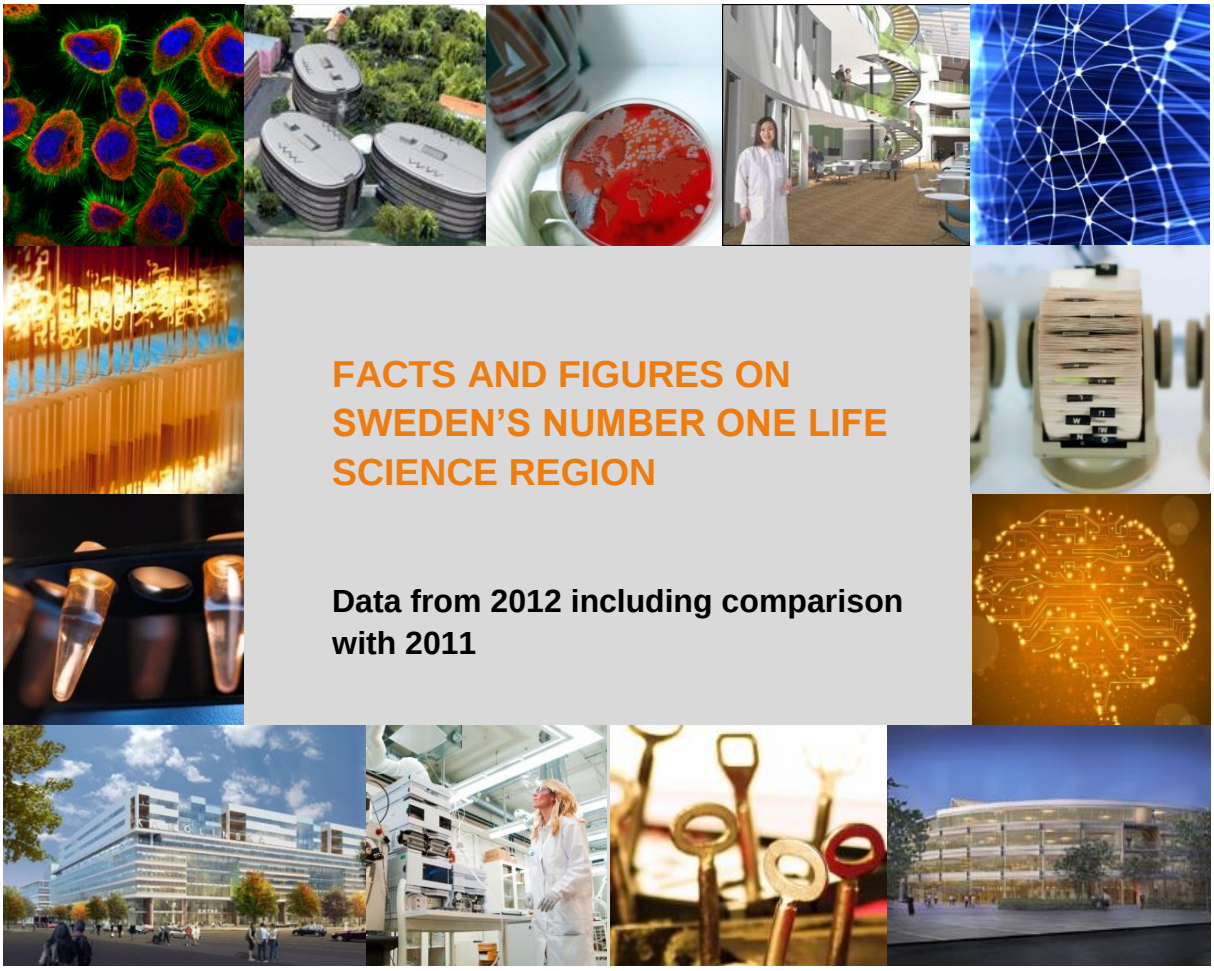

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION

Data from 2012 including comparison with 2011

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in September 2014

Executive summary

Data from 2012

The Stockholm-Uppsala region, defined as the three counties of Uppsala, Stockholm and Sörmland is one of the largest life science clusters in Europe. Based on official sources on limited public companies (2012), the region is home to 611 companies with a total of 20,852 employees. About 13,500 employees (65%) work for companies active in Research, Development and/or Production, while Marketing & Sales companies employ 29% of the workforce. Six percent of the work force is active in the consulting sector.

The workforce is distributed between subsectors as follows: Pharmaceutical 10,982 (53%), Medical technology 4,971 (24%), Biotech tools & supply 2,535 (12%), Consulting (CRO and other services) 1,187 (6%), and Diagnostics 1,108 (5%), Other biotechnology (Environmental, food-related and agricultural) accounts for less than 1%.

There are 12 companies (2 % of companies) with more than 250 employees who collectively account for 49% of the workforce. 54 companies with 51-250 employees (9% of the companies) account for 28%, 144 companies with 11-50 employees (24% of the companies) employ 16% of the workforce and the remaining 390 companies (65% of the company population) with 1-10 employees account for 7% of the workforce.

The three largest companies, AstraZeneca with 3,943 employees, GE Healthcare (1,232) and Fresenius Kabi (1,008), together account for 30% of the workforce.

Seven of the ten largest companies have a Pharmacia heritage (the different divisions of Pharmacia were acquired or merged with other companies in the late 1990s and early 2000) in one way or another. This heritage is reflected in the different profiles of the three counties, Uppsala, Stockholm and Sörmland. The most noticeable differences between the counties include a high proportion of employees in the pharmaceutical sub-sector in Stockholm (60% - of which AstraZeneca contributes 25%) and in Sörmland (91% - almost entirely due to Pfizer's biopharmaceutical production facility), while the respective contributions from the Biotech tools & supply and Diagnostics sub-sectors are relatively higher in Uppsala.

Reflecting global trends, there has been a continuous decline in recent years in employment, particularly in the pharmaceutical subsector. However, this decrease now appears to be levelling off and there are signs of consistent growth in a number of life science companies across all subsections, including Fresenius Kabi, Oasmia Pharmaceuticals, Atlas Antibodies, Bactiguard, Cepheid and Olink. Interestingly, in a sub-population of 350 companies with less than 50 employees at some point during 2007 - 2012 and engaged in R&D and manufacturing (M&S companies were excluded), the workforce showed a steady increase year on year, amounting to 32% from 2007 to 2012. Even though this sub-population represents only 20% of the total workforce within R&D and manufacturing, the figures illustrate that there is a population of small companies growing in the region. Furthermore, ambitious future plans backed by all stakeholders are underway, including major public-private investments in research funding, research and physical infrastructure totaling over 60 billion SEK (9 billion US dollars). These investments aim at securing favorable conditions for the life science sector and supporting existing companies, and also to stimulating a new generation of companies, thus ensuring that the region remains a world class life sciences cluster.

Published in September 2014

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The report[1]

The purpose of this report is to provide a descriptive analysis of the life science industry in Stockholm-Uppsala 2012 according to competence base (workforce), subsector and size categories. The report also includes comparative figures between 2012 and 2011 to highlight the most recent developments.

Introduction

The global life science industry is undergoing major changes and tens of thousands of jobs have disappeared from the sector from 2000 to 2011[2]. A recent report analyzing the global development from 2007 to 2012 among the largest Big Pharma companies shows that the workforce at these companies continues to decline (by 4% between 2007 and 2012), although, as a group, the decline in the workforce in recent years has tapered off[3]. According to the report, AstraZeneca, with its strong presence in the Stockholm-Uppsala region, stands out as the company that has continued to downsize its operations most, resulting in 16,000 lost jobs between 2007 and 2012. According to a new report from VINNOVA[4], almost 3,200 of these were Swedish jobs. The most recent downsizing of AstraZeneca's operations in Sweden took place in Södertälje, a city just south of Stockholm when it was announced that the neuroscience research facility would be closed and 1,200 employees were to lose their jobs (announcement in February 2012). It is, however, important to note that, despite this major downsizing, AstraZeneca's production facilities in Södertälje, including one of the world's largest tablet manufacturing facilities, still employs more than 3000 people.

Balancing the development in the Big Pharma industry, there is a consistent growth in a number of life science companies across all subsectors, including Fresenius Kabi, Oasmia Pharmaceuticals, Recipharm, Atlas Antibodies, Bactiguard, Cepheid and Olink.

New initiatives in the region

Triggered by the closure of the research facility in Södertälje, a series of initiatives have been launched, notably in close collaboration with AstraZeneca, with the aims of keeping the competence pool and infrastructure in place. One of them was the acquisition by Acturum Development AB of the Research and Development facilities at AstraZeneca that now operates under the name of Biovation Park[5]. The assets of the Park include 125,000 square meters of first-class well-equipped laboratories, modern in-vivo facilities and a portfolio of 14 drug development projects in various stages of development. Uppsala Innovation Centre (UIC) has been instrumental in providing professional business support to 24 companies started by previous AstraZeneca employees, 17 of which pursue life science-related activities. These companies and some academic groups are located at Biovation Park. Two institutes are also tenants of the facilities; SP Process Development, focusing on chemical, biochemical and pharmaceutical process development, and Swetox, a national platform for research and education in toxicology and related sciences.

A couple of other, substantial initiatives have also been launched following the closing down of AstraZeneca's neuroscience facility in Södertälje. In 2012, the Karolinska Institutet - AstraZeneca Joint Research Program in Translational Science was established aimed at the identification and/or validation of biomarkers of clinical utility. In 2013, this was followed by the creation of an Integrated Translational Research Centre for cardiovascular and metabolic disease and regenerative medicine, a

[1] This report has been compiled in collaboration between Stockholm-Uppsala Life Science, Uppsala BIO and Stockholm Science City.
[2] http://www.forbes.com/sites/matthewherper/2011/04/13/a-decade-in-drug-industry-layoffs/
[3] http://www.epvantage.com/Universal/View.aspx?type=Story&id=447584&isEPVantage=yes
[4] Global trends with local effects - Swedish Life Science Industry 1998-2012, VINNOVA: http://www.vinnova.se/en/Publications-and-events/Publications/Products/Global-effects-with-local-effects/
[5] www.biovationpark.com

joint venture between AstraZeneca and Karolinska Institutet located within Karolinska Institutet's research facilities.

Main challenges

Sweden has a number of challenges within the life science sector to tackle, but also without doubt some real opportunities. VINNOVA has recently launched a report on the Swedish life science industry[4] in which some of Sweden's challenges are listed. Given the fact that 50% of the industry resides in Stockholm-Uppsala, the challenges for this region are no different from those for Sweden. Some of the challenges described in the report are:

- Like in many other countries, there are several examples of manufacturing and R&D operations closing down in recent years.
- The truly global life science industry continuously evaluates competing research environments all over the world for collaborations, downsizing or new investments. An extra challenge for Sweden is that it is a small country representing less than 1 % of the market.
- The healthcare system needs to be both an active customer and partner in the innovation process to satisfy the industry expectations.
- Innovative companies are increasingly becoming intermediaries, licensing inventions to large corporations or being acquired when they are successful.
- For the small, innovative companies, which often are academic spin-offs, challenges include increasing regulatory demands, the need to document health economic benefits, dominant, global players in their field and – in order to be successful – obtaining the resources, knowledge and networks needed to get products reimbursed and enter global markets.
- A common challenge for the industry across Europe, which is no less significant in the Stockholm-Uppsala region, is access to venture capital.

What are the opportunities?

Where there are challenges, there are, also opportunities. In an increasingly competitive environment, the ability to innovate is a common success factor for the entire life science industry, irrespective of subsector. Building on Sweden's existing reputation as a leader in in innovation[6], academic groups and companies in Stockholm-Uppsala (and Sweden) are well positioned to continue their engagement in collaborative innovation and to contribute to new healthcare solutions on a global scale.

The Stockholm-Uppsala region (and Sweden) needs to consider how to adapt and respond to the ongoing transformation of the industry. As described below, a roadmap for the Stockholm-Uppsala region (and Sweden) could include building on the region's innovative capabilities within several sub-sectors of the business, including protein science, molecular diagnostics, drug development and medtech – backed by substantial investments in research infrastructure in several areas.

Molecular bioscience and protein science is an area where the Stockholm-Uppsala region in particular is in the international forefront. New technologies including genomics, proteomics, recombinant DNA technologies and high throughput screening have been important drivers for how pharma companies have re-focused their product development strategies and there is no reason to think this will change. As an example, development of biomarkers for companion diagnostics is an area of great potential for innovation by Swedish actors.

Pharmaceutical and medtech companies are increasingly required to demonstrate that their products provide real world improvements in healthcare through better patient outcomes and value for payers. Sweden's 81 established patient registries and another 24 registry candidates represent a unique resource for collaborations between clinics and companies. Possible areas for collaboration include 1) using patient registries for critical documentation of drug safety, for example, documenting early

[6] http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/index_en.htm

treatment patterns in the everyday care of patients when new drugs are introduced, 2) more efficient recruitment of patients for clinical trials and 3) performing cost-efficient clinical studies on large patient populations for instance by documenting early treatment patterns in the everyday care of patients when new drugs are introduced.

The major trend in the industry to increasingly fill pipelines with projects developed by smaller drug development companies continues and in 2013, 49 Swedish companies were running at least 81 projects in clinical phases[7] thus representing a significant pool of projects for potential collaboration. Another trend is for companies to explore new ways of collaborating with other companies and academia. Sweden has a longstanding and proud history of productive collaboration between industry and academia characterized by open collaboration and mutual trust. The Stockholm-Uppsala region has developed structured programs in the area of open innovation such as the BIO-X® program[8] and AIMday[9], a structured process for creating constructive discussions around potential collaboration between industry and academic groups.

There are a number of factors supporting forecasts of a turnaround for the industry in coming years. Firstly, we see promising growth in several young, innovative, companies. Another strength becoming increasingly apparent is the region's ability to manufacture and distribute high quality, products meeting the strictest international quality and environmental standards.

Ambitious future plans are underway integrating major investments in research infrastructure, physical infrastructure and research funding. The aim is that these investments will further strengthen the region's capacity for knowledge creation and innovation, thereby creating even better conditions for companies to be competitive on the global market.

Below is a selection of the most important of such ongoing and planned projects and investments for the next 10 years, much of which illustrates a clear direction from both national and regional/local politicians to invest in life science.

Investment in research and research infrastructure

- **Protein science** – the region has a strong tradition of leadership in protein science and is also home to GE Healthcare's global research headquarters for protein analysis and separation. The most prominent example of research project is the the Protein Atlas project. This major undertaking, initiated in 2003, aiming at mapping all 20,000 human proteins, is now near it's completion.
- **SciLifeLab** – with two sites, in Stockholm and Uppsala, represents an unprecedented national research infrastructure. (In 2012, SciLifeLab received the largest ever investment in life sciences by the Swedish government), focusing on genetics, molecular bioscience and protein science. This national life science research institute is a collaborative venture between Karolinska Institutet, KTH Royal Institute of Technology, Stockholm University and Uppsala University. More than 200 research groups are already associated with the centre which is expected to grow to 1,000 scientists in the next few years.
- Further investments in **biobanks, patient registries** and **centers of excellence** are also under way.

[7] http://a4.mndcdn.com/image/upload/yhxj3z27atu49lvav7re.pdf
[8] http://www.bio-x.nu
[9] http://aimday.se/about-aimday/

Investment in physical infrastructure

- The creation of a new city section of Stockholm, **Hagastaden (2010-2020)**, a world-leading arena for life science, with **a new university hospital (to be inaugurated in 2016-2017),** expansion of **Karolinska Institutet Science Park (2013)** and **new research facilities (2018).**
- Expansion of **SciLifeLab (2013)** in Uppsala.
- Uppsala – **Skandion Clinic (2014)**, a new facility for proton cancer therapy
- **A new building for veterinary and animal science (2014)** at Swedish Agricultural University.
- Major expansion plans including new buildings at **Uppsala University Hospital (2013 -)** - the most substantial investments in the hospital for decades.
- The Royal Institute of Technology and Karolinska Institutet are currently planning **30,000 sqm of education and research facilities** in close proximity to Karolinska University Hospital Huddinge, south of Stockholm. Activities will be conducted in close collaboration with the clinics at the hospital. Inauguration in 2016.

Support structures for innovation support and open innovation initiatives

- **Innovation Akademiska** (within Uppsala University Hospital) and **SLL Innovation** (serving several hospitals in Stockholm, including Karolinska University Hospital). Both initiatives involve facilitating entrepreneurship and innovation among hospital staff and opening clinical environments as a test bed for industry.
- **Uppsala Innovation Centre** (UIC), an incubator, recently ranked as the world's 18th best business incubator with a university connection, providing financial assistance and access to commercial and technical networks; the business incubator **STING** offers early funding as well as support from industrially experienced business coaches and **Karolinska Institutet Innovations** working in close connection with Karolinska Institutet to help researchers further develop the commercial potential of their research.
- **The BIO-X®** program, run by Uppsala BIO, provides a structured process and support to develop academic research results into life science innovations in response to defined needs in healthcare and industry. BIO-X® has recently opened it's resources for scientists across Sweden.
- **AIMday®**, a structured process for creating constructive discussions towards potential collaboration between industry and academic groups.
- **OpenLab,** a center and environment for collaboration between different parts of society and between different disciplines and professions. The goal is to produce solutions to complex social issues in this growing region through new interdisciplinary collaboration between traditional knowledge areas. The partners are the City of Stockholm, Stockholm County Council, Stockholm County Administrative Board, Karolinska Institutet, Stockholm University, KTH Royal Institute of Technology and Södertörn University.
- **Flemingsberg Science** runs the Kraftcentrum Flemingsberg project that develops ideas from everyday healthcare with the aim to create viable, commercial products or services. After 3 years, the project has resulted in 20 commercial projects, some in the form of new companies and some as project development/line extension in existing companies.

Additional support services and initiatives in *Stockholm Life*, the common trademark for life science in Stockholm, are provided by Stockholm Science City and Flemingsberg Science**.** More details can also be found at www.suls.se.

Results

NUMBER OF COMPANIES AND EMPLOYEES

This report is the fourth annual report on number of employees and turnover, by sub-sector as well as by company size class, comparing figures from 2011-2012[10].

As shown in *Table 1*, the Stockholm-Uppsala region has 611 life science companies with at least one employee, together accounting for 20,852 employees. This equals about half of Sweden's workforce within life science.

Table 1: Number of companies and number of employees

	2011	2012
Number of companies[11]	**597**	**611**
Net difference between 2011 to 2012		14
Net difference include:		
Companies going from zero ≥ one employee		*19*
Moving into the region		*5*
Existing, but previously not identified or startups		*33*
Newly included companies (total):		***57***
Change from ≥1 employee to zero employees		*- 23*
Excluded for other reasons (moved away, not life science etc)		*- 20*
Companies excluded from the 2012 dataset (total):		***- 43***
Net difference		***14***
		2,4%
Employed	***20 729***	***20 852***
Difference		***123***
		0,6%

Data on number of companies and employees from 2011 are included for reference. Since the population of companies 2011 and 2012 are not identical, the difference does not reflect an organic development of the work force.

[10]The first report of this kind based on 2009 figures was published in the autumn of 2010. We have since then further developed our methodology. The most important steps (performed in 2013 in conjunction with the third report) have been to harmonize our data with data collected and analyzed by VINNOVA, Sweden's Innovation Agency, to apply somewhat stricter criteria for selection of companies and to fine tune the categorization of companies. For details, se Methods.

[11] Only limited companies with at least one employee and meeting certain criteria (see methods) are included. Erratum: The number of companies in 2013 report was misprinted. The correct number is 597. Number of employees and all other data is not affected.

An additional 158 companies which did not meet the critera to be included in this report, but which are considered to belong to the life science sector by VINNOVA, collectively employ an additional 1,438 individuals.

There is also a population of 25 companies which engage in life science-related activities, but these are not part of their core business. Their number of employees in 2012 amounted to 710 employees.

The geographic location of the companies included in this report are displayed on the *Life Science Industry map of Stockholm Uppsala* which is available at http://industrymap.ssci.se/.

THE WORK FORCE 2012

R&D and/or Production vs. Marketing & Sales

The competence pool is diversified between R&D and/or Production vs. Marketing & Sales. 65% of the employees (13,520) are engaged in R&D and/or Production[12] while 29% (6,140) are employed by companies focusing on Marketing & Sales[12] (*Figure 1*). In addition, 1,187 experts (6%) are engaged in the consultancy sector.

Work force by sub sector

Figure 1 depicts how the competence pool is distributed between sub-sectors.

Pharmaceutical companies
This sub-sector represents about 11,000 employees of which just over 8,000 (73%) are employed by companies engaged in R&D. AstraZeneca dominates with its 3,940 employees.

Medical technology companies
The second largest sub-sector is medical technology with a total of almost 5,000 employees. About 60% are engaged in companies with R&D and/or Production activities.

Biotech tools and supply
This sector employs just over 2,500 of which GE Healthcare accounts for about half of the workforce. Almost one third of employees belong to companies with R&D and/or Production activities.

Diagnostics
Diagnostic companies employ about 1,100 persons of whom about 75% work in companies carrying out R&D and/or Production.

CRO and service
Contract Research organizations (CRO) and other service providers with special expertise in product development[13] collectively account for almost 1,200 employees. Both these categories are characterized by a large proportion of small companies employing less than 10 persons.

Other biotechnology
This sub-sector is very small with about 70 employees and includes agricultural, food-related and environmental biotechnology.

[12] Some companies designated as research, development and/or production companies in this report also cover marketing & sales. Similarly, some M&S companies are active in clinical research but are designated as M&S companies. For these companies, it has not been possible to distinguish between the two types of activities.
[13] We do not include legal companies, patent attorneys, general business consultants etc.

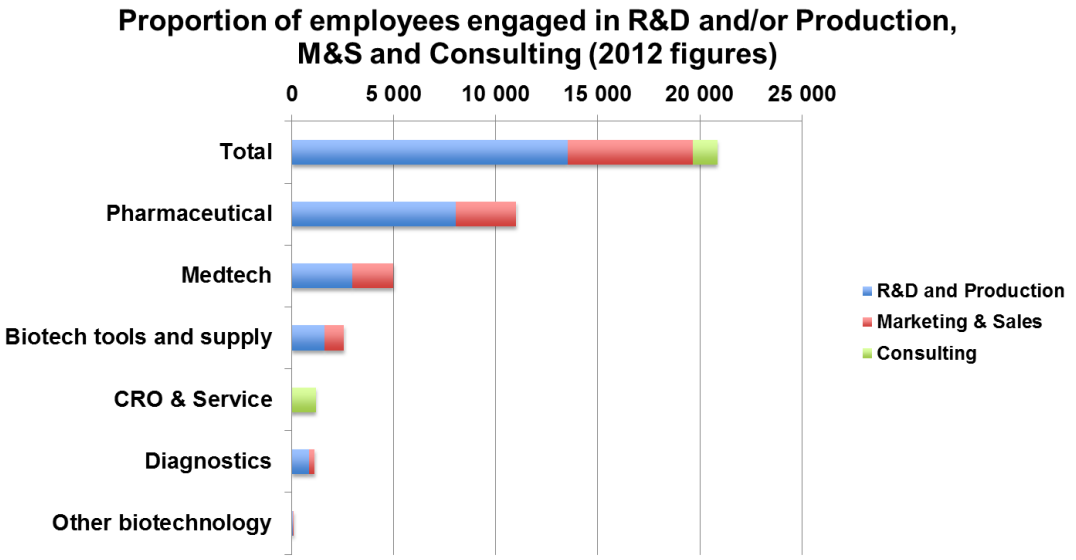


Figure 1: This figure illustrates the proportion of persons employed by companies engaged in Research & Development and/or Production activities, Marketing & Sales activities and Consultancy work, respectively. Data is presented by sub-sector.

SMALL, MEDIUM AND LARGE COMPANIES 2012

In the Stockholm-Uppsala region, 65 % of the life science companies have between one and ten employees, 24% have between 11 and 50 employees, 9% have between 51 and 250 employees and about 2 % have more than 250 employees (*Figure 2*, left bar).

Half of the region's employees work in a company with a work force of at least 250 people. Companies employing between 51 and 250 persons account for 28% of the workforce and companies employing between 11 and 50 persons account for 16%. Only 7% of employees work in a company with 1-10 employees (*Figure 2*, right bar).

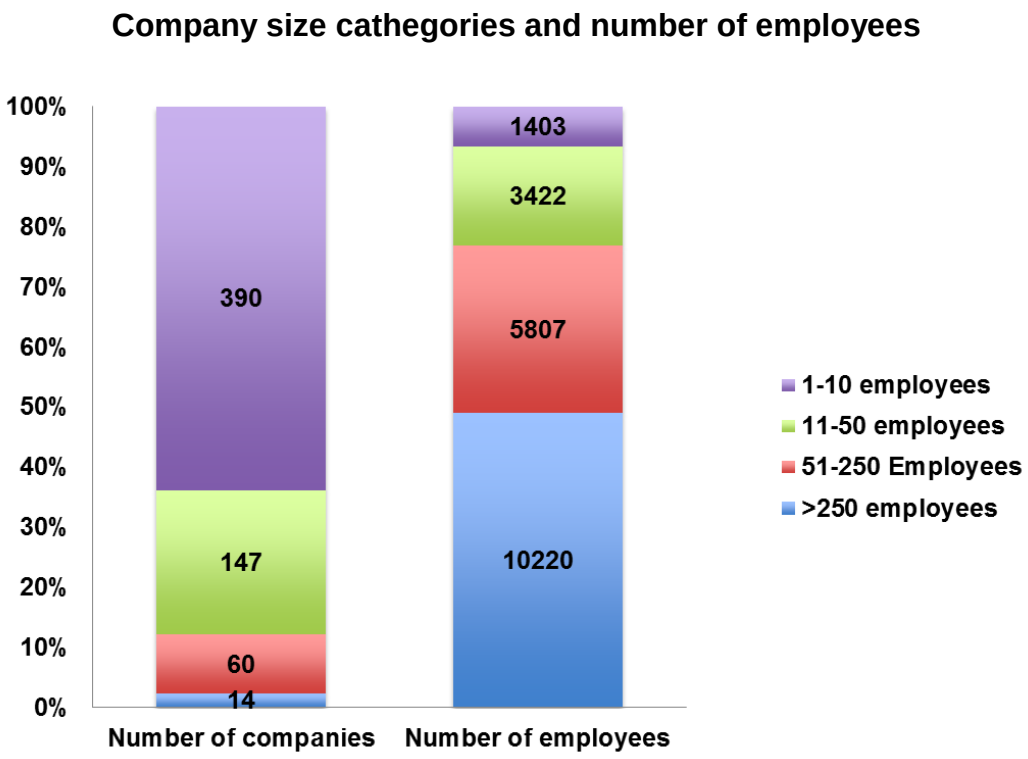


Figure 2: Number of companies vs. employees by size classes.

THE LARGEST COMPANIES – NUMBER OF EMPLOYEES 2012

Companies engaged in R&D and/or Production

There are 11 R&D and/or Production companies in the region with more than 250 employees. These companies account for about half of the work force (*Table 2*). 8 of the companies have a heritage from Pharmacia and/or Kabi (merged with Pharmacia in the early 90s) in one way or another. These companies collectively also account for a substantial proportion of the turnover within the Swedish Life Science sector.

Table 2: R&D and/or Production companies in the region employing more than 250 persons

Company	Subsector	Number of employees 2012	Turnover 2012 (billion SEK)
Astrazeneca AB	Pharmaceutical	3943	56,8
* GE Healthcare Bio-Sciences	Biotech tools & supply	1232	7,9
* Fresenius Kabi AB	Pharmaceutical	1008	2,9
St. Jude Medical	Medtech	659	2,0
* Octapharma	Pharmaceutical	629	0,9
* Pfizer	Pharmaceutical	534	10,5
* Phadia	Diagnostics	430	2,4
Maquet Critical Care	Medtech	409	1,6
* Swedish Orphan Biovitrum	Pharmaceutical	378	2,5
* Q-Med	Medtech	362	2,0
* Recipharm	Pharmaceutical	353	2,8
Total		**9 987**	**92,4**[14]
Proportion of entire company population		**48%**	- [15]

** companies with a heritage from Pharmacia and or Kabi.*

[14] Figures are national, not regional figures.
[15] Data on total turnover for the entire life science sector in Sweden not available.

THE INDUSTRY AND ITS SUB-SECTORS 2012

Number of employees per sub sector

Employment in pharmaceutical companies accounts for more than half (53%) of the work force, of which AstraZeneca's contribition is substantial. Medical technology accounts for 24% and biotech tools and supply for 12%. CRO & Service contribute 6% and Diagnostics 5%. Other biotechnology (environmental, agricultural and food-related combined) accounts for less than 1% (*Figure 3*).

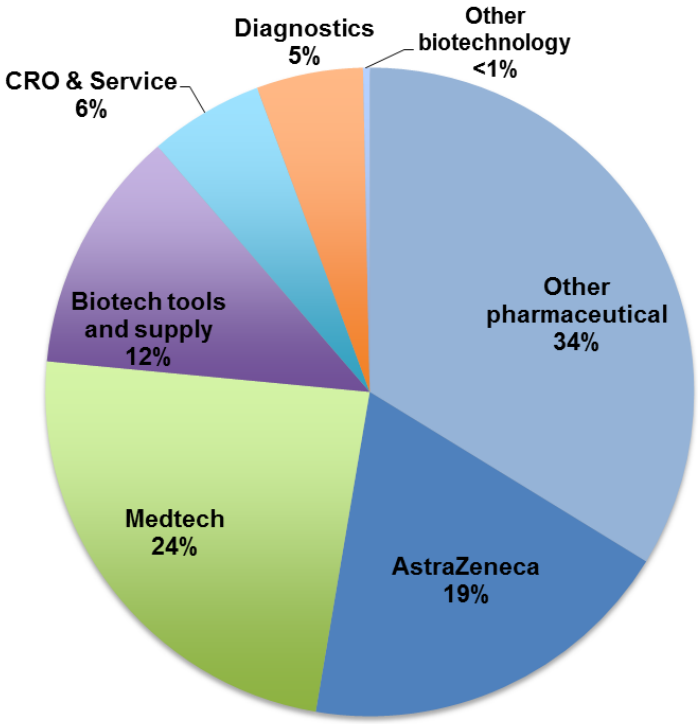


Figure 3: Distribution of work force by subsector. AstraZeneca is presented separately due to its relative size.

WORKFORCE - DEVELOPMENT FROM 2011 TO 2012 BY SUBSECTOR

In order to illustrate the development of the work force from 2011 to 2012, a sub-population of the companies with available data from both years were analysed (554 of the 611 companies collectively accounting for 97,6% of the workforce). The workforce of the total life science sector declined marginally (-0,5%). A decrease in the number of employees within the pharmaceutical and CRO/other serviece sub-sectors were compensated by an increase in the other sub-sectors, notably Medtech, Biotech Tools and Supply and Diagnostics. See also figure 4 below illustrating AstraZenecas contribution to the decrease within the Pharmaceutical sub-sector.

Table 3: Change in workforce by sub-sector 2011-2012.

Subsector	2012	2011	2012 vs. 2011	%
Pharmaceutical R&D and/or Production	7 988	8 185	-197	-2,4%
Pharmaceutical M&S	2 910	2 934	-24	-0,8%
Pharmaceutical total	**10 898**	**11 119**	**-221**	**-2,0%**
Medtech R&D and/or Production	2 863	2 832	31	+1,1%
Medtech M&S	1 892	1 773	119	+ 6,7%
Medtech total	**4 755**	**4 605**	**150**	**+ 3,3**
Biotech Tools R&D and/or Production	1 591	1 608	-17	-1,1%
Biotech Tools & Supply M&S	916	862	54	+ 6,3%
Biotech Tools & Supply total	**2 507**	**2 470**	**37**	**+ 1,5%**
Diagnostics R&D and/or Production	829	749	80	+ 10,7%
Diagnostics M&S	256	238	18	+ 7,6%
Diagnostics total	**1 085**	**987**	**98**	**+ 9,9%**
CRO and other service	**1 033**	**1 164**	**-131**	**-11,3%**
Other Biotechnology	**69**	**94**	**-25**	**- 26,6%**
Grand total	**20 347**	**20 439**	**-92**	**-0,5%**

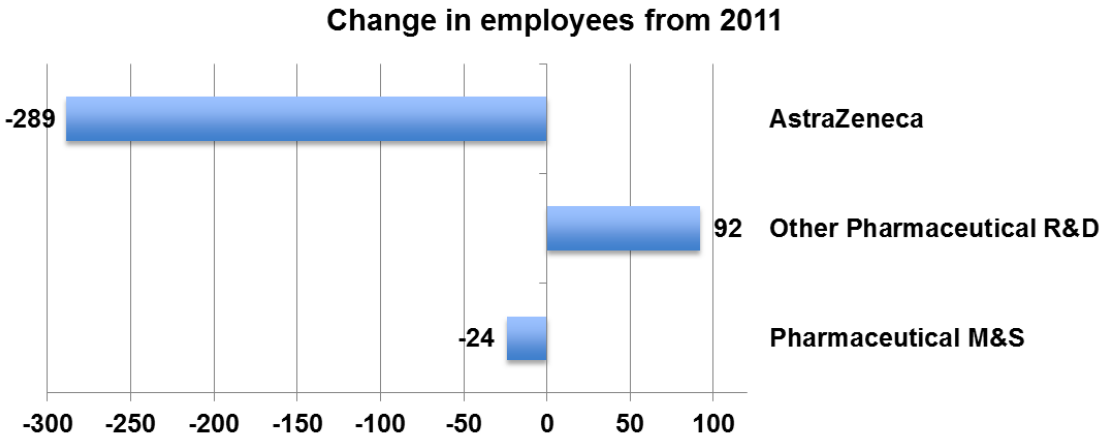


Figure 4: The figure illustrates AstraZeneca's contribution to the reduced workforce in the Pharmaceutical sub-sector from 2011 to 2012.

DYNAMICS IN CHANGES OF WORKFORCE FROM 2011 TO 2012

Figure 5 shows the balance and dynamics of employment by sub-sector, comparing number of employees 2011 and 2012. Thriving innovative ecosystems are dependent on knowledge transfer e.g. by migration of employees between companies and sectors. The net change in number of employees from 2011 to 2012 for Stockholm-Uppsala region is -92 individuals (table 3), but about 1200 changed companies in this period, accounting for 5,9% of the entire work force. This also indicates that the region has a high capacity to retain competence.

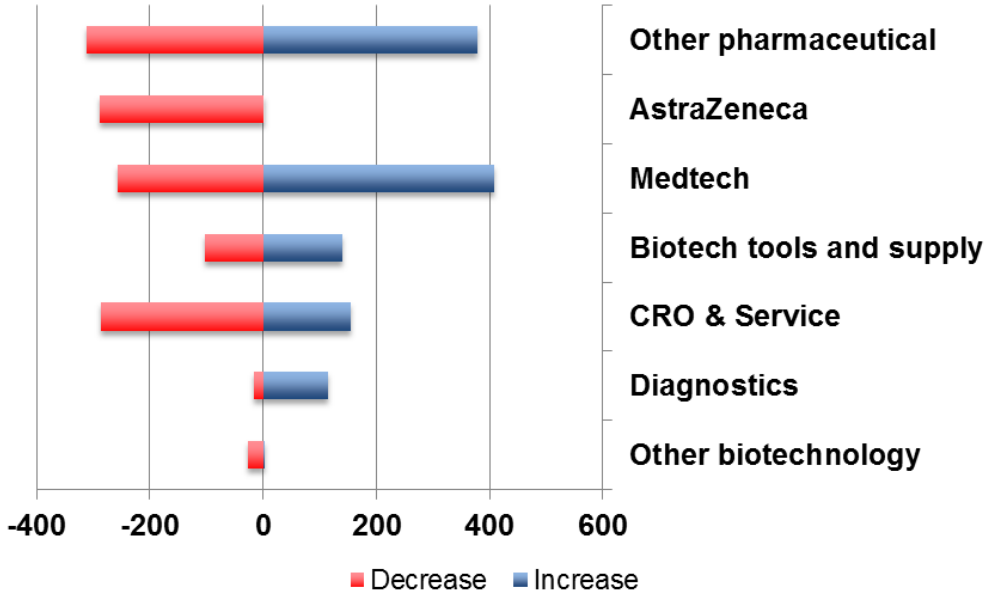
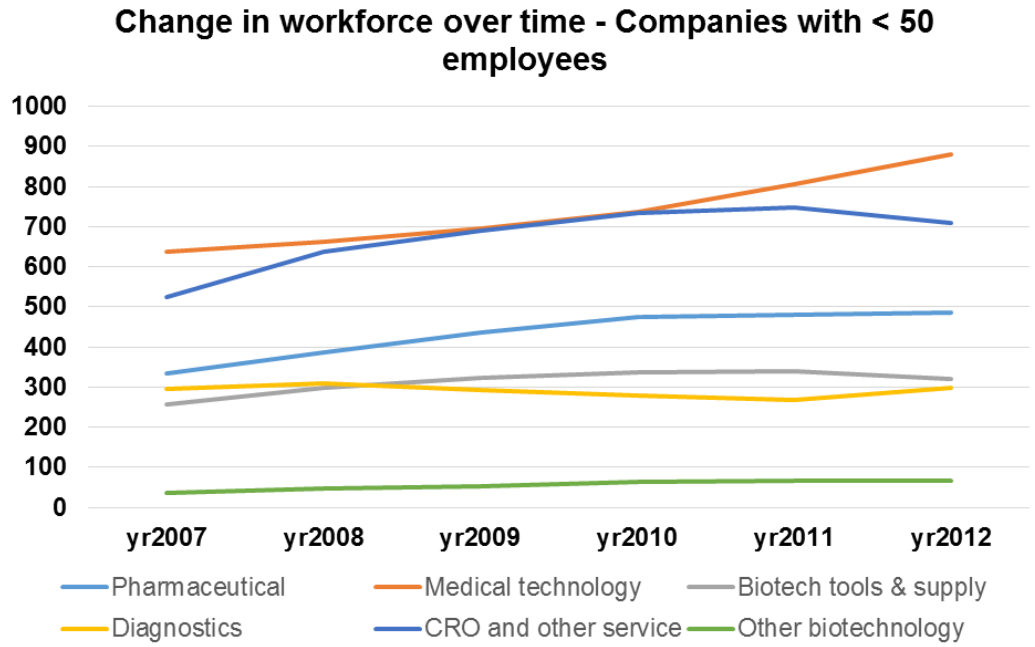


Figure 5: The graph shows changes in number of employees, comparing 2011 and 2012 (based on the sub-population of 554 of the 611 companies, see table 3). AstraZeneca is shown separately from the pharmaceutical subsector to illustrate its large contribution.

CHANGE IN WORKFORCE WITHIN R&D AND/OR PRODUCTION FROM 2007 – 2012 IN COMPANIES WITH < 50 EMPLOYEES

In order to examine the growth patterns of smaller companies engaged in R&D and/or manufacturing, a sub-population of companies which had less than 50 employees at some stage in the period 2007 to 2012 was analyzed separately. This population of companies comprised 348 companies with a combined, total workforce of 2759 employees in 2012 (20% of the total population of R&D and/or manufacturing companies). The total number of employees increased by almost 700 employees (+32%) from 2007 to 2012. The figure shows the development over time by sub-sector. Medtech contributed most to the overall increase followed by CRO and other services and pharmaceutical. The latter two subsectors showed a sligth decline or leveling off from 2011 to 2012. Diagnostics and Biotech tools&supply did not change much. Other biotechnology is far smaller than the other subsectors and did not contribute substantially to the changes. In the medtech sub-sector, one company (Compugroup Medical Sweden) stands out and contributes substantially to the increase from 2011 to 2012. Even though this sub-population represents only 20% of the total workforce within R&D and manufacturing, the figures illustrates that there is a population of small companies that grow in the region.

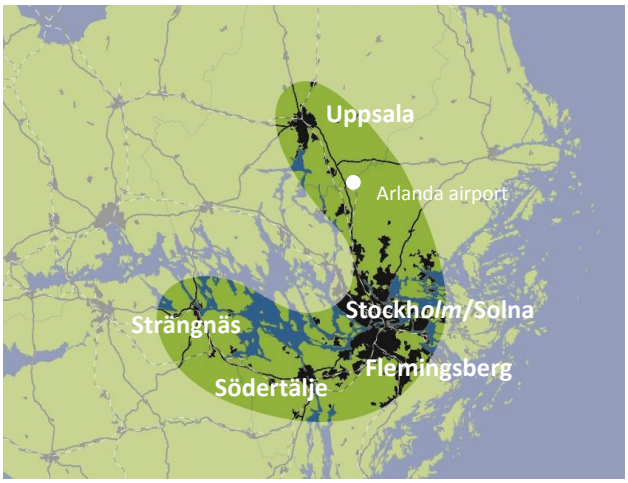


Change in workforce over time - all sub-sectors combined

yr2007	yr2008	yr2009	yr2010	yr2011	yr2012
2 083	2 342	2 491	2 625	2 708	2 759

Figure 6 shows the change in workforce over time in the six sub-sectors and the table below the figure, the change for all sub-sectors combined.

SUB-SECTORS AT THE DIFFERENT GEOGRAPHIC LOCATIONS 2012



The Stockholm-Uppsala region as defined in this report is illustrated in *Figure 7*. It contains two main bio-clusters, in Stockholm and in Uppsala as well as activities in Sörmland county (with Pfizer's manufacturing facitily). The life science region is thus concentrated within a 1,5 hour travel radius with excellent transport connections.

Figure 7. The Stockholm-Uppsala region.

Stockholm county

Stockholm represents the greater Stockholm area, including Flemingsberg, Solna and Södertälje. Pharmaceutical and Medical technology companies are the two predominant types of employers in the Stockholm area. AstraZeneca accounts for as much as one third of the life science industry in this part of the region. Of the remaining pharmaceutical companies, the two largest, Octapharma and Swedish Orphan Biovitrum both have a Pharmacia heritage. Among the medical technology companies, St Jude Medical is the largest, being based on the development and manufacturing of the implantable pacemaker, an innovation from Stockholm more than 50 years ago.

Uppsala county

In Uppsala, the predominant employers are within biotech tools and supply and the pharmaceutical industry. Here, the heritage from Pharmacia is even more evident. Uppsala has a proud history within protein chemistry/protein analysis dating back to the invention of the ultracentrifuge by The Svedberg, Nobel Laureate 1926. Two decades later, in 1948, Arne Tiselius, trained at Svedberg's laboratory was granted the Nobel Price in chemistry for his innovation electrophoreses, a milestone technology, still applied globally for the analysis of proteins. Protein science is still one of the strongest research fields at Uppsala University. Industrial applications were developed by Pharmacia and today, GE Healthcare Biosciences, global market leader in protein analysis and separation, plus additional smaller companies and Uppsala University carries this strong tradition further. Other Uppsala-based companies with a heritage from Pharmacia (and/or Kabi) are Q-Med, Fresenius Kabi, Abbott Medical Optics and the diagnostics company Phadia (now a division of Thermo Fisher). It should be noted that even though diagnostics companies are not the main employer in Uppsala, the city is a stronghold for Swedish diagnostics development and manufacturing.

Sörmland county

Pfizer and Pharmacia merged in 2003 and Strängnäs in Sörmland is home to Pfizer's biomanufacturing facility. In Sörmland, more than 90% of the work force belongs to the pharmaceutical sector.

The number of employees by sub-sector and county in the region is represented in *Figure 8*. The differences in sub-sector distribution between the counties can largely be traced back to the history of the Swedish pharmaceutical industry represented by Pharmacia, Kabi (merged with Pharmacia in the early 90s) and Astra. As many as seven out of the ten largest life science companies have a Pharmacia heritage (see *Table 2*).

Distribution of the workforce between sub-sectors in Stockholm, Uppsala and Sörmland 2011

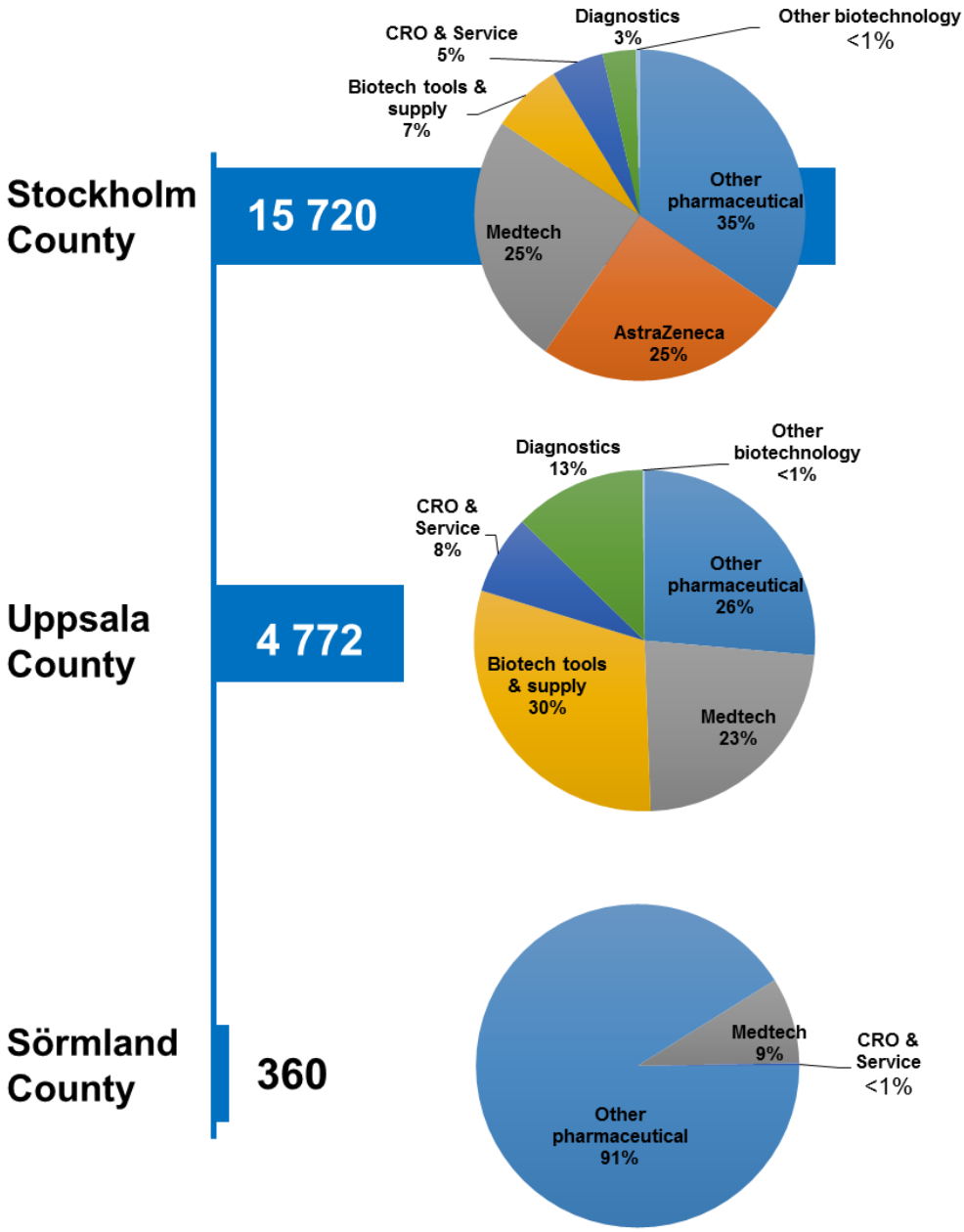


Figure 8: The bar diagram shows the distribution of the work force within the life science sector between the three counties in the region. Stockholm, Uppsala and Sörmland account for 75%, 23% and 2% of the work force respectively. The pie diagrams show the number of employees by sub-sectors in the three counties. In Stockholm, about 60% of the work forcework in pharmaceutical companies, about 25% within medical technology, 7% within Biotech Tools & Supply, 5% within CRO and service and 3% with Diagnostics. In Uppsala, Biotech Tools & Supply companies employ 30% followed by Pharmaceutical companies (26%), medical technology (23%), diagnostics (13%) and CRO & service (8%). In Sörmland, the pharmaceutical sector dominates and accounts for more than 90% of the work force.

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in September 2014

CHANGES IN NUMBER OF EMPLOYEES FROM 2011 TO 2012 IN STOCKHOLM, UPPSALA AND SÖRMLAND COUNTIES

In a previous report we documented a marked decline in number of employees from 2009 – 2011 in Stockholm County due to AstraZeneca's down-sizing, while corresponding changes in Uppsala and Sörmland counties were only marginal. In this report, comparing 2011 and 2012, all counties exhibited only marginal net changes. (*Figure 9*).

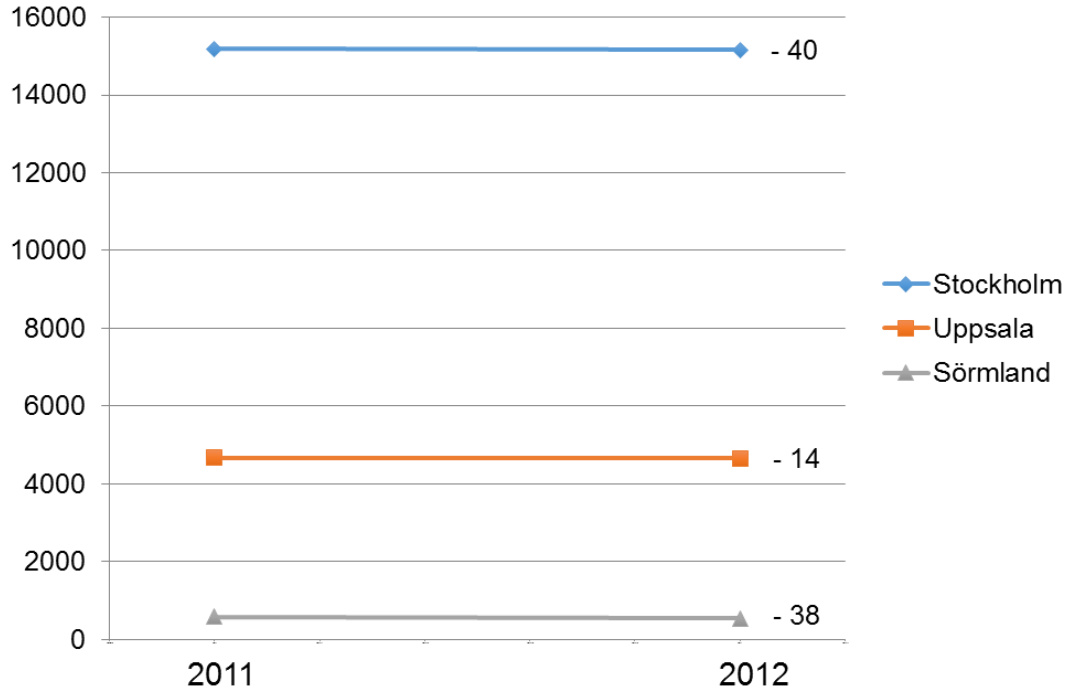


Figure 9: Stockholm, Uppsala and Sörmland Counties exhibited small absolute changes in the workforce from 2011 to 2012 (based on the sub-population of 554 of the 611 companies, see table 3).

Methods

The purpose of this report is to describe the full range of competence in the life science sector in the Stockholm, Uppsala and Sörmland region. The competence pool is a prerequisite and engine for innovation and growth in the region and represents a critical mass of knowledge and skills throughout the entire value chains of the pharmaceutical, biotechnological and medical technology industries.

Dynamic and trans-disciplinary industries - such as the Life Science sector - are often difficult to capture and identify by solely applying standard, accepted industry nomenclature such as the SNI[16] coding system. Instead, a large number of overlapping sources and methods are used to collect, select and categorize companies engaged in life science. As a result, recurring reports of the life science industry by different organizations differ substantially in both the way companies are included in the datasets as well as their categorization.

This report, which is the fourth consecutive annual report for the Stockholm-Uppsala region, is – for the second, consecutive year - based on an updated dataset which has been fully consolidated with the dataset used in VINNOVA's, a national agency for Innovation systems, recurring life science reports. The rational for this has been to:

- improve data quality and the comprehensiveness of the inventory of companies for the region.
- create one common dataset with life science companies from the Stockholm-Uppsala-Sörmland regions from which regional organizations and VINNOVA can generate independent reports describing the sector.
- synchronize definitions and categorization of individual companies as much as possible so that resulting reports can be compared.
- be able to communicate the status of the region's life science industry in a transparent and comparable way.
- develop a more efficient process for updating of the database in the future.

The workflow for the process encompassed the following subsequent steps:

- Creating the dataset
    - compilation of data
    - selection criteria for inclusion of companies in regional report
    - synchronization of categories with VINNOVA's system
    - categorization
    - acquisition of official business data for selected companies

[16] *SNI: Swedish Standard Industrial Classification is based on EU:s recommended standard NACE Rev.2. It is primary an activity classification. Production units as companies and local units are classified after the activity which is carried out. One company or a local unit can have several activities (SNI-codes).

Creating the dataset

Compilation of data

This dataset was developed in close collaboration between Stockholm Uppsala Life Science, Stockholm Science City, Uppsala BIO and VINNOVA. The current dataset is a compilation of data based on:

- SNI codes[16]
- Previous reports (VINNOVA)[17]
- Lists of companies available from life science trade organisations[18]
- Lists available from incubators and science parks[19]
- Lists of companies available in the Life Science Sweden's industry guide[20].
- The latest dataset from VINNOVA for the Stockholm-Uppsala-Sörmland regions.

This work resulted in one single, unified overall list of companies, each categorized in a consistent way so that it translates between the region's and VINNOVA's categorization systems (see Table 4 below).

Selection criteria for inclusion of companies in regional report

The selection of companies for the current report was based on the same criteria as in previous reports as described in *Table 5*.

Harmonization of categories with VINNOVA's system

Stockholm-Uppsala region and VINNOVA has previously used overlapping, but different categorization systems as well as views on how individual companies should be classified. In this work we have harmonized the two systems and created a legend for how they are related. Every single company has also been re-evaluated to maximize uniformity with VINNOVA.

Companies were categorized in the following three dimensions (also see *Table 4*):

1. Industry sector
2. Type of business
3. Operational focus or sub-sector

Categorization by industry sector, business type and operational focus/sub-sector was based on what was considered to be the company's main business. *Table 4* represents the legend for how the two systems are related. The main differences between the systems are i) that VINNOVA allows individual companies to belong to one *or more* industry sectors, whereas in Stockholm-Uppsala's system each company can only belong to one category ii) that VINNOVA applies a more detailed subdivision of categories in sub-sectors. Thus, one sub-sector category according to the region's definitions can correspond to one or several sub-sectors in VINNOVA´s system. Finally, a number of VINNOVA's sub-sectors have been excluded from this report ("related sector").as they mostly represent business to consumer based products and services that does not require regulatory approval, for example dental equipment, walking aids and wheelchairs and furniture (see Table 5).

[17] A report from VINNOVA published in 2011 (Life Science Companies in Sweden, VA 2011: 03, Anna Sandström - VINNOVA and Tage Dolk & Benny Dagger - Addendi AB). A list of companies included in that study with address in Uppsala, Stockholm or Södermanland counties were used as source material.
[18] SwedenBIO, LIF, Swedish Medtech, ASCRO
[19] STING, KISP, Serendipity Innovations
[20] Life Science Sweden's industry guide is available at http://www.swedishlifesciences.se/

Table 4: Legend to categorizations

	SULS/UBIO	VINNOVA
Industry sector	Biotechnology	Biotech (multiple criteria are allowed)
	Medtech	Medtech (multiple criteria are allowed)
	Pharmaceutical	Pharmaceutical (multiple criteria are allowed)
	Service	*n/a (no corresponding category)*
Type of business	Research & Development	Research & Development
	Incremental prod & serv dev	Incremental prod & serv dev
	Manufacturing	Manufacturing
	Marketing & Sales	Marketing & Sales
	Consulting	Consulting
Sub-sector	Pharmaceutical	Drug discovery and development Drug delivery Drug production In vitro diagnostics Biotech medical technology Bioproduction
	Diagnostic	In vitro diagnostics Biotech tools and supplies Electromechanical medical devices
	Biotech tools and supplies	Biotech tools and supplies Bioproduction
	Medical technology	Biotech medical technology Implantable devices - active and non-active Anaesthetic and respiratory devices Radiation devices - diagnostic and therapeutic
	CRO	CRO
	Other services	*n/a (no corresponding category)*
	Agricultural biotechnology Food-related biotechnology Environmental biotechnology	Agrobiotechnology Food related biotechnology Environmental biotechnology
	Related sector **(not included in this report)**	Electromechanical medical devices Industrial biotechnology Implantable devices - active and non-active Anaesthetic and respiratory devices Electromechanical medical devices Radiation devices - diagnostic and therapeutic Ophthalmic and optical products Dental devices Reusable and single-use devices Healthcare facility products and adaptations ICT tools Assistive products for persons with disability

Categorization

The categories and their definitions are listed in *Table 5*. Classification of individual companies was based on review of websites, contact with the companies, previous year's documentation and the companies' business descriptions. For corporations with multiple subsidiaries, the main activities conducted by the subsidiary in the region ruled the categorization. In some, unclear cases as to which category the particular company should be included, the authors' judgment formed the ruling.

Table 5: Definitions and selection critera

Industry sector	Definition
Pharmaceutical	Companies developing and/or markering drugs (both small molecules and biologics) and various kinds of therapeutic products or methods.
Medtech	Companies developing and/or marketing medical products that are not drugs (same definition as VINNOVA).
Biotechnology	Companies developing the application of science and technology to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services and/or marketing these products or services (same definition as VINNOVA).
Service	Companies that provide specific core capabilities and services, including CRO companies.
Type of business	**Definition**
Research & Development	Companies with exploratory research and development. Within some companies there is also sales and marketing activity and manufacturing (same definition as VINNOVA).
Incremental product & service development	Companies which principally develop their own products/services, i.e. incremental product development without elements of exploratory research (same definition as VINNOVA).
Manufacturing	Manufacturing of products. Includes companies specialised in manufacturing but also the production units of integrated companies with more than 500 employees (same definition as VINNOVA).
Marketing & Sales	Operates marketing & sales (with or without a product in late stages - Clinical Trials). These are marked throughout with M&S in the tables. (same definition as VINNOVA).
Consultancy	Companies which principally carry out consultancy and commission activity (same definition as VINNOVA).
Sub-sectors	**Definition**
Pharmaceuticals, medical technology and diagnostics companies	Active in the development and / or manufacturing of products that require Medical Product Agency (MPA) approval (drugs or medical devices), including devices which are invasive and / or exercise physiological and / or metabolic effects.
Biotechnology tools	Companies that develop equipment and methods of analysis, separation and production, reagents, etc. used by companies and academic institutions for research, product development and production in activities involving biological processes.
Other categories in biotechnology (food-related, environmental and agrobiotechnology)	Companies that are developing applications of science and technology of living organisms to develop the knowledge, products and services in these areas.
CRO	Contract Research Organization, i.e. companies that are directly involved in product development process by providing specific services.
Other service[21]	Service companies that are not CRO as defined above, but in its main business provides specific core capabilities and services with knowledge and expertise that contracting life science companies don't have.

[21] Selection criteria for Other services: Companies that engage in product development and/or manufacturing or offering services mainly within life science and possessing a pool of life science-specific competences and/or intellectual properties within their respective sub-sector of life science.

Retrieval of official business data for selected companies

The data presented in this report was retrieved from publicly available sources including *Bolagsverket*/Swedish Companies Registration Office (based on each company's annual report). The dataset only covers limited companies. Number of employees are reported for the regional employment sites.

For companies with multiple geographical sites, number of employees are reported only for the employment sites within the Stockholm-Uppsala-Sörmland region.

The annual accounting period for a majority of Swedish companies begins in January and ends in December. However, for some companies, the annual accounting period can start in May, in July or in September. In the latter case, data on number of employees from the company’s annual report which best represents years 2012 and 2011 respectively were used.

The reference group for this study includes the following life science development organizations:

Stockholm-Uppsala Life Science: Stockholm-Uppsala Life Science markets one of the most innovative and productive life science regions globally. www.suls.se

Stockholm Science City Foundation: The mission of Stockholm Science City Foundation is to attract academia and business within Life Sciences to the Stockholm Life area www.ssci.se

Uppsala BIO: Uppsala BIO is a life science pathfinder which develops programs to make life science flourish in close cooperation with industry academia, society and healthcare. www.uppsalabio.se