2016		In 2016, our water footprint was 3.99 million m ³ , a 5% reduction compared with 2015
90% of API syntheses meet resource efficiency targets at launch by 2016		100% of API syntheses (avibactam) met launch target in 2016. In addition we achieved 9% reduction in our resource efficiency metric, process mass intensity (PMI), across the portfolio
Ensure effective environmental management of our products from pre-launch through to product end-of-life by 2016		Safe API discharges were confirmed for 100% of our own and >90% globally managed supplier sites in 2016 We completed a comprehensive review for our EcoPharmacoVigilance programme

For more information please see [Environmental protection](#)





² Extended operational footprint includes: Scope 1, Scope 2 and some Scope 3 emissions. It covers energy use, road fleet, process emissions, waste incineration, business air travel, primary distribution (freight and logistics), first tier outsourced supply of API and Formulation & Packing (90% of spend, energy only) and patient use of pressurised metered dose inhalers (pMDIs), measured in tonnes carbon dioxide equivalent (tCO₂e).








As a global, science-led biopharmaceutical business, we have a responsibility to hold ourselves to high ethical standards. We strive for high levels of integrity in everything we do, whether it's our approach to bioethics, including patient safety, the way we treat the participants in our clinical trials and the use of animals in science, or our approach to human rights, or the scrutiny of our supply chain to ensure our suppliers meet our high standards.

Our performance in 2016 against the goals we set ourselves is described opposite. We are also reviewing our commitments and goals and strengthening our strategy in key areas such as our supply chain.

Key

-  Target exceeded
-  Full target achieved
-  Ongoing progress
-  Target not achieved, some progress

Ethics and transparency

Goals	Target progress	Progress highlights
All active employees to be trained on our Code of Conduct by 2016		100% of active employees trained on the Code of Conduct in 2016 Achieved a 100% score for Code of Conduct from the Dow Jones Sustainability Index
Communicate clear policies to employees by 2016		Updated our annual Code of Conduct training to provide greater clarity and simplicity for the business as well as improved accessibility via mobile devices since 2016
Ensure employees can raise concerns and that they are properly addressed by 2016		320 reports of alleged compliance breaches or other ethical concerns made through the AZethics Helpline in 2016
Meet high ethical standards across all our procurement activities and decisions worldwide by 2016		Conducted 66 high-risk supplier audits in 2016
Collate a suite of 'Culture of Care' pledges from all of our R&D sites, demonstrating our daily commitment to high standards of animal welfare by 2016		Two winners of a newly introduced 'Culture of Care' award recognising the day-to-day commitment to excellence in animal care and welfare, including one attracting the attention of the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) for further development as a project initiative
Continue to promote scientific excellence in animal care and use through a programme of global roundtable workshops by 2016		In 2016, we prepared to meet the Redacted Clinical Report Package of the European Medicines Agency (EMA) Publication of Clinical Data Policy. The policy is designed to further improve transparency and access to research information

For more information please see [Ethics and transparency](#)



We are dedicated to creating an inclusive, open and trusting organisation that embraces the skills, knowledge and unique abilities of our employees who interact with thousands of suppliers and partners all over the world.

Our Sustainability foundations reflect our abiding commitment to people: our staff, patients, suppliers and wider stakeholders. Our targets reflect our commitment to workplace diversity and inclusion, health and safety and employee engagement.

Key

- Target exceeded
- Full target achieved
- Ongoing progress
- Target not achieved, some progress

Sustainability foundations

Goals	Target progress	Progress highlights
Increase female representation at Global Career Level F and above from 42% (2015) to 42.5% by 2016		We exceeded this target, reaching 43.2% Our target for women in senior roles by end of 2017 is 43.5%
Increase representation of employees from Emerging Markets and Japan in roles that report to our SET to at least 16% by 2016		Representation was 14.5% at the end of 2016
75% reduction in total injury rate by 2025 from 2015 baseline		Total injury rate of 1.45 in 2016, exceeding our annual target of 1.64
Reduce injury rate to 1.64 in 2016, against the 2015 baseline of 1.73 (reportable injuries per million hours worked)		
55% reduction in collisions per million kilometres driven by 2025		3.62 collisions per million kilometres driven in 2016, exceeding our annual target of 4.00
Reduce the collision rate to 4.00 in 2016, against the baseline of 4.13 in 2015 (collisions per million kilometres driven)		
Develop a health and wellbeing framework for launch in 2017		Framework development on track for 2017 launch
80% of sites/marketing companies have all four Essential Health Activities ³ by 2025		
Achieve target (83%) employee survey score in 2016 for AstraZeneca as a great place to work		The outcome of our December 2016 Pulse survey was 74% ⁴
Improve employee perception of the opportunities for personal development and growth in AstraZeneca to 77% in 2016		The outcome of our December 2016 Pulse survey was 73% ⁴
Deliver further organisational simplification (target, relevant Pulse survey score to be over 62%) by 2016		The outcome of our December 2016 Pulse survey was 59% ⁴
All employees have a development plan in place by end Q3 (target 95%) by 2016		The outcome in December 2016 was that 93% of employees had a development plan in place
All employees to have had at least one quality development discussion with their line manager by the end of Q3 (the target was over 85%) by 2016		The outcome of our December 2016 Pulse survey was 82%

For more information please see [Sustainability foundations](#)

³Healthy eating and drinking, tobacco cessation, physical fitness, workplace pressure management.

⁴The decline in scores in our most recent employee survey reflects the impact of reshaping the business. We are focused on improving performance in those areas identified as important drivers of employee engagement, such as people development and line manager communication.

Benchmarking and recognition

We are proud of the external recognition we received for our work in 2016. The feedback we receive helps us identify gaps and continually strengthen our strategy and performance.



CDP

Climate A List: In the top 9% of corporations participating in CDP's climate change programme in recognition of our actions to reduce emissions and mitigate climate change.

As of October 2016, one of only four FTSE 350 companies to have received approval of our science-based targets to reduce carbon footprint.

Water A List: Among the leading 25 companies for our commitment to transparency around environmental risks and for pursuing best practice.

Supplier Climate A List: Among the 3% of companies awarded an A Grade for our efforts and actions to combat climate change by implementing programmes to reduce emissions in both direct operations and our supply chain.



DJSI

Second in Pharmaceuticals, Biotechnology and Life Sciences industry group

Score of 86%, up two points from 2015

Significant improvement in the environmental dimension of the index, gaining 18 percentage points.

Sector best scores for: Occupational Health and Safety (86%), Code of Conduct (100%), Marketing Practices (93%), Climate Strategy (100%) and Health Outcomes Contribution (100%).



Access to Medicine Index

Biggest riser, moving to 7th place in 2016 from 15th in 2014.

Industry best practice recognition for our transparent approach to intellectual property in relation to Index Countries: disclosing where we will not enforce patents, where we would consider granting a licence, and disclosing the status of our patents for products used to treat Index Diseases.



RobecoSAM

Silver Class distinction rating in the RobecoSAM index, the global sustainability investment rating which identifies companies that are strongly positioned to create long-term shareholder value.



Prime

AstraZeneca is rated 'Prime' by oekom research. Prime status is awarded to companies that meet the sustainability management requirements of 100 social and environmental criteria. Companies are also screened against several controversial business fields and practices. There are currently around 550 companies holding oekom research's prime status.



I'm proud that AstraZeneca has received significant external recognition for our environmental leadership by adopting a science-based climate target. Setting science-based targets is the right thing to do and perfectly aligned with our commitment to follow the science."

Katarina Ageborg, Chief Compliance Officer, AstraZeneca

Materiality

Global trends and the pace of change affecting society mean it is vital we stay on top of emerging risks and respond quickly. Our goal is to embed sustainability in our business strategy and all areas of our operations. To do that, we need to understand the most important issues for our business and our stakeholders and ensure our strategy is designed in such a way as to drive our effective response.

In 2016, we worked with an independent think-tank to complete a new sustainability materiality assessment to help identify the priorities that would shape our new sustainability strategy. Materiality is the principle of defining the social, environmental and governance issues that matter most to our business and our stakeholders.

The assessment process identified 27 sustainability issues relevant to AstraZeneca. These became the basis for benchmarking analysis, engagement with external and internal stakeholders and an internal review that examined our areas of strength, weakness and opportunity and our alignment with the UN SDGs.

The outcome of our materiality assessment was validated by the members of our SAB.

Materiality assessment process

The following six steps provide an overview of the process we undertook to identify our material issues.



Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

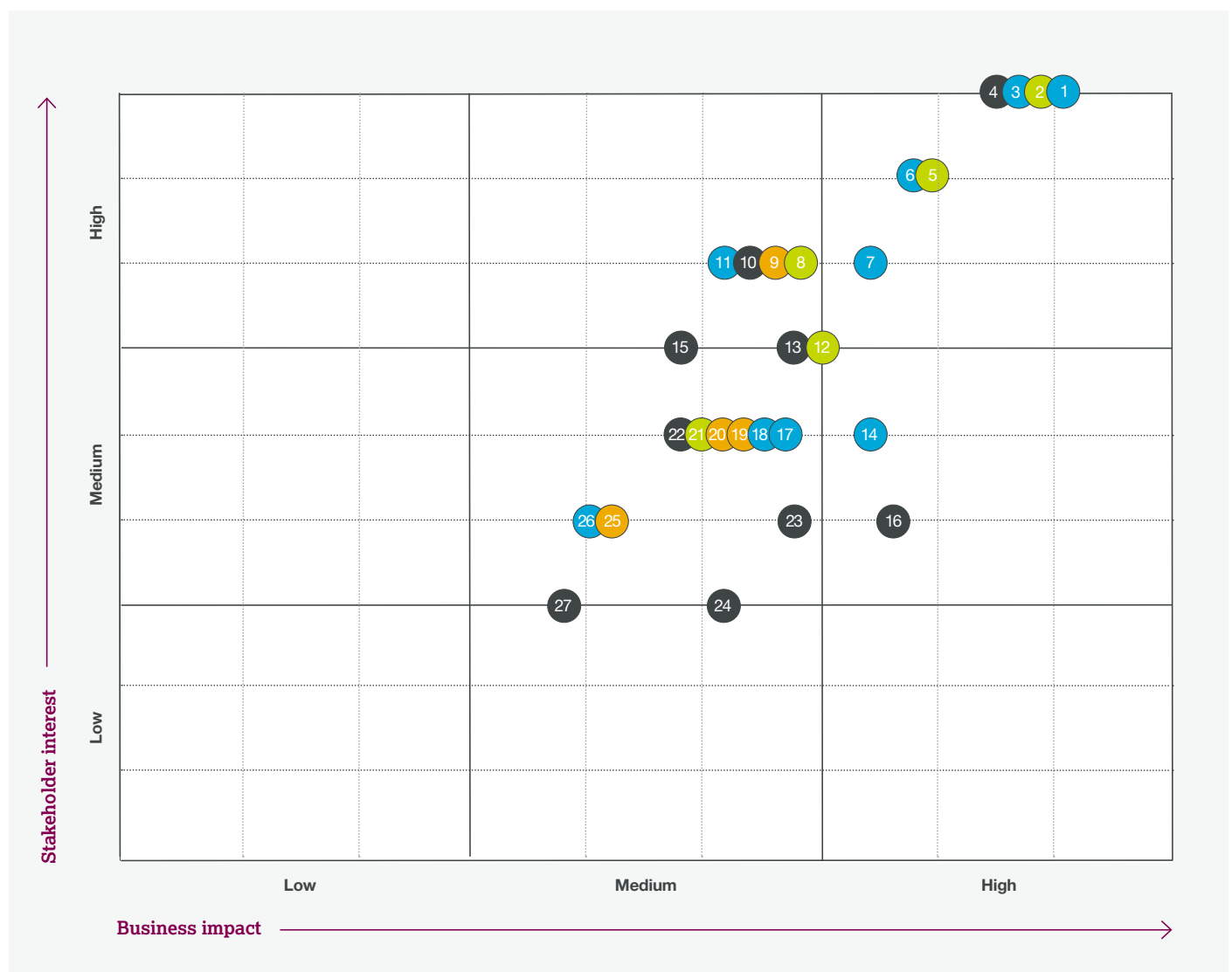
Our sustainability material issues

The 27 sustainability issues identified have been mapped on a materiality matrix to show their relative level of stakeholder interest and potential business impact.

Key

- Access to healthcare
- Environmental protection
- Ethics and transparency
- Sustainability foundations

- 1 Ethical sales and marketing
- 2 Health outcome contribution
- 3 Bribery and corruption
- 4 Product safety and quality
- 5 Product affordability
- 6 Clinical trials
- 7 Supply chain management
- 8 Healthcare reform
- 9 Pharmaceuticals in the environment
- 10 Public policy and advocacy
- 11 Intellectual property
- 12 Health systems development
- 13 Compensation
- 14 Product counterfeiting
- 15 Fair taxation
- 16 Employee retention
- 17 Bioethics
- 18 Patient interaction
- 19 Resource efficiency
- 20 Climate change
- 21 Disease prevention
- 22 Human rights
- 23 Workplace health and safety
- 24 Diversity and inclusion
- 25 Biodiversity
- 26 Research with animals
- 27 Community investment



Stakeholder engagement

We believe our long-term success lies in strengthening our connections with stakeholders, understanding their worlds and combining forces to achieve common goals. The feedback we receive from stakeholders, through both the materiality assessment process and ongoing stakeholder dialogue, informs our sustainability approach, commitments and actions.

We define a stakeholder as any individual or group who can affect, or is affected by, our business. The benefits of dialogue with our stakeholders include:

- > **Better healthcare solutions** – deeper stakeholder relationships will help us come up with creative ways to tackle healthcare challenges
- > **Better decision-making** – listening to stakeholders will improve our knowledge of present and future risks and opportunities, helping us to make good business decisions
- > **Better reputation** – responding appropriately to the changing expectations and concerns of our stakeholders will strengthen our reputation
- > **Better informed stakeholders** – information presented as part of a dialogue is more easily digested and understood, helping stakeholders to understand our business.

How we engage with stakeholders


The insight and challenge we gain from our stakeholders play an important part in shaping our business strategy and sustainability commitments. We value their feedback and we aim to develop open and trusting relationships with our stakeholder groups.

We use a wide range of channels to carry out regular formal and informal engagement – from digital to face-to-face dialogue. Through a multi-stakeholder engagement approach, we identify systematic activities to create opportunities for interaction with groups of our stakeholders. We continue to use feedback from our stakeholder dialogues as an input into our strategy development and risk management planning.

All our relationships and engagement, including with patient groups and other healthcare organisations, are based on transparent and shared objectives to improve the lives of patients and in compliance with local laws and regulations.

Our Global Policy on [Ethical Interactions and Anti-Bribery/Anti-Corruption Policy](#) guide our approach to stakeholder engagement. You can read more about how we enable stakeholders to raise concerns with us in our [2016 Ethics and Transparency](#) update.

Here, we summarise our key stakeholder groups and outcomes of our engagement in 2016.




Stakeholder group	How we engage with them	Key outcomes in 2016
 <p>Employees</p>	<p>We are dedicated to creating an inclusive, open and trusting organisation that embraces the skills, knowledge and unique abilities of our employees. To foster innovation and achieve our strategic priority of being a great place to work, we seek to harness the different perspectives, talents and ideas of our employees and ensure they feel valued for their contribution.</p> <p>Employee opinion surveys help us measure employee satisfaction and engagement and how we are doing in our aim of being a great place to work.</p>	<p>In December 2016, we completed a Pulse survey which showed 80% employee belief in our strategy (2015: 89%, 2014: 86%). This is a key indicator of employee engagement.</p> <p>74% of employees also said they would recommend AstraZeneca as a great place to work (2015: 83%, 2014: 82%).</p>

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Stakeholder group	How we engage with them	Key outcomes in 2016
 <p>Suppliers and third parties</p>	<p>Our future success depends on developing strong relationships with suppliers and third parties that uphold our high ethical standards.</p> <p>Our commitment to ethics and transparency requires us to set clear standards for those suppliers and to have strong processes in place to ensure suppliers are meeting those standards.</p> <p>We develop and implement ongoing <u>supplier engagement programmes</u> that reflect areas of specific geographical and/or supply sector risk, with a focus on and key gaps in third-party understanding.</p> <p>We provide incentives for suppliers through a number of means from specialist training to profit-sharing of any costs saved/revenue generated through our improvement initiatives.</p>	<p>In 2016, we focused on increasing our coverage of third-party activities, providing greater senior leader insight and ensuring quality and depth of compliance assessments.</p> <p>At the end of 2016, 20,613 suppliers had completed compliance assessments, a 96% completion rate. As a result, we identified 40 suppliers who did not meet our standards.</p> <p>We implemented 1,101 action plans to help third parties drive improvements in their business.</p> <p>We also conducted 66 audits on high-risk suppliers, seeking to ensure that they employ appropriate practices and controls.</p>
 <p>Patient groups⁵ and patient communities⁶</p>	<p>Our engagement with patient groups and community engagement supports us to improve health and quality of life, and demonstrates the value of science to patients and society.</p> <p>Our relationships with patient groups comply with relevant legal and regulatory requirements in each country, as well as applicable codes and our own supporting policies.</p> <p>To demonstrate this, we publish our patient group relationships on country-level websites, including but not limited to our R&D centres of excellence in <u>Sweden</u>, the <u>United Kingdom</u> and the <u>United States</u>.</p>	<p>Over 70,000 patients have been connected to AstraZeneca research and development through our five-year collaboration with the PatientsLikeMe online research community.</p> <p>Our Patient Partnership Program (PPP) is a new initiative which aims to infuse the patient voice throughout our drug discovery, development and patient support activities.</p> <p>In 2016, we established the first two PPP patient expert groups in ovarian cancer and asthma.</p>
 <p>Local communities</p>	<p>Wherever we work in the world, we aim to make a positive impact on our local communities. We maintain open dialogue with our local communities, keeping them informed of our business activities and plans, and giving them the opportunity to raise any concerns.</p> <p>We target our global community investment towards promoting healthcare in the community and supporting science-based education and careers.</p>	<p>In 2016, we spent over \$500 million on community investment sponsorships, partnerships and charitable donations worldwide, including our product donation and patient assistance programmes which make our medicines available free of charge or at reduced prices.</p> <p>We extended our YHP into Kenya. We have now reached over 1.6 million young people in 21 countries with health information for the prevention of NCDs, engaged over 40,000 young people to share health information with their peers and the community, and trained more than 12,600 frontline health providers.</p>

⁵Patient groups are independent organisations that provide advice and support to patients and their families and other caregivers.

⁶Patient communities are communities of interest online for people with specific diseases and conditions.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Stakeholder group	How we engage with them	Key outcomes in 2016
 <p>Shareholders/investors and analysts</p>	<p>We are committed to fulfilling our requirements as a publicly listed company and to further engaging with the financial community to communicate strategy, performance and other relevant metrics to assess the investment proposition. We also listen to our shareholders and external experts to help shape our future business.</p> <p>We make information available to the financial community through a range of media, including:</p> <ul style="list-style-type: none"> > Year-to-date and quarterly results announcements and presentations > Corporate website and other electronic media > Roadshows, investor conferences, and topical and educational investor science webcasts and events > Incoming telephone and email enquiries. 	<p>Four quarterly results announcements/presentations.</p> <p>An unprecedented number of meetings during investor roadshows and conferences at more than 25 global investment centres.</p> <p>A number of educational and pipeline-focused investor science events, typically related to new data presented at key medical meetings.</p> <p>Bus tour visits to main offices and facilities.</p> <p>Other investor outreach activities, including to fixed-income investors, socially responsible investors and Chartered Financial Analyst societies in the US.</p>
 <p>Government bodies and regulators</p>	<p>We, along with other pharmaceutical companies, continue to work openly and transparently with policymakers and regulators to increase access, improve outcomes and to support an environment that fosters medical and scientific innovation and value.</p>	<p>Key areas of engagement with governments and regulators in 2016 include:</p> <ul style="list-style-type: none"> > Partnering directly with governments to improve healthcare infrastructure and access to medical treatment > Flagship programmes to promote access to healthcare where it is needed most, such as through our new collaboration with PEPFAR > Engagement with governments and other bodies to uphold our responsibilities under the Nagoya Protocol. <p>Neither AstraZeneca nor its subsidiaries made any EU political donations or incurred any EU political expenditure in 2016. In 2016, the Group's US legal entities made contributions amounting in aggregate to \$1,568,250 (2015: \$1,224,550) to national political organisations, state-level political party committees and to campaign committees of various state candidates.</p>
 <p>NGOs and sustainability experts</p>	<p>Our SAB comprises five world-class thought leaders in their fields who provide the expertise, challenge and insight we need to deliver our sustainability strategy and respond to changing developments.</p>	<p>In 2016, the SAB provided feedback on our priorities and approach that was integral to the shaping of our new sustainability strategy.</p> <p>As part of our materiality assessment, we also engaged with a number of NGOs, socially responsible investors and multilateral institutions to share insights on key trends, risks and opportunities to shape our new sustainability strategy.</p>

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Our work with patient groups

Patient groups are independent organisations that provide resources and support to patients, families and caregivers and work to advocate on behalf of patients in the healthcare environment. As a company committed to improving health and quality of life, we support patient groups in their mission to bring the value of science to patients and society alike. We value sustainable engagement with our patient group partners and are committed to initiatives that elevate the patient voice and aim to improve patient outcomes.

Our support may include financial contributions and in-kind donations that seek to enhance patient welfare. Our relationships with patient groups must always comply with relevant legal and regulatory requirements in each country, as well as applicable codes and our own supporting policies. We publish our relationships with patient groups on AstraZeneca's country-level websites in our R&D centres of excellence in Sweden, the United Kingdom and the United States.

Phase III clinical trials

We are committed to developing more patient-friendly trials by integrating patient insights early on in protocol design planning. Our ambition is for AstraZeneca trials to be simpler for our patients and for faster delivery of data to answer scientific questions in protocols.

Clinical teams are supported to connect with various external patient organisations to collect insight directly from patients. Teams have access to a range of patient insight tools including: patient preference surveys; protocol simulations; patient advisory boards; clinical site; and patient focus groups. Once patient insights are reviewed by teams, we identify and implement agreed actions to optimise our protocols and then measure the impact of our actions.

We are currently implementing a consistent patient-centred approach across targeted trials to encourage and implement positive change through patient engagement.

Patient communities

Through our five-year collaboration with the PatientsLikeMe online research community, over 70,000 patients have been connected to AstraZeneca's research and development. The data patients share improves our understanding of the symptoms and outcomes that matter most, ensuring we deliver medicines that patients value. Patients have also told us how to improve studies in our key therapy areas. As a result, we acted to simplify studies, removing barriers to participation and making it easier for patients to complete on studies. AstraZeneca and PatientsLikeMe shared the results of their research and actions taken with participants, showing that the contribution of patients is valued and has an impact.

Delivering patient-centred medicines through the Patient Partnership Programme

The Patient Partnership Programme (PPP) is a new initiative that aims to infuse the patient voice throughout all our company's drug discovery, development and patient support activities. The PPP provides an open line of communication between AstraZeneca and groups of patients with functional expertise in a given disease area to learn from each other and co-create patient-centric products and services in a fast and efficient manner.

In 2016, we established the first two PPP patient expert groups in ovarian cancer and asthma. Together with global cross-functional teams working in severe asthma and ovarian cancer, our Patient Centricity team ran very successful global PPP Summits for each disease area to kick off the programmes. As a result, disease teams across a variety of functions are now engaging with key patient experts for the development of our medicines and disease management tools in severe asthma and ovarian cancer. To find out more about this programme, please refer to www.azpatientpartners.com

Responsible partnering

Partnering is an important element of our business model. It supplements and strengthens our pipeline and our efforts to achieve scientific leadership. We partner with others around the world including academia, governments, industry, scientific organisations and patient groups. These partnerships enable us to access the best science, stimulate innovation and accelerate the delivery of new medicines to target unmet medical need. We currently have more than 600 collaborations around the world.

To advance our strategy, in April 2016, we announced plans to increase partnering in relation to projects in our inflammation, infection and neuroscience disease areas and to products in markets where there is a clear rationale.

Ensuring these partnerships are transparent and uphold our high ethical standards is vital to our reputation. When making new acquisitions and developing partnership opportunities, our ethical standards are integral to our due diligence and partnering activities. We assess all projects against our 5Rs evaluation criteria: Right Target, Right Tissue or Exposure, Right Safety, Right Patients and Right Commercial. We also consider ethical conduct in sales and marketing, safety, environmental management and other sustainability issues – including the historical liabilities of potential partners and the practices they currently have in place – and we work only with those whose standards of ethical behaviour are consistent with our own.



Accountable and inclusive governance

Our commitment to growing our business in a sustainable way also helps us protect our licence to operate, attract and retain talent, manage risk and, most importantly, deliver life-changing medicines to patients. The Senior Executive Team (SET) and Board regularly review our sustainability work as part of their business review activities.

How we govern sustainability

Our well-established robust governance model helps us deliver, monitor and report progress on the framework across the business. In early 2016, we recruited a new Sustainability Director to lead the transformation of our sustainability approach across the company. We have also repositioned the sustainability function within Global Compliance.

Sustainability framework

A sustainability framework is embedded in the way we operate:



Sustainability Advisory Board

Established in 2015 and meets twice annually to provide external insight, feedback and advice to help sharpen our understanding of, and responses to, established and emerging sustainability issues. The Advisory Board also helps identify opportunities for further innovation and collaboration.

Board

Non-Executive Director, Geneviève Berger, oversees implementation of the sustainability framework and reporting to the Board.

New Board appointments are recommended by a [Nomination and Governance Committee](#). The membership of the Board at 31 December 2016 and information on individual Directors is contained in the Board of Directors section of the [Annual Report](#) (page 86).

SET

SET is responsible for the framework.

- > Senior managers throughout the Group are accountable for operating in line with the sustainability commitments within their areas, taking into account national, functional, and site issues and priorities.
- > Line managers are accountable for ensuring that their teams understand the requirements and improvement targets, and that people are clear about what is expected of them as they work to achieve our business goals.

Sustainability Council

The Council is chaired by a SET member, currently Katarina Ageborg, Chief Compliance Officer. Members comprise senior leaders from each relevant SET function. Its agenda focuses on driving long-term value creation by, among other things:

- > Agreeing sustainability priorities for the Group in line with strategic business objectives
- > Managing and monitoring the annual process of setting sustainability objectives and targets, and reviewing performance against key performance indicators (KPIs)
- > Agreeing appropriate policy positions to support our objectives and reputation management.

Sustainability Network

A network of SET function representatives and subject matter experts supports the Council. The network reviews issues with the potential to impact AstraZeneca's sustainability agenda and helps deliver the substantive elements of our programme.



Stakeholders

Regular engagement with external stakeholders, which takes place with a range of socially responsible investors and other interest groups, provides the opportunity for sustainable issues or concerns to be raised and discussed.

Managing risk

We strive to embed sound risk management in our strategy, planning, budgeting and performance management processes. We have an established risk management framework which sets out roles, responsibilities and methodology for managing risk across all areas of our business.

Members of the Board are experienced senior leaders who are adept at risk management for their specific functional areas. The Board defines the Group's risk appetite using three key dimensions: earnings and cash flow; return on investment; and ethics and reputation. Our risk management approach feeds into our strategy and business planning processes.

Line managers are accountable for identifying and managing risks and for delivering business objectives in accordance with the Group's risk appetite. The SET is required by the Board to oversee and monitor the effectiveness of our risk management processes.

Within each SET function, leadership teams discuss the risks their business faces. Annually, we map these risks to AstraZeneca's risk taxonomy. This provides a Group-wide assessment for Board, Audit Committee and SET. Changes to these risks, new and emerging risks and mitigation plans are assessed quarterly within each SET function and presented to Board, Audit Committee and SET in a Group Risk Report. A Group-wide risk network includes representatives from every material part of the business to aid communication and collation of this information.

For full details of the risks and uncertainties that we consider material to our business in that they may have a significant effect on our financial condition, results of operations and/or reputation, please see page 20 and page 214 of our [2016 Annual Report](#).

Incorporating external perspectives

Our SAB provides the expertise, challenge and insight we need to deliver our sustainability strategy and respond to changing developments.

The purpose of the SAB is to:

- > Provide feedback, constructive challenges and advice on the full range of issues relevant to AstraZeneca's sustainability agenda
- > Provide an external perspective on our sustainability plans and targets, helping to improve and evolve our long-term sustainability strategy
- > Forecast trends, emerging issues, challenges and opportunities in national and global contexts, and provide guidance on how to respond to them
- > Help AstraZeneca to develop and maintain links with external industry experts.

The SAB includes five world-class thought leaders in their fields, including several who have been instrumental in integrating positive sustainability practices in large organisations.

Current external members are:

- > Pankaj Bhatia: Deputy Director, World Resources Institute
- > Polly Courtice: Director of the University of Cambridge Institute for Sustainability Leadership
- > José Lopez: Former Executive Vice President of Operations, Nestlé SA
- > Mary-Jane Morifi: Global Capital Campaign Lead, Nelson Mandela Children's Hospital Trust
- > Jorgen Randers: Professor Emeritus, BI Norwegian Business School.

The Board met twice in 2016 to help inform the development of our new sustainability strategy and endorse our approach, priorities and overall framework. At the first meeting, in January 2016, members helped to challenge and validate the first phase of our materiality assessment, shaping the resulting priority focus areas of our strategy and discussing implementation.

At the second meeting, in September 2016, members reviewed the completion of the materiality assessment. They also reviewed the draft strategy to inform its development.

The main focus of the SAB in 2017 will be on helping to drive delivery of our new strategy, especially by contributing guidance on integration into functional business plans and activities, incorporation into leadership development and how to further productively engage stakeholders.

Sustainability foundations

We are dedicated to creating an inclusive, open and trusting organisation that embraces the skills, knowledge and unique abilities of our employees. Our global workforce includes 59,700 employees in over 100 countries who interact with thousands of suppliers and partners all over the world.

We use these interactions as an opportunity to influence, learn from others and share our policies – ensuring the organisations we work with share our Values. Our Sustainability foundations reflect our abiding commitment to people: our staff, patients, suppliers and wider stakeholders.



Great place to work

To stay at the cutting edge of scientific innovation, we seek to harness the diverse perspectives, talents and ideas of our employees.

43.2%

of employees at Career Level F (our six highest bands) or above are women



Workplace health and safety

We aim to have a safe and healthy work environment for our employees and we have set ambitious targets for 2016 to 2025 to drive continuous improvement.

1.45

injuries per million hours worked, down from 1.73 in 2015

3.62

collisions per million kilometres driven, down from 4.13 in 2015



Community investment

Wherever we work in the world, we aim to make a positive impact on our local communities.

+1.6 million

young people reached through the Young Health Programme

\$501 million

community investment to support healthcare and further science education and skills development

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Human and employee rights

Human rights is a central foundation of the way we work. It is an area in which we can use our relationships to positively influence our suppliers and partners so that they reflect and help us deliver our human rights commitments.

We are committed to respecting and promoting international human rights – not only in our own operations but across our wider spheres of influence, including our supply chain. To that end, we integrate human rights considerations into our policies, processes and practices. We are committed to ensuring there is no modern slavery or human trafficking in our supply chains or any part of our business. We will publish our full statement under Section 54 of the UK Modern Slavery Act on our website in 2017.

AstraZeneca supports the principles set out in the UN Universal Declaration of Human Rights and our policies detail our high standards of employment practice. These include respecting diversity and, as a minimum, complying with national legal requirements regarding wages and working hours. We also support the ILO standards on child labour and minimum age, and we are members of the United Nations Global Compact.

In 2016, we began conducting our third (bi-annual) human rights labour review in all countries where we have an employee presence. The survey was conducted across 106 countries and included five sections with 34 related questions. The review focused on ILO core themes including: freedom of association and collective bargaining; child labour; discrimination; working hours and wages (including questions on the Living Wage). The overall results of the survey show 100% legal compliance on employment-related matters and only two areas where a gap in meeting ILO minimum standards was identified. We are developing plans to address these gaps, which require four countries to introduce a formal grievance procedure and seven countries to increase maternity leave to the minimum 14 week ILO standard.

Living Wage

We have assessed Living Wage progress, both internally and globally, and we are satisfied that we meet or beat any government or locally recognised bodies' definition of a Living Wage. In the survey mentioned above, 84% of countries stated that there is a locally recognised definition of a 'Living Wage' and, in all instances, they had adopted or bettered the stated rate. This rate is also paid to third-party providers. We carried out our own independent external review in 2016 to assess developments in this area to inform our global approach. In 2016, we achieved Living Wage Foundation accreditation in the UK. Since then, we have been monitoring the impact on our cost base and will use our evaluation to develop our global position.

Promoting the rights of employees

We seek to follow a global approach to employee relations guided by global employment principles and standards, local laws and good practice. We work to develop and maintain good relations with local workforces and work closely with recognised national trade unions. We also regularly consult with employee representatives or, where applicable, trade unions, who share our aim of retaining key skills and mitigating job losses.

Labour rights assessments are an integral part of our Third Party Risk Management approach. We use both external intelligence, relating to geography-related labour rights risks and our own knowledge to ensure we focus on those areas of our supply chain facing the greatest risk.

Our recent global labour rights survey found:

- > 100% positive response to the question 'Does the company respect the right of its workers to join and form trade unions and to bargain collectively?'
- > 58% of countries have a relationship with trade unions and 98% of these have collective bargaining arrangements
- > Where trade unions do not have a presence, 99% of countries have established arrangements to inform, communicate and consult employees on a wide range of business matters that may have an impact on employment.

Modern slavery

The Modern Slavery Act came into force in the UK in April 2016 and supports those subjected to human trafficking and slavery. We are committed to ensuring that we identify and eliminate to the fullest extent practicable modern slavery or human trafficking risks in our supply chains and in any part of our business. Our standards comply with all national and international laws, regulations and codes for preventing trafficking and slavery in our own business operations. Furthermore, we require our contracting partners and those companies within our supply chain to do the same, as set out in our Global Standard Expectations of Third Parties. In 2017, we intend to release a public statement covering the 2016 financial year which outlines our approach to preventing modern slavery from occurring within our business and our supply chains.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Diversity and inclusion

To stay at the cutting edge of scientific innovation, we seek to harness diverse perspectives, talents and ideas and ensure our employees reflect the diversity of the communities in which we operate. We are committed to promoting and maintaining a culture of respect and equal opportunity. In 2016, we implemented a new talent management and succession planning process. It focuses on identifying, sourcing and accelerating the development of our highest potential talent to ensure we have credible successors to drive our future business growth.

Our policies and procedures are designed to help protect against discrimination on any grounds, including disability. These cover recruitment and selection, performance management, career development and promotion, transfer, training, retraining (including retraining, if needed, for people who have become disabled) and reward.

Gender diversity

We continue to focus on diversity and inclusion with a goal to increase the presence of women on our leadership teams. In 2016, we piloted a European Women as Leaders programme to support the accelerated development of high-potential women in AstraZeneca. We will roll out this programme globally in 2017.

At the end of 2016, women made up 49.9% of our global workforce. There were three women on our Board (30%). Below Board level, the representation of women in senior roles (roles at Career Level F or above, which constitute the six highest bands of our employee population) increased to 43.2% in 2016, exceeding our target of 42.5%.

Gender diversity at AstraZeneca % of women

Board of Directors of the company

2015	33%
2016	30%

SET

2015	31%
2016	33%

Directors of the company's subsidiaries

2015	27.9%
2016	27.9%

AstraZeneca employees

2015	49.8%
2016	49.9%

Geographical diversity

To ensure our senior leadership reflects our diverse geographic footprint, we track the country of origin of senior leaders and reflect this in our diversity targets. In 2016, 14.5% of leadership roles that report to the SET have a country of origin that is an Emerging Market or Japan (an increase from 5% in 2012).



Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Workplace health and safety

We believe that a safe and healthy work environment is a fundamental right of our employees and suppliers. We have set ambitious targets around workplace injuries, driver safety and promoting good health within our workplaces.

We have worked hard to create a culture of safety, health and wellbeing in our sites all over the world and have achieved considerable success. In 2016, we were recognised in the Dow Jones Sustainability Index (DJSI) when we achieved the Pharmaceuticals, Biotechnology & Life Sciences sector best score for occupational health and safety.

We made good progress against our new strategic targets in 2016, achieving a 16% reduction in the reportable injury rate and a 12% reduction in the vehicle collision rate from the 2015 baseline.

Building on our previous success in establishing a culture of health and wellbeing, we are developing a health and wellbeing framework that is based on the World Health Organization's Healthy Workplace Model. It will give sites and AstraZeneca marketing companies a blueprint for continuous improvement in health promotion. The framework will allow all sites and AstraZeneca marketing companies the flexibility to develop towards our 2025 goal through three levels of maturity. In 2017, we will conduct a global assessment of health and wellbeing maturity against the framework.

What we achieved

2025 commitment	2015 baseline	2016 target	2016 actual
75% reduction in total injury rate by 2025 from 2015 baseline (Reportable injuries per million hours worked)	1.73	1.64	1.45
55% reduction in collisions per million kilometres driven by 2025	4.13	4.00	3.62
80% of sites/marketing companies actively promote all four Essential Health Activities ⁷ by 2025	63%	Develop a health and wellbeing framework for launch in 2017	Framework development on track for 2017 launch

Promoting healthy lifestyles through the Global Corporate Challenge™

In 2016, AstraZeneca participated in the Global Corporate Challenge™ for the ninth successive year. In addition to a pedometer challenge, the programme included nutrition and weight loss advice and a tracker, heart health assessment, a sleep health module and a mental wellbeing module. 2,429 AstraZeneca employees in 347 teams took part from 28 countries and achieved a daily average of 13,204 steps. Together they clocked up 1,110,154 miles, equivalent to walking 44.85 times round the world. In the process, they burnt off the equivalent of 448,792 slices of cake! Teams from Kazakhstan swept the board taking the top three places.



Reportable injuries

In 2016, a total of 177 reportable injuries occurred including 127 lost time injuries. Vehicle accidents and 'slips and falls' were the two main accident categories, together accounting for 65% of all reportable injuries. In addition, 28 occupational illnesses were reported, including 21 lost time cases. Musculoskeletal disorders and work-related stress were the two main categories of occupational illness. Approximately 3,381 working days were lost due to work-related injuries and illnesses in 2016, down 27% on the previous year.

Year	Reportable injury rate per million hours worked	Target
2016	1.45	1.64
2015	1.73	-
2014	1.93	-

Note: This is a new injury metric for our 2016–2025 strategy. There is no target set for 2014–2015 as these years focused on lost time injury/illness rate only.

⁷ Healthy eating and drinking, tobacco cessation, physical fitness, workplace pressure management.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

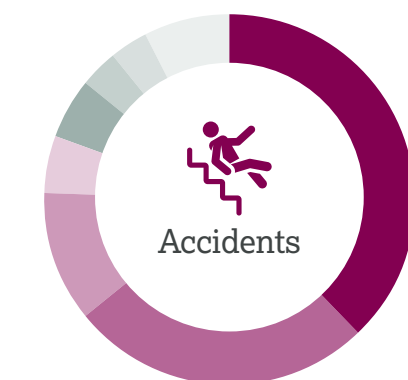
About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Accident categories in 2016

Reportable injuries by category



Vehicle 67	Fall from height 9
Slips, trips and falls 47	Cut 6
Injured while handling, lifting or carrying 20	Hit something fixed or stationary 6
Hit by moving, flying or falling object 9	Other 13

In 2016, we carried out a number of activities and initiatives focused on delivery of improvements in key areas of concern, including driver safety, fall prevention, behavioural Safety, Health and Environment (SHE), risk management, industrial hygiene and stress management. We also continued to focus on learning from incidents, using a dedicated website to communicate relevant learning from workplace incidents and how they can be prevented in the future. This website is available to all staff to help improve their safety knowledge.

Driver safety

Driving is our highest risk area for serious injury and fatality. This is why improving driver safety is our highest priority, particularly among our sales force, which is the largest group of employees that drives on AstraZeneca business.

Our focus is on promoting driver safety through awareness and training programmes among our sales force. This includes all employees in the sales force who drive on AstraZeneca business including contractors on temporary contracts who drive our vehicles, but it does not cover third-party suppliers. We monitor performance centrally to assess progress and identify areas for attention.

In 2016, we set ourselves new targets for reducing collisions per million kilometres driven. Having reduced collisions by 55% over the previous seven years, our new target is for a 55% reduction from the 2015 baseline by 2025. We surpassed our 2016 annual target achieving a 12% reduction in collision rate against baseline, with all regions showing improvement. The reduction in collisions was also reflected in the rate of vehicle accidents with reportable injury per million business kilometres driven, which improved by 25% in 2016.

Following the death of an employee while driving in 2015 and the subsequent investigation, we held training workshops in early 2016 for all employees who drive for work in the International sales region. The campaign was championed by senior commercial leadership and focused on time pressure, distracted driving and fatigue. We also reviewed our global procedure on the use of electronic devices while driving and rolled out a campaign to ensure all employees are aware of our policy and the reasons behind it. Over the last four years there have been two driving fatalities, one in 2014 and one in 2015. There were no driving fatalities in 2016.

Improving the safety of female employees in India

Our SHE and administration team in India was awarded an AstraZeneca SHE Excellence Award in 2016 for the delivery of a campaign to improve the safety of women in the field sales workforce. As well as being the right thing to do, ensuring a safe work environment for women was seen as important for the recruitment and retention of female employees. Projects over the year included personal safety basics with guidance on travel, hotel stays, parking and safe walking, all aimed at raising the level of safety consciousness in female employees. Special arrangements were made for late working, transport provision and vehicle breakdown, and a list of recommended hotels based on safety criteria was established. In addition, a committee was set up to provide female employees with a forum to resolve issues of sexual harassment headed by an independent advocate.



Awarding-winning campaigns and employee engagement

Our global and regional driver safety leads were awarded an AstraZeneca SHE Excellence Award in 2016 for their outstanding driver safety campaigns. The 'Spotlight on Safety' campaign was focused on the International sales area, covering more than 15,000 employees, and launched with senior commercial leadership championing the campaign. The Executive Vice-President for the area took part in one of the workshops in Singapore. AstraZeneca internal engagement was high throughout the #SpotlightonSafety campaign. The 'Distracted Driving' campaign was focused on all commercial markets and included a pledge not to use a mobile phone while driving. Both campaigns within the sales force had a measured impact on the driving safety of employees, with a 12% reduction in the collision rate and a 22% reduction in the vehicle injury rate compared to the previous year. Feedback from employees was very positive.

"This workshop made me think about my attitude while driving and how important it is to be careful, it's for my family." (Philippines)

"At the end of the session, so many positive responses from people participating and how this session will help to remind them to stay safe on the road." (Indonesia)



Year	Collisions per million km	
	Target (not to exceed)	Actual
2016	4.00	3.62
2015	5.60	4.13
2014	6.10	4.66

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Talent management

To underpin our sustainable business growth, we need to attract the best people in our industry. We aim to identify individuals with the required capabilities to achieve our priorities and we work collectively to purposely accelerate their development.

At AstraZeneca, we strive to create and maintain a culture of excellence and ambition. Our people are committed to developing products that will improve the lives of patients all over the world. We communicate our strategies widely to ensure all staff understand our shared goals and help us work towards achieving them.

Our ambition is to create a culture of high performance, from our leaders and scientists to facilities staff and our sales force. Once an employee arrives at AstraZeneca, we invest in their ongoing professional development and training to ensure they have a clear career path that inspires them to work towards their own and our shared goals. Within this, we also work to identify those individuals with the potential to one day lead AstraZeneca.

Developing talent

Good leadership is critical for achieving high levels of performance and engagement. We strive to attract talent by offering rewarding careers that connect the potential of our people with the capabilities required by our business. We are focusing on ensuring development opportunities are available to all employees, alongside our investment in our highest potential talent.

In 2016, we launched our new Hi-Potential Strategy. It recognises the unique contributions of individuals with particular skills and capabilities against newly defined business-critical roles to help us achieve both our short and our long-term aims. The new programme puts the primary emphasis on identifying credible successors and looks at those who are 'Ready Now'. This means identifying employees who demonstrate great potential and who, with the right support, training and development, will be ready to take on one of those critical roles in anything up to five years.

We encourage employees to take ownership of their own development and encourage leaders to spend time supporting their employees' development. To support this, in 2016 we implemented a global platform to increase the visibility and accessibility of job opportunities.

We are continuing to develop high-quality leaders. In 2016, 15% of the approximately 130 people in leadership roles that report to our SET were either promoted into the leadership population or moved roles within the leadership population.

In 2016, we also piloted a new best-practice technology-enabled leadership experience, rooted in social learning, with 180 supply and manufacturing leaders based in West Chester and Mount Vernon in the US and Vorsino in Russia. As a result of the success of these pilots, over 700 senior leaders across the organisation had enrolled on the programme by the end of the year. This experience can be accessed on any device at any time, with the goal of implementing global technology-enabled development programmes in 2017.

Employee engagement

Employee opinion surveys help us measure employee satisfaction and engagement and how we are doing in our aim of being a great place to work. Our most recent survey, carried out in December 2016, showed a decline compared to the survey at the start of the year in scores for all 10 items common to both surveys. Although this might not be unexpected given the action we are taking to re-shape our business to improve long-term competitiveness, we are continuing to focus on improving areas identified in our surveys as being important drivers of employee engagement. For example, we are driving our agenda around people development, encouraging improved dialogue between colleagues and their line managers on development. We have also continued our efforts to simplify the work environment for colleagues, whether this be through simplifying business processes or improving the IT tools we use in the workplace.

Managing change

In 2013, we announced plans to invest in three strategic R&D centres. This affected employees in the US and the UK. We encouraged and supported employees to relocate and have made good progress.

One of the programmes that is key to reinventing our company is our new R&D centre in Cambridge. As of 31 December 2016, 2,000 employees were working in Cambridge and, of these, 500 had relocated from other sites in the UK. In addition to the 750 employees hired in 2015 and 2016, we expect to hire a further approximately 350 employees in Cambridge in 2017. We have created a Cambridge Campus of eight interim sites in and around Cambridge where staff will be located until we are ready to move to the final site.

With our new facility taking shape, we begin the staged occupation of our new state-of-the-art building in 2018. For employees who do not accept offers to relocate to Cambridge, we provide career support, outplacement support and competitive severance packages.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Community investment

Wherever we work in the world, we aim to make a positive impact on our local communities. Our global workforce has the potential to be a force for good and we support our employees to take up volunteering opportunities that benefit local, national and global projects. We also focus on leveraging our contribution in areas affected by disasters through the provision of medical products and other support.

We target our global community investment towards promoting healthcare in the community and supporting science-based education and careers. The main focus of our community investment strategy is our [YHP](#), which addresses NCD prevention. We also coordinate patient assistance programmes and support for global disaster relief.

Currently, our global approach to community investment is outlined in and governed by our [Community Investment Contributions Standard](#) which allows our country operations to develop local strategies and tailor activities based on local need. The [Standard](#) provides guidance for community investment and helps us to ensure a consistent, transparent and ethical approach around the world. It also provides guidance on how to define which contributions may be classified as community investment.

In 2016, we spent a total of approximately \$501 million (2015: approximately \$680 million) on community investment, sponsorships, partnerships and charitable donations worldwide, including our product donation and patient assistance programmes, which make our medicines available free of charge or at reduced prices.

AstraZeneca provided more than \$466 million in savings to almost 200,000 patients in the United States and Puerto Rico through our AZ&Me Prescription Savings Program in 2016. Additionally, we donated over \$20 million in products across multiple therapeutic areas to our NGO partners Américas and Direct Relief International in support of public health needs and disaster relief.

Benefits of our community investment activities include:

- > Disease prevention programming
- > Access to affordable medicines
- > Education and empowerment to improve health
- > Investment in future scientists
- > Improved understanding of risk factors in adolescents from research
- > Engagement of local communities
- > Emergency relief through drug and medical assistance.

Young Health Programme

The Young Health Programme (YHP) is an NCD prevention programme developed in partnership with Johns Hopkins Bloomberg School of Public Health and Plan International. It aims to reduce the uptake of unhealthy behaviours in young people.

Today, more people die or become ill from NCDs than from communicable diseases. Conditions like hypertension, diabetes, lung cancer and chronic respiratory disease devastate lives, place a significant burden on global health systems and threaten the productivity of nations.

NCDs are often causally linked to risk behaviours such as tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. These are behaviours we learn, often in adolescence. They are heavily influenced by our culture, our geography and our socio-economic conditions. Once they are learned, they become difficult habits to break.

We aim to improve health outcomes for young people and reduce the burden of NCDs on healthcare systems by investing in disease prevention, specifically on addressing the risk factors that are precursors to the most common NCDs with a unique focus on adolescents aged 10 to 19. We deliver this programme through a three-pillared approach:

- > On-the-ground programming
- > Investment in research and evidence generation to address gaps in knowledge
- > Investment and active engagement in advocacy for the inclusion of adolescents in the global and local dialogue on NCD prevention.

We have reached 1.6 million young people with important information about healthy lifestyles through the YHP since it launched in 2010. We work with over 30 partner organisations across five continents, combining on-the-ground programmes with research and advocacy to target the four most prevalent risk factors for NCDs: tobacco use, alcohol abuse, lack of exercise and unhealthy diet. In Kenya and India, we also look at sexual and reproductive health as an additional risk factor based on a recognition that these behaviours are inextricably connected to the others and greatly influence health choices that are made and the ability for youth to participate in positive health creating behaviours.



We are proud co-founders of the Young Health Programme with AstraZeneca. Disease prevention programmes that are focused on youth contribute to addressing a serious global health issue. They help empower youth with the knowledge and the confidence to make informed choices about their health, leading to healthier societies and stronger nations in the future."

**Tanya Barron, OBE, CEO,
Plan International UK**

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

YHP on the ground

With our partners, we have reached over 40,000 young people to share health information with their peers and the community, and trained more than 12,600 frontline health providers since 2010.

In 2016, we introduced the programme to Kenya, renewed the programme in Canada, Germany and China and extended the India programme to 2020.

YHP research and evidence generation

Through YHP, we fund research and evidence needed to prioritise policies and services for adolescent health and NCD prevention. Targeted activities connected with this pillar of the programme include:

- > A global study on the Well-being of Adolescents in Vulnerable Environments (WAVE), undertaken by Johns Hopkins Bloomberg School of Public Health, which enables better understanding of the impact of both the physical and social environment on adolescent health (2014)
- > Two in-depth reviews of the prevalence of NCD risk behaviours among adolescents across Africa and Asia, published by the Population Reference Bureau in April 2015 and March 2016 respectively. The research is accompanied by detailed data sheets and policy briefs outlining the potential implications for each continent and recommended policy and programmatic interventions to address these trends
- > Support for an Adolescent Risk Factor Surveillance study in eight African countries where up-to-date data on adolescent health behaviours and protective factors is not available
- > A modelling analysis of risk factors among adolescents and potential impact on future NCD development and mortality undertaken by Imperial College London and due for publication in late 2017.

Young Health Programme Kenya

In 2016, we launched YHP in Nairobi, Kenya where there is a 27% prevalence of NCD-caused deaths. Using the experience gained from India and Brazil, Kenya is implementing programme strategies that include youth empowerment through peer education, community mobilisation, health service strengthening and local advocacy.

Kenya is also adapting its own brand of support for young people, which includes creating a supportive environment for young people within the targeted communities. This environment allows young people to take action on their new behaviours through reducing social stigma and empowering youth.

The overall objective of the programme is to contribute to improved health and gender equality of girls and boys between 10 and 24 years of age; specifically, by ensuring that adolescent girls and boys are practising fewer risk behaviours due to an increased capacity to make informed choices and to protect their health, now and in the future.

During this first year, the YHP team laid the foundations for success through engagement with community leaders, school teachers and administrators, religious leaders, young people, sub-county administrators, gate-keepers, caregivers, local Community Based Organisations, local NGOs and health services providers. They conducted a baseline study to identify the prevalence of risk behaviours that will inform their work moving forward.

Elsewhere in year one, the YHP Kenya team selected eight villages in Kibera to work in and selected and trained 40 Peer Educators to conduct outreach in their local communities. They also conducted training for health centre workers, engaged teachers in the YHP mandate and held meetings with government representatives. Additionally, 14 schools have launched health clubs through which programming will be provided.



Young Health Programme China: Volunteerism at work

AstraZeneca employee volunteers are at the heart of the YHP in China. The programme aims to educate children in vulnerable communities about air pollution, water pollution and safety. It is delivered through a curriculum that has been developed in partnership with NGO partner Horizon Corporate Volunteer Consultancy.

In 2016, 309 employees spent almost 1,000 hours at schools, sharing the curriculum and providing training and support services. Since its launch in 2013, nearly 6,000 children in 25 cities have received curriculum training from over 1,200 Chinese employees. Feedback from school surveys shows that 90% of participants have increased knowledge on health issues related to pollution.

This success has resulted in an expansion of scope for YHP China. In 2016, YHP China entered into a collaboration with NGO partner the Chinese People's Association for Friendship with Foreign Countries to provide essential training for school doctors in rural areas to support children's physical and mental health development. In 2016, AstraZeneca China received the silver award in the Third Chinese Youth Volunteer Service Project Competition, which is one of the most authoritative volunteer awards in China.



Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

YHP advocacy

The YHP funds and champions global and local advocacy to put the prevention of adolescent NCD-related risk behaviours on the global and local policy agenda. Funding provided through YHP facilitated the following activities:

- > The delivery of four advocacy workshops by NCD Child in Peru, India, Kenya and Canada to engage and teach clinicians, community service organisations and academics about youth advocacy
- > The delivery of advocacy workshops by the Public Health Institute's Rise Up Initiative that led to the development of the Coalition of Youth Advocates (COYA) in Kenya, a network of organisations calling for new solutions and financial support to raise the need for NCD prevention programmes focused on youth
- > Ongoing collaboration with NCD Child to ensure NCDs and adolescents are included in post-2015 health, development and NCD plans, including side meetings to World Health Assembly Geneva 2016 and UN General Assembly New York 2016
- > Represented by the YHP Advocacy manager from Plan International, YHP was a participant in the Global Co-ordination Mechanism on NCDs in New York
- > Collaboration with UNICEF throughout 2016, to progress the new NCD-focused chapter in the UN 'Facts for Life' publication, which is awaiting UN agency approvals. YHP representatives participated in UNICEF technical review meetings, and young people and NGO staff from YHP programmes in Brazil, India, Portugal and Romania participated in the UNICEF youth consultation on the chapter content.

Looking ahead to 2017

Over the coming year, we will extend YHP by re-launching the programme in Brazil and developing programme proposals for Australia, Serbia, the US and Portugal. As with other local programmes, these will focus on NCD prevention priorities that are relevant to each local market and will be delivered in partnership with local NGOs.

In 2017, we will continue to fund Rise Up, which will in turn support COYA and the projects their coalition members are delivering. Through this advocacy effort, YHP funding facilitates the delivery of workshops, advisory services and a conference that focuses on NCD prevention.

YHP will continue to provide core funding for NCD Child, through their secretariat the American Academy of Pediatrics, to deliver their agenda to advocate for NCD prevention and to raise the profile and voice of youth in global discussions.

Imperial College London will complete its young health research in 2017 with publication due in early 2018. We will also fund research into risk factors in the Middle East and Africa through the Population Reference Bureau and work with the International School Health Network to deliver a report on the use of schools as a conduit for delivering health promotion and disease prevention programming.

In 2017, we will conduct an evaluation of YHP to better understand the impact of our programmes at the local and global level and to better understand the value created for communities and governments.

Working with our NGO partners, we will continue to advocate for the inclusion of adolescents in the global dialogue on NCDs, which includes YHP's continued presence as a member of the Global Coordinating Mechanism on NCDs.

You can find stories of the young people helped by the programme at www.yhpvoices.com and further information at www.younghealthprogrammeyhp.com.

Investing in the next generation of scientists

Our company is built on the scientific talent and expertise of its people and we depend on a strong talent pipeline to meet our future needs. For this reason, we support STEM education. In 2014, we signed a three-year agreement with Career Ready, a UK youth employment charity, to encourage more young people in the UK to study STEM subjects and to pursue STEM-related careers. We extended this partnership to 2017 and expanded into Scotland in 2016 with the addition of 21 schools and reaching an additional 120 students.

In 2016, we:

- > Provided STEM career academies to 885 students, 43% of whom are female
- > Offered nine internships at sites in Alderley Park and Macclesfield lasting four to six weeks
- > Awarded the AstraZeneca STEM Student of the Year awards to eight students, five of whom were girls
- > Supported 14 STEM students on internships in small to medium sized enterprises.

The success of the AstraZeneca relationship and growth in STEM activities has enabled Career Ready to engage more effectively with other STEM employers to secure additional funding for programming, internships and bursaries. Included is the development of the Think Build project to attract engineers with more than £100,000 in funding secured, and new schools and colleges engaged in multiple cities across the UK. Additionally, the Health Education England project delivered over 70 paid internships in summer 2016 in Yorkshire, Humberside, the North West and Kent, Surrey and Sussex.

By supporting STEM education, we are investing in a healthy pipeline of future talent and helping to ensure the ongoing success of research at AstraZeneca.

Disaster relief

The British Red Cross is our global disaster relief partner and it is through this partnership that we channel the bulk of our disaster relief donations. The disaster relief strand of our community investment work enables us to respond when and where emergency medical need is greatest.

In July 2016, we donated \$200,000 via the British Red Cross to the Kuala Lumpur Emergency Response Unit, bringing our total donation to this Unit to \$400,000 over two years. In October 2016, we provided a further \$25,000 to replenish stocks of hygiene kits at the British Red Cross/Crescent Panama Warehouse following Hurricane Matthew.

Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Product donations

As part of our commitment to healthcare and our desire to be a responsible business, we support product donations for humanitarian or public health needs. The framework for making product donations is outlined in our Global Guidance on Product Donations which in turn is supported by our [Community Investment Contributions Standard](#).

In the main, product donations are made for use within the country making the donation. As a result, the governance and accountability for such schemes sits within the country of donation and usually is given in the case of a national emergency, international disaster relief or other genuine public health need. In some circumstances, we may make other donations across country borders, which would be classified as an international product donation programme.

Product donations for humanitarian or disaster relief purposes can only be made through established product donation partners. For international product donations, our processes are aligned with the [World Health Organization Guideline for Medicine Donations](#) with regard to the selection, quality assurance, presentation, packing and labelling, and the management of appropriate distribution of donated medicines.

All product donations must be recorded into the Global Community Investment Database.

In 2016, we donated medicines worth \$20 million (US Wholesale Acquisition Cost Value) in response to disasters and humanitarian needs all over the world and across all AstraZeneca therapy areas: cardiovascular disease and diabetes, oncology, infection, respiratory and inflammation, neuroscience and gastrointestinal medicines. These donations are in addition to the \$466 million worth of products we release at discounted prices through our affordability programme, AZ&Me.

The majority of donations we made were in response to local relief or appeals from our US-based partners, AmeriCares and Direct Relief International. To a lesser extent, we worked with Health Partners International of Canada (HPIC) to provide medicines for their Humanitarian Mission Packs and to respond to special requests connected to humanitarian mission work. We also worked with agencies in China and The Philippines to respond to natural disasters in those regions.

In 2016, our work with the AmeriCares US Medical Assistance Program allowed for AstraZeneca products to be distributed to 212 clinics in 42 states. Through HPIC, we provided additional medicines to replenish stock following Hurricane Matthew and to support ongoing relief efforts in Haiti. Through HPIC, we also responded to requests from physicians who volunteered their time to deliver healthcare services and provide training for local healthcare providers in countries around the world. Examples of this work include:

- > A donation of meropenem (Merrem®) for a paediatrician working with Angkor Hospital for Children in Siem Reap, Cambodia for use in a Sepsis Program for children arriving in medical distress
- > A donation of ropivacaine (Naropin®), lidocaine (Xylocaine®), bupivacaine (Sensorcaine®) and propofol (Diprivan®) to support a team of orthopaedic surgeons, anaesthesiologists, nurses and support staff travelling on a medical mission to Cuenca, Ecuador to provide free total hip replacements for patients unable to afford surgery who are unable to work or care for their families due to their condition
- > A donation of propofol (Diprivan®) and lidocaine (Xylocaine®) to support a team of plastic surgeons, anaesthetists and nurses from the Canada Ukraine Foundation working at the Kiev Central Hospital to conduct reconstructive surgeries (maxillofacial, hand, skin grafting, nerve repair), promote education, and share strategies and expertise.

In addition to our donations in response to disasters and public health needs, we also entered our 9th year in our partnership with AmeriCares on a target initiative in Cambodia at the Sihanouk Hospital Center of HOPE. The initiative focuses on early detection of breast cancer through patient, provider and peer education as well as treatment and management of disease post diagnosis.

In 2017, we will conduct a review of our product donation programme with an aim to identify a new structured programme that we can support through a combination of financial and product donations.



Sustainability at AstraZeneca
Goals for securing our future
Accountable and inclusive governance

About us
Benchmarking and recognition
Sustainability foundations

Our sustainability strategy
Materiality

Our global contribution
Stakeholder engagement

Employee giving and volunteering

AstraZeneca recognises the giving and volunteer efforts of its employees and provides support for these activities in alignment with our Global Procedure and Guidance on Community Investment. Local programmes vary from market to market to reflect local needs and resourcing. Volunteering time allowances vary and can range from between one to five days annually per employee for volunteer work done during work hours. Some local markets have programmes to recognise and reward volunteer work that occurs outside of work time. Here are a few of the different ways employees around the world get involved in their communities.

In April 2016, AstraZeneca US launched the Power of Us, a brand-new employee giving programme that enables all US-based employees to give back through time, talent and/or financial resources. AstraZeneca US will match 100% of employee donations to eligible charities up to \$2,500 per year, capped at \$1 million for the US operating company each year. So far, AstraZeneca's US employees have contributed 20,000 hours of volunteer service and donated more than \$1.8 million to non-profit organisations across the country through the Power of Us.

In AstraZeneca UK's North West Region, employees have revitalised their volunteering with iVolunteer, a platform that makes it easy for employees to find opportunities that are right for them. There are many different opportunities for both teams and individuals to get involved with in their local community. In 2016, employees spent more than 1,000 days volunteering. This platform has been so successful there are plans for its expansion into Cambridge, AstraZeneca's new head office community, in 2017.

Mentoring to make a difference

AstraZeneca supports Mentor Sweden in its work to use mentoring to give young people self-esteem and thus make positive decisions. This is achieved through individual mentor programmes, short-term programmes in groups and inspirational activities. AstraZeneca employees can get involved in different ways.

Cecilia is a process engineer at AstraZeneca who was paired with a teenager named Evin.

Evin says: "Cecilia has helped me to find my way. Not only when it comes to which high school programmes I should choose or what summer jobs I should apply for, but she has also encouraged me to try new things."

Despite the gap in age and experience, the pair have discovered that they are often thinking about the same things but from slightly different perspectives. Cecilia says: "As I've spent time with Evin, she has become more courageous, both in terms of things she gets involved in and the things she dares to discuss and tell me. Now she can travel in the subway and she says what she thinks and wants."

Even though the official year is over, Cecilia and Evin are still in touch. Evin adds: "Cecilia is an adult that I can talk to and ask questions. I have been able to do things that I haven't done before and see things I haven't seen before."



Access to healthcare

Providing access to healthcare for all those who need it is a significant and complex global challenge. We are making it easier for people to afford our medicines, especially in Emerging Markets. We also focus on developing strong collaborations with a wide range of partners to strengthen healthcare capabilities, particularly in developing economies.



Sustainable access

We aim to improve access to healthcare around the world by tailoring our programmes to the communities they will serve in a way that is commercially sustainable and with an aim of providing lasting health benefits. As access to healthcare can also vary within a country, our activity is tailored locally to meet the needs of different patient populations.

Highest climber

from 15th in 2014 to 7th in 2016 in the Access to Medicine Foundation global index



Health systems development

Providing medicines is beneficial, but setting up long-term health systems that will have a lasting impact on the communities they serve brings benefits for generations. Through our initiatives such as Healthy Heart Africa and working with partners on the ground, we are able to improve screening, diagnosis and treatment for health conditions.

2.7 million

patients screened for hypertension in Kenya as part of our Healthy Heart Africa programme



Intellectual property

Our intellectual property is the result of research and we actively protect our inventions. Our intellectual property strategy includes a commitment not to file for patents in a range of least developed and lowest income countries.

‘Best practice’

identified in the Access to Medicine Index for our intellectual property strategy

\$10 million

five-year global public-private partnership with the US President's Emergency Plan for AIDS Relief (PEPFAR)



Our approach

At AstraZeneca, we research, create, manufacture and market medicines and treatments for the whole world. We believe everyone should have access to these medicines, regardless of where they live or income. We work hard to improve access to medicines for all, particularly those who have traditionally been underserved by the industry.

Access to healthcare is one of our sustainability priorities and a fundamental element of our corporate strategy. We made significant progress in broadening the access to our products by making medicines more affordable. We are working towards greatly increasing access, particularly in low-income countries, through our patient access programmes.

Our efforts to improve affordability are particularly focused on patient ability to pay based on disposable household income and healthcare budgets in a particular country. We continue to grow our capabilities and build on the experience of wellbeing initiatives and patient access programmes, which provide discounts on our medicines and other patient services.

Our access to healthcare strategy is made up of three elements:

- 1 Provide high-quality, effective and appropriate medicines to those who need them.
 - 2 Improve affordability, particularly among the growing middle class in Emerging Markets.
 - 3 Bring down healthcare barriers, particularly in developing countries.
- Our strategy helps us to address affordability and other healthcare barriers, while ensuring we continue to provide high-quality medicines to those who need them.



Key

- ↑ Target exceeded
- ✓ Full target achieved
- Ongoing progress
- ⬇ Target not achieved, some progress

Access to healthcare

Goals	Target progress	Progress highlights
Expand sustainable patient access to our medicines to reach 3 million patients by 2016	✓	4.49 million patients in Emerging Markets served by patient access programmes
Young Health Programme After exceeding initial goal to reach 1 million people through the Young Health Programme by 2015, aim to renew in five markets and expand into three markets by 2018	✓	Renewed in Canada, Germany, China and India and expanded into Kenya Total reach in 2016 of 166,000 and 1.6 million youth since 2010 Proposals for expansion are in development for Brazil and Australia and for renewal in Portugal
Healthy Heart Africa Reach 10 million hypertensive patients across Sub-Saharan Africa by 2025	→	Since 2014, we have conducted over 2.7 million screenings and started treatment for over 100,000 hypertensive patients
Healthy Heart Africa Screen over 1.4 million people for hypertension by end of 2016	↑	

“

AstraZeneca has extensively expanded and updated their access strategy identifying those areas where they are best placed to provide support and are now well positioned for future progress.”

Access to Medicine Index

In Focus: How is AstraZeneca broadening access to healthcare?

The barriers to improving access to healthcare are complex and varied and require long-term, comprehensive solutions. Such challenges require a joined-up suite of global solutions. One company working alone can't address access to healthcare alone. Instead we are working with local and international partners to improve understanding, education and availability of products and services.

In developing countries, many people live in rural areas with inadequate infrastructure and little access to transport. A lack of health education means there can be a poor understanding of prevention, symptoms, self-care and appropriate medical care for various conditions. Affordability remains a significant issue, with many patients having to self-fund healthcare from their limited incomes.



As a global company, we are ideally placed to take the necessary steps to address some of these issues through our innovative and collaborative strategy. We have made significant changes to product pricing and intellectual property. We have developed an affordability-based pricing strategy for self-pay patients, which bases our retail prices on a percentage of the average disposable income in the country in which we are working. We also committed to not filing for patents in a range of low-income, lower-middle-income and upper-middle-income countries.

Beyond the walls of our offices and research facilities, we are working on the ground with a wide range of local and global partners, including governments, NGOs, charities, community groups and schools to break down barriers to healthcare through education, community schemes and infrastructure projects. The biggest of these schemes is our Healthy Heart Africa programme, through which we are tackling hypertension in Kenya and Ethiopia and providing affordable AstraZeneca hypertension medicines to those prescribed them.

Access to Medicine Index 2016

The Access to Medicine Index independently analyses and ranks the top 20 research-based pharmaceutical companies on how they make medicines, vaccines and diagnostics more accessible in low and middle-income countries. It is funded by the Bill & Melinda Gates Foundation and the UK and Dutch governments and has been published every two years since 2008.

Our performance on improving access to healthcare is assessed by the Access to Medicine Foundation in its bi-annual Index. In the latest Index report, AstraZeneca moved up from 15th to 7th.

The Index is broken down into seven technical areas:

- > General Access to Medicine Management
- > Market Influence Compliance
- > Research and Development
- > Pricing, Manufacturing and Distribution
- > Patents and Licensing
- > Capacity Building
- > Product Donations.

Of these, AstraZeneca became the biggest riser in Access to Medicine Management, Pricing, and Patents and Licensing and also improved in Capacity Building. In Research and Development we are aware that we need to consider sustainable access earlier in our research programmes. We did not score higher on Product Donations, as we do not have a publicly stated global donation strategy, preferring to make donations on an ad hoc basis to best meet patient need.



Sustainable access

We aim to meet patient needs across the world, ranging from those for whom healthcare is readily available and who can afford our medicines, to those in Emerging Markets who may need help to access our medicines and those in developing economies where barriers to healthcare are not always price related.

Product affordability

We rely on sales of medicines in our established markets to help us generate the revenue we need to provide our shareholders with a return, to invest in continued innovation and to expand the availability and affordability of our medicines.

We are working to make our medicines affordable to more people on a commercially and socially sustainable basis. Our strategy is based on an in-depth understanding of the economic conditions of the populations in emerging countries and an aim to reduce the economic burden of health on those who have limited incomes. We do this through our mainstream operations, but also via patient programmes and a targeted pricing strategy that takes into account ability to pay, particularly in Emerging and Developing Markets, where up to 45% of funding for healthcare is paid by patients out of their own pocket.

Currently our strategy focuses on chronic conditions, such as respiratory and cardiovascular disease. It is aimed at markets where there is significant unmet patient need and reflects two of our core therapy areas.

We developed an ability to pay evaluation framework to identify affordable price points for those who pay for their own healthcare by assessing household budgets and the economic impact of medicines on a country-by-country basis, using World Health Organization and other economic data sources.

We recently analysed our biggest-selling brands in emerging countries and the 13 biggest out of our pocket markets in our International Region (Russia, China, Australia, Africa and South America). As a result, we calculated that by pricing our medicines at no more than 5% of national disposable household income we can make our current respiratory and cardiovascular portfolio affordable for around 70% of the population. This includes the median income groups for which this represents increased access to medicines, plus those already in a position to pay full price. We expect to expand this methodology significantly.

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AstraZeneca rose eight spots from being 15th in 2014 and 7th this year, making AstraZeneca the highest climber in the 2016 Index. Compared to 2014, AstraZeneca has significantly increased the number of products with equitable pricing strategies. It has conducted an in-depth analysis of the abilities of different population segments in a subset of countries to pay for its products. The results have been used to shape its new pricing policy, and will continue to inform pricing adjustments. The policy has already been implemented for certain products and countries in scope. AstraZeneca has also created an Affordability Centre of Excellence to train staff on this new policy.”

**Access to Medicine Index –
Pricing, Manufacturing and Distribution**

Sustainable benefits

Wherever possible, we integrate a wide range of localised support services for patients, ranging from disease education, health awareness and preventive measures, to discounted or free healthcare services, dietary advice and nurse counselling. We also partner directly with NGOs and governments to improve the underlying healthcare infrastructure and improve access to medical treatment.

Our medicines play an important role in treating unmet medical need and, in doing so, they also bring therapeutic as well as economic benefits. Effective treatments can help lower healthcare costs by reducing the need for more expensive care, such as hospital stays or surgery, or through preventing patients from developing more serious or debilitating diseases. They also contribute to increased productivity by reducing or preventing the incidence of diseases that keep people away from work.

Further patient access programmes which provide discounts on our medicines, and other patient services include Disfruto Mi Salud in Central America and the Caribbean, AZyYo (AstraZeneca and You) in Chile and Karta Zdorovia in Russia. We have significantly expanded our initiatives across Latin America, the Middle East and Africa, and Asia Pacific, and the number of patient access programmes in Emerging Markets has more than doubled since 2013, reaching 4.9 million patients in total by the end of 2016.

In Central and Eastern Europe, we offer Patient Access Card programmes to provide discounts on some of our key medicines, along with educational materials that help people understand their disease and the importance of sticking to their treatment plans. For example, in Romania, a Patient Access Card is distributed by doctors to appropriate patients to enable co-payment reductions. Typically, a separate card is required for each treatment, but we are simplifying the process by making a single card apply to reductions on a range of our key products, making it easier for patients to manage and reducing the administrative burden on pharmacists. Patients in rural areas are also benefiting from a new dedicated call centre. By the end of 2016, we had reached an additional 30,000 cardiovascular patients through this single card programme and distributed over 295,000 cards.

Brazilian Mosaic makes medicines affordable

Brazil is one of the many countries in which we operate where there are huge socio-economic disparities within the population and, despite the universal healthcare system, the private sector remains the main source of funding for medicines. The relative investment in medicines is also lower than in comparable countries and the percentage of private expenditure is on a par with economies without universal healthcare. This has an impact on household disposable income and the ease of access to medicines.

To address this disparity, AstraZeneca Brazil has tried to understand how to apply the right discount to the right population groups, as well as determining how to incentivise people to continue with the treatment they need. We did so by identifying economic patient profiles through an innovative and customised approach called Mosaic Segmentation.

The starting point is to use economic data supplied by data provider Experian to compile profiles across the population. These profiles incorporate the income segment linked to patients' national ID numbers. When a patient registers on the programme they are automatically assigned a discount level based on their ability to pay. This link between individual levels of affordability and access to medicines has helped more than 150,000 patients since February 2016. It is the latest development in AstraZeneca Brazil's Faz Bem programme, which helped a total of almost 2.5 million patients since it was launched in 2008.



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AstraZeneca considers five socio-economic factors when setting prices for a first-line heart disease medicine. AstraZeneca's intra-country equitable pricing strategy for ticagrelor (Brilinta®): (1) disease burden, (2) the availability of public financing, (3) levels of inequality, (4) supply chain conditions and (5) patient awareness. The strategy targets 27% of priority countries. In India, China and Brazil, it targets multiple population segments. This strategy is particularly important as ticagrelor is used first line in the prevention of atherothrombotic events. It is also on patent, and AstraZeneca is the only manufacturer.”

Access to Medicine Index

Healthy Heart Africa

AstraZeneca's Healthy Heart Africa (HHA) is an innovative programme committed to tackling hypertension and the increasing burden of cardiovascular disease across Africa.

Aligned with AstraZeneca's broader sustainability goals, our commitment to addressing hypertension is part of our access to healthcare strategy and based on our expertise, with over a century of experience in treating cardiovascular diseases, and an extensive portfolio of anti-hypertensive medicines.

Given our product portfolio we are in a position to make a major contribution and impact to SDG 3.4.1. According to estimates from 2012, over three-quarters of premature deaths were caused by cardiovascular disease, cancer, diabetes and chronic respiratory disease.

HHA was established with the ambition to be a sustainable programme. We sell the AstraZeneca medicines at, or close to, a 90% price reduction to the patients, which is achievable with a no-profit/no-loss business model.

Supporting local healthcare systems

HHA aims to support local health systems by increasing awareness of the symptoms and risks of hypertension and by offering education, screening, reduced-cost treatment and control. In developing a programme to address hypertension in Africa, we realised that we needed to customise our approach to suit conditions on the ground, in order to ensure the sustainability of the programme. Recognising the significant barriers to access, HHA's model is based on three key pillars:

- > Increasing education and awareness
- > Training providers and supporting the development of guidelines that are appropriate for community-based implementation
- > Developing a supply chain and distribution model that ensures access and affordability.

To ensure local capacity is being built throughout the process, we joined forces with eight local partners in Kenya at every level of care, to create a demonstration model that works for the country. These partners work across the private, public and faith-based sectors, and include: AMREF, AMPATH, Christian Health Association of Kenya, PSI, and the Kenyan Catholic Conference of Bishops, PATH, Kenya's Mission for Essential Drugs and Supplies, to establish secure supply chains for antihypertensive medicines, and Savannah, a Kenyan data management company, which we have partnered with to allow for continuous monitoring of programme outputs and patient-level data capture.

HHA's approach dedicates extensive time and investment in monitoring, evaluation, data management and evidence generation. Learning by doing and evolving approaches based on data from the field is critical to continuously improving and tailoring our business model, as we plan for expansion across Africa.



HHA achievements

HHA aims to reach 10 million hypertensive patients across Africa by 2025. Since launching HHA in 2014, we have:

- > Conducted over 2.7 million hypertension screenings
- > Activated over 404 health facilities
- > Trained over 3,000 healthcare workers across 31 counties in Kenya
- > Identified over 500,000 people with elevated blood pressure
- > Diagnosed 100,000 patients with high blood pressure.

Broadening access in Ethiopia

In February 2016, following the successful launch of the HHA programme in Kenya, we developed a partnership and signed a memorandum of understanding with the Federal Ministry of Health (MOH) in Ethiopia. The agreement is to integrate HHA into the Ethiopian healthcare system and facilities, with a specific focus on hypertension. This was done in support of the Government of Ethiopia's National Strategic Action Plan for Non-Communicable Diseases.

The goal for our Ethiopia HHA partnership is to decentralise and scale up high-quality hypertension care and treatment across health facilities in and around Addis Ababa, with eventual expansion to 12 hospitals and 36 health centres across seven regions.

Despite a challenging environment in Ethiopia due to a state of unrest, our dedicated HHA team on the ground has been able to achieve some key milestones in the first year of implementation, including:

- > Developing the first hypertension protocol and training materials in Ethiopia, together with the MOH and the Ethiopian Cardiology Society
- > Training more than 900 health workers, including clinicians, nurses and health extension workers
- > Fully mobilising 37 health facilities.

Key data will be reported as the programme progresses.



Tackling HIV/AIDS with PEPFAR

In September 2016, we announced a \$10 million five-year global public-private partnership with the US President's Emergency Plan for AIDS Relief (PEPFAR) that will expand access to HIV/AIDS and hypertension services by offering them in an integrated manner at existing PEPFAR-supported HIV/AIDS sites, beginning in Kenya.

Beginning with an initial one-year pilot programme in Western Kenya and working with the Kenyan Ministry of Health, the PEPFAR-HHA partnership will leverage PEPFAR's existing HIV infrastructure in Homa Bay and Kisumu. The pilot will be implemented by PATH, a current PEPFAR partner with extensive expertise implementing both HIV and NCD programming. The partnership will work closely with the Government of Kenya, a key partner for both AstraZeneca and PEPFAR through existing initiatives, to contribute to both the HIV and NCD programming priorities of the country.



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Together, we have made remarkable progress in the global response to HIV/AIDS. Yet, we need innovative approaches to better identify and serve harder to reach populations, including men, who too often only present for care when they are very ill. Through this new partnership with AstraZeneca we will enhance our ability to deliver earlier and more effective HIV/AIDS testing and treatment for working-age men in two high-prevalence counties in Kenya.”

Ambassador Deborah L. Birx, MD, US Global AIDS Coordinator and Special Representative for Global Health Diplomacy

“

AstraZeneca shares PEPFAR's vision of improving the health and lives of underserved communities in Sub-Saharan Africa. Increasing rates of hypertension and cardiovascular disease in the region threaten individuals, families and communities, and burden already-stressed health systems. We are honoured and proud to join with PEPFAR to improve access to vital testing and treatment which help stem the tide of both hypertension and HIV/AIDS.”

Mark Mallon, Executive Vice President, International, member of the Senior Executive Team and HHA sponsor at AstraZeneca

Health systems development

Access to healthcare depends on having a functional healthcare system and the right allocation of resources to make sure that medicines are used appropriately as part of overall health management.

Partnering to strengthen health systems

For people in communities with limited healthcare infrastructure, we partner with others to help strengthen healthcare frameworks and capabilities. As well as helping to increase the extent of the work we do, it helps us to break down barriers to healthcare, particularly those around infrastructure and religious or cultural barriers. We work with local partners to gain insight into the local community and how we can work most effectively while remaining culturally sensitive.

Tackling breast cancer in South Africa

Breast cancer is the most common cancer and greatest cause of cancer death among women in South Africa. Poor education and lack of awareness of breast health issues, cultural barriers and lack of access to healthcare facilities have hindered efforts by the government to combat the disease among low-income communities.

Phakamisa is our breast cancer partnership programme in South Africa. Phakamisa means 'to uplift' in Zulu or 'elevate' in Xhosa. This programme is now in its fifth year of operation, bringing together different organisations to help raise breast cancer awareness, increase early diagnosis, and improve access to treatment and effective support networks. In collaboration with South Africa's Foundation for Professional Development, we are providing accredited courses in cancer diagnosis, treatment and care to doctors, nurses and other healthcare professionals. Since the launch of Phakamisa, more than 600 healthcare professionals have been provided with courses. AstraZeneca is also working to ensure that our comprehensive range of hormonal treatments is made available to the health service in a cost-effective way.

In partnership with the Cancer Association of South Africa and the Breast Health Foundation, we are training Phakamisa 'Navigators': teams of volunteers and counsellors to go out into the community, raising awareness and supporting patients. Since the start of the programme 400 people have been trained as Navigators. Continued education for the Navigators has also covered socially relevant issues such as cervical cancer, HIV, gender-based violence and child abuse.

As of the end of 2016, over 1.6 million women have been reached by Navigators across the country. The primary objective of these Navigators is to support patients who are diagnosed with breast cancer in the public system. Their interaction with people when raising awareness of breast health in their communities made it possible for close to 3,800 malignant lumps to be identified and referred for effective treatment, something which might not have been discovered if the services of the Phakamisa Navigators were not available. During the four years since the programme started, a monthly average of 2,501 patients have been supported by Phakamisa Navigators in the public health sector.



Addressing prostate cancer

Prostate cancer affects one in six men in South Africa. Although it is not as widely addressed as breast cancer, the mortality of prostate cancer is much higher than that of breast cancer. With this reality facing South African communities, Phakamisa embarked on another challenge during 2016 and started to implement the aspects of the breast cancer model so that prostate cancer patients can also be supported when diagnosed. Phakamisa Prostate is currently being rolled out in three of the country's nine provinces, with implementation in the rest of the country planned for 2017. Phakamisa Prostate offers the same service as the breast cancer programme through the collaboration of NGOs and private entities that join Phakamisa in the worthy cause to change and impact the lives of cancer patients and their families in South Africa.



Working with partners to increase capacity

AstraZeneca partners with Tianjin University to address manufacturing skills gaps at the industry level in China. This is an example of best practice. AstraZeneca has a long-term partnership with Tianjin University that aims to improve manufacturing safety standards at the industry level in China. Rather than training individual manufacturers, AstraZeneca provides funding, training and other support to the university's Process Safety Laboratory to fill local skills gaps. The company's expertise is shared more widely via the university's connections with manufacturers, to build industry-wide capacity.

Source: Access to Medicine Index

Building on success

Building on the successful and ongoing Phakamisa collaboration in South Africa, in 2012 we set up a new partnership in Kenya, where breast cancer is a particular issue. During the year, we trained 150 healthcare practitioners and 60 volunteers through a series of workshops in four major Kenyan cities. The programme was successfully introduced to Ghana in 2013. Support to prostate cancer patients will also be given from 2016 in Kenya and Ghana. In 2016, AstraZeneca is extending the programme to more countries in Sub-Saharan Africa such as Nigeria, Angola and Ethiopia.

Disease prevention

Preventing disease is far more cost effective than curing disease. By focusing on prevention, we support the development of healthier communities, schools and workplaces and increase the likelihood that people will live long and productive lives. This has a positive impact on healthcare costs and on the overall health of national economies.

One such example is AstraZeneca's Young Health Programme. Launched in 2010, the programme has reached 1.6 million young people and worked with over 30 expert organisations in 21 countries, combining on-the-ground programmes, research and advocacy to target the four most prevalent risk factors for NCDs: tobacco use, the harmful use of alcohol, lack of exercise and unhealthy eating. We continue to expand the Young Health Programme to new countries and participate globally and locally in the effort to increase investment in NCD prevention programming for youth.

Read more about the ongoing success of our Young Health Programme [here](#) and in the Community investment section of the full 2016 sustainability update.

NCDs are those conditions often caused by lifestyle factors and have a much bigger global death toll than bacterial and viral infections.

NCDs



Heart disease



Cancer



Type 2 diabetes



Respiratory disease

Lifestyle factors



Tobacco



Drugs and alcohol



Lack of exercise



Unhealthy diet

Intellectual property

Intellectual property (IP) rights are the lifeblood of the biopharmaceutical industry, providing the incentives required to conduct the research and development (R&D) that produces new medicines to treat patients and improve patients' lives. AstraZeneca proactively makes patent information in the Index Disease space available on its website and is also willing to consider granting patent licences in certain areas.

It takes approximately 10 to 15 years to develop a new medicine, and for every one medicine that reaches patients, there are thousands of drug candidates that fail. The ability to obtain patent protection for innovations in R&D, under a robust IP protection and enforcement framework, is one of the main incentives for innovation and provides a sustainable framework for the innovative, pharmaceutical R&D that produces life-saving medicines.

AstraZeneca seeks to protect innovations worldwide. We have developed an IP strategy that means we don't file patent applications in a number of low-income and developing countries. We have prioritised the countries where we seek patent protection for our products and accept that we cannot file patent applications in every country of the world. In Sub-Saharan Africa, AstraZeneca does seek patents for invention for new chemical entities in Angola, Ethiopia, Gambia, Ghana, Kenya and Nigeria. We also seek them for new chemical entities and other types of inventions in South Africa.

Unless constrained by contract, AstraZeneca proactively abandons all patent property that does not support a product, or an actual or potential pipeline asset, and is therefore of no value to us. As a result, other research organisations can use what we have learned to seek further insights and inform their own work without having to secure a licence from AstraZeneca or anyone else. AstraZeneca will license (i.e. not enforce) its patent rights in the neglected tropical disease space regardless of country.

AstraZeneca also has a position of accepting licence terms, i.e. not enforcing its patent property in any low-income countries (LICs) or least developed countries (LDCs). While we do currently seek to patent inventions directed to new chemical entities in Angola, Ethiopia and/or Gambia (which equates to about 6% of the total number of LICs and LDCs), we would not consider enforcing such rights unless the economy of a country improved to enable that

country to cease to be classified as an LIC and/or LDC. There are precedents for such a transition as Botswana and Cape Verde moved out of LDC status in 1994 and 2008 respectively.

We seek to improve the visibility of the existence of our patent rights covering products that may be used to treat Index Diseases and Index Countries as each are defined by the Access to Medicine Index (listed on page 164 and 163 respectively in the Access to Medicine Index – Methodology Report 2016). It is not always straightforward to access information about the expiry of patent rights from publicly available sources. To help with this we include patent expiry information for China, the EU, Japan and the US for key products in our Annual Report. We have published a table that provides details of the patent rights we have in Index Countries for medicines that are used to treat Index Diseases, together with an indication of the expiry of those rights.

We recognise the right of developing countries to use the flexibilities in the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights, including the DOHA Declaration (14 November 2001) in certain circumstances, such as a public health emergency. This is enshrined in our Public Policy Issue for Compulsory Licensing.

Licensing is an important way of allowing access to patent-protected inventions. Our Non-Exclusive Voluntary Licence (NEVL) Public Policy Issue sets out the criteria under which we would grant such a licence. We are flexible and will consider proposals concerning the geographic scope of any NEVL. Also, AstraZeneca will license its patent rights in LICs, LDCs and lower-middle-income countries (LMICs) for all Index Diseases (for all Index Diseases see page 22 of the Access to Medicine Index – Methodology Report 2015) except for communicable diseases. We reserve the right to enforce these patents in LMICs for all other uses.

AstraZeneca will license any patent rights covering medicines on the Essential Medicines List for supply of those Essential Medicines to LICs, LDCs and LMICs, and would also consider licensing any patent rights to third parties for supply of such medicines in or to Medium Human Development Countries (MHDCs).

AstraZeneca supports the Bolar research exemption (or safe harbour exemption) under which a third party may prepare for and obtain regulatory approval so that a generic product can be available on patent expiry; but this does not mean that the company interprets Bolar as extending to commercial manufacture, importation or stockpiling during the lifetime of a patent.

Best practice: Clarity in approach to IP management

AstraZeneca clearly states the countries where it holds patents, where it will not file for patents, where it is prepared to license and for which products, and gives an indication of the term.

Source: Access to Medicine Index

Environmental protection

As we push the boundaries of science and develop new medicines, we must conserve natural resources and ensure our products are environmentally safe at all stages in their life cycle. We strive to manage our environmental impacts across the entire value chain from research, development and production through patient use and final disposal.



Protecting natural resources

Our business is built on cutting-edge science and we base our environmental targets and monitoring on sound scientific data and insight. In 2015, we set specific targets for the period 2016–2025 to drive our efforts to reduce greenhouse gas (GHG) emissions, water consumption and waste. We committed around \$25 million to natural resource projects to reduce our impacts across our sites in 2016.

5%

cut in emissions down to 1,657 ktCO₂e since 2015, exceeding our 2016 target

Quadrupled

our sourcing of certified zero carbon power from renewable sources to 445,000 Megawatt hours since 2015

5%

reduction in water consumption since 2015



Ensuring the environmental safety of our products

As a minimum, we are committed to ensuring effective environmental management of our products from pre-launch through to product end-of-life. We aim to lead our industry in understanding and mitigating the effects of pharmaceuticals in the environment (PIE).

16

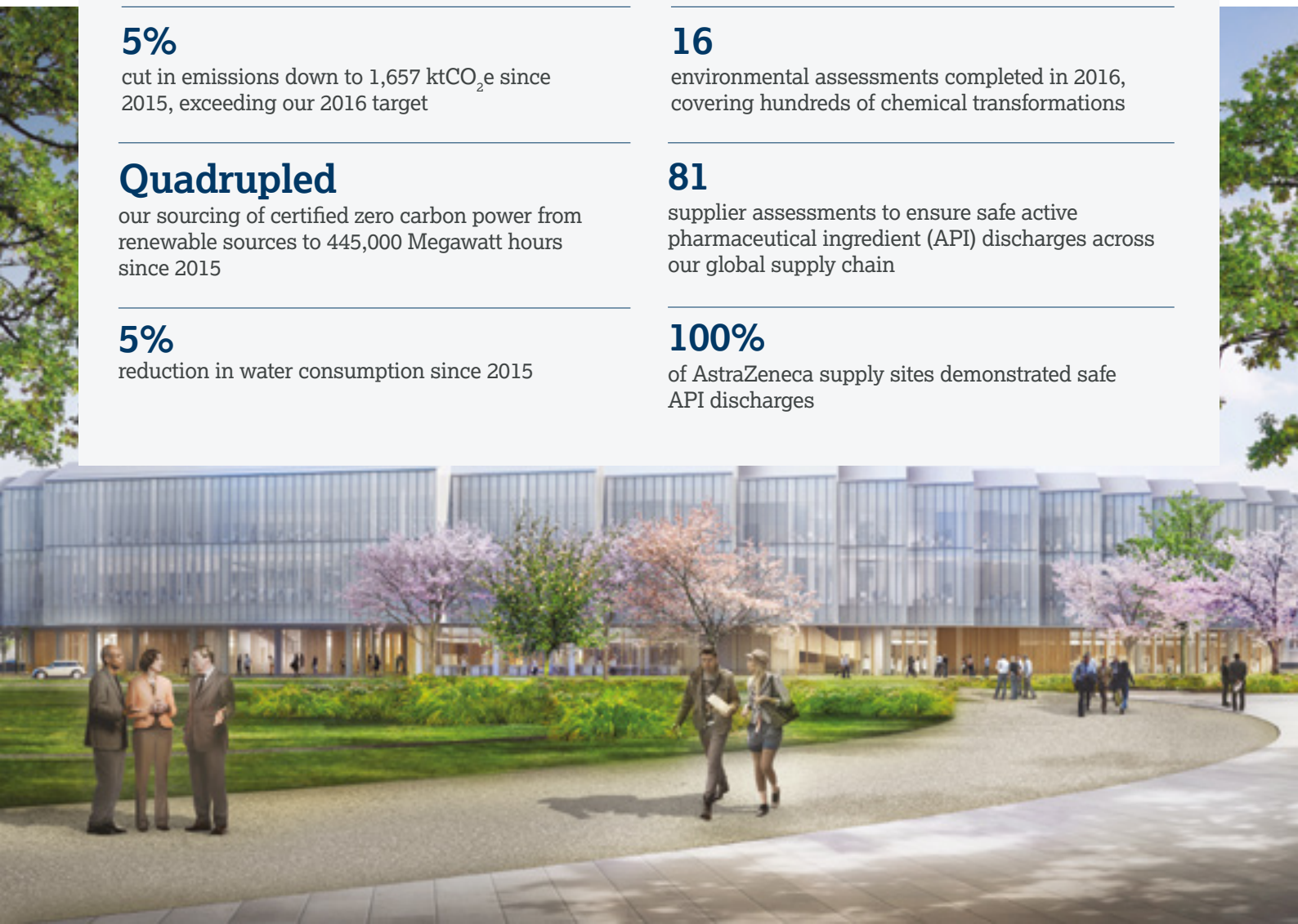
environmental assessments completed in 2016, covering hundreds of chemical transformations

81

supplier assessments to ensure safe active pharmaceutical ingredient (API) discharges across our global supply chain

100%

of AstraZeneca supply sites demonstrated safe API discharges



Our approach

In 2016, we reaffirmed environmental protection as one of our three core sustainability priorities. We are committed to operating in a way that respects and protects our climate and natural resources through a science-based approach that drives continuous improvement across our value chain.

In 2016, we embarked on a new strategy that sets ambitious commitments up until 2025. As we develop more innovative medicines and technologies, we constantly face new challenges and opportunities. We take a robust, science-based approach to balancing health benefits with the need to protect the environment. Ensuring all our sites comply with the relevant regulatory and industry standards is the minimum we must do to retain our licence to operate. We aim to go much further by leading our industry to understand its risks and to make the most of opportunities to reduce our collective impacts on the environment.

Our strategy and commitments



Protect natural resources

Improving the environmental performance of our operations and supply chain, including reducing our GHG footprint

Commitments

Climate change:

Limit our 2025 extended operational GHG footprint¹ to 2015 levels

Science-based target:

Reduce absolute Scope 1 emissions by 20% and Scope 2 emissions by 95% by 2025 against the 2015 baseline, and reduce all Scope 3 emissions by 25% per million USD of sales in the same timeframe

Reduce GHG emissions from waste incineration, business air travel, primary distribution (freight and logistics) and first tier APIs and formulation & packaging (F&P) suppliers (>90% of category spend, energy only) by 20% by 2025 from a 2015 base-year

Reduce GHG emissions per device from patient use of inhaler therapy devices over the same time period

Improve primary data collection within Scope 3 value chain GHG accounting by 2020

Other climate change targets:

10% absolute reduction in energy consumption against a 2015 baseline by 2025

100% renewable power consumption globally by 2025; interim ambition of 100% in the US and Europe by 2020

70% air to sea conversion in primary distribution by Q4 2017

Waste: 10% absolute reduction against a 2015 baseline by 2025

Water: Maintain usage at 2015 levels as our business grows by 2025

90% of **API** syntheses meet resource efficiency targets at launch

Establish equivalent resource efficiency targets for **biologics** (for example antibodies, oligonucleotides and peptides)



Ensure the environmental safety of our products

Reducing environmental impacts throughout the entire life cycle of our medicines, including understanding and minimising the long-term effects of PIE

Commitment

Ensure effective environmental management of our products from pre-launch through to product end-of-life

For scope and boundaries of our environmental reporting see page 26.

¹ Extended operational footprint includes: Scope 1, Scope 2 and some Scope 3 GHG emissions. It covers energy use, road fleet, process emissions, waste incineration, business air travel, primary distribution (freight and logistics), first tier outsourced supply of API and F&P (90% of spend, energy only), and patient use of pressurised metered dose inhalers (pMDIs), measured in tonnes carbon dioxide equivalent (tCO₂e).









What we have achieved

Our first year's progress against our commitments for 2016–2025 is summarised in the table below:



Key

-  Target exceeded
-  Full target achieved
-  Ongoing progress
-  Target not achieved, some progress

Goals	Target progress	Progress highlights
Reduce operational GHG footprint ¹ by 2% (against a 2015 baseline) to 1,708,335 tonnes CO ₂ e by 2016		Our operational GHG footprint totalled 1,656,917 metric tonnes in 2016, a 5% reduction from our 2015 baseline
Have our climate change targets approved by the Science Based Targets (SBT) initiative by 2016		We attained verification that our climate change targets are science based
Set out a target for 100% renewable power by 2016		We launched our commitment to 100% renewable power consumption globally by 2025 and in the US and Europe by 2020 through the RE100 initiative
Publicly disclose information associated with our climate change performance by 2016		We increased the scope of our operational carbon footprint reporting in 2016
Reduce waste generation by 2% (against a 2015 baseline) to 36,760 tonnes by 2016		In 2016, our total waste was 37,923 metric tonnes, a 1% increase on 2015
Reduce water use by 2% to 4.13 million m ³ (against a 2015 baseline) by 2016		In 2016, our water footprint was 3.99 million m ³ , a 5% reduction compared with 2015
90% of API syntheses meet resource efficiency targets at launch by 2016		100% of API syntheses (avibactam) met launch target in 2016. In addition we achieved 9% reduction in our resource efficiency metric, process mass intensity (PMI), across the portfolio
Ensure effective environmental management of our products from pre-launch through to product end-of-life by 2016		Safe API discharges were confirmed for 100% of our own and >90% globally managed supplier sites in 2016 We completed a comprehensive review for our EcoPharmacoVigilance (EPV) programme

¹ Extended operational footprint includes: Scope 1, Scope 2 and some Scope 3 emissions. It covers energy use, road fleet, process emissions, waste incineration, business air travel, primary distribution (freight and logistics), first tier outsourced supply of API and F&P (90% of spend, energy only), and patient use of pressurised metered dose inhalers (pMDIs), measured in tonnes carbon dioxide equivalent (tCO₂e).

Our environment management system

At the highest level, the [AstraZeneca Code of Conduct](#) sets out the ethical standards we expect of our employees, including carrying out business in an environmentally responsible manner.

Our [Global Safety, Health and Environment \(SHE\) Policy](#) is the overarching document for our SHE Management System and is applicable to all functions and locations. It is supported by detailed global standards and procedures that establish mandatory requirements in key risk areas. Our SHE performance is regularly monitored and managed through comprehensive assurance programmes that include performance reporting, internal auditing and an annual management review.

Our approach to SHE management is compatible with ISO14001 and, although it is not a requirement, our facilities have the option of seeking this certification. Additionally, two of our largest sites have now attained ISO50001 certification – Gaithersburg in the US and Macclesfield in the UK. Our internal SHE auditors are trained in techniques for auditing against ISO14001 and OHSAS18001.

In Focus: How do we use science to protect the environment?

Because we believe science should be the driver for everything we do, it goes without saying that it plays a critical role in helping us understand and manage our environmental impacts and opportunities. From improving the sustainability of our medicines to reducing our carbon footprint and developing understanding of the risks of PIE, we invest significant time, resources and expertise in leading on science-based environmental protection for our industry.

In October 2016, we became one of only four FTSE 350 companies to have its climate change targets approved by the SBT initiative. SBT is a partnership between CDP, the UN Global Compact (UNGC), World Resources Institute (WRI), and World Wide Fund for Nature (WWF). It seeks to create systematic change in how companies set targets, ensuring they contribute their fair share of the challenging emissions reduction needed to limit global temperature increase to less than 2 degrees Celsius. In this way, science-based emission-reduction targets are founded not only on the GHG reduction projects in a company's pipeline, but also on the fair, sector-specific contribution it can make to help avoid the worst impacts of climate change. We are now working to deliver our science-based target and will develop it as we further our understanding and GHG monitoring matures.

Improving the environmental performance of our product pipeline is another critical area that involves a delicate balance between meeting patient needs while reducing environmental impacts and other sustainability considerations. Pharmaceutical production is extremely complex and the needs of patients will always come first. But we are committed to the proactive development of medicines that have a lower environmental footprint and place considerable importance on integrating environmental considerations across a medicine's entire life cycle – from research to manufacturing, commercialisation, use and disposal. We take a broad view and apply a wide range of approaches including [Life Cycle Analysis \(LCA\)](#), environmental risk management plans, green chemistry, packaging improvements and research. This considers the natural resources we use to manufacture our products and the safety of our pharmaceutical products in the environment.

Using cutting-edge science to develop industry-wide knowledge and understanding of the risks of PIE, including potential issues that are yet to be regulated and key scientific questions that need to be resolved, is an area on which we are particularly focused. In 2016, we invested around \$1.1 million in research specifically related to PIE, collaborating with leading universities and academic scientists and helping to leverage around \$5 million per annum. Our investment includes co-funding research on [regulatory protection goals for antimicrobial resistance \(AMR\)](#) – an area where there is still much to do but in which we believe following science will play a vital role in developing science-based policy and regulation.



Managing the impacts of our outsourced manufacturing

The ethical business expectations for all third parties we work with are set out in our [Global Standard Expectations of Third Parties](#), including standards for environmental protection and conservation. We outsource a significant proportion of our manufacturing, in particular production of the API, to third parties and we make it a priority to measure and report on the environmental impacts that arise from this outsourcing.

In 2016, we continued to focus on our globally managed first tier suppliers in the API and formulation and packing (F&P) categories, as this is the group of suppliers with which we have a high degree of influence and collaborative opportunity. We work closely with these suppliers to set appropriate environmental standards and targets and to collect environmental performance data.

We capture environmental performance data for over 90% (based on spend) of our global outsourced manufacturing of APIs and F&P suppliers across our established brands. For the first time, we are presenting data for first tier supplier energy carbon dioxide (CO₂) emissions, waste generation and water consumption over a four-year period. With the introduction of our new strategy, the energy used by our globally managed first tier suppliers is also incorporated in our operational GHG footprint scope.

As part of our commitment to ensuring the environmental safety of our products, we have an industry-leading programme to ensure safe API discharges from our manufacturing sites, including those managed by our suppliers. We work with them to help them understand the environmental and reputational importance of this issue and provide annual training and a simple tool to facilitate assessments. We technically review these assessments to ensure accuracy and consistency. In 2016,

45 APIs and 49 suppliers across 18 countries were included in scope and we completed 81 supplier assessments. All demonstrated safe API discharges representing 92% compliance for the identified scope. This met our target of demonstrating >90% compliance, which allows for the pace of change in our supplier base due to new product introductions and business development projects.

We want to promote holding third-party suppliers accountable for protecting the environment across our supply chains as active members of the [Pharmaceutical Supply Chain Initiative](#) where we share our experience and learn from others across our industry. In June 2016, we presented our safe API discharge programme as best practice and discussed the specific challenges posed by antibiotic-containing effluents at a European Pharmaceutical Industry Trade Association workshop hosted by Medicines for Europe.

AstraZeneca's globally managed suppliers in scope for environmental initiatives (environmental footprint data reporting and safe API discharges)



Minimising impacts across the product life cycle

To minimise the environmental impacts of our products, we take a whole life-cycle view and work with all those involved throughout the lifespan of a product – from discovery and development through to patient use and end-of-life disposal.

Our approach to environmental stewardship involves a wide range of activities, including:

- > LCA of key products to understand impacts and opportunities
- > Developing environmental risk management plans for all new products
- > Applying green chemistry principles to our manufacturing processes
- > Continual improvement of environmentally sustainable packaging
- > Ongoing commitment to the safety of medicines in the environment.

Once our medicines are on the market, we provide healthcare professionals with clear information on their appropriate use. We also work with authorities and industry partners to guide patients on how to safely dispose of unused medicines. See [page 24](#) for how we are tackling PIE.

Understanding the impacts of a medicine

We use LCA to understand and address the complexity of our individual products, their APIs and the wide variety of delivery systems. In recent years, our application of LCA has expanded significantly, developing our understanding of key strategic areas such as natural resources and the environmental safety of our products, forging stronger working partnerships and helping to identify productive improvements.







We conduct LCAs in a pragmatic manner, applying the appropriate tools and data analysis to further our sustainability understanding and goals. For more comprehensive studies, we work with third-party consultants using detailed tools and databases to develop a thorough insight of product impacts with attention focused on the highest impact areas of the product life cycle. Alternatively, for fast paced, high attrition and dynamic activities such as API synthesis, we support projects with rapid, insightful reviews that can be conducted in-house. In this instance, we use (and lead in the development of) the American Chemical Society Green Chemistry Institute Pharmaceutical Roundtable PMI-LCA tool.

In 2016, we conducted nine in-depth, cradle-to-grave product LCAs. In addition, we completed PMI-LCAs for 48% of the development portfolio in respect of the API synthesis.

Driving efficiencies: process mass intensity

Post-launch improvements in material costs and quality are obvious business drivers, but environmental performance is also key. At AstraZeneca, we do not consider the environmental aspects as a special condition: they are embedded within the core deliverables for our process development teams. We have adopted a metric called process mass intensity (PMI) as a measure of our efficiency in using materials. PMI is measured as kg of raw materials used to produce 1kg of final API. We set a PMI target for all drug molecules to achieve at launch, based on projected peak year sales. PMI has been a fundamental strategic corporate target since 2010 and has been a very useful tool to show the impact we can have as an organisation, to focus our approach and recognise successes in our product pipeline.

Life cycle of a medicine

	Life-cycle stage	What the stage involves	Our approach to managing the impacts
 1	API production, tableting and formulation	Extraction of resources and manufacturing of organic and inorganic commodity chemicals Use of excipients, additives and solvents Energy in preparation of starting materials, intermediates and processing Solvent disposal Potential release of API to the aquatic environment from manufacturing	Green chemistry – developing effective manufacturing processes that use fewer chemicals and fewer natural resources including energy and water Investing in the recycling and reuse of solvent wastes Safe API discharge programme with AstraZeneca and globally managed supplier sites
 2	Device production (where required)	Use of materials for device manufacture (e.g. glass, plastics, metals and electrical components)	Environmental Sustainability Assessments for the device and packaging in the development stage for the selection of the most sustainable device
 3	Packaging	Use of materials, including: – Primary packaging (bottle, blister packs, vials etc.) – Secondary packaging (Cartons, leaflets etc.) – Tertiary packaging (Shipping box, pallet and shrinking wrap etc.)	Developing more sustainable packaging solutions that reduce resource consumption and waste, including: – Reducing packaging size and materials used – Switching to materials from recycled or renewable sources – Using materials that can be easily recycled
 4	Distribution	Transportation	Pursuing more efficient and sustainable modes of transport such as switching from air to sea
 5	Patient use	Use by patients of our medicines and devices	Environmental risk assessments conducted as part of product approval Patient communication and education programmes to promote sustainable use of medicines EcoPharmacoVigilance programme to monitor environmental product risks globally
 6	Disposal	Disposal of unused medicines Energy reclamation from waste	Responsible waste management including promoting the safe disposal of medicines

Life Cycle Analysis in action

We have been exploring the use of a connected digital device that can be coupled with our Symbicort dry powder inhalers to treat asthma and chronic obstructive pulmonary disease.

The addition of the connected digital device component has an environmental burden through the plastics, battery and additional packaging it involves. But one of the main drivers behind the use of the Smartinhaler™ device is that it improves patient adherence to prescribed medicine. This increased adherence is claimed by Adherium to reduce the use of rescue medication by 44%² and to reduce the number of unplanned hospital admissions by 80%³.

The Coalition for Sustainable Pharmaceuticals and Medical Devices has developed guidance for assessing the environmental impacts of care pathways. We have used this guidance, coupled with LCA, to assess the impacts of the device and identify the number and type of events that would be needed to rebalance the environmental burden.

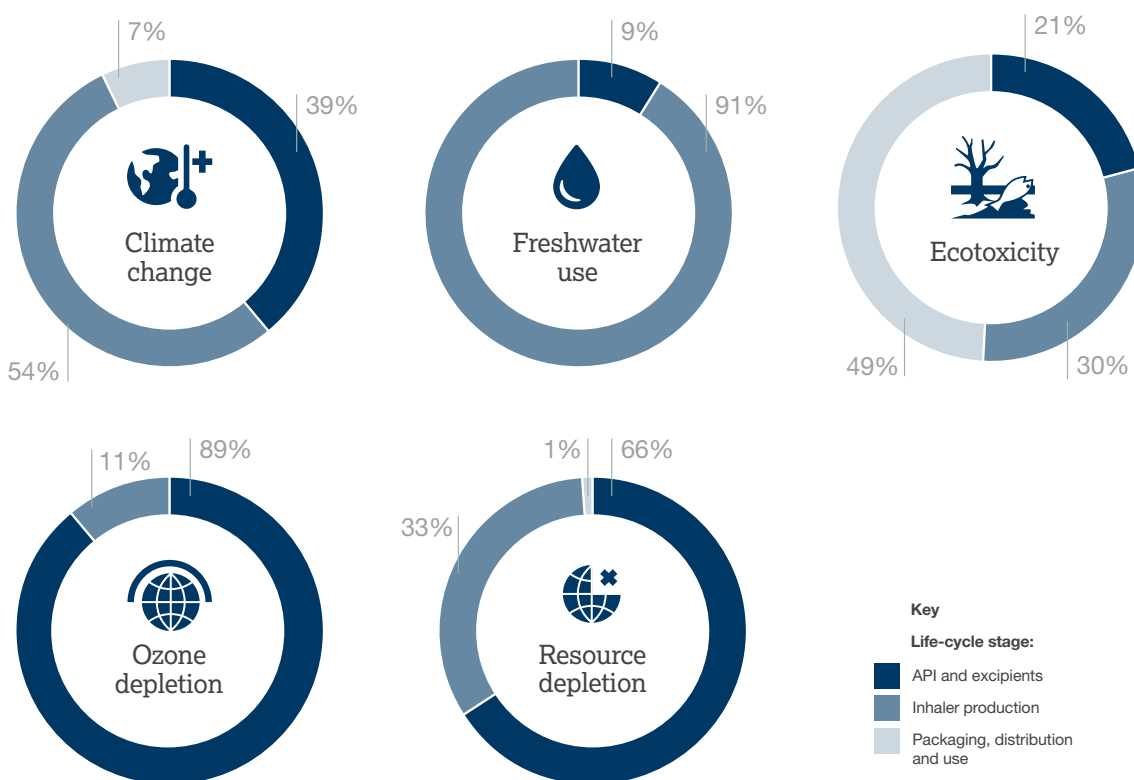
How do the impacts stack up?

We have calculated that every single avoided visit to an Accident and Emergency department balances the life-cycle impacts of 45 Symbicort Turbu+™ or 34 pMDI+™ digital devices.

This means that, in addition to improving patient care, the positive environmental benefits through reduced hospital admissions outweigh the environmental costs of the device.

Comprehensive LCA of the Symbicort Turbu+™

Environmental impact



² Chan AHY, Stewart AWS, Harrison J, Camargo C, Black PN, Mitchell EA. The effect of an inhaler with ringtones on asthma control and school attendance in children. *Lancet Respir Med*. January 21 2015. [http://dx.doi.org/10.1016/S2213-2600\(15\)00008-9](http://dx.doi.org/10.1016/S2213-2600(15)00008-9)

³ Morton RW, Heather E Elphick, Alan S Rigby, William J Daw, David A King, Laurie J Smith, Mark L Everard. *Thorax* 2016; 0:1–8. doi:10.1136/thoraxjnl-2015-208171

Embedding sustainability in design and manufacturing: SHE Triggers model

Our SHE Triggers model ensures we consider environmental factors at the earliest possible stage of development. It is designed to promote the sustainability of our design and manufacturing processes – including APIs, products, devices and packaging. By flagging potential safety, health and environmental issues at an early stage in the development process, they can be investigated and, where possible, designed out of the process. The model incorporates environmental assessment tools that enable our scientists to assess environmental risks and challenges in the products they are developing.

In 2016, we completed 16 environmental assessments of development products. The reviews detailed hundreds of chemicals for potential impact on our environment alongside legislation and green chemistry considerations.

Making history with Tagrisso™

AstraZeneca made history and fulfilled an unmet patient need with Tagrisso™ being one of the fastest development programmes ever – from start of clinical trials to approval and launch in just over two and a half years.

In the early stages of development, osimertinib (the active component of Tagrisso™) had a PMI of 501. This was quickly reduced to 324 in the early stages of development, surpassing the original PMI target of 500. However, despite the low annual peak tonnage expected for an oncology product, our efforts to reduce resource consumption did not end there. We continued to develop our manufacturing process and further reduced the PMI by more than 70% to 112.

This achievement represents:

- > A GHG footprint reduction of 1,215kg CO₂e/kg of osimertinib (from 1,566 to 351kg CO₂e/kg API)
- > A hazardous waste reduction at peak year sales of 778 tonnes per annum (1,001 tonnes to 223 tonnes), just over the amount of hazardous waste produced by 4,100 EU citizens a year⁴.



778 tonnes

reduction in hazardous waste



⁴ http://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics#Hazardous_waste_generation

Protecting natural resources

Increasing global population and per capita consumption are expected to trigger the largest growth in resource demand the world has ever experienced⁵, with demand for natural resources expected to rise by more than a third by 2030⁶. Climate change will further increase the challenge and will have important consequences for the health of society and the pharmaceutical industry. It is vital we use resources wisely and minimise emissions and waste throughout the value chain. We support development of the circular economy and are seeking opportunities to integrate circular thinking across our product design, supply chain planning and waste management.

In 2016, we committed around \$25 million to natural resource efficiency projects to reduce environmental impacts at our sites. These projects are expected to accelerate our resource efficiency performance. They include solvent recovery to make better use of resources and reduce hazardous waste, a novel heat pump system to reduce reliance on natural gas, and numerous resource efficiency works programmes. We plan to invest another \$22 million in resource efficiency in 2017 and will ensure all sites have natural resources plans that align with our environmental targets.

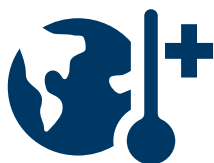
Climate change

Climate change threatens to undermine the last half-century's advances in global health. However, because the actions to mitigate and adapt to climate change have direct and indirect health benefits – from reducing air pollution to improving diet – concerted efforts to tackle climate change actually represent one of the greatest opportunities to improve global health this century⁷. We make it a priority to contribute towards the united global effort that involves business, governments, non-governmental organisations (NGOs) and communities working together. Measuring and reporting emissions, and setting and achieving science-based targets to manage our direct and indirect contribution, are central to our approach.

Climate change poses an increasing risk for our business. Its potential impacts on human health are far reaching – from the consequences of heat waves, poor air quality and the increasing prevalence of disease in flood-stricken communities, to the potential spread of vector-borne diseases and the consequences for food security. The impacts on water and other natural resources make it all the more important we use resources wisely and make the switch to renewable energy, while reducing emissions across our operations and engaging with our supply chain to ensure our suppliers do their fair share.

We are planning work to better understand the full range of regulatory, physical and financial risks and opportunities posed by climate change across our own sites and our supply chain throughout 2017 so we can begin developing an adaptation strategy. We estimate that the most immediate risk to our operations from a changing climate is the availability of water. In 2016, we identified our sites with the greatest exposure to water scarcity where we will prioritise water efficiency projects to reduce our exposure to water risks.

The solutions to climate change have direct and indirect benefits to public health. For instance, the transition to more fuel-efficient vehicles and renewable power not only reduces GHG emissions but also supports disease prevention by reducing local and regional air pollutants that contribute to some of AstraZeneca's priority therapy areas – respiratory, which includes chronic obstructive pulmonary disease.



It is part of our social licence to operate that we reduce our contribution to the conditions for which we are producing life-changing medicines.



⁵Ellen MacArthur Foundation, 2013. Towards the Circular Economy, volume 1. Available at: www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf

⁶<http://www.pwc.co.uk/issues/megatrends/climate-change-and-resource-scarcity.html#1>

⁷Lancet Report on Climate Change and Health, 2015. <https://climatehealthcommission.org/resources>

What we set out to achieve	Our approach	What we achieved
<p>Our aim by 2016 was to:</p> <p>Reduce operational GHG footprint by 2% (against a 2015 baseline) to 1,708,335 tonnes CO₂e</p> <p>In 2017, we will continue progressing towards our science-based targets:</p> <ul style="list-style-type: none"> > Reduce site GHG emissions (energy, F-gas and process emissions, waste incineration) by 23% against the 2015 baseline > Reduce energy consumption by 2% against the 2015 baseline > Maintain road fleet, freight transport and business air travel emissions reduction achieved in 2016 (6%, 13% and 14% respectively) > Freight transport air to sea conversion of 70% by Q4 	<p>Move up the GHG hierarchy through energy efficiency improvements at existing and acquired sites</p> <p>Designing efficiency into new sites</p> <p>Pursuing lower-carbon alternatives to fossil fuels and procuring green electricity</p> <p>Improving the fuel efficiency of our sales and marketing vehicle fleet</p> <p>Moving our global freight transport from air to sea</p> <p>Managing our business air travel</p>	<p>Our operational GHG footprint totalled 1,656,917 metric tonnes in 2016, a reduction of 5% against the 2015 baseline</p> <p>Energy-related emissions were down 25% against the 2015 baseline (net of market instruments)</p> <p>Freight transport air to sea conversion of 63%, by tonne per km moved (2015: 54%)</p> <p>Road fleet emissions were down 6% against the 2015 baseline</p> <p>Business air travel emissions reduced by 14% against the 2015 baseline</p> <p>23% of total energy consumption (58% of imported electricity) was from certified renewable sources in 2016</p> <p>CDP A List for Climate Change and Supply Chain programmes, and 'A-' score for our role as a supplier</p> <p>DJSI score of 100% for Climate Strategy</p>

Science-based targets and commitments

As a business built on cutting-edge science, we take a scientific approach to setting our climate change targets and we aim to do our fair share of the collective effort needed by industry to mitigate climate change. We are making good progress: in 2016, we were listed on the Climate A List by CDP, the international not-for-profit organisation that drives sustainable economies and represents 827 investors with total assets of \$100 trillion. This places us among the top 9% of corporations participating in CDP's climate change programme and recognises our strategy and actions to reduce emissions and mitigate climate change. Our efforts to measure and manage our supply chain footprint also led to our inclusion in CDP's Supply Chain Climate A List, and we received further recognition for our role as a supplier with a score of A minus in CDP's supplier response programme. As of October 2016, AstraZeneca was one of only four FTSE 350 companies to have had its climate change targets approved by the SBT initiative. We also launched our RE100 strategy to source 100% renewable power globally by 2025.

Understanding and managing our carbon impacts

Like most businesses our main GHG emissions arise from the energy we use, travel and transport, process emissions at our facilities and, indirectly, from the activities of our suppliers. An exception to this is our pressurised metered dose inhaler (pMDI) therapy products which form the greatest single contribution to our GHG footprint. The emissions occur during patient use of the devices, which rely on hydrofluoroalkane (HFA) propellants.

Our 2016–2025 strategy uses an extended operational footprint which includes all Scope 1, Scope 2 and our most material Scope 3 emissions sources, including emissions from patient use of inhaler therapy devices.

We use a hierarchical approach⁹ to prioritise action for reducing our GHG emissions, based upon the principle of avoiding demand in the first instance then reducing it through efficiency and finally substituting our energy supply with low and zero emission sources.

1

Avoid

through major business decisions (by designing efficiency into manufacturing processes and new build projects such as our new Cambridge facility in the UK)

2

Reduce

through efficiency and demand management (by improving the fuel efficiency of our road fleet and investing in the energy efficiency of our sites)

3

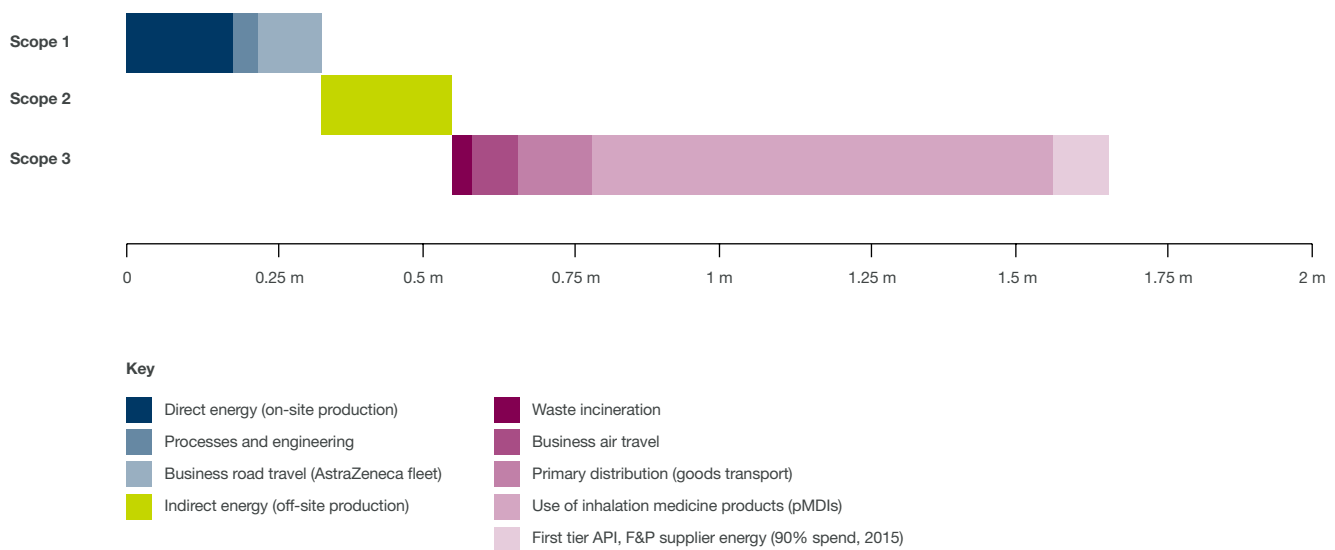
Substitute

in zero/low carbon energy (through our commitment to source 100% renewable power)

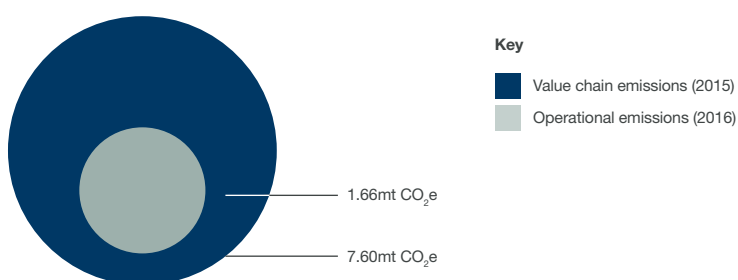
⁹ Institute of Environmental Management and Assessment (IEMA) GHG Hierarchy, <https://www.iema.net/assets/uploads/Special%20Reports/iema20ghg20report204.10.10.pdf>

To help drive business decisions and investments that avoid and reduce GHG emissions, we have committed to set an internal price on carbon. Preliminary work indicates that a value in the region of \$80–\$90 per tonne CO₂e applied to our Scope 1 and Scope 2 emissions could be what is necessary to enable the achievement of our 2025 targets. Over the coming year, we will refine this value and establish how it is best utilised to influence current and/or future emissions. We will report further on this work in our 2017 update.

Breakdown of our operational GHG emissions footprint by source 2016 (tonnes CO₂e): 1,656,917 CO₂e



Carbon emissions across our value chain



Environmental protection
Environmental compliance

Our approach
Pharmaceuticals in the environment

Minimising our impacts
About our reporting

Protecting natural resources

Our emissions

Operational footprint GHG emissions (tonnes CO₂e)

Scope 1	2015 baseline
2013	318,626
2014	328,722
2015	338,038
2016	329,140

Scope 2	2015 baseline
2013	389,703
2014	346,343
2015	351,471
2016	219,574

Scope 3	2015 baseline
2013	914,646
2014	1,056,158
2015	1,053,690
2016	1,108,204

2016–2025 strategy operational footprint total	2015 baseline
2013	1,622,975
2014	1,731,223
2015	1,743,199
2016	1,656,917

We report in line with the WRI GHG Protocol and as such use dual accounting to report our emissions from electricity, using market and location-based emission factors.

Electricity emissions dual reporting (tonnes CO₂e)

Year	Electricity (market-based ¹¹)	Electricity (location-based ¹²)
2016	219,574	292,363
2015	351,471	287,903
2014	346,343	290,288
2013	389,703	274,399

Scope 3 emissions

In 2014, we began work to quantify the GHG emissions associated with our entire value chain using the categories outlined in the GHG Protocol Scope 3 Guidance. Some of these sources we deem to be within our sphere of control, such as business air travel, and we have included those in our operational footprint and science-based targets to reduce absolute emissions. Our remaining Scope 3 emissions are estimated based on a mixture of primary and secondary data sources. We report them one year in arrears and our science-based target is intensity based.

For our 2015 Scope 3 emissions calculations, under 10% of data is based on primary data. Our science-based target includes an ambition to increase this amount.

Sources of Scope 3 emissions (tonnes CO₂e)¹³

	Emissions in 2015
Purchased goods and services	5,794,302
Use of sold products	688,653
Downstream transportation and distribution	312,799
Business travel	241,384
Upstream transportation and distribution	203,684
Fuel and energy related (not Scope 1 and 2)	121,435
Capital goods	93,024
Waste generated in operations	30,208
End-of-life treatment of sold products	23,507
Employee commuting	23,337
Upstream leased assets	23,242
Downstream leased assets	956

⁹ GHGs from direct fuel combustion, process and engineering emissions at our sites and from fuel use in our vehicle fleet.

¹⁰ GHGs from imported electricity are calculated using the GHG Protocol Scope 2 Guidance (January 2015) requiring the dual reporting using two emissions factors for each site – market-based and location-based.

¹¹ Market-based factors are more specific to the site and local energy market, taking account of the residual energy mix a site is sourcing power from and any certified renewable power purchased by a site.

¹² Location-based factors are the grid average emissions factor for the country (or subregion in the US) that a site is in.

¹³ Three Scope 3 categories were reviewed and deemed not relevant to AstraZeneca: processing of sold products, franchises and investments.

Reducing emissions from our road fleet

We have incorporated fuel efficiency into our fleet selection process since 2010. We operate a 'cap and reduce' system in some markets to reduce the fleet average emissions per km driven. In 2016, we delivered a further fleet efficiency improvement of 3%. Combined with a 3% reduction in km driven, this resulted in a 6% cut in GHG emissions against the 2015 baseline.

Our procurement team works with commercial markets to incorporate lifetime costs into fleet selection decisions, which supports a preference for more fuel-efficient vehicles. All of our regional markets delivered fleet efficiency improvements during 2016: 11% in Japan, 5% in North America, 3% in Europe and 1% in International (rest of world).

We will be going further in 2017: investigating the potential for alternatively fuelled vehicles in our commercial road fleet, such as electric vehicles and plug-in hybrids. We also recognise the air quality impact transportation can have, particularly in urban areas, and we are working to understand our transportation impacts better. We are looking forward to the improved vehicle testing regime that will better reflect real-world driving conditions.



Energy CO₂ emissions from outsourced manufacturing

Energy CO₂ emissions from outsourced manufacturing of APIs and F&P activity amounted to around 96,000 tonnes in 2015, down 12% from the previous year.

We continue to work with suppliers to encourage the setting of appropriate environmental improvement targets, particularly in the area of energy use. For the first time, this source of GHG emissions is included within scope of our operational footprint commitments for 2016–2025.

Energy CO₂ emissions from outsourced manufacturing

	CO ₂ from energy use (thousand metric tonnes)			
	2012	2013	2014	2015
AstraZeneca manufacturing sites	349	406	371	407
API category	67	60	33	35
F&P category	51	38	77	61

Towards lower-impact respiratory therapies

Our pMDIs, typically used for the treatment of respiratory conditions such as asthma, rely on HFA propellants. When released, these gases represent 47% of our 2016 operational GHG footprint. While HFAs have no ozone depletion potential and a third or less of the global warming potential than the chlorofluorocarbons (CFCs) they replace, they are still potent GHGs.

In 2016, we included emissions from patient use of pMDI inhaler therapy products in our operational GHG footprint commitments for the first time. We believe we should account for these emissions and find innovative ways to minimise them.

We continue to explore practical opportunities to reduce the climate impact of these devices while fulfilling patient needs, such as by substituting the propellant for an alternative with a lower climate impact. Research is ongoing to assess the feasibility of technologies that could potentially lower the impact of our inhaler technologies.

Our proactive approach to managing the impact of our inhaler therapies puts us in a resilient position regarding new regulatory control such as the 2016 Kigali Amendment to the Montreal Protocol, implementing a global phase-down of HFCs.



Committed to sourcing 100% renewable electricity

In 2016, we followed through on our 2015 commitment to set out a pathway to source 100% renewable power at our sites worldwide. We publicised our commitment through the RE100 initiative, led by The Climate Group and CDP, which provides a robust quality framework within which to deliver our ambitious plans.

Our commitment is to source 100% renewable power globally by 2025. We have an interim target to achieve 100% renewable power at our US and European sites by 2020. Compared with 2015, our sourcing of certified zero carbon power from renewable sources such as wind and solar quadrupled to 445,000 MWh in 2016 due to some major users transitioning to 100% for the full year: Gaithersburg, Frederick and Philadelphia in the US and Gothenburg and Södertälje in Sweden. This accounted for 58% of our global imported power and puts us on track to achieve both our 2020 and 2025 milestones.

The progress we have made so far has mainly been through 'off-site' solutions including green energy contracts and procuring certificates, for example Renewable Energy Certificates in the US and Guarantees of Origin in Europe. Our commitment has inspired some of our sites to substitute imported energy with on-site renewables such as solar photovoltaics (PV) at Macclesfield in the UK (pictured below) and at Frederick in the US, which will displace almost 2,000 tonnes CO₂e of Scope 2 emissions and 180 tonnes CO₂e of energy supply chain emissions annually. Further on-site projects have been approved in the US and Australia in 2017.



Macclesfield solar panels



Reducing our energy consumption

Over our previous strategy period (2010–2015) we reduced our energy consumption by 23% and, in 2016, we set out a target to make a further 10% reduction by 2025. In 2016, our Scope 1 energy consumption reduced by 2% and our Scope 2 imported energy consumption rose by 1%. This resulted in a net reduction of 4,112 MWh. Our priority is to avoid energy demand in the first instance alongside looking for opportunities to reduce our energy consumption and aiming to substitute 100% of electricity use with certified zero carbon renewable electricity by 2025.

Investments in energy efficiency in 2016 included:

- > A heat pump at Gothenburg, Sweden: this \$3.5 million project utilises novel heat pump technology which is highly efficient and electrifies some of the site's heat demand, potentially displacing over 60% of site natural gas consumption. Coupled with the site transitioning to renewable electricity in 2016, the investment will save approximately 2,700 tonnes CO₂e per year
- > LED lighting at Frederick, US: this \$0.7 million project will replace all site lighting with highly efficient light-emitting diode (LED) lighting, reducing energy consumption by 1,050 MWh and emissions by 560 tonnes CO₂e
- > Purified water production at Södertälje, Sweden: this \$0.4 million project replaces water purification equipment with highly efficient alternatives which, in addition to water and waste savings, reduce site energy emissions by 300 tonnes CO₂e per year.

The efficiency benefits of investments made during 2015 and 2016 will be fully realised during 2017.

In 2017, further natural resource efficiency projects will include a combined heat and power (CHP) plant and solar PV plant at Gaithersburg in the US, which will improve the energy efficiency and security of this growing site while reducing costs. Combined with 100% certified renewable electricity imports, the site's energy footprint will be dramatically reduced against the 2015 baseline. Additionally, the utilisation of site-based generation is estimated to displace 680 tonnes CO₂e of energy supply chain emissions annually.

Certified renewable electricity (MWh)

2013	81,700
2014	101,965
2015	104,921
2016	444,497

Total energy use (MWh)¹⁴

2013	2,089,942
2014	1,827,322
2015	1,906,404
2016	1,902,292

¹⁴ One major site acquisition took place part way through 2015. Our 2015 data has been recalculated accordingly (see page 26).

Responsible use of water

Forty per cent of the world's population currently lives in water-stressed river basins¹⁵ and an estimated 663 million people still lack improved drinking water sources¹⁶. We recognise the need to ensure water sources are used responsibly and equitably, as a shared public resource. We invest in technology and optimise our processes to reduce water consumption across our operations while ensuring the water we do use is treated to the highest standards before it is returned to the environment.

In 2016, we made it on to the CDP's Water A List. CDP's water score is an indicator of a company's commitment to transparency around its environmental risks and a demonstration of pursuing best practice. As a member of the A List, AstraZeneca has been recognised among the leading 25 companies in the world for water stewardship.



Top 25

AstraZeneca is recognised among the leading companies in the world for water stewardship

What we set out to achieve	Our approach	What we achieved
<p>Our aim by 2016 was to:</p> <p>Reduce water usage by 2% against 2015 levels to 4.13 million m³</p> <p>In 2017, we will aim to:</p> <p>Maintain a 4% reduction in water consumption against the 2015 baseline</p>	<p>Completing Water Conservation Plans at our major sites</p> <p>Conducting water audits at our sites to identify water reduction opportunities</p> <p>Investing in water efficiency projects such as water reclamation and reuse</p> <p>Understanding the risk water scarcity poses to our business</p>	<p>In 2016, our water footprint was 3.99 million m³, a 5% reduction compared with 2015</p> <p>Audits were completed at two major sites, with three more planned for 2017</p> <p>We assessed water scarcity at our sites, enabling prioritisation of water efficiency projects in areas of greatest need</p>

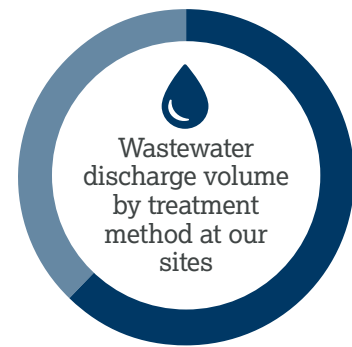
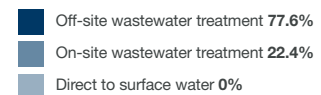
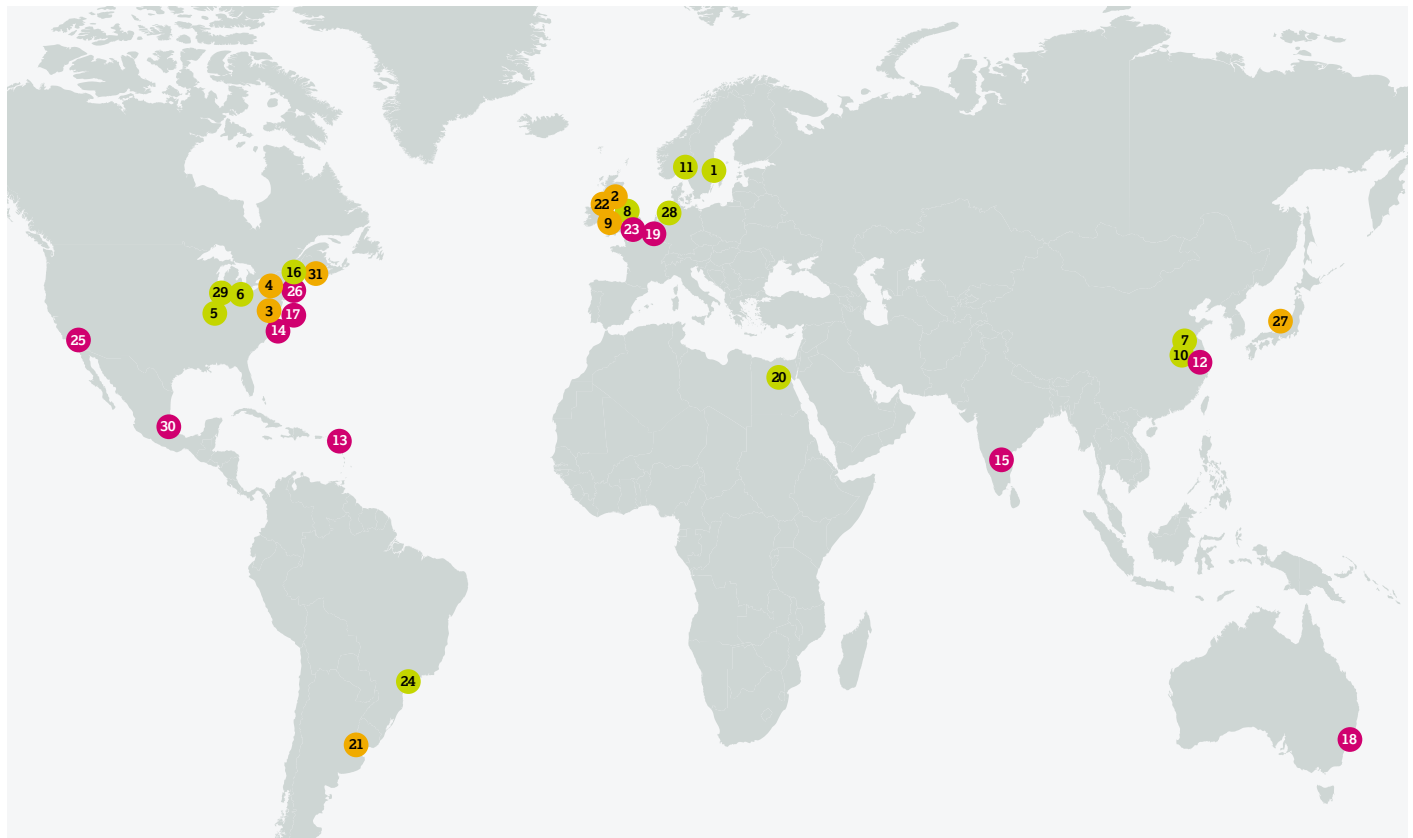
¹⁵ OECD, 2015. Principles on Water Governance. Available at: www.oecd.org/gov/regional-policy/OECD-Principles-on-Water-Governance-brochure.pdf

¹⁶ WHO/UNICEF, 2015. Progress on sanitation and drinking water, 2015 Update and MDG Assessment https://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf

Understanding our water-related risks

While all our facilities use water, our sites with the largest water footprints are located in the UK, Sweden and the US. Some of our sites are situated in water-stressed areas, such as our Zhangjiang site in Shanghai, which has recently implemented a project to recycle water via cooling towers and is developing a system for rainwater harvesting.

We have developed a standard methodology to assess water risk at every site. Based on the WRI *Aqueduct* tool, it has enabled us to broaden our understanding of our water-related risks and identify priorities for investment. During 2016, our major sites completed Water Conservation Plans and we are developing strategies to ensure all sites in water-stressed areas are taking extra steps to mitigate their water risk.

**Treatment method****Latest site water stress assessment****Key:****AstraZeneca water stress rating**

1. Sweden Södertälje
2. UK Macclesfield
3. US Gaithersburg
4. US Frederick
5. US Mount Vernon
6. US West Chester
7. China Taizhou
8. UK Alderley Park

9. UK Avlon
10. China Wuxi
11. Sweden Gothenburg
12. China Shanghai Zhangjiang
13. Puerto Rico Canóvanas
14. US Newark
15. India Yelahanka Bangalore
16. US Boston

17. US Wilmington
18. Australia North Ryde
19. France Dunkirk
20. Egypt 6 October City
21. Argentina Buenos Aires
22. UK Speke
23. UK Cambridge
24. Brazil Cotia – São Paulo

25. US Ardea
26. US Philadelphia
27. Japan Mafhara
28. Netherlands Nijmegen
29. US Louisville
30. Mexico Lomas Verdes
31. US Westborough

Our water use (million m³)

		2015 baseline
2013	3.7	
2014	3.8	
2015	4.2	
2016	4.0	

2015 water use from
outsourced manufacturing

The water used in our outsourced API and F&P manufacturing is much less than that used in our own activities. In 2015, our outsourced water footprint decreased 17%.

	Water use (million m ³)			
	2012	2013	2014	2015
AstraZeneca manufacturing sites	1.9	2.0	2.9	3.3
API category	0.2	0.4	0.3	0.3
F&P category	0.6	0.6	0.9	0.8

Year	COD of effluent leaving our sites (tonnes)
2013	154
2014	196
2015	210
2016	260

Reducing our water footprint
at Gaithersburg, US

In early 2016, a new water reuse system came online at our Gaithersburg site in the US, which houses over 3,000 employees. It is the result of detailed work with consultants, URS Corporation, to identify opportunities to increase water reuse at the site. Following in-depth chemical analysis, we were able to identify three water sources previously sent to drain or sewer use that were of an appropriate composition to be used as cooling tower makeup water:

- > Firstly, a volume of groundwater from under the One Medimmune Way that was previously diverted to storm water piping is now diverted to a storage tank and pumped directly into the cooling tower return line (permitted at an average of 37m³ per day)
- > Secondly, reverse osmosis reject water that was previously discharged to the sanitary sewer is now collected in a 6m³ tank and pumped to the cooling tower return line
- > And finally, condensate water from the air handling units is collected in three small concrete impounds and fed into the makeup water.

The water reuse system is expected to reduce the site's total water footprint by 6%.

Chemical oxygen demand
of discharged water

We track and report our total effluent emissions using the standard chemical oxygen demand (COD) parameter. A measure based on COD is more precautionary than a biochemical oxygen demand (BOD) based metric. We measure the COD of wastewater as it leaves our sites. A number of our sites have their own on-site wastewater treatment facilities, while the majority work with downstream municipal wastewater treatment plants.

Both methods are designed to remove most of the COD before the wastewater is discharged to the environment. In 2016, COD of the effluent leaving our sites increased by 24%, largely due to higher levels of activity at biologics sites which release effluent that can be rich in bio-accessible material, which increases aquatic oxygen demand. The majority of this residual COD is removed by offsite wastewater treatment plants.



Responsible waste management

Waste management is key to our environmental protection strategy and waste prevention is our primary goal. It contributes to improving efficiency and reducing our reliance on natural resources. As our production levels continue to grow over the next 10 years, achieving our 10% reduction target is going to be a significant challenge. Finding ways to break the linkage between business growth and waste generation is a key focus area.

To reduce the amount of waste we produce, we look for opportunities to improve efficiency during our production processes, integrate waste-minimisation considerations into purchasing decisions, and engage our employees to reduce waste. While waste prevention is our top priority, we also seek to maximise treatment by material recycling and avoiding landfill disposal when prevention is impractical.

We characterise waste as either hazardous (such as chemical waste) or non-hazardous waste, as defined by local legislation. The majority of our hazardous waste consists of solvent and aqueous streams from our manufacturing activities. Non-hazardous waste includes general waste, such as paper and plastics, from our facilities around the world.

What we set out to achieve

In 2016, we targeted a 2% reduction in waste generation against the 2015 baseline. We failed to achieve this, generating total waste of 37,923 metric tonnes, a 1% increase on 2015. Although we initiated waste-reduction projects, including major investment to enable solvent reuse at our Swedish manufacturing site, these were insufficient to offset the increase in activity across our network.

Total waste (tonnes)

		2015 baseline
2013	32,750	
2014	35,797	
2015	37,510	
2016	37,923	

Non-hazardous waste sent to landfill (tonnes)

		2015 baseline
2013	1,800	9% of total
2014	1,900	10% of total
2015	2,600	13% of total
2016	1,900	9% of total

What we set out to achieve	Our approach	What we achieved
<p>Our aim by 2016 was to:</p> <ul style="list-style-type: none"> > Reduce waste generation by 2% (against a 2015 baseline) to 36,760 tonnes <p>As similar behaviours and strategies are needed to reduce both hazardous and non-hazardous waste generation, our waste target covers both categories</p> <p>Our aim by 2017 is to:</p> <ul style="list-style-type: none"> > Reduce waste to 4% below the 2015 baseline > Achieve a 2% increase in our recycle rate against a 2015 baseline 	<p>Waste audits and employee engagement at sites worldwide</p> <p>Investing in the recycling and reuse of solvent wastes</p> <p>Promoting responsible end-of-life disposal of our medicines</p>	<p>In 2016, our total waste was 37,923 metric tonnes, a 1% increase from 2015</p> <p>Our 2016 waste volumes consisted of 44% hazardous waste and 56% non-hazardous waste</p> <p>We achieved a 1% reduction in hazardous waste against the 2015 baseline</p> <p>Non-hazardous waste increased by 3% against the 2015 baseline</p>

Waste from outsourced manufacturing

The waste produced from outsourced manufacturing is comparable to that produced from manufacturing activities on our own sites. In 2015, our outsourced waste footprint remained stable.

	Waste produced (thousand tonnes)			
	2012	2013	2014	2015
AstraZeneca manufacturing sites	29	19	29	32
API category	35	24	23	24
F&P category	5	4	7	7

Note: Outsourced manufacturing data is collected after the year end, so data presented here is for 2015.

In Focus: How are we supporting the circular economy?

In a circular economy, open production systems in which resources are extracted, used to make products and become waste after the product is consumed are replaced by systems that retain resource value and conserve energy. A circular economy keeps resources in use as long as possible, maximising their utility and minimising waste¹⁷.

In 2015, the European Commission published its [action plan for the circular economy](#) which includes proposals for legislation, investment and schemes across the following areas: product design; production processes; waste management; secondary raw materials; plastics; and critical raw materials.

Over the past year, we have taken a leading role in publishing the EFPIA¹⁸ [White Paper on Circular Economy](#) which sets out an industry response to the principles underpinning the circular economy and proposals for legislation.

The shift to a more circular economy could bring many health benefits. With improving human health and wellbeing the driving motivation of the pharmaceutical industry, we have an important role to play. For example, by optimising materials and processes to reduce our carbon footprint, we will help to combat climate change – described as the greatest opportunity to advance human health in the 21st century¹⁹.

Transition to a circular economy will require changes throughout the value chain, from product design to new business and market models, from new ways of turning waste into a resource to new models of consumer behaviour. We see this as an opportunity to harness our innovation expertise, drive the efficient use of materials and improve long-term business value. By engaging on this issue now, we believe our industry can help shape future policy decisions to maximise opportunities for the healthcare sector. In 2017, we will initiate a circular economy working group and identify at least two circular economy opportunities to explore for development.

You can find out more in the [EFPIA White Paper](#) along with an [article by our own experts](#) who helped to produce it.



Sustainable packaging

Packaging plays an important role in protecting our products from manufacturing through to end-use – improving product security and avoiding unnecessary waste. We are constantly investigating new ways to improve the environmental performance of our packaging solutions, reduce the resources they use and minimise the waste they generate.

Our packaging materials include: primary packaging – bottles, caps and blister packs; secondary packaging – cartons; and tertiary packaging – shipping boxes. We focus on:

- > Reducing packaging size and materials used
- > Switching to materials from recycled or renewable sources
- > Using materials that can be easily recycled.

Our SHE Triggers model ensures we consider environmental issues at the earliest possible stage of packaging and device development. We also continuously review our packaging requirements and identify improvements for existing products.

Our global Packaging Strategy continues to include new and improved standards. By the end of the year, all our sites were aligned to new global Pack Standards. We have further consolidated our packaging solutions across the business to reduce and simplify our standard packaging sizes.

¹⁷ EFPIA White Paper on Circular Economy, October 2016: http://www.efpia.eu/uploads/Modules/Documents/efpia-white-paper-on-circular-economy-oct-2016_final.pdf

¹⁸ EFPIA is the European Federation of Pharmaceutical Industries and Associations, of which AstraZeneca is an active member.

¹⁹ Watts et al, 2015. Health and climate change: policy responses to protect public health: [www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)60854-6.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)60854-6.pdf)

Responsible disposal of medicines

Poorly disposed of medicines can have an impact on the environment. We work with various other organisations – including authorities and stakeholders across the supply chain – to raise public awareness of the safe disposal of medicines; one such example is the [EU Medsdisposal](#) campaign.

In 2016, we developed a [PIE animation](#) that describes the routes of medicines into the environment, which highlighted the problems of improper disposal. It aims to educate people about the importance of completing their course of medicine and returning unwanted medicines to a pharmacy. We contribute to collection schemes in a number of countries including Canada, France, Spain and Portugal.

We work to maximise the efficiency of our product forecasting and logistics to reduce product waste and its associated financial and environmental costs. Where product waste cannot be avoided, we render it safe through incineration.

**Reducing packaging size:
Respule 18 pack**

One of the best ways we can cut our resource use, waste, emissions and associated costs is by reducing the size of our packaging. In 2016, we completed a project at our North Ryde site in Australia to optimise carton space utilisation in our Respule 18 pack. By eliminating excess space in cartons, we were able to reduce packaging material and increase the density of products packed into each pallet, also cutting freight and associated emissions. Key outcomes and benefits of the project include:

- > 17% increase in pallet density
- > 42% reduction in CO₂ emissions
- > 23 tonnes of carton/board waste previously sent to landfill avoided
- > 7 pallets less packed per batch, resulting in cost savings in excess of \$650,000 per annum in freight alone
- > Reduced complexity where it doesn't add value for the patient.



Biodiversity

As well as being vital to the health of our planet, natural biological resources are a valuable source of medicines. AstraZeneca is committed to promoting biodiversity on the land it manages by identifying, implementing and reviewing appropriate actions at a local level to reduce its impact and create sustainable ecosystems. Appropriate management and sustainable use of biodiversity on our sites contributes to a great place to work and enhances general wellbeing.

Protecting biodiversity at our sites

Although our land holdings are relatively small, we manage our sites to support sustainable ecosystems and encourage wildlife for the benefit of our employees and local communities. We actively support the principles of the Convention on Biological Diversity and we continue to apply best practice, actively managing biodiversity on our sites through local biodiversity action plans. These plans set out locally specific actions to conserve and enhance native habitats, create and maintain refuges for flora and fauna, and preserve links with the surrounding environment via green corridors of uninterrupted habitat.

We have assessed our potential local biodiversity impacts at all of our major sites. As a result, 25 sites are implementing bespoke biodiversity action plans, including all major fully operating sites over five hectares. In 2016, we joined the Wildlife Habitat Council to provide independent evaluation and accreditation of our site biodiversity actions plans.

Grasslands for the Future

Since pre-settlement times, native prairie ecosystems have declined by 99% in Indiana. Our Mount Vernon manufacturing site in Posey County, Indiana, is a 500-acre campus located in a rural area. It is traversed by a 4.4-mile stretch of a tributary of the Ohio River. Historically, much of the site was used for agriculture which negatively impacted on native habitats. In 2012, we decided to stop agricultural use of the land and launched Grasslands for the Future, a project to restore 250 acres of native prairie grassland. We began by restoring a 20-acre area – removing non-native and invasive species and hydro-seeding with a native grasslands mix that was developed in collaboration with the Wesselman's Nature Center. The site is monitored bi-annually to ensure that the native plants are successful and to remove non-native invasive species as the need arises. We hope to restore more of the area in the coming years.



Nagoya Protocol and use of resources in product research

At AstraZeneca, we sometimes use natural biological resources to help deliver life-changing medicines. When we do, we recognise our responsibility to access and use this material in a transparent and fair way.

The Nagoya Protocol is a binding international Protocol agreed in 2010 with the objective of fairer 'access and benefits sharing' from the research use of the planet's genetic resources. It aims to conserve global biodiversity, foster trust and create mutual benefits and opportunities. Now enforced in over 90 countries, the Nagoya Protocol ensures local people benefit from the materials and knowledge they share.

Where we use such genetic resources in product R&D, we acknowledge our responsibilities under the Nagoya Protocol. Our failure to meet the requirements could mean years of wasted work, as research can be stopped and, in certain countries, products' patent rights challenged, leading to delays, restrictions and reputational risks.

Where we wish to harvest a genetic resource that falls within the scope of the Nagoya Protocol, we make sure that we have established Prior Informed Consent and Mutually Agreed Terms with the country of origin before we access the material. We record this in a due diligence process.

To support our businesses and ensure compliance, we operate an effective and simple governance structure. The Nagoya Protocol governance team helps guide projects through the complexities of the international protocol and we have developed processes and tools, such as the 'Nagoya Sourcing eTool', to ensure our researchers carry out due diligence before using genetic resources. In 2016, we also developed an animation to explain the requirements of the Protocol to our employees.

The UK Department for Business, Energy & Industrial Strategy has used our approach as an example to help other companies in our industry sector develop their own processes.

Valuing natural capital

In 2016, we joined the Prince of Wales at the Cambridge Institute for Sustainability Leadership's (CISL's) [Natural Capital Leaders Platform](#). The Platform is a global network of companies committed to managing their impacts and dependencies on natural resources. It aims to develop practical approaches to help business understand, value, measure and manage its impacts and opportunities related to the natural environment. We are exploring the value that Natural Capital Assessments might bring to our business decisions by integrating the financial impacts of our investments that are associated with natural capital into our financial analysis. We will report on the outcomes of our trial in 2017.

Environmental compliance

Our many business operations are subject to a wide range of laws, rules and regulations relating to environmental protection. Failure to comply with these could adversely affect our licence to operate, damage our reputation, cause harm to people or the environment, and lead to fines or other penalties. It could also lead to interruption of production that may negatively impact on patient access, so ensuring we comply with the relevant regulations wherever we operate is a top priority.

Registration, Evaluation, Authorisation and restriction of CHemicals (REACH)

REACH is a European Union regulation which aims to provide high-level protection to human health and the environment from exposure to hazardous substances. It ensures manufacturers and importers take responsibility to understand and manage the risks associated with their use. The principles and objectives of REACH are consistent with AstraZeneca's core Values. We ensure continuous compliance with REACH requirements via our robust governance process, including internal auditing and supplier assessments. We request our suppliers to provide information on the presence of substances of very high concern in packaging materials and devices. We also provide safety data sheets for all AstraZeneca substances supplied to third parties, to ensure effective risk assessment and safe use throughout the supply chain.

Balancing the risks and opportunities of nanotechnology

AstraZeneca takes an active interest in any new and emerging technologies that may provide benefits to patients, including nanotechnology. We maintain a watching brief on the impact of nanotechnology to our future business strategies. We are aware of the societal, safety, health and environmental concerns regarding the use of nanomaterials and nanotechnology systems. We continue to monitor the scientific landscape as nanomaterials are developed for emerging data that suggests any increased hazards from their use. We believe that the hazard and risk assessment of nano-based medicinal products can be performed under existing regulatory policies. If additional hazards or risks are identified that would support new regulatory guidelines specific for nanomaterials, we will support such measures. We are committed to supporting the efforts of governmental and regulatory bodies in having an open dialogue on the use and potential risks of these materials.

Reducing emissions of solvents

Emissions to atmosphere of volatile organic compounds (VOCs) result from API manufacturing processes due to the use of organic solvents, and from R&D activities. We employ a range of technologies to minimise these emissions from our operations and we can demonstrate ongoing reduction in recent years.

Solvent (VOC) consumption and emissions from AstraZeneca sites

Consumption (tonnes)

2013	6,303
2014	6,979
2015	7,851
2016	8,184

Emissions (tonnes)

2013	359
2014	295
2015	258
2016	210

Environmental compliance performance

We have robust processes that are designed to avoid unplanned environmental incidents arising from our operations. Where such incidents do occur, we thoroughly investigate the causes, identify actions to prevent re-occurrence in the future, and share the learning across our organisation.

Environmental compliance summary

	2013	2014	2015	2016
Prosecutions ²⁰	0	0	0	0
Enforcement actions ²¹	2	1	1	1
Regulatory warnings/alerts ²²	6	4	6	5
Other environmental compliance matters ²³	14	7	4	9
Significant environmental violations ²⁴	0	1	1	0
Financial penalties relating to above (\$)	7,000	33,000	14,000	1,000

²⁰ Prosecution: Successful or pending legal action taken in a civil or criminal court against AstraZeneca.

²¹ Enforcement action: Any formal administrative or judicial enforcement proceeding, notices of violation, or similar action by a regulator that requires the company to do, or not do, something.

²² Regulatory warning/alert: Any formal written warning or alert received from a regulator stating that the company is in violation of an applicable SHE requirement, which if not corrected or repeated could incur prosecution or enforcement action.

²³ Other environmental compliance matter: any less significant environmental compliance matter not included above.

²⁴ Significant environmental violation: those that result in a fine >\$10,000.

Pharmaceuticals in the environment

Pharmaceuticals enter the environment and trace levels are measured in rivers, lakes, soils and occasionally drinking water. Societal concerns about pharmaceuticals in the environment (PIE) are likely to continue as patient access to medicines and population levels increase, resulting in a greater environmental burden. As a responsible innovator, we need to understand the environmental risks of our products in order to proactively manage them and we are committed to providing scientific leadership on PIE.

Concerns over the impacts of PIE have been recognised by the United Nations Environment Programme and the World Health Organization within its Strategic Approach to International Chemicals Management, where Environmentally Persistent Pharmaceutical Pollutants has been included as an emerging policy issue. We aim to lead our industry in understanding and mitigating the effects of PIE. As a minimum, we are committed to ensuring effective environmental management of our products from pre-launch through to product end-of-life.

Assessing our impacts

To understand the potential impacts of our medicines on the environment, we conduct an environmental risk assessment (ERA) prior to the approval of a new medicine. We do this by generating environmental fate and toxicity data according to international standards. The specific studies required are defined in guidance established by the European Medicines Agency (EMA) and the US Food and Drug Administration (FDA). In 2016, we submitted regulatory ERAs for all products that were within the scope of these EMA and FDA regulations.

While we have a prospective ERA at the point of registration, there is no regulatory requirement to review the ERA or to monitor for potential adverse effects in the environment once a product has been launched. To ensure we understand the global environmental impacts of our APIs once in use we conduct EcoPharmacovigilance²⁵ (EPV). Our EPV process reviews emerging science and literature, looking for new information that might change the way we assess the

environmental risks associated with our APIs. If reliable and relevant data are published that demonstrate our existing environmental effects data may not protect the environment, we revise our safe discharge limits accordingly. This helps to ensure that we have up-to-date science-based targets for our PIE-based work around the globe. We also collate any measured environmental concentrations that have been published and compare these to our safe concentrations so that we can understand the accuracy of our regulatory ERA.

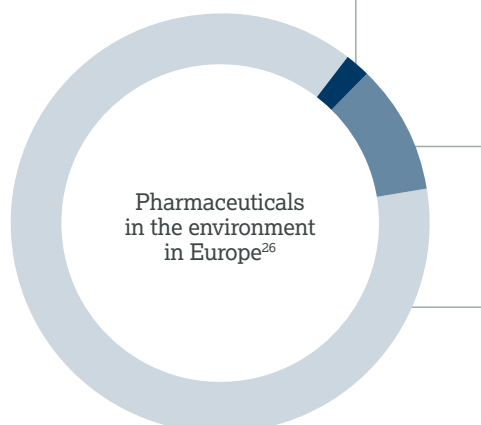
How do pharmaceuticals get into the environment?

The majority of pharmaceuticals get into the environment through patient excretion and wastewater effluents, but they can also enter the system during pharmaceutical manufacture and through inappropriate disposal of medicines by patients. In 2016, we created an [animation](#) to explain in simple terms the risks associated with PIE and what we are doing to manage them.



2%

attributed to waste from production



²⁵ Holm et al (2013) Ecopharmacovigilance in Practice: Challenges and Potential Opportunities. Drug Safety Volume 36, Issue 7, pp 533–546.

²⁶ http://ec.europa.eu/health/sites/health/files/files/environmentstudy_environment.pdf

²⁷ Murray-smith et al (2012) Managing emissions of active pharmaceutical ingredients from manufacturing facilities: An environmental quality standard approach. Integrated Environmental Assessment and Management, 8: 320–330.



Safe discharges of APIs

While waste from production is only a small proportion of the PIE burden, it is the part we as an industry can deal with directly, and we take responsibility for doing so. Although there are limited regulatory requirements, we set safe discharge concentrations called Environmental Reference Concentrations (ERCs) and Maximum Tolerable Concentrations (MTCs). The ERC and MTC approach²⁷ is based on established environmental quality standard methodology and takes into account indirect exposure of fish-eating mammals and humans, as well as aquatic wildlife (e.g. algae, invertebrates and fish). These values must not be exceeded in our manufacturing discharges to the aquatic environment and we apply them to the waste from our own production sites and those of our key suppliers.

We established ERCs and MTC values for 49 of our APIs (2015: 45) and have a rolling programme to confirm compliance. In 2016, all our worldwide manufacturing sites demonstrated compliance with our ERC and MTC criteria for these products.

To reduce impacts through our supply chain, we share our ERC and MTC methodology with key suppliers and require them to risk assess and manage emissions associated with the APIs they manufacture or formulate on our behalf. In 2016, we completed 81 ERC assessments involving 49 suppliers (2015: 98). We run annual training for suppliers to explain our approach, methodology and expectations.



10%

from unused medicines that people don't dispose of properly



88%

as a result of patient use

Managing the global risks of PIE

Recognising that regulatory guidance on the requirement to conduct an ERA are currently restricted to North America and Europe, we have instigated a project to understand the fate and behaviour of APIs in Emerging Markets. We are focused on those markets with less developed wastewater treatment infrastructure and different water use and reuse patterns. In 2016, we published a review of the relevance of existing ERA frameworks for low and middle income countries²⁸. This review highlighted significantly different wastewater and water reuse patterns in many of these markets that are not captured under current regulatory frameworks and the lack of terrestrial environmental ecotoxicology and fate data for APIs used in water-stressed areas. We are currently exploring the key outcomes of this review in our ongoing PIE-related research work.

Intelligent assessment of PIE

At the start of 2015, a €10 million research project between several pharmaceutical companies and the European Commission called Intelligent Assessment of Pharmaceuticals in the Environment (iPiE) was initiated under the Innovative Medicines Initiative. The project aims to develop screening tools for use both earlier on in drug development and for older medicines, including animal alternatives, to identify environmental risks without the need for *in-vivo* testing.

Key deliverables from AstraZeneca in 2016 supporting our iPiE and animal welfare commitments include:

- > A fish reporter assay (animal alternative as a fish embryo) that can detect chemicals that bind to the oestrogen receptor element to help identify potential endocrine-disrupting chemicals²⁹
- > An *in vitro* fish gill cell assay to identify chemicals with high rates of uptake from water into fish, as these would be at increased risk of exposure and concern. The assay can also identify chemicals that are excluded from uptake and that are of low risk³⁰
- > Development and validation of quantitative adverse outcome pathways to help predict the impact of pharmaceutical exposure on environmentally important populations where drug targets are conserved³¹.



What science can do



Tackling the global threat posed by antimicrobial resistance

To tackle the environmental aspects of the threat posed by antimicrobial resistance (AMR), we are co-funding research that aims to develop and validate new regulatory protection goals for AMR development in the environment. As part of our commitment to the Industry AMR Road map shared with the United Nations General Assembly in September 2016, we are developing an approach to identify minimum selective concentrations for AMR development in the environment with a focus on macrolide and beta-lactam antibiotics. These projects will help establish safe environmental levels for antibiotics entering the environment as a result of drug production and patient use. Initial data from these projects indicates that a holistic approach to the environmental management of antibiotics that includes both the human and environmental protection goals is required.

Leading the industry

AstraZeneca chairs the ERA working group and sits on the governance team of the EFPIA PIE task force. In this role, we advocate the implementation of an Eco-Pharmaco-Stewardship (EPS) approach to human medicinal products that includes the development of an extended ERA model, responsible effluent management, and research to help identify and prioritise the environmental issues associated with innovative or legacy medicinal products. We are championing EPS and the extended ERA model to regulatory stakeholders on behalf of the wider pharmaceutical industry. In 2016, we also coordinated the industry response to the EMA ERA concept paper that will form the basis for the future revision of this regulatory guideline.

We invest in a proactive environmental research programme that collaborates with leading universities and academic scientists. In 2016, we co-sponsored several research projects that support around 14 PhD students and four post-doctoral scientists across a wide range of cutting-edge projects.

Together, we aim to:

- > Identify risks associated with the presence of PIE and potential mitigation options
- > Understand whether the therapeutic targets of our medicines are present in wildlife, and the potential for impacts on non-target wildlife populations

- > Reduce key scientific uncertainties within our ERAs
- > Develop tools and techniques to assess environmental risks posed by emerging and innovative medicines e.g. nano-based medicines and biologic-based therapies
- > Address the global environmental risks posed by PIE, especially in Emerging Markets where there are different standards of water management and novel exposure scenarios
- > Understand the relationship between the environmental dimension of AMR and resistance in the clinic.

To maximise the benefits of our research, we typically publish over 10 scientific manuscripts every year. These are publicly accessible and peer reviewed before publication in scientific literature. We also provide numerous external scientific presentations to share our research.

We aim to be transparent with our environmental data, making it available to independent scientists on our webpage.

²⁸ Lees et al, 2016. Pharmaceuticals in soils of lower income countries: Physico-chemical fate and risks from wastewater irrigation. *Environment International*. 94: 712-723.

²⁹ Green et al (2016). High-Content and Semi-Automated Quantification of Responses to Estrogenic Chemicals Using a Novel Translucent Transgenic Zebrafish. *Environmental Science and Technology*. 50 (12): 6536-6545.

³⁰ Schnell et al (2016). Procedures for the reconstruction, primary culture and experimental use of rainbow trout gill epithelia. *Nature Protocols*. 11: 490-498.

³¹ Margiotta-Casaluci et al (2016). Internal exposure dynamics drive the Adverse Outcome Pathways of synthetic glucocorticoids in fish. *Nature Scientific Reports*. 6:21978.

About our environmental protection reporting

Scope of consolidation

Unless otherwise specified, all SHE data reported covers all AstraZeneca business activities worldwide, regardless of their function (manufacturing, research and development or commercial sites and administrative headquarters) for the period 1 January 2016 to 31 December 2016.

Environmental data is reported for all sites with the following exceptions.

Energy, waste and water information is not required from:

- > Sites occupying leased or rented properties where these services are provided as part of the site's rental agreement
- > Sites with fewer than 50 permanent staff (AstraZeneca employees and contractors).

Ozone-depleting substances, F-gas and solvent use and emission data is required from all sites whenever the consumption thresholds stated in the Ozone-depleting substances and F-gases section below are exceeded.

In addition to reporting activities on site, our reporting requirements extend to:

- > The safety and health impacts of activities undertaken by all AstraZeneca staff managed from the site. This includes sales representatives and any staff working from home
- > The SHE reporting of the impact of any ancillary facilities that are under the control of site management but not within the boundary of the main site, for example associated office accommodation or warehouse premises.

Regular review of data is carried out to ensure accuracy and consistency. This has led to slight changes in the data for previous years. None of the changes are statistically significant. The data quoted in this report is generated from the revised data.

Changes in scope

Changes in AstraZeneca's business (new sites, site closures, transfers of activity) between 2015 and 2016 have been analysed according to our Global Safety, Health & Environment Performance Data Recalculation Procedure to assess our business's performance on a scope that is comparable from one period to the next. Our SHE Strategy baseline data for 2015 is adjusted as necessary for each SHE performance metric.

One major site acquisition took place part way through 2015. Our 2015 data has been recalculated accordingly as shown in the table below.

	Recalculated 2015 baseline	Actual 2015 performance
Scope 1 and 2 GHGs (tonnes CO ₂)	689,509	658,749
Energy (MWh)	1,906,404	1,818,926
Waste (tonnes)	35,510	34,585
Water (m ³)	4,209,867	3,989,005

In our new strategy period, we have included two new sources of GHG emissions in our 'operational carbon footprint' scope for the first time:

- > The energy used by our globally managed first tier suppliers
- > Emissions from patient use of pMDI inhaler therapies.

Reporting methods for the calculation of our operational carbon footprint are under constant review to ensure they reflect the latest GHG calculation techniques and the criteria set out by the Greenhouse Gas Protocol Corporate Standard. In 2016, we implemented improved reporting methods for: electricity (at our sites and our first tier suppliers); business air travel; and freight and logistics (see Reporting methods for details). These methods were retrospectively applied to the 2015 baseline data and subsequently the 2014 and 2013 data to allow a four-year comparison.

Reporting guidelines and procedures

To ensure the uniformity and reliability of indicators used across our business, AstraZeneca has a mandatory Global SHE Performance Reporting Procedure as part of its overall SHE Policy documentation framework. This document specifies the standard methodologies to be used for SHE performance reporting across the business including definitions, methodological principles and calculation formulae.

We standardise our SHE performance data collection from all sites with the use of the TrackWise Enterprise Quality Management software. This system has inbuilt formulae and emissions factors to ensure consistency in calculation of performance metrics. Our local SHE specialists input data from their sites into TrackWise quarterly. This process is used to gather 100% of our safety, health and site-based environmental performance data.

Non-site-related environmental performance data covering GHG emissions from product use, business air travel, freight and logistics, and first tier suppliers is collected from relevant global business functions. All data submitted is checked by specialists from the global SHE team to ensure data quality. In addition, our global internal SHE audit programme incorporates further detailed checks on data submitted and a third party provides assurance of key performance data presented in our Annual Report.



Reporting methods

Ozone-depleting substances and F-gases

Total consumed and emitted amounts of Ozone-depleting substances and F-gases must be reported if the total consumed or emitted amount is greater than 1kg for the reporting quarter.

Solvents

Total consumed and emitted amounts of solvent must be reported across three solvents categories (non-halogenated, halogenated dichloromethane and halogenated other) if the total consumed of any one solvent type is greater than 100kg for the reporting quarter. Site data can be ascertained through emission monitoring or estimated on the basis of mass balance. The classification of a solvent (or VOC) is based on EU regulations.

Waste

Construction waste is excluded from our waste data. The method of waste disposal is determined and reported by our waste contractors. The distinction between hazardous and non-hazardous waste is made according to local waste management legislation.

Water

Water volumes used are determined using regular meter readings. Non-contact cooling water (water used solely for cooling purposes which is abstracted and returned directly to the environment with no deterioration or changes in chemical properties) is excluded. One site utilised this type of water in 2016. Before this water source was used, the site completed an environmental impact assessment which determined the process had negligible effect on the thermal properties of the water body. The use of non-contact cooling water at this site is controlled by environmental permit.

The breakdown of water use by source should be treated is estimated as our sites name only their primary water source.

We have a Global Standard governing the assessment of water scarcity across our sites and supply chain network. This provides guidance for the interpretation of the WRI's *Aqueduct* tool and the implications of local factors which may mitigate the water scarcity assessment.

Energy

Site energy and fuel consumption is determined using utility bills based on site meter readings. Sites report imported, exported and generated power, including any from certified low and zero carbon sources. As part of the transition to sourcing 100% renewable power globally, an internal procurement guideline has been developed to ensure any renewable power projects and/or certificate purchases meet certain quality criteria in line with the RE100 commitment.

GHG emissions and scopes

Emissions

Conversion factors must be used to calculate the GHG emissions associated with AstraZeneca's activities. The methodology applied is dictated by the activity, as follows:

Energy: 'Location' factors for electricity have been derived from the International Energy Agency (IEA) and USEPA eGRID (Sub-region) databases. 'Market' factors for electricity have been derived from the IEA, US Center for Resource Solutions, EU RE-DISS II databases and where available directly from electricity suppliers. All electricity factors are updated annually. All other fuels and emission sources use factors from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

ODS, F-gas and solvents: 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Waste incineration: 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Road fleet: Each market (country) discloses average CO₂ per km of its fleet and distance driven quarterly.

Business air travel: UK Defra GHG factors applied according to distance travelled (short/medium/long-haul) and seat class, including radiative forcing. Factors are updated annually.

Freight and logistics: UK Defra GHG factors applied according to mode (air, sea, road), distance travelled (short/medium/long-haul – air freight only), including radiative forcing (air freight only). Factors are updated annually.

Product emissions from pMDIs: Factors from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories are applied according to production volumes of our pMDI devices that contain HFA propellants and HFA content per device.

Supply chain emissions associated with our operational carbon footprint: Sometimes referred to as 'well-to-tank' fuels, are calculated using UK Defra GHG factors and are updated annually.

Supply chain other: The remaining emissions sources not covered by the above are estimated based upon procurement spend sub-categories using a globally recognised database. This is conducted one year in arrears.

Scopes

We follow the GHG Protocol Corporate Standard definitions to assign our emissions sources into one of three scopes:

Scope 1: GHGs from direct fuel combustion, process and engineering emissions at our sites and from fuel use in our vehicle fleet.

Scope 2: GHGs from imported electricity, heat and steam. Electricity emissions are calculated using the GHG Protocol Scope 2 Guidance (January 2015) 'market-based' factors net of market instruments.

Scope 3: GHG Protocol Scope 3 categories: purchased goods and services; capital goods; fuel- and energy-related activities; upstream transportation and distribution; waste generated in operations; business travel; employee commuting; upstream leased assets; downstream transportation and distribution; processing of sold products; use of sold products; end-of-life treatment of sold products; downstream leased assets; franchises; and investments.

Ethics and transparency

Patient safety and product security

Our approach

Bioethics

Compliance

Antimicrobial resistance

Supply chain management

Ethics and transparency

We want to be valued for the medicines we provide and trusted for the way we work. That means leading our industry in demonstrating ethical business practices and high levels of integrity in everything we do. It is why human rights, safety and health, environmental protection and business ethics are core to AstraZeneca's approach to sustainability.



Compliance

We emphasise to all our staff the importance of compliance with our AstraZeneca Values, Code of Conduct and supporting requirements. We empower our people to ask questions when they are unclear or make a report when they have a concern.

100%

of active employees trained on the Code of Conduct



Managing our supply chain

We extend our high ethical standards to our whole supply chain and regularly check and audit that our suppliers reflect our Values.

8,977

supplier assessments carried out in 2016



Product security

The illegal trade in medicines is a public health risk and our aim is to disrupt this activity by working with partners around the globe.

\$16.5 million

worth of AstraZeneca counterfeit and illegal medicines seized



Animals in science

We apply a single, consistent Global Standard for animal welfare and are committed to reducing, refining and replacing animals in our work.

100%

of staff working with animals are appropriately trained in animal care, use and welfare



Antimicrobial resistance

Although we no longer develop small molecule antimicrobials in-house, we're standing with our peers to tackle this global issue.

Signed

the Davos Declaration on Combating Antimicrobial Resistance with over 100 other companies

Our approach

We have worked hard to position ourselves as a global leader in the pharmaceutical industry. As a leader, we have a responsibility to hold ourselves to high ethical standards and to demonstrate ethical business practices. We strive for high levels of integrity in everything we do, whether it's our approach to bioethics, including the use of animals in science, the way we treat the participants in our clinical trials, our approach to human rights or the scrutiny of our supply chain to ensure our suppliers meet our high standards.



Key

- ↑ Target exceeded
- ✓ Full target achieved
- Ongoing progress
- Target not achieved, some progress

What we have achieved

Goals	Target progress	Progress highlights
All active employees to be trained on our Code of Conduct by 2016	✓	100% of active employees trained on the Code of Conduct in 2016 Achieved a 100% score for Code of Conduct from the Dow Jones Sustainability Index
Communicate clear policies to employees by 2016	→	Updated our annual Code of Conduct training to provide greater clarity and simplicity for the business as well as improved accessibility via mobile devices since 2016
Ensure employees can raise concerns and that they are properly addressed by 2016	→	320 reports of alleged compliance breaches or other ethical concerns made through the AZethics Helpline in 2016
Meet high ethical standards across all our procurement activities and decisions worldwide by 2016	→	Conducted 66 high-risk supplier audits in 2016
Collate a suite of 'Culture of Care' pledges from all of our R&D sites, demonstrating our daily commitment to high standards of animal welfare by 2016	→	Two winners of a newly introduced 'Culture of Care' award recognising the day-to-day commitment to excellence in animal care and welfare, including one attracting the attention of the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) for further development as a project initiative
Continue to promote scientific excellence in animal care and use through a programme of global roundtable workshops by 2016		In 2016, we prepared to meet the Redacted Clinical Report Package of the European Medicines Agency (EMA) Publication of Clinical Data Policy. The policy is designed to further improve transparency and access to research information

Compliance

We expect everyone at AstraZeneca to observe the highest standards of integrity and honesty, and to act with care, diligence and fairness in all they do. We are committed to delivering consistently high standards of sales and marketing practices worldwide, and we work with only those third parties who embrace high standards of ethical behaviour that are consistent with our own.

Building a culture of compliance

Our Global Compliance function exists to drive and embed a culture of ethics and integrity throughout our organisation. We require all our employees to take personal accountability for their actions and to demonstrate individual behaviour that is in line with our Values and principles. That means engaging them and supporting them to ensure they understand and follow our requirements and feel comfortable asking questions or reporting concerns.

We focus our efforts on:

- > Communicating clear policies to employees
- > Improving compliance behaviours through effective advice, training and support
- > Monitoring compliance
- > Ensuring employees and the public can raise concerns and that they are properly addressed
- > Fair and objective investigations of possible policy breaches
- > In close collaboration with Internal Audit Services, providing stakeholders with effective assurance and reporting on key issues, including risk management relating to third parties working on our behalf, as well as strengthening of compliance controls to address identified gaps.

Our Code of Conduct is at the core of our compliance programme, and compliance with the Code is mandatory for all employees. The Code has been translated into 40 languages and provides clear direction as to how our commitment to honesty and integrity is to be realised through consistent actions across all areas of the business.

Our Global Policies, as well as local and functional procedures, support the Code and provide clear guidance in key risk areas.

Every new starter receives training on the Code of Conduct. We then require all employees to complete an annual refresher

course on the Code of Conduct and ethical business practices. Our training is designed to be straightforward, to promote employee understanding.

We are committed to the highest standards of ethical conduct in all of our operations, including transparency in how we partner with physicians and medical institutions. In the US, our external transparency reporting meets the requirements of the Physician Payments Sunshine Act (Open Payments), as well as relevant state transparency laws. In Europe, AstraZeneca's reporting meets the requirements of the European Federation of Pharmaceutical Industries and Associations (EFPIA) Disclosure Code, as well as applicable local transparency requirements.

In 2016, AstraZeneca took steps to strengthen the capabilities of our Global Compliance function, including the development of the Global Compliance Academy, a social learning platform where our Compliance professionals can interact to share learnings and best practices and build their skills through tailor-made, on-demand training.

Reporting breaches and concerns

Our Code of Conduct requires employees to report any concern they may have about a possible breach of the Code or its supporting requirements. Employees are advised to consult with their line manager or their Human Resources, Legal or Compliance functions. The Code provides additional contact channels through our Helpline, which includes the AZethics telephone lines, the AZethics website, and the Global Compliance email and postal addresses. These channels are also available to the general public for reporting concerns. Reports can be made anonymously where desired and where permitted by local law.

The AZethics website and telephone lines are managed and externally operated by an independent third party on AstraZeneca's behalf. The website is available in 38 languages, and the phone lines are operable in 96 countries, to facilitate reporting. When

an inquiry is made or a concern is raised, the details of the report are sent to AstraZeneca for appropriate follow-up and resolution.

We take all alleged compliance breaches and concerns seriously, and investigate them and report the outcome of such investigations to the Audit Committee, as appropriate. Internal investigations are undertaken by staff from our Global Compliance, Human Resources and/or Legal functions, to preserve the independent nature of the review. When necessary, external advisers are engaged to conduct and/or advise on investigations.

When allegations of misconduct by employees or third parties are confirmed after full investigation, business stakeholders take appropriate disciplinary or remediation actions, including termination of employment or termination of a third-party engagement, when necessary. They also implement the necessary enhancements within the business to help prevent future misconduct, including retraining of relevant employees and strengthening of local procedures and controls. Similarly, as part of continuing to do business with the third-party, they take the necessary steps to help prevent future misconduct, including re-emphasising our expectations of ethical behaviour to the third party's management, providing retraining to relevant third-party employees, and negotiating improved processes and controls within the third party's business.

In 2016, 320 reports of alleged compliance breaches or other ethical concerns were made through the Helpline, including reports made by any anonymous route that could be considered whistle-blowing; in 2015 there were 326 reports. The majority of cases come to our attention through management and self-reporting, which can be seen as an indication that employees are comfortable in raising their concerns with line managers, local Human Resources, Legal or Compliance, as recommended in the Code and reinforced in the 2016 Code training. We make it clear that anyone who raises a possible breach in good faith is fully supported by management and will not be subject to retaliation.

Ethical sales and marketing

Effective sales and marketing are key to the sustainable growth of our business and to improving access to healthcare for people around the world. Accessing new markets, working with healthcare professionals and advocating for our products are all a part of that and must be done ethically. Our [Global Policy on Ethical Interactions](#) supports our Code of Conduct; as with the Code of Conduct, compliance with our Global Policies is mandatory for all employees. Our Global Policy on Ethical Interactions sets out our principles and requirements to meet our commitment to operate ethically and with integrity – including our zero tolerance for bribery and corruption. It includes guidance on appropriate product promotion to ensure we provide healthcare professionals with evidence-based, reliable information about our medicines in the best interests of patient care.

When we work with suppliers, distributors and partners on the sales and marketing of our products, we carry out appropriate risk assessments and due diligence to ensure they are reputable. We actively engage with these organisations to maintain oversight of their activities and make sure that they are operating to high standards of ethical practice that are consistent with our own.

We maintain a robust compliance programme with dedicated compliance personnel, who advise on and monitor adherence to our Code of Conduct and supporting requirements. They also support our line managers locally, seeking to ensure that their staff meet our high ethical standards.

A network of nominated signatories review our promotional materials and activities against applicable requirements. Audit professionals in Internal Audit Services also conduct compliance audits on selected marketing companies and third parties.

We identified six confirmed breaches of external sales and marketing codes or regulations in 2016 (2015: 11).

There were 1,729 instances, most of them minor, of non-compliance with our Code of Conduct, Global Policies or supporting requirements in our Commercial Regions, including instances by employees and third parties (2015: 1,749). We removed a total of 222 employees and third parties from their roles as a result of these breaches (a single breach may involve more than one person). We also formally warned 429 others and provided further guidance or coaching on our policies to 1,283 more. The most serious breaches were raised with the Audit Committee.

The US Foreign Corrupt Practices Act investigation involving AstraZeneca was resolved in 2016 following a civil settlement agreed with the Securities and Exchange Commission; the Department of Justice closed its investigation without taking action against the company.

Reports of alleged compliance breaches/ethical concerns via the Helpline

2013	149
2014	247
2015	326
2016	320

Confirmed breaches of external sales and marketing codes or regulations




2013	11
2014	6
2015	11
2016	6

Instances of non-compliance with Code of Conduct, Global Policies or supporting requirements in our Commercial Regions

2013	1,773
2014	1,847
2015	1,749
2016	1,729

Corrective actions taken in our Commercial Regions

2013	1,813	568	187
2014	1,573	454	213
2015	1,476	490	339
2016	1,283	429	222

 Guidance and coaching
 Formal warning
 Removal from role

Preventing corruption

A key focus of our Global Ethical Interactions Policy is on anti-bribery/anti-corruption, and this Policy specifically declares AstraZeneca's zero tolerance for bribery or any other form of corruption, even if AstraZeneca loses business as a result. Our Global Ethical Interactions Policy makes clear that bribery includes giving or receiving something of value that is intended or could be seen as improper influence, and that 'something of value' can take many forms, such as: cash payments, discounts/rebates, compensation for services or reimbursement of expenses; gifts, samples or other items of value; meals, travel/accommodation or other hospitality; contributions; or even providing access to resources or information.

In 2016, the mandatory annual training on our Code of Conduct included a module dedicated to ethical business practices and featuring anti-bribery/anti-corruption principles. Also in 2016, Global Compliance developed training specific to anti-bribery/anti-corruption, using real-life scenarios to help employees put our principles into practice in their daily work. This training was made available to all employees to complement the Code of Conduct training.

The Global Compliance function works with a range of specialist functions throughout the company, including Legal and Procurement, to ensure ongoing compliance with AstraZeneca's anti-bribery/anti-corruption principles. Global Compliance also works closely with the Internal Audit Services function, and both functions separately provide quarterly reporting to the Audit Committee of AstraZeneca's Board of Directors, including assurance reporting on incidents of non-compliance relating to anti-bribery/anti-corruption. The Audit Committee also annually reviews AstraZeneca's systems and controls in place to prevent bribery and corruption.

Anti-bribery/anti-corruption auditing forms a significant part of our global monitoring and audit programmes of the commercial business. Each year, AstraZeneca uses a mixture of internal and external measures, including the Transparency International Corruption Perceptions Index, as well as market-specific risk factors, to perform its risk assessments for these programmes. These programmes cover a range of activities associated with bribery/corruption risk, including, but not limited to,

tendering, sales and distribution, engaging healthcare professionals and other third parties for services, items of value and hospitality, and contributions. Also, as part of our commitment to continuously improve our compliance programme, in 2016, AstraZeneca continued to invest in analytics techniques to review data to improve detection and correction of potential non-compliant activities. A key area of focus for this work was around anti-bribery/anti-corruption.

AstraZeneca is also an active member of aclegal, an industry global working group addressing anti-bribery/anti-corruption and anti-money laundering compliance issues within the life sciences sector, including regular benchmarking and best-practices sharing. Through active participation in this and other industry associations such as the UN Global Compact, AstraZeneca keeps pace with and is firmly committed to taking the necessary internal steps to ensure alignment with current international codes and standards.

Third parties and corruption

AstraZeneca is committed to working with only those third parties who embrace high standards of ethical behaviour that are consistent with our own; we carry out this commitment by conducting appropriate risk assessments and due diligence, implementing contractual obligations with our third parties and maintaining oversight of third-party engagements. Specifically, AstraZeneca has a robust, centralised third-party risk assessment and due diligence process that is undertaken prior to engaging relevant third parties for goods or services, across local marketing companies and other business units. This process covers a wide range of risks, including, but not limited to, bribery/corruption risk.

To support the effectiveness of this process, a risk-based approach to training that is consistent with the US Foreign Corrupt Practices Act and UK Bribery Act guidance is taken. In this way, we focus on the higher-risk geographies, as well as on the higher-risk third parties and activities. In 2016, we provided anti-bribery/anti-corruption training to AstraZeneca engagement owners (who are responsible for managing third-party engagements) as well as to higher-risk third parties (such as distributors), focusing our efforts on higher-risk geographies. This training

allowed for customisation with case studies and other information specific and relevant to the particular audience, designed to make the training most impactful.

In addition, for all relevant third-party engagements, AstraZeneca provides the third party with our [Expectations of Third Parties](#), which describe our key expectations for third parties with respect to anti-bribery/anti-corruption and other relevant risks. Our Expectations of Third Parties explicitly prohibits third parties from:

- > Directly or indirectly giving, offering or promising a bribe, or authorising anyone else to do so
- > Directly or indirectly receiving, soliciting or agreeing to accept a bribe, or authorising anyone else to do so.

It explicitly states that AstraZeneca has zero tolerance for bribery or any other form of corruption and will support all refusals by third parties to engage in bribery, even if we lose business as a result.

Political donations

Neither the company nor its subsidiaries made any EU political donations or incurred any EU political expenditure in 2016. To enable the company and its subsidiaries to continue to support interest groups or lobbying organisations concerned with the review of government policy or law reform without inadvertently breaching the Companies Act 2006, we put a resolution to shareholders at our AGM, to authorise the company and its subsidiaries to:

- > Make donations to political parties or independent election candidates
- > Make donations to political organisations other than political parties
- > Incur political expenditure, up to an aggregate limit of \$250,000.

In the US, corporate political contributions are subject to both federal and state laws and regulations. In 2016, the Group's US legal entities made contributions amounting in aggregate to \$1,568,250 (2015: \$1,224,550) to national political organisations, state-level political party committees and to campaign committees of various state candidates.

We did not make any corporate donations at the federal level and all contributions were made only where allowed by US federal and state law. We publicly disclose details of our corporate US political contributions, which can be found on our [website](#).

The annual corporate contributions budget is reviewed and approved by the US Vice-President, Corporate Affairs and the President of our US business to ensure robust governance and oversight. US citizens or individuals holding valid green cards exercised decision-making over the contributions and the funds were not provided or reimbursed by any non-US legal entity. Such contributions do not constitute political donations or political expenditure for the purposes of the Companies Act 2006 and were made without any involvement of persons or entities outside the US.

Corporate tax

AstraZeneca is a global, science-led biopharmaceutical business. We are one of only a handful of companies to span the entire life cycle of a medicine from research and development to manufacturing and supply, and global commercialisation of primary care and specialty care medicines. We operate in over 100 countries and our innovative medicines are used by millions of patients worldwide.

Our business activities around the world incur a substantial amount and variety of business taxes. We pay corporate income taxes, customs duties, excise taxes, stamp duties, employment and many other business taxes in all jurisdictions where applicable. In addition, we collect and pay employee taxes and indirect taxes such as Value Added Tax (VAT). The taxes we pay and collect represent a significant contribution to the countries and societies in which we operate.

AstraZeneca aims to comply with tax laws in the countries in which it does business and is committed to transparent and constructive relationships with all relevant tax authorities.

In December 2015, the Financial Reporting Council (FRC) in the UK announced that it would conduct a review of companies' tax reporting to encourage more transparent recording of the relationship between the tax charges and accounting profit. The FRC Corporate Reporting Review Team subsequently conducted a review of the tax disclosures in our financial statements for the year ended 31 December 2015 and in 2016 confirmed that they had no substantive issues to raise. The FRC's role is not to verify the information provided but to consider compliance with reporting requirements.

The Committee took note of and was satisfied with relevant reports from the regulators that exercise routine oversight over the company's external auditors, the FRC and the Public Company Accounting Oversight Board.

The Audit Committee reviewed the company's approach to tax including governance, risk management and compliance, tax planning, dealings with tax authorities and the level of tax risk the company is prepared to accept. The full statement, which was published in November 2016, can be found at www.astrazeneca.com.

The integrated nature of our worldwide operations can produce conflicting claims from revenue authorities as to the profits to be taxed in individual countries. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the incidence of double taxation on our revenues and capital gains. The company's worldwide operations are taxed under laws in the jurisdictions in which they operate. International standards governing the global tax environment regularly change. The Organisation for Economic Co-operation and Development (OECD) has proposed a number of changes under the Base Erosion and Profit Shifting Action Plans.

View our tax policy [here](#).

Supply chain management

Our future success depends on building and maintaining a strong and sustainable supply chain that supports our research and development of new medicines and upholds our high ethical standards. Monitoring and improving performance across the 45,000 suppliers we use around the world protects our business and, more importantly, the patients who use our medicines.

We are committed to meeting high ethical standards across all our procurement activities and decisions worldwide. We expect our third parties to meet these strict standards, as set out in our [Global Standard Expectations of Third Parties](#). Our Global Standard incorporates our Code of Conduct and key international standards such as those published by the International Labour Organization (ILO).

Every employee who sources goods and services on behalf of AstraZeneca is expected to follow responsible business processes, which are embedded into our procurement procedures. All our procurement professionals receive detailed training on responsible procurement.

We also require our suppliers to complete regular supplier assessments. At the end of 2016, 20,613 suppliers had completed compliance assessments, a 96% completion rate with the remaining 4% in progress. We maintain oversight of our supply chain and where we are spending our money.



“

At AstraZeneca, we have clear company Values to guide our behaviour and the decisions we make on a daily basis, helping to ensure that we do the right thing and act with integrity in every situation.

It is critically important to us that the third parties we work with share our Values and ensure that any work on our behalf upholds our ethical standards. Only together can we maintain and enhance the trust of our customers and stakeholders and, ultimately, deliver our Purpose: to push the boundaries of science to deliver life-changing medicines.”

Pascal Soriot, CEO, AstraZeneca

In Focus: How do we ensure an ethical and transparent supply chain?

Global corporations have an extraordinary amount of power and influence, especially when it comes to buying in products and services. Big business has a responsibility to spend its money wisely and in a way that has benefits for the wider business community and the populations it serves. A transparent procurement system is critical to this.

In order to achieve our goals, complete our research and market our products, we work with suppliers and third parties all over the world. Carefully selecting which third parties we work with on the basis of their ethical standards, and providing support and training to those who want to do better, helps us ensure an ethical pipeline. It also spreads a commitment to human rights, health and safety, environmental sustainability and diversity to a wider number of businesses and organisations.

Our commitment to ethics and transparency requires us to set clear standards for those suppliers and to have strong processes in place to monitor and audit our supply chain to ensure suppliers are meeting those standards.

We start by selecting the supplier we want to work with. In some instances, we are able to select from a number of companies who carry out similar work and can choose to work with the one that best demonstrates our Values. In other instances, there might be only one company able to perform the tasks we need. On those occasions we take a collaborative approach and work with a supplier to bring that company's standards up to meet our own. Sometimes a supplier has the right intent, but without enough knowledge or experience to address risks and implement improvements. Where possible, and when a supplier shows appropriate commitment, we support them to achieve our high standards.

Our commitment to supply chain excellence goes right to the top. Each member of our Senior Executive Team (SET) is accountable for ensuring that procurement activity within their area is carried out in a manner consistent with our strategy and that the skills and resources are in place to deliver the requirements of the strategy. The Chief Procurement Officer is accountable for the governance and assurance of the Third Party Risk Management process and reports directly to a member of the SET.



We provide incentives for suppliers through a number of means from specialist training to profit-sharing of any costs saved/ revenue generated through our improvement initiatives.

AstraZeneca is a member of the Pharmaceutical Supply Chain Initiative. This not-for-profit organisation helps and supports suppliers to meet the expectations of the industry with regard to labour, health, safety, environment and management systems. The group is increasingly expanding its reach to include a range of services used across the pharmaceutical industry. We have used our experience with supplier auditing to help ensure the effectiveness of the audit approach used by the industry, contributing ideas, manpower and key documentation to ensure the success of this platform.

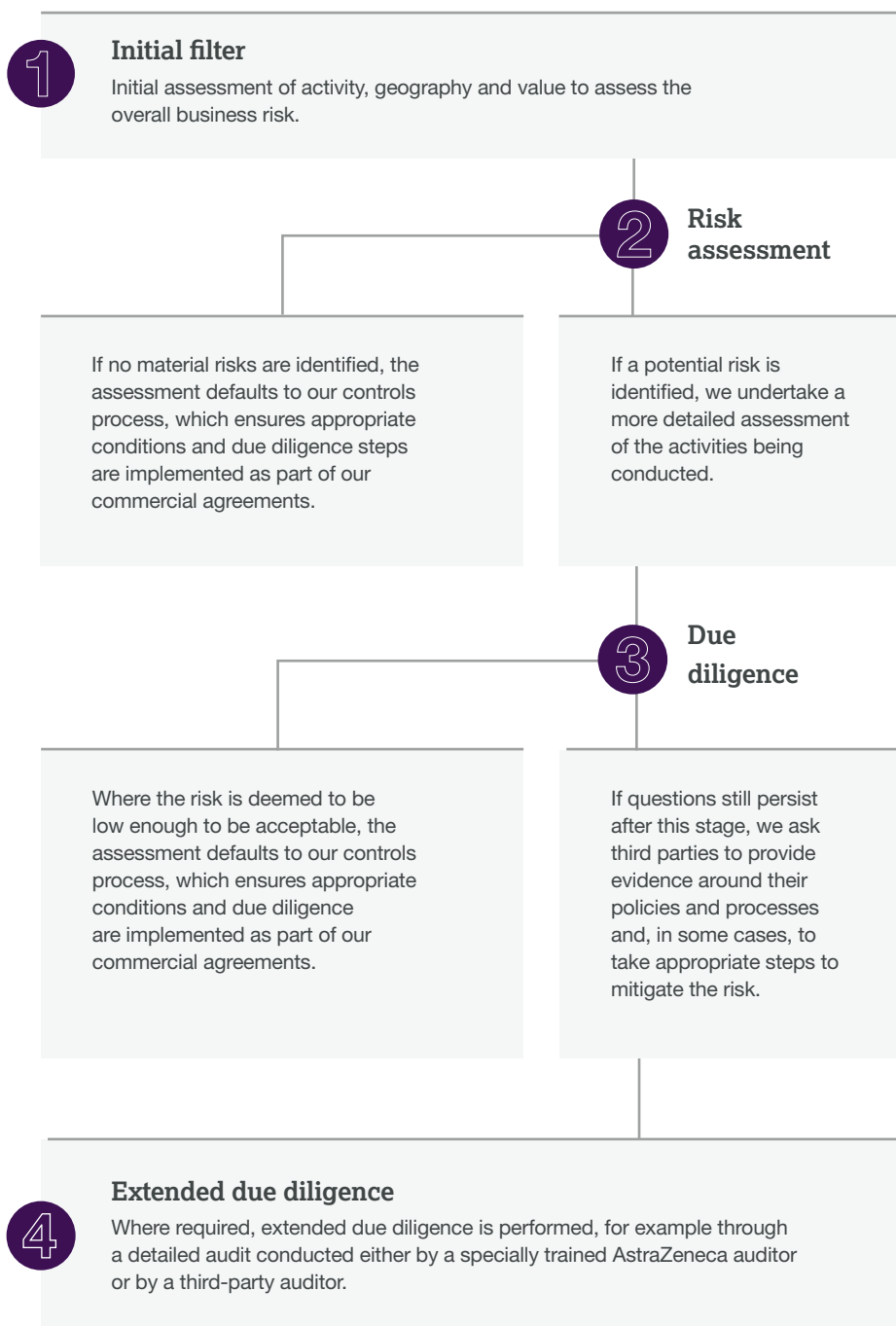
We are also members of Verisk Maplecroft, which helps organisations optimise and strengthen the risk management processes and supply chains by providing a portfolio of global risk analytics with world-leading analysis, real-time locational monitoring and innovative risk calculator technology.



Our procurement organisation works to assess and monitor risks within our global supply chain, including suppliers, downstream supply chain partners and local business development partners.

We apply a globally consistent approach to assessing risk, which allows us to focus our efforts on high-risk relationships and ensure suppliers understand and are able to meet our expectations.

Our four-stage assessment process



Monitoring standards and compliance**Quality audits**

Year	Internal quality audits of AstraZeneca suppliers	Internal quality audits of AstraZeneca sites
2013	398	25
2014	395	24
2015	428	40
2016	461	36

In 2016, we conducted 66 extended audits on high-risk suppliers. We found 32% of suppliers met our expectations, with a further 42% implementing improvement plans to address minor instances of non-compliance. 40 potential suppliers failed to meet our

required standards and we discontinued the relationship (0.45% of total suppliers assessed, in line with external benchmarks). 1,101 assessments resulted in an action plan to help improve standards at our third parties.

Supplier assessments by region since 2014**Helping suppliers meet our ethical standards**

We develop and implement ongoing supplier engagement programmes that reflect areas of specific geographical an/or supply sector risk, with a focus on any key gaps in third-party understanding. In Algeria, for example, our local organisation supported a supplier who had a number of gaps against AstraZeneca expectations. We provided subject matter expertise and shared documents to help inform and educate the supplier on the level of expectation. We also provided access to specific individuals who could coach the supplier's management team. In particular, these related to human resource management, quality systems and anti-bribery/anti-corruption. Using this support and knowledge the supplier was able to rectify the identified gaps and raise awareness within their own organisation of responsible business practices.

Patient safety and product security

Developing a new medicine carries inherent risk and ensuring patient safety is our top priority. It is our responsibility to eliminate all risk where possible, and to minimise it where it is not possible to eliminate it completely.

Pharmacovigilance is the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problems. It is our responsibility to our patients and we take it very seriously.

During the development phase, we carry out extensive and rigorous preclinical and clinical testing to establish a potential new medicine's safety and efficacy. Once we establish an acceptable benefit and risk profile, we submit comprehensive information, including clinical trial data, to the regulatory authorities responsible for approving medicines in each country or region in which we want to launch the product.

We work with regulators to develop prescribing information that gives healthcare professionals the information they need to promote patient safety – including indications for use, dosing recommendations, warnings and contra-indications, as well as potential side effects. Where appropriate we also make information available directly to patients about our medicines and how they should be taken.

While enormously helpful in defining how patients will broadly respond to a medicine, clinical trials cannot replicate the complete range of patient circumstances that exist among larger and more diverse patient populations. Rare side effects can often be identified only after a medicine has been launched and used in far greater numbers and over longer periods of time.

For all our medicines, under development as well as on the market, we have comprehensive and rigorous systems in place for detecting and rapidly evaluating adverse effects, including mechanisms for highlighting those that require immediate attention. Each medicine has a dedicated safety team, which includes a responsible global safety physician and one or more pharmacovigilance scientists. At each affiliate, we also have at least one appropriately qualified person who is responsible for pharmacovigilance matters.

Safety information is provided from many sources, including reports on suspected adverse drug reactions from healthcare providers and patients and from review of the scientific literature. Our Global Patient Safety Database is the central source of information for patient safety across our organisation and for reporting to regulatory authorities.

In addition, we use tools to enable signal detection and data compilation, and are investing in information technology. In compliance with regulatory requirements, all available safety information is continuously and regularly reviewed and, following stringent assessment, any new safety data is provided to regulators, doctors, other healthcare professionals and, where appropriate, patients.

We develop patient risk management plans for all our medicines. These help us identify, further evaluate and reduce risks to patients and, where appropriate, we provide the plans to the regulatory authorities. During 2016, we implemented a system with reporting and dashboard functions to track the status of our activities to address important risks in an optimised way.

Our Patient Safety Quality System covers all products and is a part of the company's overall quality system, providing a quality environment that meets the requirements of Good Pharmacovigilance Practice and Good Regulatory Practice. A programme is in place to monitor and evaluate the performance and compliance of the quality system globally against defined quality requirements. Pharmacovigilance leadership regularly reviews summaries of these monitoring activities. The quality system is designed based on continuous improvement principles to proactively anticipate and avoid or minimise the impact of potential quality issues by taking prompt and effective measures.

Fighting the illegal trade in medicines, protecting our patients

Key for product security is protecting our patients from the dangers of illegally traded (including counterfeit and stolen) medicines. Counterfeits, for example, can fail to provide effective treatment and sometimes cause direct harm to patients. It is impossible to estimate on a global scale how common the illegal trade in medicines is, and although it is impossible to prevent entirely, our aim is to disrupt this activity.

The illegal trade in medicines is a global issue that requires global solutions. It is only through strong partnerships and good education that we can disrupt criminal activities that threaten the wellbeing of patients.

We require our employees to report suspicions of possible illegal trade of medicines that come to their attention to our global security function's mailbox. In addition to our employee reports, patients, healthcare professionals, law enforcement and regulators, for example, also report such cases to us.

We analyse suspicious samples which are sent to us and have a global team who work with local colleagues to coordinate our response. For example, we may gather evidence for a prosecution (according to globally acceptable standards) for relevant local law enforcement agencies, report appropriate cases to health authorities and we may take in-market action alerting doctors, pharmacists or wholesalers. We rely on their cooperation and the local health authority to stop such medicines from reaching patients.



Global product security strategy

Our Global product security strategy covers three areas as follows:



The illegal trade of medicines is not a problem AstraZeneca can tackle alone. We therefore work closely with other pharmaceutical companies through industry trade associations including the International Federation of Pharmaceutical Manufacturers and Associations, the European Federation of Pharmaceutical Industries and Associations and Pharmaceutical Research and Manufacturers of America. We also work with not-for-profit organisations including the [Pharmaceutical Security Institute](#) and [Alliance for Safe Online Pharmacy – Europe](#), to raise awareness of the threat of counterfeit medicines.

One such initiative to help raise awareness among patients, healthcare professionals and regulators is the ‘[Fight the Fakes](#)’ campaign.

We also conduct training, where appropriate, to raise awareness of types of illegal trade for our employees and third parties.

In addition, we work closely with other pharmaceutical companies through the Pharmaceutical Security Institute to identify cases of illegal trade and coordinate investigations. As there is no global law enforcement agency or regulator, pharmaceutical companies like AstraZeneca can often act as an interface between authorities in different countries.

In 2016, Global Security investigations led to 147 raids and the seizure of counterfeit and illegal AstraZeneca products worth \$16.5 million, and 59 associated arrests.

Security along our supply chain

We work to improve security in our supply chains for our investigational and commercialised products by collaborating with others to share best practice for supply chain design with the aim of inhibiting the entry of illegally traded medicines.

This includes:

- > Strengthening our processes for third parties and adding product security clauses in our contracts with supply chain partners
- > Training our third parties to report any suspicions and to maintain secure distribution channels
- > Using seals on some packs to make it more difficult and expensive for counterfeiters to copy our packaging, and help identify packs which have been tampered with
- > Complying with traceability legislation (application of unique codes to packs) which some countries are implementing as part of their anti-counterfeiting strategy.

Driving greater protection

The illegal trade in medicines is hard to measure. We do not publish performance targets around our work. However, we continue to make progress on all three areas of our strategy.

As an industry, there has been a lot of progress in terms of raising awareness of the dangers of counterfeit medicines, including the dangers of buying medicines online. While the counterfeiting of any product is illegal, we need to ensure that patients recognise the potentially life-threatening risks specifically associated with counterfeit medicines.

Along with colleagues across the industry, we are continuing our efforts to dismantle the illegal trade in medicines and work with governments to develop legislation that will better protect patient safety and ensure that the sentencing of those convicted of producing and distributing counterfeit medicines, for example, reflects the seriousness of the crime.



What to do if you are concerned about receiving an illegally traded medicine or you have a suspicion about your medicine

AstraZeneca urges patients and healthcare professionals to be alert to the possibility of illegally traded medicines. Anyone who is concerned that their AstraZeneca medicine may not be genuine can contact their doctor (physician), pharmacist (or other healthcare professional) or health authority. You can also contact AstraZeneca through this [website](#) or in the country where you are based.

Patients can protect themselves from illegally traded medicines by obtaining their medicines only from licensed and regulated outlets, and avoiding unregulated sources on the internet. Patients should be vigilant when examining their medicines, paying attention to altered or unsealed packaging or changes in the product packaging.

Product quality and recalls

AstraZeneca operates a Pharmaceutical Quality System structured to meet the requirements of the internationally adopted pharmaceutical quality system, ICHQ10. This system applies throughout the life cycle of all our products, facilitating innovation, continual improvement and strengthening links between pharmaceutical development and manufacturing activities. It applies to all investigational and commercial products, large and small molecules, including Medical Devices. The Pharmaceutical Quality System is independently assessed by National Competent Authorities located in the countries where we manufacture or market products.

We comply with international standards for Good Manufacturing Practice (GMP). We are assessed by the competent authorities for the regions as well as locally.

Managing quality issues and recalls

All issues reported to AstraZeneca, which may lead to a product recall, are managed and supported by a central dedicated team. When an issue is flagged, this team convenes a meeting or meetings of the appropriate global and local (country or site) personnel. The process applies to all AstraZeneca products and all countries where AstraZeneca's products are sold.

The global procedure commits to achieve the highest possible standards around the management of product issues and recalls, and meets the criteria stipulated within the World Health Organization Guidelines. This global procedure also meets the product recall requirements of the US Food and Drug Administration (FDA), EU regulators and GMP.

In the first instance, the issues management team will work to understand the scope of the issue and the product batches and countries affected as well as the impact for patients and healthcare providers. It also assesses the relevant communications needed with regulators and customers, and establishes how returned products will be monitored to ensure a recall (if necessary) is effective.

We have Enterprise Resource Planning (ERP) systems in place to enable easy and quick identification of product batches and locations in the distribution chain in the case of a recall. These ERP systems track AstraZeneca products at batch level and readily determine supply destinations.

For onward distribution of products to hospitals, pharmacies and patients, we work with local marketing companies and preferred sales partners or distributors to identify batch and product location to ensure an effective recall. We use these networks to communicate with healthcare professionals to alert them to the issue and provide a contact phone number for customers to contact us for further information.

Our global procedure outlines the process and clear actions that must be taken identifying responsibilities for both global and local individuals. The process stipulates that actions must also follow country-specific routines and legislation for all recalls, and that simulated trace and track recalls must be performed periodically with correction of any deficiencies in the process.

We are in the process of rolling out serialisation of products; this has already been implemented in a number of countries and will be rolled out globally by 2020. This will further enhance our ability to track products within the supply chain, as well as assure the pedigree of the product delivered to the patient.

During 2016, there were no quality issues that could have led to patient impact. Consequently we have not had to trigger a single patient-level recall. We have participated in six recalls that were issued at pharmacy or distribution level. Each recall triggers a deep dive root cause investigation and preventative actions.

Recalls

Year	Number of recalls at pharmacy or wholesale level
2013	Total = 3 (All FDA Classification III)*
2014	Total = 6 (All FDA Classification III)*
2015	Total = 10 (One at FDA Classification I, one at FDA Classification II and eight at FDA Classification III)*
2016	Total = 8 (Two at FDA Classification II, six at FDA Classification III)*

*US recalls were classified by the FDA. Recalls in other territories were classified by AstraZeneca aligned to the FDA's guidance.

Inspections

We were inspected 33 times in 2016 by 18 different Health Authorities including the US FDA.

We did not receive any FDA warning letters in 2016. At the end of each inspection, the FDA provides us with a list of 'observations' or areas for improvement. During 2016 we received one FDA observation (classified as a 483), which was for a third-party site, not one of AstraZeneca's own sites.

Total FDA observations (483s)

	31	2013
	22	2014
	16	2015
1		2016

Total FDA inspections

	5	2013
	9	2014
	9	2015
3		2016

Bioethics

Bioethics are the principles, behaviours and ethical standards that govern our research and development worldwide. Our Bioethics Policy covers a number of subject areas, including the use of human biological samples (HBS), using animals in research, and the conduct of clinical trials. Where appropriate, we use internationally approved standards to achieve high ethical standards. We also constantly review our policies and procedures to ensure good practice and learning.

Our Bioethics Advisory Group (BAG) brings together subject matter experts who monitor and oversee our activities in critical areas of bioethical interest. In 2016, we reviewed how BAG operates, and implemented some changes to membership, reporting and governance to ensure it remains relevant and effective. We have aligned sponsorship of BAG with ownership of the Global Bioethics Policy, under the Chief Medical Officer. This ensures that BAG has visible senior sponsorship and authority commensurate with its objectives and obligations.

AstraZeneca is not involved in any research on human reproductive cloning, for which there is a UNESCO international ban and country-level legislative bans.

HBS

HBS, such as solid tissue and biofluids, are vital to developing a deeper understanding of human diseases, which helps us develop effective, new and personalised medicines. In carrying out this important area of research, we maintain policies and processes to ensure that we both comply with the law and meet regulatory concerns.

Protecting the rights of donors and their families

AstraZeneca greatly appreciates the generosity of those donating human biological samples for research. We place an emphasis on the principle of informed consent that protects the rights and expectations of donors and families throughout the process of acquisition, use, storage and disposal of samples. Protecting the confidentiality of a donor's identity is of utmost importance and a key part of our process includes the coding of biological samples and associated data (including genetic data). AstraZeneca takes rigorous measures to protect the data privacy of subjects, aiming to minimise the risk of their re-identification when processing the data.

The key aspects of our policies and standards extends to the approval of HBS sources and collaborations involving HBS. We use extremely rigorous assessments and have high quality and ethical expectations of our tissue suppliers. To support compliance in sourcing HBS, AstraZeneca worked with an external provider to implement a commercial centralised automated solution for simplified and compliant HBS procurement.

Stem cell research and use of human foetal tissue

Stem cell technology may offer new opportunities to develop innovative and safer medicines and would help ensure better treatments for patients. There are two main forms of stem cell research, human induced pluripotent stem cells (hiPSC), which can be taken safely from adult volunteers, and human embryonic stem cells (hESC). The majority of our stem cell work uses hiPSC, which is a less ethically sensitive alternative to using human embryos. We are actively evaluating both technologies.

We use hESC when there is no alternative technology that would provide the scientific information required to accurately model for a serious human disease. We are interested in the potential of stem cells to differentiate into mature human cells allowing more accurate prediction of drug metabolism and certain safety/toxicity outcomes in people.

Stem cells may also prove valuable for the development of more biologically relevant in vitro models for disease modelling and drug target efficacy evaluation. This would represent a significant step forward in increasing the human relevance of early drug development studies, and help us overcome current limitations that a restricted supply of primary cells presents. There is also the potential to reduce the need for animal studies.

In rare circumstances, AstraZeneca may use human foetal tissue (hFT) in research to advance our understanding of serious medical disorders. In such rare cases, an internal review of the scientific validity of the research proposal will be conducted and permission to use the tissue will be granted only when no other scientifically reasonable alternative is available. To further limit and avoid future use of human foetal tissue, we use cutting-edge scientific advancements and commit to implementing industry best practices.

By the end of 2016, seven research proposals that include use of cells derived from hFT were received for consideration, but none were progressed, either for scientific or other reasons. We continue to review our processes for the supply of human foetal tissue. Currently, four projects using three different hESC lines have been approved.

HBS governance

To monitor our use of HBS, we have created the HBS governance team. This team is responsible for the governance of the collection, storage, use and disposal of HBS, hFT and hESC in R&D. It is also accountable for approving experiments using hESC and hFT as described in the HBS Standard. If there were to be an incident involving the use of HBS, the governance team is accountable for investigation and resolution.

The AstraZeneca Scientific Reference Panel sits alongside the HBS governance team and is responsible for independent internal review of proposals for use of hESC and hFT. It looks at scientific validity and ensures there are no other reasonable means available to conduct the research. In each case, it asks two key questions:

- > Will the proposed study address the experimental aims?
- > Does the proposed research require the use of hFT/hESC rather than other tissue?

Clinical trials

We study the effects of potential new medicines in humans using clinical trials. The clinical trial phase is essential in the development of new medicines. At any one time, AstraZeneca may have hundreds of clinical trials underway in different locations around the world. We take very seriously our commitment to delivering consistently high standards of ethical practice and scientific conduct in all our trials, wherever they take place.

A potential new medicine is tested in humans only after rigorous and extensive pre-clinical research has confirmed its potential efficacy and safety. Trial medicines go through three phases of testing before they are submitted to regulatory authorities for an approval to market. All medicines have side effects that may affect some people, so the safety of any medicine needs to be assessed in terms of its benefit and risk profile.

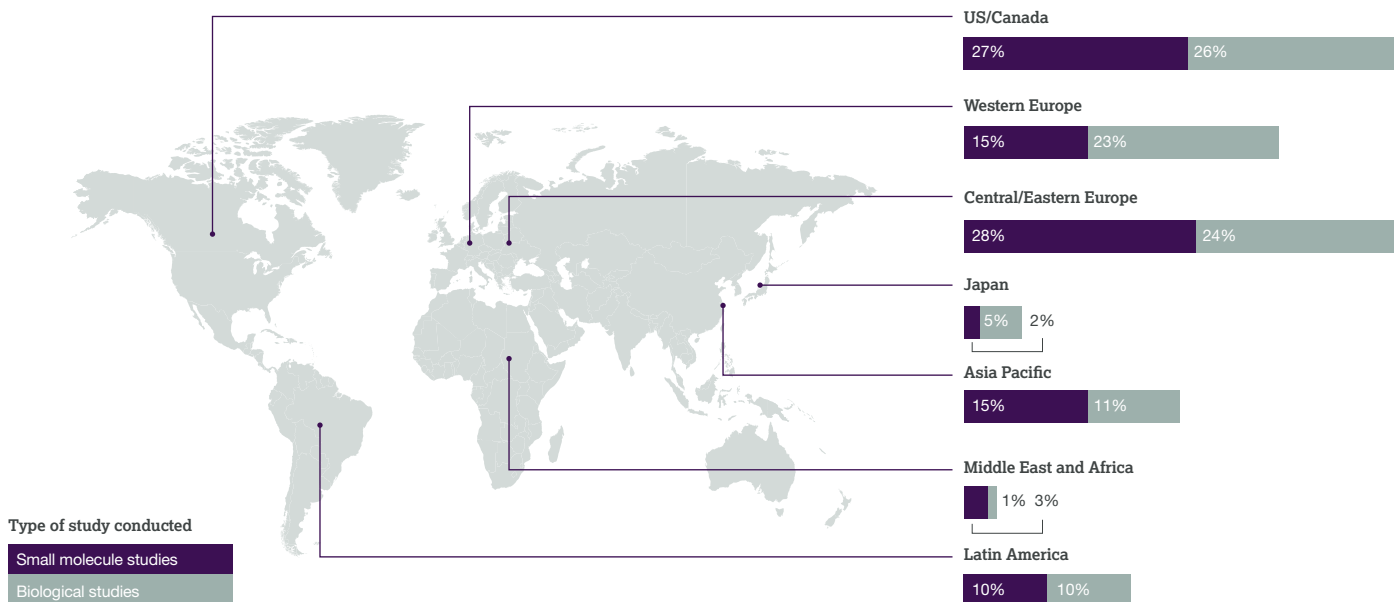
We can't eliminate all the risks to clinical trial participants, but we aim to minimise risks as much as possible. Our top priority is to make sure that those taking part in our studies are not exposed to any unnecessary risks and that, before they give their consent, they understand fully what taking part in a trial means.

Our informed consent process ensures that patients participating in any and every trial understand the benefits and risks, the purpose of the trial and how it will be conducted. We explain that they could receive a comparator drug or placebo and that they can pull out of the trial at any time, with or without giving a reason.

To ensure patients understand all the information that is being given to them, we provide it in the patients' local language or, if literacy is an issue, we provide the information verbally. We use independent witnesses to ensure patient safety and that the consent process is verified. Witnesses are responsible for confirming that a participant has received and understood all the information they need to be able to give their informed consent to participate in any AstraZeneca Group research study.

All our clinical studies are designed and finally interpreted in-house. Some are conducted by contract research organisations (CROs) on our behalf. In 2016, approximately 48% of patients in our small molecule studies and 44% of patients in our biologics studies were monitored by CROs. We require these organisations to comply with our global standards and we conduct risk-based audits to monitor compliance.

Clinical trials around the world in 2016



Implementing to the highest standards

Our standards are global and apply to all AstraZeneca Group clinical trials, in all locations, whether they are being conducted by us or on our behalf by external CROs. If our policies differ from local regulations, we adopt whichever standard is higher.

Our Standard Operating Procedures and Policies require that all staff involved in clinical trials and all investigators are trained in ICH (the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use) guidelines and local Good Clinical Practice regulations. Our standards apply to all AstraZeneca-sponsored clinical trials, in all locations, but the conduct of our trials in emerging countries is a specific focus for our compliance monitoring and assurance activities.

Clinical trial transparency

Since 2015, our dedicated Clinical Trial Transparency office has been working to ensure our compliance with clinical trial policies and all legal requirements. We have committed to allow external parties to request patient-level data as part of the Commitment to Responsible Data Sharing. Sharing more data will help the industry as a whole improve existing and develop new products and treatments, and will save money by avoiding duplication of research. More information can be found on our company website located at www.AstraZenecaClinicalTrials.com.

Calls for 'open access' to clinical data raise complex practical, legal and ethical issues around full disclosure of patient information. Decision-makers, as well as academia and industry, have a duty to consider all the implications that could arise from such proposals. These include ensuring scientific rigour, safeguarding patient privacy and protecting innovation and medical progress. We continue to engage with regulators, legislators, industry, medical and scientific bodies to streamline and implement policies, standards, processes and systems to support responsible clinical trial data sharing that deliver real benefits to medical science and patients.

The Commitment to Responsible Data Sharing is a voluntary, industry-wide scheme designed to improve transparency across the pharmaceutical industry.

To communicate better with clinical trial patients, AstraZeneca developed a suite of 95 different patient engagements. For example, our lay language summaries put research findings into language that patients and the general public can understand. In 2017, we will launch a website for lay language summaries which are interventional studies. The purpose of the website is to allow greater access to these summaries. The website will include summaries that are from 2015 onwards and can be accessed by visiting www.TrialSummaries.com.

We implemented new global standards this year, which give patients and researchers more information about our research. Every patient who participates in a study sponsored by us receives a note recognising their contribution as well as a copy of the study's Trial Results Summary. We also launched the [AstraZeneca Group Data Request Portal](#) to allow external researchers to request our clinical data and reports. We have responded to over 50 requests so far.

In 2016, we prepared to meet the Redacted Clinical Report Package of the EMA Publication of Clinical Data Policy. The policy is designed to further improve transparency and access to research information. We have taken significant steps to make increasing amounts of data available to those who request it. Our challenge is to protect patients' personal information and company confidential information, while still achieving the highest levels of transparency. At the end of the year we submitted the first package to the EMA for our subsidiary group Ardea. The process and work in this area is new to the industry and will quickly develop in 2017 to meet the submission requirements.



Animals in science

We are committed to helping the public understand our use of animals in research. This remains a challenging issue for many people, but animal studies are a critical stage in the development of new life-saving and life-improving medicines and treatments.

This year, we continued to support the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs). Our commitment to the 3Rs (Reduction, Refinement and Replacement) is reflected in our [Global Bioethics Policy](#).

We have enhanced our approach to animal research governance in recent years, revising our policies and processes, and making sure our internal systems and structures reflect our responsible approach to the use of animals in science. Under the leadership of our Chief Veterinary Officer, our Council for Science and Animal Welfare (C-SAW) now oversees all issues relating to the use of animals in science. We are confident that we have robust governance and oversight mechanisms that will allow us to drive continuing improvement in laboratory animal science and welfare.

Our [Bioethics Policy](#) states that all research involving animals must be carefully considered and justified, that the principles of the 3Rs be applied and that the welfare of the animals we use is a top priority. Our requirements apply globally across all our internal animal research, to third parties who conduct research on our behalf, and to the breeders and suppliers of animals for use in such studies.

The Concordat on Openness on Animal Research

We are transparent about our use of animals in research and, as such, we became a signatory of The Concordat on Openness on Animal Research in 2014. Now in its second full year, we have again contributed to the [Concordat's annual report](#) in 2016.

We signed up to all four of the Concordat's commitments:

- > Being clear about when, how and why we use animals in research
- > Enhancing our communications with the media and public about our research using animals
- > Providing opportunities for the public to find out about our research using animals
- > Reporting annually on our progress.

Organ on a chip: the direction of future travel

Organ on a chip might well be the most exciting scientific advance towards eventually eliminating the need for the use of animals in science. So far, it is the closest we have come to replicating the biological functioning of a human organ outside the human body and being able to use it as a test subject.

The organ-on-chips are self-contained units, typically about the size of a memory stick, that contain hollow microfluidic channels lined by human cells, which recreate the physiological functions of human organs.

Scientists are currently developing lung, liver, kidney, pancreas, blood-brain barrier and bone marrow organ-on-a-chip systems. There is also a major effort to integrate these organ chips to create a virtual 'human-body-on-chips'. This will enable us to test new discoveries in a way that would provide us with scientifically relevant results and help us better understand how a medicine might ultimately impact patients.

Although the Concordat is a UK initiative, we welcome and engage in open and constructive dialogue with stakeholders worldwide who have a legitimate interest in our use of animals in research. As well as providing funding to organisations and working groups that educate the public about the use of animals in research, we take active steps to be open about our own animal programmes. For instance, we conducted over 30 UK facility tours to staff and external representatives from UK universities and animal welfare organisations.

Our UK Animal Welfare and Ethical Review Body (AWERB) meetings, where we discuss past, present and future animal work to ensure appropriate ethical review, are open to all staff on site, not just those involved in the animal programme. In the US, we have invited groups of schoolchildren to our site to learn more about the crucial role animals play in bringing new drugs to patients.

Implementing and sharing high standards

Our C-SAW is the expert decision-making group accountable for animal welfare and compliance across the AstraZeneca Group of companies.

Our annual C-SAW Global 3Rs awards, which ran for the third time in 2016, recognise efforts to reduce, refine and replace the use of animals in research.

The judging panel, which included a lay member and an external expert from the NC3Rs (Dr Vicky Robinson CBE) as well as representatives of science, veterinary and laboratory leads from across the geographic business, reviewed 30 very high-quality entries.

The panel elected three winners who were able to demonstrate outstanding efforts and success in applying the principles of the 3Rs in their work:

- > A team from the US and Japan who built a successful case to reduce primate studies that received regulatory agreement
- > A UK team who have established a battery of applications including in vitro tissue slices to better address tumour progression
- > Another UK team that established the science to support group housing of ferrets during essential batch efficacy testing of FluMist®.

Many of the submissions represent significant efforts at the grass roots of laboratory animal care. To recognise the efforts of these teams in doing the right thing, the panel chose to recognise an additional two teams for the 2016 C-SAW Culture of Care Award.



Science, animal welfare and our reputation all go hand in hand when it comes to animal research. The 3Rs wholly represent our Values to put patients first, follow the science and do the right thing."

Pascal Soriot,
CEO, AstraZeneca



In Focus:

How are we improving the ethical use of animals in science?

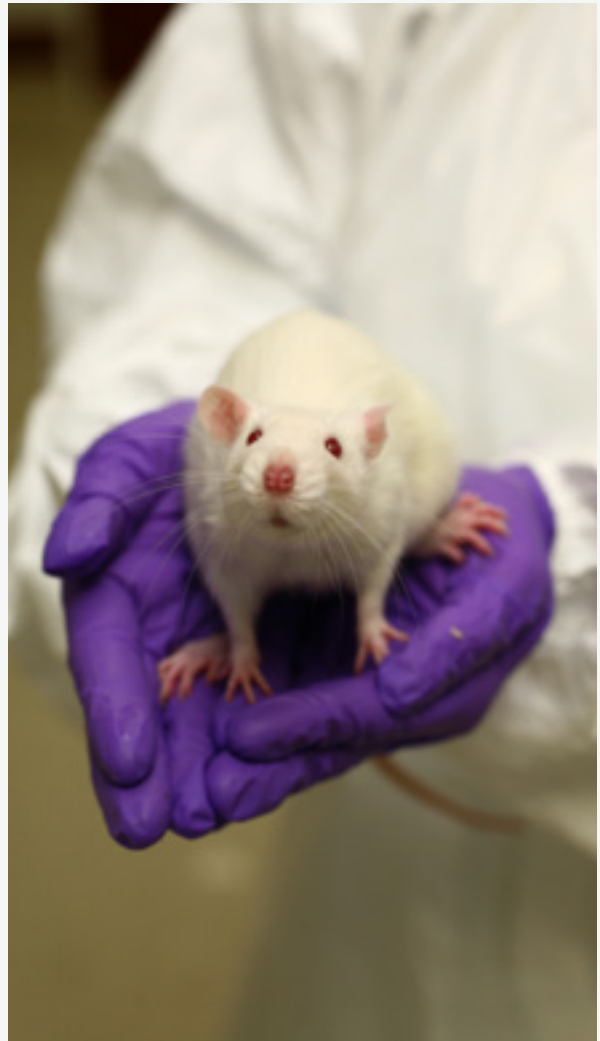
We rely on animal studies in order to create new and improved medicines. Some types of animal studies are required by regulators before they approve a new medicine to be tested in humans during clinical trials. We are also still working to understand fundamental biological processes, where often there is no alternative to the use of live animals. Until we have a good understanding of these processes, we can't look at ways of replicating those using non-animal models.

But that doesn't mean that we are relaxed about how many or what kind of animals we use. Our scientists are constantly looking to find better, more accurate models that can reduce our reliance on animal studies, with the hope of one day replacing them altogether. For the time being the use of animals remains a necessity, so we are equally committed to improving the care and welfare of the animals we do have to use.

We have a proud history of reducing, refining and replacing animals in scientific studies and have made further progress in 2016. Our scientists collaborate and communicate to share innovative practices with our peers to continue to advance the 3Rs. Recent examples include:

- > Ongoing strategic collaborations working to develop new technologies (e.g. '[organ on a chip](#)' on page 17) that may one day replace many types of animal studies
- > Working with academic collaborators to develop a new model of human heart cells to help provide a better indication of the potential effects of new drugs. We hope this will be more widely used by others and work towards reducing the number of animal studies in this important field
- > Publishing and sharing refinements we developed in animal welfare to benefit animals more broadly, for instance with regard to social housing and refined methods of blood sampling.

We support and advocate for the NC3Rs, and work with them on many of the innovations that advanced the 3Rs.



Improving ferret welfare through group housing – 2016 C-SAW Global 3Rs Awards Winner

As a requirement for licensing, each batch of Fluenz/FluMist® must be tested. This involves the use of several hundred ferrets each year because like humans, ferrets are susceptible to flu virus.

Ferrets are social animals and we usually house them in groups. However, regulators have expressed concerns that increased play and proximity could be seen to increase body temperature, which would make interpretation of test results difficult. Elevated temperature is also a symptom of flu, so we had to be able to show that any temperature increases in our animals were as a result of the flu, not from play or other activity.

The team worked with the contractor to demonstrate that group housing did not affect body temperature. By providing this compelling scientific evidence to support our stance, we were able to persuade the regulatory agency to allow us to group house ferrets for Fluenz and FluMist® testing. This is an example of how we are always seeking ways to apply our high animal welfare standards in practice.



Animal welfare

The welfare of the animals we use in research is a top priority. It is the right thing to do ethically, but it is also essential for reliable research outcomes. Stress can cause different responses in different animals. Ensuring animals are fit and well and that their behavioural needs are met reduces stress, reduces variation and produces better quality data from fewer animals.

To reduce stress in the animals we use, we work to high standards of animal welfare and are constantly looking for ways to improve. We provide mandatory training, ongoing competency assessments and continuing professional development opportunities such as certifications and ratifications for employees involved in our animal research. To work towards comparable animal care standards around the globe, we employ a single consistent Global Standard for all animal work, whether carried out in our own facilities or by third parties acting on our behalf. We require the work to be:

- > Compliant with laws or regulations in the location where the work is conducted
- > Consistent with the principles of the 8th Edition of the Guide for the Care and Use of Laboratory Animals (Institute for Laboratory Animal Research) – internationally respected good practice guidelines for animal care
- > Wherever possible, conducted in facilities accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC International).

We undertake a range of due diligence activities, overseen by the C-SAW, to ensure that this is the case.

Rat Playtime – 2016 Global 3Rs ‘Culture of Care’ Award Winner

Long-term housing of rats in caging that does not give them the opportunity to fully carry out valuable natural behaviours such as standing fully upright, climbing, burrowing and foraging has been shown to affect rat behaviour. In order to allow our rats the chance to experience an environment that provides them the opportunity to carry out these natural behaviours, socialisation pens were created, where they could spend time out of their home cage and socialise, exercise, explore and play with each other.

The design of the pen and the provision of enrichment materials within it was carefully considered to encourage and allow the rats to carry out natural behaviours while allowing them to feel secure. Access to different enrichment materials, covered areas and tunnels to hide in were provided, as well as furniture that allowed them to climb and explore the vertical space. Food treats were hidden around the pen to promote foraging behaviour, and some treats were hand fed, encouraging the rats to see hands as a good thing and increasing interaction.

It became very apparent that there was an increase in the confidence and friendliness of the rats. They became more used to and amenable to being handled and were much more likely to voluntarily interact with people. Refining their environment proved to be of great value to both the rats’ and their carers’ wellbeing. This activity will be shared more broadly through a jointly hosted NC3Rs/AstraZeneca workshop in March 2017.



Measuring compliance

The Institute Risk Assessment Tool is designed to assist PARTNER Coordinators with determining if an on-site inspection is warranted. The template calculates risk factors to provide an overall risk score, which can then be used to quantify the degree of risk and provide the PARTNER Coordinators with an objective course of action.

Factors for evaluating risk include:

- > Species being used
- > Whether the study involves novel or sensitive procedures
- > Our track record with the facility

- > The reputation and standing of the facility
- > AAALAC accreditation status
- > The nature of regulatory oversight and the laws or regulations that apply to the facility.

Inspections can be done virtually or physically and inspectors use our Facility Inspection Template to guide their analysis. Inspectors must evaluate the information that is critical to the success or failure of a project, so the question list is just a baseline for inspecting an institute. Inspectors are empowered to use their professional judgement and experience to build upon this where necessary.

Approving animal studies

Internal studies: Each country where we have internal animal facilities has a different requirement for the in-house ethical review of internal studies. In the United Kingdom the committee responsible is AWERB. In Sweden it's the Djurskyddsorgan and in the United States and China it's the Institutional Animal Care and Use Committee. Each of these committees has slightly different requirements and responsibilities to regulatory authorities, but their shared remit is to ensure proposals for research involving animals are properly reviewed and to assure the welfare of the animals.

External studies: Review and approval of external animal research is performed by representatives from each site that have been appointed by the C-SAW. This group is known as the PARTNER (Platform for Animal Research, Tracking, and External Relationships) Site Coordinator Team.

The PARTNER Site Coordinator is the primary contact at each site responsible for animal study ethical review and tracking. Their key responsibilities include providing training in the requirements of the AstraZeneca Global Standard: Animal Care and Welfare, reviewing study submissions and being a point of contact for incident reporting.

The PARTNER Site Coordinator may also perform the duties of an Institute Inspector and manage the relationship between third-party institutes and AstraZeneca. Above all the inspector's role is to ensure that third-parties acting on our behalf have bioethical standards consistent with our own, and that the requirements of the Global Standard are being met.

100% of staff working with animals are appropriately trained in animal care, use and welfare.



The use of animals in research is a complex topic. For more information visit:

Understanding Animal Research: www.understandinganimalresearch.org.uk

Americans for Medical Progress: www.amprogress.org/animal-research/faqs

The National Centre for the Replacement, Refinement and Reduction of Animals in Research: www.nc3rs.org.uk



Number of animals used in research

The majority of animals we use – over 97% – are rodents and many are undergoing mild procedures such as oral dosing, blood sampling or a simple injection under the skin.

The total number of animals we use will continue to vary because use depends on a number of factors, including the amount of pre-clinical research we are doing, the

complexity of the diseases under investigation and regulatory requirements. We believe that without our active commitment to the 3Rs, our animal use would be much greater.

Our priorities are to ensure we are using the right number of animals needed to deliver a statistically reliable result, and to avoid repeating studies unnecessarily.

Year	In-house	External contract research	Total
2013	260,930	19,676	280,606
2014	194,162	15,634	209,796
2015	182,055	33,220	215,275
2016	193,451	25,651	219,102

Nagoya Protocol

AstraZeneca is supportive of the Nagoya Protocol, an international agreement to protect the benefits enjoyed by the country of origin of natural biological resources used in research.

The pharmaceutical industry sometimes uses natural biological resources (such as plant or fish extracts) that might be modified to support its research and development programmes on the path to finding a new medicine.

The Nagoya Protocol is an international treaty which helps to ensure fair reward is given to the country that originally supplies the biological material. In accordance with the Protocol, we, as users of biological resources, have to record our access and use of the

material and keep a record of this for 20 years ('due diligence'). We also have to set 'mutually agreed terms' – a contract that legally defines the conditions of the deal and the benefit that will be received by the country of origin if a new drug is produced. This protects indigenous and local communities, by ensuring that their rights to their natural resources are protected, and promotes a measured and transparent approach to the use of natural resources, which supports the sustainability of our planet's biological diversity.

We are committed to ensuring these communities understand their ownership of and associated rights to their natural resources, and that they are giving informed consent before the removal of these materials and understand the equitable benefits they will

receive in return. We do this with consideration for and adherence to local laws, procedures and customs wherever we work.

Whenever a researcher wants to use biological material that is in the scope of the Nagoya Protocol, our internal processes ensure they meet the appropriate requirements. We have created a dedicated e-tool to help researchers establish whether or not the resource they want to use is in scope and provide guidance. Our procurement team can help the research team contact appropriate suppliers, our business development team oversees the process to ensure it is fair and our Nagoya governance team guides the research team through the process.

Antimicrobial resistance

The increasing resistance of infectious diseases to antibiotics is a global issue. We have previously invested in research and development in infection and are calling on our colleagues across the industry, health leaders, patients, physicians and governments around the world to come together with a multi-stakeholder approach to tackle the global threat that antimicrobial resistance (AMR) poses to society and the barriers that prevent new antibiotics coming to the market.



At the World Economic Forum in Davos in early 2016, we signed the Davos Declaration on Combating Antimicrobial Resistance along with over 100 other companies. The Declaration acts as a collective call on governments to commit to the investment needed to support the development of new antibiotic technologies.

We sold the antibiotics part of our business to Pfizer this year, but, recognising the impact of AMR now and in the future, have committed to continuing to share our research and use our influence to contribute to addressing this global challenge.

We believe the fight against antibiotic resistance requires three key developments:

1

Stronger antibiotic stewardship

Appropriate selection, dosing, route and duration of antimicrobial therapy, along with proper manufacturing controls and environmental management, is necessary to help address the threat posed by antibiotic resistance.

There is an urgent need for global collaboration to develop or update a locally relevant framework of stewardship practices, which delineate responsible surveillance, prescribing practices and antibiotic use to address current trends in increasing AMR.

2

Innovative regulatory pathways

New antimicrobial drugs are needed urgently, but the current drug pipeline is alarmingly thin with many companies moving away from antibiotic development. Innovative regulatory approaches that balance the data needed for registration with the unmet medical need would encourage further drug development.

Positive steps have been taken by leading regulatory authorities. These new approaches to regulatory pathways will facilitate the development of new drugs to combat emerging, rare pathogens, especially those that are resistant to multiple antibiotics. It will be important to see these new ideas implemented globally.

3

Commercial models

Current private/public models are not conducive to bringing antibiotics to market. The pipeline is virtually dry, especially in Gram-negative bacteria; an area which particularly needs new antibiotics.

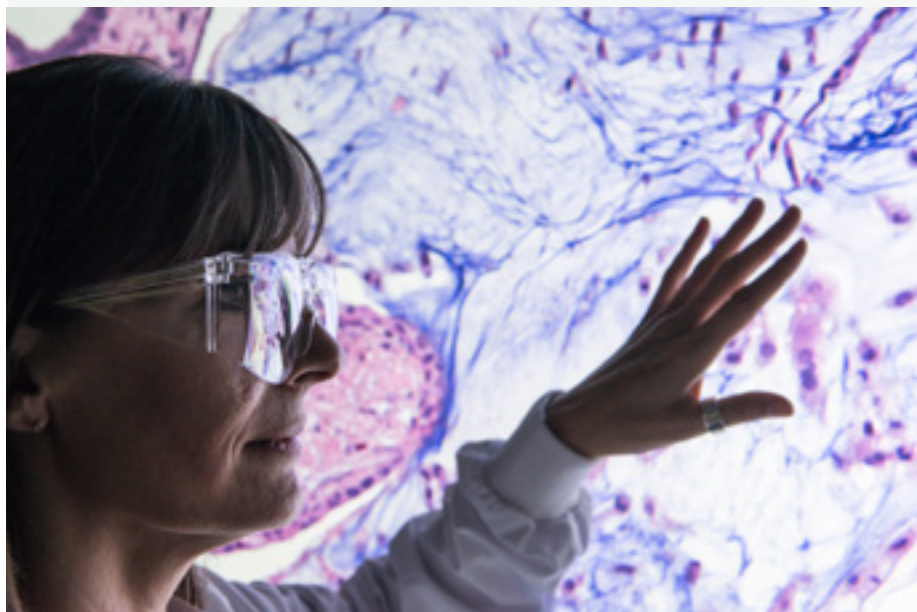
Antibiotics need to be viewed as a public good, similar to the firefighting system in place in all communities, and will require a reimbursement strategy that recognises the reality of the insurance value of antibiotics.

The AMR roadmap

In September 2016, we became one of 13 signatories to the Industry Roadmap for Progress on Combating Antimicrobial Resistance. The roadmap includes a series of commitments made by pharmaceutical companies to work towards a sustainable and predictable market for antibiotics, vaccines and diagnostics that enhances conservation for new and existing treatments. It also called for coordinated action to improve prevention of infections, hygiene, stewardship and conservation measures.

These commitments include:

- > Implementing measures to reduce environmental pollution from production of antibiotics
- > Working with partners to ensure antibiotics are only used in patients who need them
- > Improving access and ensuring affordability for existing and future antibiotics, diagnostics and vaccines
- > Exploring new opportunities for open collaborations between industry and the public sector to address challenges in the research and development of new antibiotics, vaccines and diagnostics, recognising the value these bring to society.



Preventing pneumonia to reduce the antibiotic burden

Among the most problematic multidrug resistant bacterial pathogens are *Staphylococcus aureus* and *Pseudomonas aeruginosa*. These are frequent causes of hospital infections and often result in death or significant illness and a longer stay in hospital.

MedImmune, the biologics research and development arm of AstraZeneca, is currently conducting two Phase 2B studies of MEDI4893 and MEDI3902 to prevent patients with one of these pathogens from going on to develop pneumonia.

This approach may well spare the use of antibiotics in the first place or improve outcomes in patients who do develop pneumonia, further preserving the usefulness of antibiotics.

MedImmune is also continuing to work to discover new kinds of antibacterial agents that work against the most resistant strains of bacteria.



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This full Sustainability Update and our Summary
Sustainability Update are also available on our website
www.astrazeneca.com/sustainability

