ICON PLC
Form 20-F
March 01, 2019

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C.20549

FORM 20-F
(Mark One)
___ Registration statement pursuant to Section 12(b) or (g) of the Securities Exchange Act of 1934
OR
_X_ Annual report pursuant to Section 13 or 15 (d) of the Securities Exchange Act of 1934
For the fiscal year ended: December 31, 2018
OR
___ Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
OR
___ Shell company report pursuant to section 13 or 15(d) of the Securities Exchange Act of 1934.

Commission File Number: 333-08704
ICON PUBLIC LIMITED COMPANY
(Exact name of Registrant as Specified in its Charter)
ICON PUBLIC LIMITED COMPANY
(Translation of Registrant's name into English)

Ireland
(Jurisdiction of Incorporation or Organization)

SOUTH COUNTY BUSINESS PARK,
LEOPARDSTOWN,
DUBLIN 18, IRELAND

(Address of principal executive offices)
Brendan Brennan, Chief Financial Officer
South County Business Park, Leopardstown, Dublin 18, Ireland.
Brendan.Brennan@iconplc.com
+353-1-291-2000

(Name, telephone number, email and/or facsimile number and address of Company contact person)
Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of each class	Name of exchange on which registered
ORDINARY SHARES, PAR VALUE €0.06 EACH	NASDAQ GLOBAL SELECT MARKET

Securities registered or to be registered pursuant to section 12(g) of the Act:
Title of each class
NONE
Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:
NONE
(Title of class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report: 53,971,706 Ordinary Shares.

Indicate by check mark if the registrant is a well-known seasoned issuer, as determined in Rule 405 of the Securities Act. Yes X No__

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to section 13 or 15(d) of the Securities Exchange Act of 1934. Yes __ No X

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes X No__

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months: Yes X No__

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non- accelerated filer.

Large accelerated filer X Accelerated filer __ Non-accelerated filer __ Emerging growth company _

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for ocmplying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP X International Financial Reporting Standards as issued by the International Accounting Standards Board __ Other __

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. Item 17 __ Item 18__

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act) Yes __ No X

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General

As used herein, “ICON plc”, “ICON”, the “Company” and “we” or “us” refer to ICON public limited company and its consolidated subsidiaries, unless the context requires otherwise.

Unless otherwise indicated, ICON plc’s financial statements and other financial data contained in this Form 20-F are presented in United States dollars (“$”) and are prepared in accordance with generally accepted accounting principles in the United States (“U.S. GAAP”).

In this Form 20-F, references to "U.S. dollars", "U.S.$" or "$" are to the lawful currency of the United States, references to "pounds sterling", "sterling", "£", "pence" or "p" are to the lawful currency of the United Kingdom, references to “euro” or “€” are to the European single currency adopted by nineteen members of the European Union (including the Republic of Ireland, France, Germany, Spain, Italy, Finland, Belgium, Latvia, and the Netherlands). ICON publishes its consolidated financial statements in U.S. dollars.

Cautionary Statement Regarding Forward-looking Statements

Statements included herein which are not historical facts are forward-looking statements. Such forward-looking statements are made pursuant to the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995 (the “PSLRA”). Forward-looking statements may be identified by the use of future tense or other forward looking words such as “believe”, “expect”, “anticipate”, “should”, “may”, “strategy”, or other variations or comparable terminology. T forward looking statements involve a number of risks and uncertainties and are subject to change at any time. In the event such risks or uncertainties materialize, our results could be materially adversely affected. The risks and uncertainties include, but are not limited to, dependence on the pharmaceutical industry and certain clients, the need to regularly win projects and then to execute them efficiently and correctly, the challenges presented by rapid growth, competition and the continuing consolidation of the industry, the dependence on certain key executives, changes in the regulatory environment and other factors identified in the Company’s United States Securities and Exchange Commission filings and in the “Risk Factors” included on pages 4 through 16. The Company has no obligation under the PSLRA to update any forward looking statements and does not intend to do so.

Part I

Item 1. Identity of Directors, Senior Management and Advisors.

Not applicable.

Item 2. Offer Statistics and Expected Timetable.

Not applicable.

Item 3. Key Information.

Selected Historical Consolidated Financial Data for ICON plc

The following selected financial data set forth below are derived from the Company's consolidated financial statements and should be read in conjunction with, and are qualified by reference to, Item 5 "Operating and Financial Review and Prospects" and the Company's consolidated financial statements and related notes thereto included elsewhere in this Form 20-F.

The Company adopted ASC 606 'Revenue from Contracts with Customers' ("ASC 606") with a date of initial application of January 1, 2018. The new revenue recognition policies were applied in the preparation and presentation of the results for the twelve months ended December 31, 2018. As ICON adopted the standard using the cumulative effect transition method, there is no restatement of comparative amounts. The results for the year ended December 31, 2017 and previously therefore reflect the provisions of ASC 605 'Revenue Recognition'. The most significant impact of application of the new standard reflects the measurement of a clinical trial service as a single performance obligation recognized over time. We concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical trial. The progress towards completion for clinical service contracts is measured based on total project costs (direct fees are therefore inclusive of third party costs). Revenue is our primary measure of performance on adoption of ASC 606. In common with others in the sector, our results previously separately identified that revenue stream which related to services provided by third parties. Those services were previously separately identified as reimbursable expenses and presented separately in our Statement of Operations. Reimbursable expenses are included within direct costs on adoption of ASC 606. Throughout the document revenue as reported on adoption of ASC 606 is referred to as revenue. Revenue as reported for the years ended December 31, 2017 and previously are gross revenues (inclusive of revenue from reimbursable expenses) or net revenues (excluding revenue from reimbursable expenses). This treatment is consistent with the adoption of ASC 606 from January 1, 2018 without restatement of comparatives. See note 26 for impact of new accounting policy.

	Year Ended December 31,				
	2018	2017	2016	2015	2014
	(in thousands, except share and per share data)				
Statement of Operations Data:					
Revenue/gross revenue	$2,595,777	$2,402,321	$2,364,956	$2,161,618	$2,030,286
Reimbursable expenses (1)	—	(643,882)	(698,469)	(586,640)	(526,970)
		1,758,439	1,666,487	1,574,978	1,503,316
Costs and expenses:					
Direct costs (1)	1,818,220	1,027,310	961,333	908,979	903,167
Selling, general and administrative	325,794	323,741	325,726	326,786	336,461
Depreciation and amortization	65,916	61,297	59,575	57,677	52,542
Restructuring and other items (2),(3),(4),(5)	12,490	7,753	8,159	—	8,796
Total costs and expenses	2,222,420	1,420,101	1,354,793	1,293,442	1,300,966
Income from operations	373,357	338,338	311,694	281,536	202,350
Net interest (expense)/income	(8,743)	(10,281)	(11,522)	(2,686)	366
Income before provision for income taxes	364,614	328,057	300,172	278,850	202,716
Provision for income taxes	(41,958)	(46,569)	(37,993)	(39,311)	(30,248)
Net income	$322,656	$281,488	$262,179	$239,539	$172,468
Net income per ordinary share (6):					
Basic	$5.96	$5.20	$4.75	$4.08	$2.80
Diluted	$5.89	$5.13	$4.65	$3.97	$2.73
Weighted average number of ordinary shares outstanding:					
Basic	54,118,764	54,129,439	55,248,900	58,746,935	61,496,115
Diluted	54,790,663	54,849,046	56,407,136	60,290,033	63,131,417

	Year Ended December 31,				
	2018	2017	2016	2015	2014
	(in thousands)				
Balance Sheet Data:					
Cash and cash equivalents	$395,851	$282,859	$192,541	$103,911	$118,900
Available for sale investments	59,910	77,589	68,046	85,990	97,100
Working capital	719,560	534,960	463,552	290,939	281,148
Total assets	2,354,255	2,146,618	1,825,843	1,717,209	1,528,850
Non-current other liabilities	13,446	17,111	23,752	12,224	13,179
Non-current government grants	877	966	887	959	1,116
Ordinary share capital	4,658	4,664	4,692	4,719	5,059
Additional paid-in capital	529,642	481,337	438,126	383,355	327,212
Shareholders' equity	1,354,281	1,191,000	945,174	763,096	950,206

(1)

Reimbursable expenses are comprised of payments to investigators and certain other costs reimbursed by clients under terms specific to each of the Company's contracts. Reimbursable expenses included within direct costs for the year-ended December 31, 2018 were $702,812,000. See Note 2 (d) to the Audited Consolidated Financial Statements.

(2) A restructuring charge of $12.5 million was recognized during the year ended December 31, 2018, under a restructuring plan adopted following a review of operations. The restructuring plan reflected resource rationalization across the business to improve resource utilization. See Note 14 to the Audited Consolidated Financial Statements.

(3) A restructuring charge of $7.8 million was recognized during the year ended December 31, 2017, under a restructuring plan adopted following a review of operations. The restructuring plan reflected resource rationalization across the business to improve resource utilization. See Note 14 to the Audited Consolidated Financial Statements.

(4) A restructuring charge of $8.2 million was recognized during the year ended December 31, 2016 under a restructuring plan adopted following a review by the Company of its operations. The restructuring plan includes resource rationalizations in certain areas of the business to improve resource utilization and improve operational effectiveness, resulting in a charge of $6.2 million, and office consolidation which resulted in the recognition of an onerous lease obligation of $2.0 million. See Note 14 to the Audited Consolidated Financial Statements.

(5) A restructuring charge of $8.8 million was recognized during the year ended December 31, 2014. Following the closure of the Company's European Phase 1 services in 2013, the Company recognized a charge in 2014 in relation to its Manchester, United Kingdom facility; $5.6 million in relation to asset impairments and $3.2 million in relation to an onerous lease charge associated with this facility.

(6) Net income per ordinary share is based on the weighted average number of outstanding ordinary shares. Diluted net income per share includes potential ordinary shares from the exercise of options.

Risk Factors

Various risk factors that are relevant to our business and the services we provide are outlined below. If any of these events were to occur, our business operations and financial results could be materially adversely affected.

Risk Related to Our Business and Operations

We depend on a limited number of customers and a loss of, or significant decrease in business from one or more of them could affect our business.

During the year ended December 31, 2018 39.5% of our revenues were derived from our top five customers, with one customer contributing more than 10% of our revenues during the period (13.6%). During the year ended December 31, 2017 42% of our revenues (including revenue from reimbursable expenses) were derived from our top five customers, with one customer contributing more than 10% of our revenues (including revenue from reimbursable expenses) during the period (21.0%). No other customer contributed more than 10% of our net revenues during this period. See note 16 Disaggregation of revenue.

During the year ended December 31, 2016 45% of our net revenues (excluding revenue from reimbursable expenses) were derived from our top five customers, with one customer contributing more than 10% of our net revenues (excluding revenue from reimbursable expenses) during the period (26%). No other customer contributed more than 10% of our net revenues during this period. The loss of, or a significant decrease in business from one or more of these key customers could have a material adverse impact on our results of operations and financial results.

Many of our contracts are long-term fixed-fee contracts. We would lose money in performing these contracts if the costs of performance exceed the fixed fees for these projects and we are unable to negotiate a change order for the value of work performed.

Many of our contracts are long-term fixed fee contracts. Revenues on these contracts are agreed in the contract between the Company and the customer and are based on an assessment of progress towards completion based on the cost of time and reimbursable costs. Factors considered in estimating time requirements include the complexity of the study, the number of geographical sites where trials are to be conducted and the number of patients to be recruited at each site. The Company regularly reviews the estimated hours on each contract to determine if the budget accurately reflects the agreed tasks to be performed taking into account the state of progress at the time of review. The Company also endeavors to ensure that changes in scope are appropriately monitored and change orders for additional revenue are promptly negotiated for additional work as necessary. If we were to fail to successfully negotiate change orders for changes in the resources required or the scope of the work to be performed and the costs of performance of these contracts exceeded their fixed fees, it could materially adversely affect our operations and financial results.

If our customers discontinue using our services, or cancel or discontinue projects, our revenue will be adversely affected and/or we may not receive their business in the future or may not be able to attract new clients.

Our clients may discontinue using our services completely or cancel some projects either without notice or upon short notice. The termination or delay of a large contract or of multiple contracts could have a material adverse effect on our revenue and profitability. Historically, clients have cancelled or discontinued projects and may in the future cancel their contracts with us for reasons including, amongst others:

- the failure of products being tested to satisfy safety or efficacy requirements;
- unexpected or undesired clinical results of the product;
- a decision that a particular study is no longer necessary or viable;
- poor project performance, quality concerns, insufficient patient enrollment or investigator recruitment; and
- production problems resulting in shortages of the drug.

If we lose clients, we may not be able to attract new ones and if we lose individual projects, we may not be able to replace them.

If we fail to attract or retain qualified staff, our performance may suffer.

Our business, future success and ability to continue to expand operations depends upon our ability to attract, hire, train and retain qualified professional, scientific and technical operating staff. We compete for qualified professionals with other Clinical Research Organizations “CROs”, temporary staffing agencies and the in-house departments of pharmaceutical, biotechnology and medical device companies. An inability to attract and retain a sufficient number of high caliber clinical research professionals (in particular, key personnel and executives) at an acceptable cost would impact our ability to provide our services, our future performance and results of operations.

Our ability to perform clinical trials is dependent upon the ability to recruit suitable willing patients.

The successful completion of clinical trials is dependent upon the ability to recruit suitable and willing patients on which to test the drug under study. The availability of suitable patients for enrollment on studies is dependent upon many factors including, amongst others, the size of the patient population, the design of the study protocol, eligibility criteria, the referral practices of physicians, the perceived risks and benefits of the drug under study and the availability of alternative medication, including medication undergoing separate clinical trials. Insufficient or inappropriate patient enrollment may result in the termination or delay of a study which could have a material adverse impact on our results of operations.

The Company is focused on continuing to develop its expertise in patient recruitment. The focus is on making it easier for the site and the patient to actively participate in a trial to ensure increased predictability, enrolment and retention. Our site and patient solutions group includes upfront planning of site and patient management including identification, enrolment and engagement.

Improved site selection is achieved through:

- leading technology to identify where the patients are that match the protocol;

- assessment of the qualification of sites based on real data;

- partnerships with leading technology vendors such as Intel, EHR4CR and TriNeTX and developing the capability to enable EMR interrogation into clinical insights such as sub-populations and larger pre-screened pool where the technology and regulations are enabled.

The burden on the site in ensuring patient enrolment and engagement is achieved through integrated site networks. ICON have a number of site alliance partners. During 2018, we enhanced our site and patient recruitment capabilities with an expansion of the PMG Research network through a partnership with the Du Page Medical Group. We also use digital solutions to drive site performance, including pre-screening, eConsent, learning management, document tracking and management with key applications.

Our ability to perform clinical trials is dependent upon our ability to recruit suitable willing investigators.

We contract with physicians located in hospitals, clinics or other similar sites, who serve as investigators in conducting clinical trials to test new drugs on their patients. Investigators supervise administration of the study drug to patients during the course of the clinical trial. The successful conduct of a clinical trial is dependent upon the integrity, experience and capabilities of the investigators conducting the trial. Insufficient investigator recruitment, which in turn may lead to insufficient or inappropriate patient enrollment, may result in the termination or delay of a study which could have a material adverse impact on our results of operations.

We rely on third parties for important products and services.

We depend on certain third parties to provide us with products and services critical to our business. Such services include, amongst others, suppliers of drugs for patients participating in trials, suppliers of kits for use in our central laboratory business, suppliers of reagents for use in our testing equipment and providers of maintenance services for our equipment. The failure of any of these third parties to adequately provide the required products or services or the significant increase in the costs of such products and services could have a material adverse effect on our business.

Our business depends on the continued effectiveness and availability of our information systems, including the information systems we use to provide our services to our clients, and any system failures of, security breaches of or cyber-attacks to these systems may materially limit our operations or have a material adverse effect on our results of operations.

Due to the global nature of our business and our reliance on information systems to provide our services, we use web-enabled and other integrated information systems in delivering our services. We will to continue to increase the use of these systems and such systems will either be developed internally or provided in conjunction with third parties. We also provide access to similar information systems to certain clients in connection with the services we provide them. As the use, scope and complexity of our information systems continue to grow, we are exposed to and will increasingly be exposed to the risks inherent in the development, integration and ongoing operation of evolving information systems, including:

- disruption or failure of data centers, telecommunications facilities or other key infrastructure platforms;
- security breaches, cyber-attacks or other failures or malfunctions in our application or information systems or their associated hardware or other systems that we have access to or that we rely upon or that have access to our systems; and
- excessive costs, excessive delays or other deficiencies in or problems with systems development and deployment.

The materialization of any of these risks may impede our ability to provide services, the processing of data, the delivery of databases and services and the day-to-day management of our business and could result in the corruption, loss or unauthorized disclosure of proprietary, confidential or other data, as well as reputational harm. While we have cybersecurity controls and disaster recovery plans in place, they might not adequately protect us in the event of a system failure, security breach or cyber-attack. Despite any precautions we take, damage from fire, floods, hurricanes, power loss, telecommunications failures, computer viruses, information system security breaches, cyber-attacks and similar events that impact on our various computer facilities could result in interruptions in the flow of data to our servers and from our servers to our clients. Corruption or loss of data may result in the need to repeat a trial at no cost to the client, but at significant cost to us, or result in one or more of the termination of a contract, legal proceedings or

claims against us or damage to our reputation. Additionally, significant delays in system enhancements or inadequate performance of new or upgraded systems once completed could damage our reputation and harm our business. Long-term disruptions in the infrastructure caused by events such as security breaches, cyber-attacks, natural disasters, the outbreak of war, the escalation of hostilities and acts of terrorism, particularly involving cities in which we have offices, could adversely affect our business.

Unauthorized disclosure of sensitive or confidential data, whether through system failure or employee negligence, fraud or misappropriation, could damage our reputation and cause us to lose clients. Similarly, despite investing in information and cyber-security controls there is a risk that unauthorized access to or through our information systems or those we develop for our clients, whether by our employees or third parties, including a cyber-attack by computer programmers and hackers who may attack ICON systems, develop and deploy viruses, worms, ransomware or other malicious software programs could result in negative publicity, significant remediation costs, legal liability, loss of customers and damage to our reputation and could have a material adverse effect on our results of operations and financial results. In addition, our liability insurance might not be sufficient in type, the cover provided or amount to adequately cover us against claims related to security breaches, cyber-attacks and other related breaches.

Upgrading the information systems that support our operating processes and evolving the technology platform for our services pose risks to our business.

Continued efficient operation of our business requires that we implement standardized global business processes and evolve our information systems to enable this implementation. We have continued to undertake significant programs to optimize business processes with respect to our services. A failure to effectively manage the implementation and adapt to new processes designed into these new or upgraded systems in a timely and cost-effective manner may result in disruption to our business and negatively affect our operations.

We have entered into agreements with certain vendors to provide systems development and integration services that develop or license to us the IT platform for programs to optimize our business processes. If such vendors fail to perform as required or if there are substantial delays in developing, implementing and updating the IT platform, our customer delivery may be impaired and we may have to make substantial further investments, internally or with third parties, to achieve our objectives. Additionally, our progress may be limited by parties with existing or claimed patents who seek to prevent us from using preferred technology or seek license payments from us.

Meeting our objectives is dependent on a number of factors which may not take place as we anticipate, including obtaining adequate technology-enabled services, creating IT-enabled services that our customers will find desirable and implementing our business model with respect to these services. If we do not keep pace with rapid technological changes in the CRO industry, our products and services may become less competitive or even obsolete. This applies in particular to our ICONIK, Firecrest and ADDPLAN and One Search services. Also, increased requirements for investment in information technology may negatively impact our financial condition, including profitability.

We rely on our interactive response technologies to provide accurate information regarding the randomization of patients and the dosage required for patients enrolled in the trials.

We develop and maintain computer run and web based interactive response technologies to automatically manage the randomization of patients in trials, assign the study drug and adjust the dosage when required for patients enrolled in trials we support. An error in the design, programming or validation of these systems could lead to inappropriate assignment or dosing of patients, which could give rise to patient safety issues, incorrect dosing of patients, invalidation of the trial and/or liability claims against the Company, amongst other things, any of which could have a material effect on our financial condition and operations.

Our operations might be impacted by a disruption to travel systems.

Many of our operations rely on the availability of air or other transportation for the distribution of clinical trial materials, study samples and personnel. While we have developed contingency plans to minimize the impact of such events, a disruption to the availability of air transportation or other travel systems could have a material adverse impact on our ability to provide services and results of operations.

We may make, or be unable to make, acquisitions in the future, which may lead to disruptions to our ongoing business.

We have made a number of acquisitions and will continue to review new acquisition opportunities. If we are unable to identify suitable acquisition targets, complete an acquisition or successfully integrate an acquired company or business, our business may be disrupted. The success of an acquisition will depend upon, among other things, our ability to:

- effectively and quickly assimilate the operations and services or products of the acquired company or business;
- integrate acquired personnel;
- retain and motivate key employees;
- retain customers; and
- minimize the diversion of management's attention from other business concerns.

In the event that the operations of an acquired company or business do not meet our performance expectations, we may have to restructure the acquired company or business or write-off the value of some or all of the assets of the acquired company or business.

Improper performance of our services

The performance of clinical development services is complex and time-consuming. We may make mistakes in conducting a clinical trial that could negatively impact or damage the usefulness of the clinical trial or cause the results to be reported improperly. If the clinical trial results are compromised, we could be subject to significant costs or liability, which could have an adverse impact on our ability to perform our services. Large clinical trials are costly, and while we endeavor to contractually limit our exposure to such risks, improper performance of our services could have an adverse effect on our financial condition, damage our reputation and result in the cancellation of current contracts or failure to obtain new contracts from affected or other clients.

Our relationships with existing or potential customers who are in competition with each other may adversely impact the degree to which other customers or potential customers use our services, which may adversely affect our results of operations.

The biopharmaceutical industry is highly competitive, with biopharmaceutical companies each seeking to persuade payers, providers and patients that their drug therapies are better and more cost-effective than competing therapies marketed or being developed by competing companies. In addition to the adverse competitive interests that biopharmaceutical companies have with each other, biopharmaceutical companies also have adverse interests with respect to drug selection and reimbursement with other participants in the health care industry, including payers and providers. Biopharmaceutical companies also compete to be first to market with new drug therapies. We regularly provide services to biopharmaceutical companies who compete with each other and we sometimes provide services to such customers regarding competing drugs in development. Our existing or future relationships with our biopharmaceutical customers may therefore deter other biopharmaceutical customers from using our services or may result in our customers seeking to place limits on our ability to serve other biopharmaceutical industry participants. In addition, our further expansion into the broader health care market may adversely impact our relationships with biopharmaceutical customers and such customers may elect not to use our services, reduce the scope of services that we provide to them or seek to place restrictions on our ability to serve customers in the broader health care market with interests that are adverse to theirs. Any loss of customers or reductions in the level of revenues from a customer could have a material adverse effect on our results of operations, business and prospects.

We have only a limited ability to protect our intellectual property rights and these rights are important to our success.

Our success depends, in part, upon our ability to develop, use and protect our proprietary methodologies, analytics, systems, technologies and other intellectual property. Existing laws of the various countries in which we provide services or solutions offer only limited protection of our intellectual property rights, and the protection in some countries may be very limited. We rely upon a combination of trade secrets, confidentiality policies, non-disclosure, invention assignment and other contractual arrangements and patent, copyright and trademark laws, to protect our intellectual property rights. These laws are subject to change at any time and certain agreements may not be fully enforceable, which could further restrict our ability to protect our innovations. Our intellectual property rights may not prevent competitors from independently developing services similar to or duplicative of ours. Further, the steps we take in this regard might not be adequate to prevent or deter infringement or other misappropriation of our intellectual property by competitors, former employees or other third parties and we might not be able to detect unauthorized use of, or take appropriate and timely steps to enforce our intellectual property rights. Enforcing our rights might also require considerable time, money and oversight and we may not be successful in enforcing our rights.

We may, in certain circumstances, grant a customer more expansive rights in intellectual property developed in connection with a contract than we would normally grant. In such situations, we may forego the use of all intellectual

property rights we create or develop, which would limit our ability to reuse or deploy that intellectual property for other customers. Any limitation on our ability to provide a service or solution may result in us losing revenue-generating opportunities and may also result in us incurring additional expenses to develop or license new or modified solutions for other projects or customers.

The biopharmaceutical industry has a history of patent and other intellectual property litigation and we might be involved in costly intellectual property lawsuits.

The biopharmaceutical industry has a history of intellectual property litigation, and these lawsuits will likely continue in the future. Accordingly, we may face patent infringement legal proceedings by companies that have patents for similar business processes or other legal proceedings alleging infringement of their intellectual property rights. Legal proceedings relating to intellectual property could be expensive, take significant time and divert management's attention from other business concerns, regardless of the outcome of the litigation. If we do not prevail in an infringement lawsuit brought against us, we might have to pay substantial damages and we could be required to stop the infringing activity or obtain a license to use technology on unfavorable terms. Any

infringement or other legal processing related to intellectual property could have a material adverse effect on our operations and financial condition.

We act as legal representative for some clients.

We act as the legal representative for certain clients in certain jurisdictions. As we believe that acting as legal representative of clients exposes us to a higher risk of liability, this service is provided subject to our policy and requires certain preconditions to be met. The preconditions relate to obtaining specific insurance commitments and indemnities from the client to cover the nature of the exposure. However, there is no guarantee that the specific insurance will be available and provide cover or that a client will fulfill its obligations in relation to their indemnity.

Risk Related to Our Industry

We are dependent on the continued outsourcing of research and development by the pharmaceutical, biotechnology and medical device industries.

We are dependent upon the ability and willingness of the pharmaceutical, biotechnology and medical device companies to continue to spend on research and development and to outsource the services that we provide. We are therefore subject to risks, uncertainties and trends that affect companies in these industries that we do not control. We have benefited to date from the tendency of pharmaceutical, biotechnology and medical device companies to outsource clinical research projects. Any downturn in these industries or reduction in spending or outsourcing could materially adversely affect our business. The following could each result in such a downturn:

- if pharmaceutical, biotechnology or medical device companies expanded upon their in-house clinical or development capabilities, they would be less likely to utilize our services;

- if governmental regulations were changed, it could affect the ability of our clients to operate profitably, which may lead to a decrease in research spending and therefore this could have a material adverse effect on our business; and

- if unfavorable economic conditions or disruptions in the credit and capital markets negatively impacted our clients.

Large pharmaceutical companies are increasingly consolidating their vendor base and entering strategic partnership arrangements with a limited number of outsource providers.

Large pharmaceutical companies are continually seeking to drive efficiencies in their development processes to both reduce costs associated with the development of new drug candidates and accelerate time to market. As a result, large pharmaceutical companies, in particular, are increasingly looking to consolidate the number of outsource providers with which they engage, with many entering strategic partnership arrangements with a limited number of outsource providers. The failure to enter strategic partnership arrangements with customers or the loss of existing customers as a result of them entering strategic partnership arrangements with our competitors could have a material adverse impact on our results of operations.

Increased collaboration amongst pharmaceutical companies in research and development activities may lead to fewer research opportunities.

Certain pharmaceutical companies have begun to collaborate in seeking to develop new drug candidates. Increased collaboration amongst pharmaceutical companies may lead to fewer research opportunities, which in turn may lead to fewer outsource opportunities for companies within the CRO industry. A reduction in outsource opportunities as a result of this increased collaboration could have a material adverse impact on our results of operations.

We operate in a highly competitive and dynamic market.

The CRO industry is highly competitive. In particular, we compete with other large global CROs for strategic relationships with large pharmaceutical companies. If we are unable to retain and renew existing strategic relationships and win new strategic relationships, there would be a material adverse impact on our results. Similarly, we compete with other CROs for work which comes outside of these strategic relationships and being unable to win work outside of these strategic relationships would have a material adverse impact on our results.

The type and depth of services provided by CROs has changed in recent years. Failure to develop and market new services or expand existing service offerings could adversely affect our business and operations.

New entrants may also enter the market which would further increase competition and could adversely affect our business and operations.

Risk Related to Our Financial Results and Financial Position

Our quarterly results are dependent upon a number of factors and can fluctuate from quarter to quarter.

Our results of operations in any quarter can fluctuate or differ from expected or forecast results depending upon or due to, among other things, the number and scope of ongoing client projects, the commencement, postponement, variation, cancellation or termination of projects in a quarter, the mix of activity, cost overruns, employee hiring and other factors. Our revenue in any period is directly related to the number of employees who were working on billable projects together with investigator activity during that period. We may be unable to compensate for periods of under-utilization during one part of a fiscal period by earning revenue during another part of that period. We believe that operating results for any particular quarter are not necessarily a meaningful indicator of future results.

Also, if in future quarters, we are unable to continue to deliver operational efficiencies and our expenses grow faster than our revenues, our operating margins, profitability and overall financial condition may be materially adversely impacted.

Our exposure to exchange rate fluctuations could adversely affect our results of operations.

Our contracts with clients are sometimes denominated in currencies other than the currency in which we incur expenses related to such contracts. Where expenses are incurred in currencies other than those in which contracts are priced, fluctuations in the relative value of those currencies could have a material adverse effect on our results of operations.

In addition, we are also subject to translation exposures as our consolidated financial results are presented in U.S. dollars, while the local results of certain of our subsidiaries are prepared in currencies other than U.S. dollars, including, amongst others, the pound sterling and the euro. Accordingly, changes in exchange rates between the U.S. dollar and those other currencies will affect the translation of subsidiary companies' financial results into U.S. dollars in reporting our consolidated financial results.

Our effective tax rate may fluctuate from quarter-to-quarter, which may adversely affect our results of operations.

Our quarterly effective tax rate has depended and will continue to depend on the geographic distribution of our taxable earnings amongst the multiple tax jurisdictions in which we operate and the tax law in those jurisdictions. Changes in the geographic mix of our results of operations amongst these jurisdictions may have a significant impact on our effective tax rate from quarter to quarter. Changes in tax law in one or more jurisdictions could also have a significant impact on our tax rate and results. In addition, as we operate in multiple tax jurisdictions, we may be subject to audits in certain jurisdictions. These audits may involve complex issues which could require an extended period of time for resolution. The resolution of audit issues may lead to differences, additional taxes, fines or penalties which could have a material adverse impact on our effective tax rate and our financial condition and results.

Our unsatisfied performance obligation (assessment of the realizable value of contracted awards) may not convert to revenue and the rate of conversion may slow.

Our remaining unsatisfied performance obligation is that element of contracted awards that has not yet converted to revenue. This value is not necessarily a meaningful predictor of future results, due to the potential for the cancellation

or delay of projects included in the backlog. No assurances can be given that we will be able to realize this backlog in full as revenue. A failure to realize these contracted awards could have a material adverse impact on our results of operations. In addition, as the length and complexity of projects increases, the rate at which contracted awards convert to revenue may be slower than in the past. A significant reduction in the rate of conversion could have a material impact on our results of operations.

The Company is exposed to various risks in relation to our cash and cash equivalents and short term investments.

The Company's treasury function manages our available cash resources and invests significant cash balances in various financial institutions to try to ensure optimum returns for our surplus cash balances. These balances are classified as cash and cash equivalents or short term investments depending on the maturity of the related investment. Cash and cash equivalents comprise cash and highly liquid investments with maturities of three months or less. Short term investments comprise highly liquid investments with maturities of greater than three months and minimum "A-" rated fixed and floating rate securities.

Given the global nature of our business, we are exposed to various risks in relation to these balances including liquidity risk, credit risk associated with the counterparties with whom we invest, interest rate risk on floating rate securities, sovereign risk (our principle sovereign risk relates to investments in U.S. Treasury funds) and other factors.

Although we have not recognized any significant losses to date on our cash and cash equivalents or short term investments, any significant declines in their market values could have a material adverse effect on our financial position and operating results.

Changes in accounting standards may adversely affect our financial statements

We prepare our financial statements in accordance with generally accepted accounting principles in the United States of America ('US GAAP') which is revised on an on-going basis by the authoritative bodies. It is possible that future accounting standard changes, may require additional changes to the accounting treatment that we apply in preparation of our financial statements. These changes may also require significant changes to our reporting systems. We applied ASC 606 - 'Revenue from contracts with customers' with effect from January 1, 2018. Under this new standard, the Company is required to recognize revenue in respect of our clinical trial services on a percentage of completion basis. The change in revenue recognition requires significant estimates of project costs that will need to be updated and adjusted on a regular basis. These updates may result in unexpected variability in the timing of recognition of revenue and therefore in our operating results. Application of ASC 842 - 'Leases' will result in the recognition of a lease liability and right-of-use asset on the Consolidated Balance Sheet at December 31, 2019. See Item 5 for our assessment of the impact of application.

Risk Related to Political, Legal or Regulatory Environment

We may lose business opportunities as a result of health care reform and the expansion of managed care organizations.

Numerous governments, including the U.S. government have undertaken efforts to control growing health care costs through legislation, regulation and voluntary agreements with medical care providers and drug companies. If these efforts are successful, pharmaceutical, biotechnology and medical device companies may react by spending less on research and development and therefore this could have a material adverse effect on our business.

In addition to health care reform proposals, the expansion of managed care organizations in the health care market may result in reduced spending on research and development. Managed care organizations' efforts to cut costs by limiting expenditures on pharmaceuticals and medical devices could result in pharmaceutical, biotechnology and medical device companies spending less on research and development. If this were to occur, we would have fewer business opportunities and our revenues could decrease, possibly materially.

Healthcare reform legislation, other changes in the healthcare industry and in healthcare spending could adversely affect our business model, financial condition or results of operations.

Our results of operations and financial conditions could be affected by changes in healthcare spending and policy. The healthcare industry is subject to changing political, regulatory and other influences. It is possible that legislation will be introduced and passed in the United States repealing, modifying or invalidating the current healthcare reform legislation, in whole or in part, and signed into law. Because of the continued uncertainty about the implementation of the current healthcare reform legislation, including the potential for further legal challenges or repeal of that legislation, we cannot quantify or predict with any certainty the likely impact of the current healthcare reform legislation or its repeal on the health care sector, on our customers and ultimately on our financial condition or results of operations, in particular the outsourcing of costs by our customer base to CROs.

We may lose business as a result of changes in the regulatory environment.

Various regulatory bodies throughout the world may enact legislation, rules and guidance which could introduce changes to the regulatory environment for drug development and research. The adoption and implementation of such legislation, rules and guidance is difficult to predict and therefore could have a material adverse effect on our business.

Failure to comply with the regulations and requirements of the U.S. Food and Drug Administration and other regulatory authorities could result in substantial penalties and/or loss of business.

The U.S. Food and Drug Administration, or "FDA", and other regulatory and government authorities and agencies inspect and audit us from time to time to ensure that we comply with their regulations and guidelines, including environmental and health and safety matters, and other requirements imposed in connection with the performance of government contracts. We must comply with the applicable regulatory requirements governing the conduct of clinical trials and contracting with the government in all countries in which we operate. If we fail to comply with any of these requirements we could suffer some or all of:

- termination of or delay in any research;
- disqualification of data;
- denial of the right to conduct business;
- criminal penalties;
- other enforcement actions including debarment from government contracts;
- loss of clients and/or business; and
- litigation from clients and/or patients and/or regulatory authorities and/or other affected third parties, and resulting material penalties, damages and costs.

We are subject to political, regulatory, operational and legal risks associated with our international operations.

We are one of a small group of organizations with the capability and expertise to conduct clinical trials on a global basis. We believe that this capability to provide our services globally in most major and developing pharmaceutical markets enhances our ability to compete for new business from large multinational pharmaceutical, biotechnology and medical device companies. We have expanded geographically in the past and intend to continue expanding in regions that have the potential to increase our client base or increase our investigator and patient populations. We expect that revenues earned in emerging markets will continue to account for an increasing portion of our total revenues. However, emerging market operations may present several risks, including civil disturbances, health concerns, cultural differences such as employment, regulatory and business practices, compliance with economic sanctions, laws and regulations, volatility in gross domestic product, economic and governmental instability, the potential for nationalization of private assets and the imposition of exchange controls. In addition, operating globally means the Company faces the challenges associated with coordinating its services across different countries, time zones and cultures.

Changes in the political and regulatory environment in the international markets in which we operate such as price or exchange controls could impact our revenue and profitability and could lead to penalties, sanctions and reputational damages if we are not compliant with those regulations. Political uncertainty and a lack of institutional continuity in some of the emerging, developing or other countries in which we operate could affect the orderly operation of markets in these economies. In addition, in countries with a large and complicated structure of government and administration, national, regional, local and other governmental bodies may issue inconsistent decisions and opinions that could increase our cost of regulatory compliance and/or have a material adverse effect on our business.

On June 23, 2016, the United Kingdom, or U.K., held a referendum, referred to as “Brexit”, in which voters approved an exit from the European Union (E.U). As a result of the referendum, the British government continues to negotiate the terms of the U.K.’s future relationship with the E.U. The terms of the exit continue to be unknown however it is possible that there will be greater restrictions on trade and the transfer of goods and other items (including lab

samples) between the U.K. and E.U. countries and increased regulatory complexities. At present, these changes are not expected to significantly affect our operations or financial results. Approximately 3% of our revenue is billed in Sterling. We currently employ approximately 700 people in the UK. The announcement of Brexit and continued uncertainty around the terms of exit is causing volatility in global stock markets and exchange rates. The fluctuation of currency exchange rates may expose us to gains and losses on non U.S. currency transactions.

Uncertainty of the legal environment in some emerging countries could also limit our ability to enforce our rights. In certain emerging and developing countries we enjoy less comprehensive protection for some of our rights, including intellectual property rights, which could undermine our competitive position.

If any of the above risks or similar risks associated with our international operations were to materialize, our results of operations and financial condition could be materially adversely affected.

We operate in many different jurisdictions and we could be adversely affected by violations of the Foreign Corrupt Practices Act of 1977 (FCPA), UK Bribery Act of 2010 and similar anti-corruption laws in other jurisdictions.

The FCPA, UK Bribery Act of 2010 and similar anti-corruption laws in other jurisdictions prohibit companies and their intermediaries from making improper payments for the purpose of obtaining or retaining business. In addition, the FCPA imposes certain books, records and accounting control obligations on public companies and other issuers. Our internal policies mandate compliance with these anti-corruption laws. We operate in many jurisdictions that have experienced corruption to some degree and in certain circumstances, anti-corruption laws have appeared to conflict with local customs and practices. Despite our training and compliance programs, we cannot assure that our internal control policies and procedures will protect us from acts in violation of anticorruption laws committed by persons associated with us and our continued expansion, including in developing countries, could increase such risk in the future. Violations of the FCPA, the U.K. Anti-Bribery Act of 2010 or other similar anti-corruption laws in other jurisdictions, or even allegations of such violations, could disrupt our business and result in a material adverse effect on our financial condition, results of operations, cash flows and reputation. For example, violations of anti-corruption laws can result in restatements of, or irregularities in, our financial statements as well as severe criminal or civil sanctions. In some cases, companies that violate the FCPA might be debarred by the U.S. government and/or lose their U.S. export privileges. In addition, U.S. or other governments may seek to hold us liable for successor liability FCPA violations or violations of other anticorruption laws committed by companies that we acquire or in which we invest. Changes in anti-corruption laws or enforcement priorities could also result in increased compliance requirements and related costs which could materially adversely affect our business, financial condition, results of operations and cash flows.

Current and proposed laws and regulations regarding the protection of personal data could result in increased risks of liability or increased costs to us or could limit our service offerings.

The confidentiality, collection, use and disclosure of personal data, including clinical trial patient-specific information, is subject to governmental regulation generally in the country that the personal data was collected or used. For example, United States federal regulations under the Health Insurance Portability and Accountability Act of 1996, or HIPAA, and as amended in 2014 by the Health Information Technology for Economic and Clinical Health (“HITECH”) Act, require individuals’ written authorization, in addition to any required informed consent, before Protected Health Information may be used for research. Such regulations specify standards for de-identifications and for limited data sets. We are both directly and indirectly affected by the privacy provisions surrounding individual authorizations because many investigators with whom we are involved in clinical trials are directly subject to them as a HIPAA “covered entity” and because we obtain identifiable health information from third parties that are subject to such regulations. As there are some instances where we are a HIPAA “business associate” of a “covered entity”, we can also be directly liable for mishandling protected health information. Under HIPAA’s enforcement scheme, we can be subject to up to $1.5 million in annual civil penalties for each HIPAA violation.

The European data protection framework was significantly revised in 2018 with the coming into force of the General Data Protection Regulation ('GDPR') containing new provisions specifically directed at the processing of health information, sanctions of up to 4% of worldwide gross revenue and extra-territoriality measures intended to bring non-EU companies under the proposed regulation. Post GDPR implementation we are receiving increased volumes and breadth of data protection/privacy queries from both sponsors and strategic alliance partners and anticipate that this will continue.

For the regulators in the European Union, or EU, personal data includes any information that relates to an identified or identifiable natural person with health information carrying special obligations, including obtaining the explicit consent from the individual for collection, use or disclosure of the information. EU regulations also apply to the personal data of EU data subjects traveling or living outside the EU. In addition, we are subject to EU rules with

respect to cross-border transfers of such data out of the EU. The United States, the EU and its member states and other countries where we have operations, such as Japan, South Korea, Malaysia, the Philippines, Russia and Singapore, continue to issue new privacy and data protection rules and regulations that relate to personal data and health information. Failure to comply with certain certification/registration and annual re-certification/registration provisions associated with these data protection and privacy regulations and rules in various jurisdictions, or to resolve any serious privacy complaints, could subject us to regulatory sanctions, criminal prosecution or civil liability. Federal, state and foreign governments are contemplating or have proposed or adopted additional legislation governing the collection, possession, use or dissemination of personal data, such as personal health information and personal financial data as well as security breach notification rules for loss or theft of such data. Additional legislation or regulation of this type might, among other things, require us to implement new security measures and processes or bring within the legislation or regulation de-identified health or other personal data, each of which may require substantial expenditures or limit our ability to offer some of our services. Additionally, if we violate applicable laws, regulations or duties relating to the use, privacy or security of personal data, we could be subject to civil liability or criminal prosecution, be forced to alter our business practices or suffer reputational harm.

The failure to comply with our government contracts or applicable laws and regulations could result in, among other things, fines or other liabilities, and changes in procurement regulations could adversely impact our business, results of operations or cash flows.

Revenues from our government customers are derived from sales to federal, state and local governmental departments and agencies through various contracts. Sales to public segment customers are highly regulated. Noncompliance with contract provisions, government procurement regulations or other applicable laws or regulations (including but not limited to the False Claims Act) could result in civil, criminal and administrative liability, including substantial monetary fines or damages, termination of government contracts or other public segment customer contracts, and suspension, debarment or ineligibility from doing business with the government and other customers in the public segment. In addition, generally contracts in the public segment are terminable at any time for convenience of the contracting agency or upon default. The effect of any of these possible actions by any governmental department or agency could adversely affect our business, results of operations or cash flows. In addition, the adoption of new or modified procurement regulations and other requirements may increase our compliance costs and reduce our gross margins, which could have a negative effect on our business, results of operations or cash flows.

Liability claims brought against us could result in payment of substantial damages, costs and liabilities and decrease our profitability.

Customer Claims
If we breach the terms of an agreement with a customer (for example if we fail to comply with the agreement, all applicable regulations or Good Clinical Practice) this could result in claims against us for substantial damages which could have a material adverse effect on our business. As we are a “people business” in that we provide staff to provide our services in hospitals and other sites, there is a risk that our management, quality and control structures fail to quickly detect a failure by one or more employees or contractors to comply with all applicable regulations and Good Clinical Practice and our internal requirements and standard operating procedures thereby exposing us to the risk of claims by customers.

Claims relating to Investigators
We contract with physicians who serve as investigators in conducting clinical trials to test new drugs on their patients. This testing creates the risk of liability for personal injury to or death of the patients. Although investigators are generally required by law to maintain their own liability insurance, we could be named in lawsuits and incur expenses arising from any professional malpractice or other actions brought against the investigators with whom we contract.

Indemnification from Customers
Indemnifications provided by our customers against the risk of liability for personal injury to or death of the patients arising from a study drug vary from customer to customer and from trial to trial and may not be sufficient in scope or amount, or our customer may not have the financial ability to fulfill their indemnification obligations. Furthermore, we would be liable for our own negligence and negligence of our employees which could lead to litigation from customers or action or enforcement by regulatory authorities.

Insurance
We maintain what we believe is an appropriate level of worldwide Professional Liability/Error and Omissions Insurance. In the future we may be unable to maintain or continue our current insurance coverage on the same or similar terms. If we are liable for a claim or settlement that is beyond the level of insurance coverage, we may be responsible for paying all or part of any award or settlement amount. Also, the insurance policies contain exclusions which mean that the policy will not respond or provide cover in certain circumstances.

Claims to Date

To date, we have not been subject to any liability claims that are expected to have a material effect on our business; however, there can be no assurance that we will not become subject to such claims in the future or that such claims will not have a material effect on our business.

Risk Related to Our Indebtedness

We have incurred debt, which could impair our flexibility and access to capital and adversely affect our financial position.

As of December 31, 2018 and December 31, 2017, we had an outstanding principal amount of indebtedness of $350 million under our $350 million Note Purchase and Guarantee Agreement or ‘Senior Notes’ that we entered into on December 15, 2015. The Senior Notes will mature on December 15, 2020. We also have up to $150 million of additional borrowing capacity available under the Revolving Credit Facility which was entered into with Citibank, JP Morgan, Santander, HSBC Bank and Morgan Stanley International on March 12, 2018. No amounts were drawn under the Revolving Credit Facility as of December 31, 2018. This

facility bears interest at LIBOR plus a margin. We are monitoring the phasing out of LIBOR currently scheduled for 2021. We have engaged with our lenders on the implications of the change. In the absence of an agreed new rate, documents continue to be negotiated using LIBOR. We will continue to engage with our lenders in respect of the requirement for a new rate and seek an amendment letter at that point.

The cost and availability of credit are subject to changes in the global or regional economic environment. If conditions in the major credit markets deteriorate our ability to obtain debt financing on favorable terms may be negatively affected. We may incur additional debt in the future. Our debt could have significant adverse consequences, including to:

- limit our ability to borrow additional funds for working capital, capital expenditures, acquisitions or other general business purposes;
- limit our ability to use our cash flow or obtain additional financing for future working capital, capital expenditures, acquisitions or other general business purposes;
- require us to use all or a portion of our cash flow from operations to make debt service payments;
- require us to sell certain assets;
- restrict us from making strategic investments, including acquisitions or cause us to make non-strategic divestitures;
- place us at a competitive disadvantage compared to our competitors that have less debt;
- cause us to incur substantial fees from time to time in connection with debt amendments or refinancing;
- limit our flexibility to plan for, or react to, changes in our business and industry; and
- increase our vulnerability to the impact of adverse economic and industry conditions.

Our ability to meet our debt service obligations will depend on our future performance, which will be subject to financial, business and other factors affecting our operations, many of which are beyond our control. If we do not have sufficient funds to meet our debt service obligations, we may be required to refinance or restructure all or part of our existing debt, sell assets, borrow more money or sell securities, none of which we can be assured that we would be able to do in a timely manner, or at all.

In addition, a failure to comply with the covenants under our indebtedness could result in an event of default under such indebtedness. In the event of an acceleration of amounts due under our existing indebtedness as a result of an event of default, we may not have sufficient funds or may be unable to arrange for additional financing to repay our indebtedness or to make any required accelerated payments.

In addition, we are required, under the terms of the Senior Notes, to offer to purchase all of the outstanding Senior Notes if we experience a change of control. Similar requirements exist in the Revolving Credit Facility. These provisions may delay or prevent a change in control that our stockholders may consider desirable.

Covenants in our credit agreements may restrict our business and operations and our financial condition and results of operations could be adversely affected if we do not comply with those covenants.

The Senior Notes and the Revolving Credit Facility credit agreements include certain customary covenants that limit our ability to, amongst other things, subject to certain exceptions:

- incur or assume liens or additional debt;
- dispose of assets;
- engage in mergers or reorganizations; or
- enter into certain types of transactions with affiliates.

The Senior Notes agreement also includes certain financial covenants that require us to comply with a consolidated leverage ratio, a minimum EBITDA to consolidated net interest charge ratio and a maximum amount of priority debt, each of which are defined

in the Note Purchase and Guarantee Agreement. Our ability to comply with these financial covenants may be affected by events beyond our control.

These covenants may limit our operating and financial flexibility and limit our ability to respond to changes in our business or competitive activities.

In the event that we fail to pay principal or interest when due on the Senior Notes, or as a result of a material breach of any representation, warranty or covenant or any other event of default then all outstanding amounts could become immediately due and payable. If, in such a circumstance, any of the holders of the Senior Notes, accelerate the repayment of such indebtedness, there can be no assurance that we will have sufficient assets to repay our indebtedness.

Interest rate fluctuations may materially adversely affect our results of operations and financial condition in the event that the Company draws down on either Revolving Credit Facility or in respect of any future issuances of debt.

The interest rate in respect of the Senior Notes is fixed at 3.64% for the five year term of the agreement. The Revolving Credit Facility bears interest at LIBOR plus a margin. There were no amounts drawn on either Revolving Credit Facility or the short term uncommitted facility at December 31, 2018. The Company is therefore subject to interest rate volatility in respect of any future draw down on the Revolving Credit Facility or in respect of any future issuances of debt.

Risk Related to Our Common Stock

Volatility in the market price of our common stock could lead to losses by investors.

The market price of our common stock has experienced volatility in the past and may experience volatility in the future which could lead to losses for investors. Factors impacting volatility in the market price of our common stock include, amongst others:

- general market and economic conditions;
- our results of operations;
- issuance of new or changed securities analysts’ reports or recommendations;
- developments impacting the industry or our competitors;
- introduction of new products or services by us or our competitors;
- the public's reaction to our press releases, our other public announcements and our filings with the SEC;
- guidance, if any, that we provide to the public, any changes in this guidance or failure to meet this guidance;
- changes in the credit rating of our debt;
- sale, or anticipated sale, of large blocks of our stock;
- additions or departures of key personnel;

- regulatory or political developments;
- litigation and governmental investigations;
- changing economic conditions; and
- exchange rate fluctuations.

In addition, stock markets have from time to time experienced significant price and volume fluctuations unrelated to the operating performance of particular companies. Future fluctuations in stock markets may lead to volatility in the market price of our common stock which could lead to losses by investors.

Item 4. Information on the Company.

History and development

ICON public limited company (“ICON plc”) is a clinical research organization (“CRO”), founded in Dublin in 1990, which provides outsourced development services on a global basis to the pharmaceutical, biotechnology and medical device industries. We specialize in the strategic development, management and analysis of programs that support all stages of the clinical development process - from compound selection to Phase I-IV clinical studies. The Company earns revenues by providing a number of different services to its customers. These services, which are integral elements of the clinical development process, include clinical trial management, consulting, contract staffing and laboratory services. The Company has the expertise and capability to conduct clinical trials in most major therapeutic areas on a global basis and has the operational flexibility to provide development services on a stand-alone basis or as part of an integrated “full service” solution. The Company has expanded predominately through organic growth, together with a number of strategic acquisitions to enhance its expertise and capabilities in certain areas of the clinical development process. The Company’s mission is to accelerate the development of drugs and devices that save lives and improve the quality of life. Our vision is to be the Global CRO partner of choice in drug development by delivering best in class information, solutions and performance in clinical and outcomes research.

We are a public limited company in Ireland and operate under the Companies Act of Ireland. Our principal executive office is located at: South County Business Park, Leopardstown, Dublin 18, Republic of Ireland. The contact telephone number of this office is +353 1 2912000. Our website is www.iconplc.com. Additionally, the SEC maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

We believe that we are one of a select group of CROs with the expertise and capability to conduct clinical trials in most major therapeutic areas on a global basis and have the operational flexibility to provide development services on a stand-alone basis or as part of an integrated “full service” solution. At December 31, 2018, we employed approximately 13,670 employees in 89 locations in 37 countries. During the year ended December 31, 2018, we derived approximately 34.5%, 55.7% and 9.8% of our revenue in the United States, Europe and Rest of World, respectively. See Note 19 Business Segment and Geographical Information.

On July 27, 2017, a subsidiary of the Company, ICON Clinical Research Limited acquired Mapi Développement SAS ('Mapi') and its subsidiaries ("Mapi Group"). Mapi Group has over 40 years of experience supporting Life-Science companies as the world leading Patient-Centered Research Company in commercializing novel treatments through Real-World Evidence, Strategic Regulatory Services, Pharmacovigilance, Market Access and Language Services. Mapi Group is the premier provider of Health Research and Commercialization services to Life-Science companies enabling Market Authorization, Market Access and Market Adoption of novel therapeutics. Cash outflows on acquisition were $145.8 million (see Note 4 of the Financial Statements at Item 19). The acquisition of Mapi Group strengthened ICON’s existing commercialization and outcomes research business adding significant commercialization presence, analytics, real world evidence generation and strategic regulatory services.

On September 15, 2016, a subsidiary of the Company, ICON US Holdings Inc. acquired ICON Government & Public Health Solutions, Inc. ("GPHS") (formerly Clinical Research Management, Inc. ("ClinicalRM")) which resulted in net cash outflows of $52.4 million (including certain payments made on behalf of GPHS totaling $9.2 million). GPHS is a full-service CRO specializing in preclinical through Phase IV support of clinical research and clinical trial services for biologics, drugs and devices. The organization helps customers progress their products to market faster, with a wide array of research, regulatory and sponsor services within the U.S. and around the globe. GPHS provide full service and functional research solutions to a broad range of U.S. government agencies and commercial customers. Their extensive expertise extends across basic and applied research, infectious diseases, vaccines development and testing

and the response to bio-threats. They have worked in collaboration with government and commercial customers to respond to the threat of global viral epidemics.

On December 15, 2015, the Company issued through its subsidiary ICON Investments Five Unlimited Company (the "Issuer") Senior Notes for aggregate gross proceeds of $350 million through a private placement. The Senior Notes will mature on December 15, 2020. Interest payable is fixed a 3.64% and is payable semi-annually on the Senior Notes on each June 15 and December 15, which commenced on June 15, 2016. The Senior Notes are guaranteed by ICON plc. The Senior Notes may be redeemed, at the Issuer's option, at any time prior to maturity, at par plus a make whole premium, together with accrued and unpaid interest, if any, to the redemption date. The terms of the notes are set forth in the Note Purchase and Guarantee Agreement, dated as of December 15, 2015, by and among the Issuer, ICON plc and the purchasers named therein (“Note Purchase and Guarantee Agreement”). The Issuer used the proceeds from the sale of the Senior Notes to repay the existing $350 million bridge facility. The Notes have not been and will not be registered under the Securities Act of 1933, as amended and may not be offered or sold in the United States absent registration or an applicable exemption from registration requirements.

Industry Overview

The CRO industry provides independent product development solutions and services for the pharmaceutical, biotechnology and medical device industries. Companies in these industries outsource services to CROs in order to manage the drug and device development process more efficiently and to bring both patent-protected bio-similars and medical devices to market faster to enhance patient well-being and maximize their return on investment. The CRO industry has evolved since the 1970s from a small number of companies that provided limited clinical development services to a larger number of CROs that offer a range of services that encompass the entire research and development process, including pre-clinical development, clinical trials management, clinical data management, study design, biostatistical analyses, post market surveillance, regulatory affairs, central laboratory and market access services. CROs are required to provide services in accordance with good clinical and laboratory practices, as governed by the applicable regulatory authorities.

The CRO industry is highly fragmented, consisting of several hundred small, limited-service providers, medium sized CROs and a small number of large CROs with global operations. Although there are few barriers to entry for small, specialist service providers, we believe there are significant barriers to becoming a CRO with global capabilities and expertise. These barriers include the infrastructure and experience necessary to serve the global demands of clients (sponsors), the ability to recruit sites and patients globally, the simultaneous management of complex clinical trials, the ability to offer customers a variety of delivery models, broad therapeutic expertise and the development and maintenance of the complex information technology systems required to integrate these capabilities. In recent years, the CRO industry has experienced consolidation, resulting in the emergence of a select group of CROs that have the capital, technical resources, integrated global capabilities, data and expertise to manage the development programs of pharmaceutical, biotechnology and medical device companies. We believe that large and medium sized pharmaceutical companies are selecting a limited number of CRO service providers with which they deal rather than utilizing many, in order to form strategic partnerships with global CROs in an effort to drive incremental development efficiencies and leverage the scientific and medical expertise. We believe that this trend will continue to concentrate the market share among the larger CROs with a track record of quality, speed, flexibility, responsiveness, global capabilities and access to patients and overall development experience and expertise.

New Drug Development – Ethical Pharmaceuticals and Biologics - An Overview

Before a new drug or biologic may be marketed, it must undergo extensive testing and regulatory review in order to determine that it is safe and effective. The following discussion primarily relates to the FDA approval process for such products. Similar procedures must be followed for product development with other global regulatory agencies. The stages of this development process are as follows:

Preclinical Research “In vitro” (test tube) and animal studies must be conducted in accordance with applicable regulations to establish the relative toxicity of the drug over a wide range of doses and to detect any potential to cause birth defects, affect vital organs, cause mutations or cancer. Many of these tests must be performed before a new investigational therapy can progress into human studies. If results warrant continuing development of the drug or biologic, the sponsor or owner of the asset will file for an Investigational New Drug Application, or IND, which must be approved by the FDA before starting the proposed clinical trials. However, preclinical studies will continue to be conducted in parallel with the clinical trials, some of which can take up to 3 years to complete.

Clinical Trials (approximately 3.5 to 7 years).

Exploratory Development

Phase I (approximately 6 months to 1 year) consists of basic safety and tolerability testing in small numbers of human subjects, initially in healthy volunteers, and includes studies which may show the drug is having an effect on the body, if it is safe, how it is affected by other drugs, where it goes in the body, how long it remains active and how it is broken down by and eliminated from the body. After single and multiple dose studies have been conducted, the asset can progress into Phase II, however, Phase I studies will continue to be done to help support the development of the asset in new populations such as children or the elderly.

Phase II (approximately 2 to 3 years) includes basic efficacy and dose-range testing in a limited patient population (usually) 100 to 200 patients to help provide preliminary safety and evidence that the drug is likely to be effective in the target disease. If the Phase II results are satisfactory the sponsor may decide to proceed to Phase III studies.

Confirmatory Development

Phase III (2 years or greater) consists of efficacy and safety studies in several hundred to a few thousand patients at multiple investigational sites (hospitals and clinics), often in multiple geographies. These studies look to definitively confirm the overall benefit of the agent and, if successful, will be used to provide the labelling claims for the drug. These studies can be placebo-controlled trials, in which the new drug is compared with a “sugar pill”, or studies comparing the new drug with one or more drugs with established safety and efficacy profiles in the same therapeutic indication.

FDA approval, through submission of an investigational new drug (IND) application, is necessary for all clinical trials, regardless of the phase of development. In addition, parallel independent committee approval is also required. NDA or BLA Preparation and Submission. Upon completion of Phase III trials, the sponsor assembles the statistically analyzed data from all phases of development into a single large submission along with the Chemistry, Manufacturing and Controls (CMC) and preclinical data and the proposed labeling into the New Drug Application (NDA), or Biologics License Application (BLA) and submits them for assessment and approval by the relevant division of the FDA.

Expanded Access Programs (EAPs), Sometimes a study drug may continue to be provided to subjects after completion of a clinical trial, also called compassionate use. EAPs refer to the regulated use of a study drug outside of a clinical trial by patients with serious or life-threatening conditions where there is no alternative therapy available. In this context the FDA may allow the sponsor to make the study drug available to a larger number of patients for treatment use.
FDA Review and Approval of NDA or BLA (1 to 1.5 years). Data from all phases of development is scrutinized to confirm that the applicant company has complied with all applicable regulations and that the benefit to risk ratio for the drug or biologic is positive for the specific use (or “indication”) under study. The FDA may refuse to accept the NDA or BLA if the application has administrative or content criteria which do not meet FDA standards. The FDA may also deny approval of the drug or biologic product if applicable regulatory requirements are not satisfied, if the drug has not adequately shown to be effective or there are safety concerns. Often a company will be required to conduct specific studies after the approval of a drug. These are called post approval commitments.

Post-Market Surveillance, Phase IV Studies and Health Outcomes. Once approved by the FDA, the FDA requires the drug or biologic license holder to collect and periodically report to the FDA additional safety (and perhaps efficacy) data on the drug or biologic for as long as the license holder markets it (post-market surveillance, including pharmacovigilance). If the product is marketed outside the U.S., these reports must include data from all countries in which the drug is sold. Additional studies (Phase III and Phase IV) may be undertaken after initial approval to find new uses for the drug, to test new dosage formulations, or to confirm selected non-clinical benefits, e.g., increased cost-effectiveness or improved quality of life. Additionally, FDA and other regulatory agencies are requiring license holders of drugs or biologics to prepare risk management plans which are aimed at assessing areas of product risk and actively managing such risks throughout the product lifecycle.

Key Trends Affecting the CRO Industry

CROs derive substantially all of their revenue from the research and development expenditures of pharmaceutical, biotechnology and medical device companies. Based on investment analyst research and our internal estimates, we estimate that development expenditures outsourced by pharmaceutical and biotechnology companies worldwide in 2018 was approximately $33 billion. We believe that the following trends create further growth opportunities for global CROs, although there is no assurance that growth will materialize.

Continued Innovation and Development of Enabling Technologies

Innovation Driving New Drug Development Activity.

New technologies together with improved understanding of disease pathology (driven by scientific advances such as the mapping of the human genome) have increased the number of new drug candidates being investigated in early development. This has greatly broadened the number of biological mechanisms being targeted which increasingly include rare/orphan diseases that currently have no effective treatments.

These developments should lead to increased activity in both Preclinical and Phase I development and in turn lead to more treatments in Phase II-III clinical trials. As the number of trials that need to be performed increases and these trials become focused in indications where finding suitable patients is increasingly challenging, we believe that drug developers will increasingly rely on

CROs to manage these trials to leverage their global expertise and to continue to focus their own competences on drug discovery and sales and marketing.

New Technology Enabling More Efficient Development.

Technology innovation is playing an increasing important role in helping to support more efficient drug development. The larger CROs have been at the forefront of this innovation developing technology solutions that support the integration of trial data across multiple systems; data repositories that enable sponsors to get real time clinical insights on their drugs performance and tools that support better trial designs and operation. These include;

- adaptive trial software, such as ICON's ADDPLAN software, which is part of the ICONIK Informatics Hub and is the market leader for design, simulation and analysis of adaptive clinical trials spanning Phases I to IV. ADDPLAN has been used by regulatory agencies (FDA, EMA (Europe) and PMDA (Japan)) to assess adaptive trial submissions;

- FLEX ADVANTAGE is our interactive response technology platform (accessible through the web and web-enabled mobile devices) for managing patient randomization, investigator sites and clinical suppliers;

- Data analysis from ICONIK Informatics Hub allows us to enhance the design and delivery of our projects, through stronger engagement with investigators and patients;

- PDx-Pop software is a graphical interface for NONMEM which has its own automation methodology which expedites the iterative process of population pharmacokinetic modeling and analysis;

- IMRA is a web based laboratory review application that allows global access to the latest laboratory data on a study - it facilitates detailed analysis of any trends, signals, alerts or patient specific data on a real-time basis.

The emergence of M-health technologies that build on the global prevalence of mobile and digital technologies also have an influence on drug development. It is now possible to capture health data using mobile devices and wearables. This enables sponsors to gather new clinical and "real-world" patient insights and will also be used to enhance patient engagement and adherence throughout the development process. As these devices mature it will also be possible to complete more "virtual trials" based on remote monitoring of patients in their home environment which may drive further efficiencies in the trial process.

Social media is also becoming an important platform for life sciences companies to strengthen patient engagement programs and collaborate with other stakeholders in the health care system. Many sufferers of specific diseases are forming patient groups and actively collaborating using social media. These groups represent an important potential source of patients for new clinical studies but can also provide valuable insights into effectiveness and safety of new treatments.

As the influence of technology on drug development grows, it broadens the potential number of partners that CROs will work with in the future.

Expanded use of new patient data sources.

Pharmaceutical companies are looking to access a variety of new health care data sources containing medical and prescribing records to help improve development programs and to get better evidence of the value their treatments are bringing to patients once they are launched in the market. The larger global CROs have significant data management experience which can be leveraged to support these efforts and have invested in analytics capabilities to help deliver better insights for customers during the product lifecycle. Global CROs are also forging collaborations to access

specific data sets that can provide further patient insights to support better matching of patients to the clinical trial process.

Improving Productivity and Operating Efficiencies

Continuing focus on Productivity within Research and Development Programs.

Pharmaceutical and biotechnology companies continue to seek ways to improve the productivity of their development efforts and increasingly see the use of CROs as a strategic component of these efforts. They are leveraging the expertise with CROs to help identify the most promising drug candidates in early development and discontinue developing those that have safety issues, limited efficacy or that will have significant reimbursement challenges. These companies are also initiating programs to drive more efficiency in their development programs. One example of this has been the efforts to achieve a more seamless transition across development phases, particularly Phase I-III. In parallel, regulatory initiatives such as the 21st Century Cures Act and the emergence

of clinical trial techniques such as adaptive trial design and risk based clinical trial monitoring are enhancing development, allowing effective treatments to get to patients quicker at reduced development costs.

Cost Containment Pressures.

Over the past several years, drug companies have sought more efficient ways of conducting business due to margin pressures stemming from patent expirations, greater acceptance of generic drugs, pricing pressures caused by the impact of managed care, purchasing alliances and regulatory consideration of the economic benefit of new drugs. Consequently, drug companies are centralizing research and development, streamlining their internal structures and outsourcing certain functions to CROs, thereby converting previously fixed costs to variable costs. Larger companies (and more recently medium sized companies) are actively entering strategic partnerships with a limited number of CROs in an effort to drive increased efficiencies. The CRO industry and in particular large CROs with global capabilities, considerable scientific knowledge and expertise are often able to perform the needed services with greater focus and at a lower cost than the client could perform internally, although CRO companies themselves are facing increased cost containment pressures as drug companies seek to further reduce their cost base.

Global trends influencing the CRO industry

Pressure to Accelerate Time to Markets and Globalization of the Marketplace.

Reducing product development time maximizes the client's potential period of patent exclusivity, which in turn maximizes potential economic returns. We believe that clients are increasingly using CROs that have the appropriate expertise and innovation to improve the speed of product development to assist them in improving economic returns. In addition, applying for regulatory approval in multiple markets and for multiple indications simultaneously, rather than sequentially, reduces product development time and thereby maximizes economic returns. We believe that CROs with global capabilities, considerable knowledge and experience in a broad range of therapeutic areas are key resources to support a global regulatory approval strategy. Alongside this, the increasing need to access pools of new patients is leading to the conduct of clinical trials in new "emerging regions" such as Eastern Europe, Latin America, Asia-Pacific and South America. We believe that having access to both traditional and emerging clinical research markets gives global CROs a competitive advantage.

Growth within the Biotechnology Sector.

The nature of the drugs being developed is continuing to change. Biotechnology is enabling the development of targeted drugs with diagnostic tests to determine whether a drug will be effective given a patient's genomic profile. An increasing proportion of research and development ("R&D") expenditure is being spent on the development of highly technical drugs to treat very specific therapeutic areas in areas of unmet medical need. Much of this discovery expertise is found in biotechnology firms. We believe that it is to these organizations that the large pharmaceutical companies will look for an increasing proportion of their new drug pipelines. Whether it is through licensing agreements, joint ventures or equity investment, we believe we may see the emergence of more strategic relationships between small discovery firms and the larger pharmaceutical groups. As the majority of these biotechnology companies do not have a clinical development infrastructure, we believe that the services offered by CROs will continue to be in demand from such companies providing they have the necessary funding.

Increasing Number of Large Long-Term Studies and an increasing requirement to show the Economic Value of New Treatments.

We believe that to establish competitive claims and demonstrate product value, to obtain reimbursement authorization from bodies such as the National Institute for Health and Clinical Excellence in the UK, and to encourage drug

prescription by physicians in some large and competitive categories, more clients need to conduct outcome studies to demonstrate, for example, that mortality rates are reduced by certain drugs. To verify such outcomes, very large patient numbers are required and they must be monitored over long time periods. We believe that as these types of studies increase there will be a commensurate increase in demand for the services of CROs who have the ability to quickly assemble large patient populations, globally if necessary, and manage this complex process throughout its duration.

The rising costs of health care in most developed countries also means there is an increasing pressure to show that new medical treatments are more cost effective and deliver better patient outcomes than existing treatments regimes. This also means that sponsors need to increasingly generate outcomes data both as part of the product approval submissions and as part of post-approval research programs. This is creating opportunities for CROs who can offer support in developing and interpreting this data.

A Focus on Long-term Product Safety.

The clinical trial approval process can only detect major and common adverse side effects of drugs; less common but no less serious side effects may only become apparent after many years of use. As a result, there is an increase in the number of drugs given “conditional approvals” where further ‘post-approval’ studies are being mandated. In addition, prudent sponsors undertake similar studies to detect early warning signs of any potential problems with their products. Such studies may take the form of prospective long-term safety studies, simpler observational studies or registries where patients meeting specific criteria for disease or drug use are followed for long periods to detect any safety issues. CROs are well positioned to perform these studies on behalf of sponsors.

Increasing Regulatory Demands.

Regulatory agencies are requiring more data to support new drug approvals and are seeking more evidence that new drugs are safer and more effective than existing products. As a result, the complexity of clinical trials, the number of procedures required to be conducted in these trials and the size of regulatory submissions are driving the demand for services provided by CROs.

The ICON Strategy

ICON’s mission is to accelerate the development of drugs and devices that save lives and improve the quality of life. Our vision is to be the global CRO partner of choice in drug development by delivering best in class information, solutions and performance.

We have achieved strong growth since our foundation in 1990. The impact of the International Conference on Harmonization Good Clinical Practice, the resulting globalization of clinical research and the acceleration in the understanding of human and molecular biology which has led to many new treatment paths being explored were key catalysts of our early growth.

As our market has evolved, biopharmaceutical companies are tackling productivity challenges, increasing budget constraints and greater demands to demonstrate product value; all of which are placing increased pressure on their revenues and levels of profitability. However these trends have generally been positive for CROs, as increased outsourcing has been adopted by these companies as they seek to create greater efficiencies in their development processes, convert previously fixed costs to variable, and accelerate time to market for new treatments.

One consequence of the drive to accelerate time to market will be increased emphasis on making existing drug development phases more seamless, through the use of techniques such as adaptive trial designs to filter the most promising compounds and test these in parallel in several therapeutic indications or with other drug combinations.

Regulatory and reimbursement pressures will increase the emphasis on late stage (post marketing) research, while increasing requirements to demonstrate the economic value of new treatments. As a result, outcomes and comparative effectiveness research will most likely be required in order to secure on-going product reimbursement. Furthermore, we believe advances in molecular biology and genetics will drive further growth in innovation in the long term which in turn should create further growth opportunities for both biopharma companies and their outsource development partners.

We expect the increased adoption of outsourcing will be a core strategy of clients in the near term as they respond to the increased pressures on their revenues and profitability. Larger clients were the first to form strategic partnerships with global CROs in an effort to reduce the number of outsource partners with whom they engage and to reduce inefficiencies in their current drug development models. More recently we have seen the increasing adoption of this

partner model with mid-tier pharmaceutical and biotechnology firms as they also seek to drive development efficiencies. As outsourcing penetration increases, we believe clients may seek a greater level of integration of service offerings from CROs, although some will continue to purchase services on a stand-alone basis. Creating greater connectivity and “seamlessness” between our services and the sharing of “real-time” clinical, operational and “real world” data with clients will therefore become increasingly important for CROs. ICON will seek to benefit from this increased outsourcing by clients to grow our business by increasing market share with our existing client base and adding new clients within the Phase I-IV outsourced development services market; the aim being to ensure we will be considered for all major Phase I-IV projects.

Our strategy to achieve these objectives is focused on the following areas:

Partnerships, Customers and Markets

We continue to focus on expanding and deepening our partnerships with existing customers, while also developing new customer relationships.

Strategic client relationships will increasingly manifest themselves in many different forms. Many of these relationships will require innovative forms of collaboration across ICON service areas and departments and will therefore require increased flexibility to offer services on both a standalone functional basis and as part of a fully integrated service solution. To support this objective, we continue to evolve our collaboration and delivery models, invest in technology that will enable closer data integration across our service areas and enhance our project and program management capabilities.

We continue to enhance our capabilities through both organic service development and targeted acquisitions, to meet the evolving needs of both existing and new clients. In 2017 we acquired the Mapi Group, a leading Patient-Centered Health Outcomes Research and Commercialization company. This acquisition strengthened ICON's existing Commercialization and Outcomes Research business adding significant commercialization presence, analytics, real world evidence generation and strategic regulatory expertise. The combined organization will be a leader for real world evidence, post approval research, language services, consultancy services supporting clinical outcomes assessments, pricing and market access and scientific communications.
We continue to target growth in under-penetrated CRO market segments, outsourcing penetration within Medical Device companies has lagged that of bio-pharma firms but is beginning to accelerate. EU Regulatory reform enacted in 2017 is a further catalyst to growth in this segment as it included stricter requirements to perform clinical evaluations and post sale surveillance. ICON is well positioned in this market having acquired strong device development capabilities in the acquisition of Aptiv Solutions in 2014. We continue to expand our presence in regions such as Asia-Pacific, in particular in China and Japan, building on our acquisition of Niphix, the Japanese subsidiary of Aptiv Solutions, in 2014 and BeijingWits Medical Limited, a leading Chinese CRO, in 2012.

Operational Excellence and Quality

We continue to enhance our operating processes and delivery models to gain competitive advantage.

Our proprietary ICONIK platform, which integrates clinical data across multiple systems allows us to access clinical and real world data to enhance protocol design, profile match patients to trials. It also facilitates collection of real-time data during the trial process enabling better decision making and project execution. The platform uses data and evidence based research to develop solutions that engage investigators and patients more effectively to improve patient recruitment and retention.

ADDPLAN is part of the ICONIK Informatics Hub. The software provides industry leading statistical design, simulation and analysis for adaptive clinical trials, from phase I to IV and helps our customers identify the most promising drug candidates earlier in the development process and in parallel test these across several therapeutic indications and with other drug combinations.

Finding and engaging suitable patients to conduct clinical trials is one of the biggest issues facing drug development industry today. Less than 1% of the US population participates in clinical trials and the performance of investigative sites that do take part in research is uneven, hard to predict and many trials do not meet the initial recruitment goals. The current market challenge in patient enrollment creates an opportunity for ICON to differentiate its service offering and we are working to reduce patient recruitment times through enhanced site and investigator selection based on key performance metrics and through use of our proprietary Firecrest technology which is used to train and support sites during the development process. Our PMG site network alliances enhanced our ability to enroll patients onto the clinical studies we perform. We have also developed strategic alliances with investigator site groups and health care systems in all major global research markets. In partnership with others we are pioneering patient recruitment solutions that leverage cognitive computing to transform clinical trial matching and allow a data-driven approach to deliver the right patients for trials.

Quality project execution underpins all that we do and we have an ongoing focus on developing our people and processes to continue to enhance our service delivery. We are also deploying supporting technologies which we believe will enable faster and deeper insights into the quality of trial data.

We are focused on operational excellence across our support functions and we operate a global business support infrastructure across functions including finance, information technology, facilities, human resources and legal. This is enabling us to enhance the service levels across these support areas whilst driving down the costs of this service provision.

Talent, Leadership Development and Culture

At the core of our strategy is our people. Within ICON we have highly qualified and experienced teams, the majority of whom have third level educational qualifications. The need to develop and retain this expertise and talent within the organization is fundamental in enabling us to be the global CRO partner of choice for our customers. We have invested in creating an innovative learning environment delivered through ICON's training and development group, who have formed an industry leading collaboration with University College Dublin. This enables ICON to provide customized management and development programs

for global employees. These programs are focused on leadership development for those people management roles and specific technical training in competencies that are core to our business, such as project and program management and clinical research associate development. We continue to invest to refine and develop these programs.

Within our training program we have also created a Clinical Research Academy and a unique Graduate Certificate in Clinical Trial Management which is enhancing the quality of graduate training in clinical research and increasing the pool of talent available to ICON that can support our customers' drug development programs.

Our learning and development programs are complemented by advanced people development practices which incorporate rigorous, analytics based screening in the hiring process, global career frameworks, pay for performance aligned to our strategy, and on-going talent review and succession planning.

Our leadership and talent programs contribute to the enhanced retention of our employees, better project deliverables for our customers and the enhanced financial performance of the business.

Our investment in people was reflected by our inclusion in 2018 for the second consecutive year, by Forbes in their list of the best employers in America. ICON was ranked the top CRO and amongst the top 10 employers in the Drugs and Biotechnology industry overall.

Enhance Capabilities & Expertise

To meet the evolving needs of our clients we continue to enhance our capabilities through both organic service development and targeted acquisitions. During 2018, we continued to enhance our scientific and therapeutic expertise to support our customers in specific areas including Oncology, Orphan and Rare Diseases, CNS, Dermatology, Infectious Disease and Womens Health.

We have continued to invest in building our capabilities in the gathering, analysis and application of real world patient data within both the clinical trial and post-trial observational study environments. Alongside expanding internal capabilities, we continue to develop innovative partnerships with providers of real world data including EHR4CR and Trinetx. During 2018, we signed an agreement with Intel to deploy the Intel® Pharma Analytics Platform for use in clinical trials. The Intel platform is an artificial intelligence solution that enables remote monitoring and continuous capture of clinical data from study subjects using sensors and wearable devices and can apply machine learning techniques to objectively measure symptoms and quantify the impact of new therapies.

We continued to enhance our site and patient recruitment capabilities during 2018 with the expansion of the PMG Research network through a partnership with the Du Page Medical Group. DuPage is the largest independent, multi-specialty physician group in the Chicagoland area with access to more than 700 physicians in over 50 clinical specialties ranging from primary to specialty care in areas such as cardiology and oncology. Through this agreement PMG assumed the research infrastructure at DuPage providing expanded investigator and patient access and bringing clinical research as a care option to the communities served.

Applied Innovation

ICON is focused on applying innovation that can help our customers improve their development outcomes. We are focusing this innovation in three critical areas; improving clinical trial design and execution; faster and more predictable patient recruitment; and evolving clinical trials to be more patient centric which includes data collection and analysis directly from patient's digital devices. Our approach to developing solutions to these challenges incorporates partnering with best in class technology providers but is also supported by a suite of differentiated ICON proprietary technologies.

Our ICONIK platform is a web-based information platform that facilitates the management, reporting, analysis and visualization of all data relating to drug development, and supports our risk based monitoring solution. This solution allows monitoring resources to be directed at specific sites based on real-time data analysis which can significantly reduce monitoring costs for clients.

Firecrest; ICON's proprietary comprehensive site performance management system, is a web-based solution which enables accurate study information, including protocol information, training manuals and case report forms, to be rolled out quickly and simultaneously to investigative sites. It allows site behavior to be tracked to ensure training is understood, procedures are being followed and that timelines and study parameters are met. It can significantly reduce the number of data queries originated from investigator sites.

Our ADDPLAN software offers a leading statistical design, simulation and analysis software for adaptive clinical trials and helps our customers identify the most promising drug candidates earlier. ADDPLAN is used by FDA, EMA and Japan's PMDA, as well

as over fifty top pharmaceutical and medical device companies and academic researchers (see Information Systems on page 27 for further information).

Alongside the application of these technology solutions we are also focused on innovation through the redesign and where appropriate the automation of current clinical trial processes.

Services

ICON is a global provider of drug development solutions and services to the pharmaceutical, biotechnology and medical device industries. These solutions span the Clinical Development lifecycle from compound selection to Phase I-III clinical studies and post approval outcome research and market access consulting solutions.

We offer a broad range of specialized services to assist pharmaceutical, biotechnology and medical device companies to bring new drugs and devices to market faster. Our services span the entire lifecycle of product development and can be adapted to suit local trials or large global programs. Specific clinical development services offered to biopharmaceutical and medical device companies include:

- Product Development Planning;
- Strategic Consulting;
- Study Protocol Preparation;
- Clinical Pharmacology;
- Pharmacokinetic and Pharmacodynamic Analysis;
- Site Feasibility - EMR & Data Analytics ICON owned Site Networks;
- Patient Recruitment & Retention;
- Digital Patient and Site Solutions - FIRECREST;
- Project Management;
- Clinical Operations /Monitoring;
- Patient Centric Monitoring;
- Data Management;
- Adaptive Trials -ADDPLAN;
- Virtual Trials;
- Medical Imaging;
- Biostatistics;

- Medical Affairs;
- Pharmacovigilance;
- Strategic Regulatory Services;
- Electronic Endpoint Adjudication;
- Medical Writing and Publishing;

- Interactive Response Technologies;
- Functional Solutions;
- Research Trials for US Government Agencies;
- Strategic Resourcing Central Laboratories;
- Bioanalytical Laboratories;
- Biomarket Development;
- Real World Strategy & Analytics;
- Real World & Late Phase Research;
- Access, Commercialization & Communications;
- Patient Centered Sciences and;
- Medical Device & Diagnostics Research.

Sales and Marketing

Our marketing strategy is focused on building a differentiated brand position for ICON and supporting our business development efforts to develop and build relationships with pharmaceutical, biotechnology, medical device, and government and public health organizations. Our marketing activities are coordinated centrally to ensure a consistent and differentiated market positioning for ICON and to ensure all marketing efforts align to the overall strategic objectives of the business. Our business development teams are located throughout the Americas, Europe and Asia Pacific regions. Business development activities are carried out by account executives with assigned territories and global account directors supporting our large accounts. Specialized business development teams focus on growing each of our business areas. Collectively, our business development team, senior executives and project team leaders share responsibility for the maintenance of key client relationships. Our aim is to develop deeper relationships within our client base in order to gain repeat business and give us opportunities to penetrate into other therapeutic indications and adjacent service lines.

Competition

The CRO industry is fragmented, consisting of many small, niche service providers, a declining number of medium-sized providers and a smaller number of large CROs, including ICON, that are differentiated by the scale of their global operations, breadth of service portfolios and supporting technology infrastructure. The need to conduct complex research and access patients on a global basis is driving market share to these global CROs. When competing for large development programmes, ICON competes primarily with IQVIA, PAREXEL, Pharmaceutical Product Development ('PPD'), the Covance Drug Development business of LabCorp, PRA Health Sciences and Syneos Health. In some specific markets, for example biotech and mid-tier pharma, ICON may also compete against mid-tier CROs including Medpace.

CROs generally compete on the basis of previous product experience, the ability to recruit patients on a global basis, the depth of therapeutic and scientific expertise, the strength of project teams, price and increasingly on the ability to

apply new innovation that can drive significant time and cost savings throughout the development process. An evolving area of competition is the need to provide services that can help generate the evidence of the economic value of new treatments that payers and regulators require. This requires access to new data sources which includes information to support the identification of suitable investigator sites and patient populations as well as data on the value delivered by new products following marketing approval.

We believe that we compete favorably in all these areas and we continue to invest in our capabilities to ensure that we remain competitive in the future.

Customers

During the year ended December 31, 2018 revenue was earned from over 800 clients. During the year ended December 31, 2018 39.5% of our revenues were derived from our top five customers, with one customer contributing more than 10% of our revenues during the period (13.6%). No other customer contributed more than 10% of our revenues (including revenue from reimbursable expenses) during this period. During the year ended December 31, 2017 42.0% of our revenues were derived from our top five customers, with one customer contributing more than 10% of our revenues (including revenue from reimbursable expenses) during the period (21.0%). No other customer contributed more than 10% of our revenues (including revenue from reimbursable expenses) during this period. See note 16 Disaggregation of Revenue.

During the year ended December 31, 2016 45% of our net revenues (excluding reimbursable expenses) were derived from our top five customers, with one customer individually contributing more than 10% of our net revenues during the period (26%). No other customer contributed more than 10% of our net revenues during this period.

The loss of, or a significant decrease in business from one or more of these key customers could have a material adverse impact on our results of operations.

Unsatisfied performance obligation

Our unsatisfied performance obligation consists of contracted revenue yet to be earned from projects awarded by clients. At December 31, 2018 we had contracted unsatisfied performance obligations of $5.3 billion (see note 17 Contract Balances). We believe that our backlog as of any date is not necessarily a meaningful predictor of future results due to the potential for cancellation or delay of the projects included in the backlog, and no assurances can be given on the extent to which we will be able to realize this backlog as net revenue.

Information Systems

Having access to accurate and timely information is critical in the management, delivery and quality of all aspects of drug development. To enable this ICON has developed an Informatics strategy built around ICONIK, a web-based information platform that enables the management, reporting, analysis and visualization of all data relating to drug development. ICONIK collects, manages and standardizes study data from multiple sources, including Electronic Data Capture (EDC), patient diaries, central laboratories and imaging, to provide a single view of study information. ICONIK enables ICON to deliver new services such as ICONIK monitoring which uses near-real time clinical data to drive monitoring visit schedules thereby reducing overall cost and time to market.

In addition to managing clinical data, ICONIK collects operational data, such as project management, clinical trials management system (CTMS) and metric information to drive trial efficiency and transparency. Investigator data, such as payments, site details and performance, can also be incorporated. ICONIK can be accessed via a portal that allows clients access to study related information via a secure web based environment.

Firecrest, our site management and training technology, is another important component of our Informatics strategy. Firecrest provides an on-line web-based portal to access visit by visit study guides which drive site performance and quality.

ICON also utilizes a range of enterprise applications that enable the delivery of our business services in a global environment. The focus is to provide ease of access and capture of study information for our staff and clients globally. Our current information systems are built on open standards and leading commercial business applications from vendors including Microsoft, Amazon, Oracle, Dell, SAS and Medidata. IT expenditure is authorized by strict IT

governance policies requiring senior level approval of all strategic IT expenditure based on defined, measurable business benefits.

In Clinical Operations, we have deployed a suite of software applications that assist in the management and tracking of our clinical trial activities. These software applications are both internally developed and commercially available applications from external vendors. These include a clinical trial management application that tracks all relevant data in a trial and automates all management and reporting processes. In our Data Management function, we have deployed leading clinical data management solutions including EDC and Clinical Data Warehouse solutions from external vendors. This allows us to guarantee the integrity of client data and provide consolidated information across client studies. In our clinical trials management area Firecrest Clinical provides a comprehensive site performance management system that improves compliance, consistency and execution of activities at investigative sites. The web-based solution enables accurate study information, including protocol information, training manuals and case report forms, to be rolled out quickly and simultaneously to sites. Site behaviour can then be tracked to ensure training

is understood, procedures are being followed, timelines are met and study parameters are maintained. As well as meeting day to day operational requirements, these systems are feeder systems into the ICONIK platform.

We have also developed an interactive response technology (IXR) system which provides features such as centralized patient randomization, drug inventory management, patient diary collection and provides our clients with a fully flexible data retrieval solution which can be utilized via telephone, internet browser or a mobile device. In our central laboratory business, we utilize a comprehensive suite of software, including a laboratory information management system (LIMS), a kit / sample management system and a web interface system to allow clients to review results online. Our Laboratory also utilizes (IMRA) a web based laboratory application to facilitate detailed analysis of any potential trends, signal or alerts in Laboratory data. ICON provides imaging services through the use of it internally developed MIRA platform and also utilizes Medidata's Rave Commercial Imaging for collecting, managing and processing data to support its imaging capabilities.

ICON supports Population Pharmacokinetics & Pharmacokinetic Pharmacodynamic modeling though the use of its proprietary software NONMEM®. NONMEM® can also be accompanied with PDx-Pop proprietary software to provide graphical interfaces.

All of the Company's global finance operations utilize Oracle's eBusiness suite to serve the organization's financial and project accounting requirements. Workday is used to fulfill our HR people management requirements.

The Company's strategy of using technology to enhance our global processes can be seen from our deployment of platforms like ICONIK Metrics Stream EDMS/QMS our global SOP Document Management system, our Web-based training delivery solution, iLearn, workflow and automation platforms such as ServiceNow, Sailpoint for identity management and governance and Pega & Argus for pharmacovigilance. The Electronic Trial Master File is delivered via ICON's proprietary software ICOMaster or the Wingspan software platform. Our business development and contracting teams use Salesforce.

Our IT systems are operated from two Data Centre hubs in Dublin, Ireland and Philadelphia, Pennsylvania. These hubs reside within purpose built Data Centre facility locations. Other offices are linked to these hubs through a network managed by Verizon, a tier one global telecommunications provider. This network provides global connectivity for our applications and allows collaboration and communication using tools like Cisco Jabber, WebEx, Sharepoint and Box. Mobile staff can also access all systems via secure remote access facilities. A global corporate intranet portal provides access to all authorized data and applications for our internal staff as well as providing an internal platform for company-wide communication. IT systems are protected with robust information security controls which are independently audited twice annually as part of maintaining ICON's ISO27001:2013 certification.

Following the acquisition of Aptiv Solutions we have integrated and continue to enhance three new technology platforms into the ICON offerings. These comprise ADDPLAN for simulation and design of exploratory/pilot and confirmatory/ pivotal adaptive clinical trials (ADDPLAN® DF (Dose Finder), ADDPLAN® Base, ADDPLAN® MC (Multiple Comparison) and ADDPLAN® PE (Population Enrichment)); AptivAdvantage which is an integrated platform comprising EDC, randomization and drug supply management specifically created for execution of adaptive clinical trials and used to deliver risk-based monitoring; and Aptiv Insite which is a novel approach to risk-based monitoring, using Verification by Statistical Sampling (VSS) to manage data quality and site related risks. ICON utilizes PUBSHUB to automate medical and scientific communications and publications management.

Contractual Arrangements

We are generally awarded projects based upon our responses to requests for proposals received from companies in the pharmaceutical, biotechnology and medical device industries, or work orders executed under our strategic partnership

agreements.

Revenues on long term contracts are recognized based on an assessment of progress towards completion. Payment terms usually provide either for payments based on the delivery of certain identified milestones, units delivered or monthly payments, according to a contracted payment schedule over the life of the contract. Where clients request changes in the scope of a trial or in the services to be provided by us, a change order or amendment is issued which may result either in an increase or decrease in the contract value. We also contract on a "fee-for-service" or "time and materials" basis.

Contract periods may range from several weeks to several years depending on the nature of the work to be performed. In most cases, an upfront portion of the contract fee is paid at the time the study or trial is started. The balance of the contract fee is generally payable in installments over the study or trial duration and may be based on the completion of certain performance targets or "milestones", on units delivered, or on a fixed monthly payment schedule. For instance, installment payments may be based on patient enrollment dates or delivery of the database.

On adoption of ASC 606 'Revenue from Contracts with Customers', we concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical trial. The progress towards completion for clinical service contracts is measured based on total project costs (direct fees are therefore inclusive of third party costs). Gross revenue or 'revenue' is therefore our primary measure of performance on adoption of ASC 606 and in presentation of our results for the year ended December 31, 2018. In common with others in the sector, our results previously separately identified that revenue stream which related to services provided by third parties. Those services were previously separately identified as reimbursable expenses and presented separately in our Statement of Operations. Reimbursable expenses include payments to investigators, travel and accommodation costs and various other expenses incurred over the course of the clinical trial which are fully reimbursable by the client. Reimbursable expenses are included within direct costs on adoption of ASC 606. See note 26 for impact of new accounting policy. Reimbursable expenses are included within the contract and are invoiced on a monthly basis based on actual expenses incurred. Expenses incurred are determined by reference to activity.

As the currency in which contracts are priced can be different from the currencies in which costs relating to those contracts are incurred, we usually negotiate currency fluctuation clauses in our contracts which allow for price adjustments if changes in the relative value of those currencies exceed predetermined tolerances.

Most of our contracts are terminable immediately by the client with justifiable cause or with 30 to 90 days’ notice without cause. In the event of termination, we are usually entitled to all sums owed for work performed and expenses incurred through the notice of termination and certain costs associated with termination of the study. Termination or delay in the performance of a contract occurs for various reasons, including, but not limited to, unexpected or undesired results, production problems resulting in shortages of the drug, adverse patient reactions to the drug, the client's decision to de-emphasize a particular trial, inadequate patient enrollment or investigator recruitment.

Government Regulation

Regulation of Clinical Trials

The clinical investigation of new drugs is highly regulated by government agencies. The standard for the conduct of clinical research and development studies is Good Clinical Practice (“GCP”), which stipulates procedures designed to ensure the quality and integrity of data obtained from clinical testing and to protect the rights and safety of clinical subjects.

The FDA and other prominent regulators have promulgated regulations and guidelines that pertain to applications to initiate trials of products, the approval and conduct of studies, report and record retention, informed consent, applications for the approval of drugs and post-marketing requirements. Pursuant to these regulations and guidelines, service providers that assume the obligations of a drug sponsor are required to comply with applicable regulations and are subject to regulatory action for failure to comply with such regulations and guidelines. In the United States and Europe, the trend has been in the direction of increased regulation and enforcement by the applicable regulatory authority.

In providing services in the United States, we are obligated to comply with FDA requirements governing such activities. These include ensuring that the study is approved by an appropriate Independent Review Board (“IRB”) and Ethics Committee, obtaining patient informed consents, verifying qualifications of investigators, reporting patients’ adverse reactions to drugs and maintaining thorough and accurate records. We must maintain critical documents for each study for specified periods, and such documents may be reviewed by the study sponsor and the FDA.

The services we provide outside the United States are ultimately subject to similar regulation by the relevant regulatory authority. In addition, our activities in Europe are affected by the European Medicines Agency.

We must retain records for each study for specified periods for inspection by the client and by the applicable regulatory authority during audits. If we fail to comply adequately with applicable regulations and guidelines, it could result in a material adverse effect. In addition, our failure to comply with applicable regulations and guidelines, depending on the extent of the failure, could result in fines, debarment, termination or suspension of ongoing research,

the disqualification of data or litigation by clients, any of which could also result in a material adverse effect.

Potential Liability and Insurance

The nature of our business exposes us to potential liability including, but not limited to, potential liability for (i) breach of contract or negligence claims by our customers; (ii) non-compliance with regulatory or legal obligations including, but not limited to, anti-bribery and anti-corruption laws; (iii) third party (such as patients) claims in respect of our performance of services.

In addition, although we do not believe we are legally responsible for acts of third party investigators (physicians running trials), we could be subject to claims arising as a result of the actions of these investigators.

We try to reduce this potential liability by:

- Seeking contractual indemnification from customers in relation to certain activities. However, the terms and scope of indemnification varies from customer to customer and project to project and the performance of these indemnities is not secured. As a result, we bear the risk that indemnification may not be relevant or sufficient or that the indemnifying party may not have the financial ability to fulfill its indemnification obligations. Furthermore this indemnification does not protect us against our own acts or omissions such as our negligence or where our performance does not reach the required contractual, industry or regulatory standard.

- Maintaining worldwide professional liability insurance. While we believe our insurance coverage is adequate, there is no guarantee that we will continue to be able to maintain such insurance coverage on terms acceptable to us, if at all, or that the relevant policy will respond and provide cover when we want it to.

We could be materially adversely affected if ICON is required to pay damages or bear the costs of defending or settling any claim outside the scope of or in excess of a contractual indemnification provision, an indemnifying party does not fulfill its indemnification obligations, the claim is in excess of level of our insurance coverage or the relevant circumstances are not covered by our insurance policies.

Description of Property

Our principal executive offices are located in South County Business Park, Leopardstown, Dublin, Republic of Ireland, where we own an office facility of approximately 15,000 square meters. We lease all other properties.

We maintain thirty-two offices in North America; twenty-eight in the United States, three in Canada and one in Mexico. We maintain twenty-nine in Europe; five of our offices in the UK, three each in Germany and France, two each in Italy, Ireland, Spain, and the Netherlands and one in each of Belgium, the Czech Republic, Hungary, Israel, Latvia, Poland, Romania, Sweden, Turkey and the Ukraine. We have twenty offices in Asia; six offices in China (including one in Hong Kong), four in India, three in Japan, two in Singapore, one in each of The Philippines, Russia, South Korea, Taiwan and Thailand. We have one office in Australia and one in New Zealand. We have five offices in South America; one in each of Argentina, Brazil, Chile, Colombia and Peru. We maintain one office in South Africa.

Organizational Structure

Details of the Company’s significant subsidiaries or entities under the Company's control at December 31, 2018 are as follows:

Company	Country	Group ownership
ICON Clinical Research, S.A.	Argentina	100%
ICON Clinical Research PTY Limited	Australia	100%
ICON Clinical Research Austria GmbH	Austria	100%
DOCS International Belgium N.V.	Belgium	100%

ICON Pesquisas Clínicas LTDA.	Brazil	100%
ICON Clinical Research EOOD	Bulgaria	100%
ICON Clinical Research (Canada) Inc.	Canada	100%
Mapi Life Sciences Canada Inc.	Canada	100%

Company	Country	Group ownership
Oxford Outcomes LTD	Canada	100%
ICON Chile Limitada	Chile	100%
ICON Clinical Research (Beijing No.2) Co., Ltd	China	100%
ICON Clinical Research (Beijing) Co., Ltd	China	100%
ICON Clinical Research Hong Kong Limited	China (Hong Kong)	100%
Ispitivanja ICON d.o.o (ICON Research Ltd.)	Croatia	100%
ICON Clinical Research s.r.o.	Czech Republic	100%
DOCS International Nordic Countries A/S	Denmark	100%
DOCS International Finland Oy	Finland	100%
DOCS International France S.A.S.	France	100%
ICON Clinical Research S.A.R.L.	France	100%
Mapi Développement SAS	France	100%
Mapi Research Trust*	France	100%
Mapi SAS	France	100%
DOCS International Germany GmbH	Germany	100%
ICON Clinical Research GmbH	Germany	100%
ICON Klinikai Kutató Korlátolt Felelősségű Társaság (ICON Clinical Research Limited Liability Company)	Hungary	100%
ICON Clinical Research India Private Limited	India	100%
ICON Clinical Research Israel Limited	Israel	100%
DOCS Italia S.R.L.	Italy	100%
ICON Japan K.K.	Japan	100%
ICON Investments Limited	Jersey	100%
ICON Clinical Research Korea Yuhan Hoesa (ICON Clinical Research Korea Ltd.)	Korea	100%

ICON CRO Malaysia SDN. BHD.	Malaysia	100%
ICON Clinical Research México, S.A. de C.V.	Mexico	100%

Company	Country	Group ownership
DOCS Insourcing B.V.	Netherlands	100%
DOCS International B.V.	Netherlands	100%
ICON Contracting Solutions Holdings B.V.	Netherlands	100%
ICON Clinical Research (New Zealand) Limited	New Zealand	100%
ICON Clinical Research Perú S.A.	Peru	100%
ICON Clinical Research Services Philippines, Inc.	Philippines	100%
DOCS International Poland Sp. z o.o.	Poland	100%
ICON Clinical Research Sp. z o.o.	Poland	100%
DOCS Resourcing Limited	Republic of Ireland	100%
ICON (LR) Limited	Republic of Ireland	100%
ICON Clinical International Unlimited Company	Republic of Ireland	100%
ICON Clinical Research Limited	Republic of Ireland	100%
ICON Clinical Research Property Development (Ireland) Limited	Republic of Ireland	100%
ICON Holdings Unlimited Company	Republic of Ireland	100%
ICON Holdings Clinical Research International Limited	Republic of Ireland	100%
ICON Investments Five Unlimited Company	Republic of Ireland	100%
ICON Investments Four Unlimited Company	Republic of Ireland	100%
ICON Clinical Research S.R.L.	Romania	100%
ICON Clinical Research (Rus) LLC	Russia	100%
ICON Clinical Research d.o.o. Beograd	Serbia	100%
ICON Clinical Research (Pte) Limited	Singapore	100%
ICON Clinical Research Slovakia, s.r.o.	Slovakia	100%
ICON Clinical Research España, S.L.	Spain	100%
DOCS International Sweden AB	Sweden	100%

DOCS International Switzerland GmbH	Switzerland	100%
ICON Clinical Research (Switzerland) GmbH	Switzerland	100%

Company	Country	Group ownership
ICON Clinical Research Taiwan Limited	Taiwan	100%
ICON Clinical Research (Thailand) Limited	Thailand	100%
ICON Ankara Klinik Arastirma Dis Ticaret Anonim Sirketi	Turkey	100%
DOCS Ukraine LLC	Ukraine	100%
ICON Clinical Research LLC	Ukraine	100%
DOCS International UK Limited	United Kingdom	100%
ICON Clinical Research (U.K.) Limited	United Kingdom	100%
ICON Development Solutions Limited	United Kingdom	100%
Mapi Life Sciences UK Limited	United Kingdom	100%
Addplan, Inc.	USA	100%
Beacon Bioscience, Inc.	USA	100%
C4 MedSolutions, LLC	USA	100%
CHC Group, LLC	USA	100%
Complete Healthcare Communications, LLC	USA	100%
Complete Publication Solutions, LLC	USA	100%
DOCS Global, Inc.	USA	100%
Global Pharmaceutical Strategies Group, LLC	USA	100%
ICON Clinical Research LLC	USA	100%
ICON Early Phase Services, LLC	USA	100%
ICON Government and Public Health Solutions, Inc. (formerly Clinical Research Management (ClinicalRM))	USA	100%
ICON Laboratory Services, Inc.	USA	100%
ICON US Holdings Inc.	USA	100%
Managed Care Strategic Solutions, L.L.C.	USA	100%

Mapi USA, Inc.	USA	100%
MMMM Consulting, LLC	USA	100%
MMMM Group, LLC	USA	100%

Company	Country	Group ownership
PMG Research of Bristol, LLC	USA	100%
PMG Research of Charleston, LLC	USA	100%
PMG Research of Charlotte, LLC	USA	100%
PMG Research of Christie Clinic, LLC	USA	100%
PMG Research of Hickory, LLC	USA	100%
PMG Research of Raleigh, LLC	USA	100%
PMG Research of Rocky Mount, LLC	USA	100%
PMG Research of Salisbury, LLC	USA	100%
PMG Research of Wilmington, LLC	USA	100%
PMG Research of Winston-Salem, LLC	USA	100%
PMG Research, Inc.	USA	100%
Pricespective, LLC	USA	100%
PubsHub LLC	USA	100%

*Mapi Research Trust is an association, its members are ICON Subsidiary entities.

Item 4A. Unresolved Staff Comments.

Not applicable.

Item 5. Operating and Financial Review and Prospects.

The following discussion and analysis should be read in conjunction with our Consolidated Financial Statements, accompanying notes and other financial information, appearing in Item 18. The Consolidated Financial Statements have been prepared in accordance with U.S. GAAP.

Overview

We are a CRO, providing outsourced development services on a global basis to the pharmaceutical, biotechnology and medical device industries. We specialize in the strategic development, management and analysis of programs that support all stages of the clinical development process - from compound selection to Phase I-IV clinical studies. Our vision is to be the Global CRO partner of choice in drug development by delivering best in class information, solutions and performance in clinical and outcomes research.

We believe that we are one of a select group of CROs with the expertise and capability to conduct clinical trials in most major therapeutic areas on a global basis and have the operational flexibility to provide development services on

a stand-alone basis or as part of an integrated “full service” solution. At December 31, 2018, we employed approximately 13,670 employees, in 89 locations in 37 countries. During the year ended December 31, 2018 we derived approximately 34.5%, 55.7% and 9.8% of our revenue in the United States, Europe and Rest of World, respectively.

Revenue consists of fees earned under contracts with third-party clients. In most cases, a portion of the contract fee is paid at the time the study or trial is started, with the balance of the contract fee generally payable in installments over the study or trial duration, based on the delivery of certain performance targets or milestones. Revenue from long term contracts is recognized on a proportional

performance method based on the relationship between time incurred and the total estimated duration of the trial or on a fee-for-service basis according to the particular circumstances of the contract. As is customary in the CRO industry, we contract with third party investigators in connection with clinical trials. Investigator costs and certain other third party costs are included in our assessment of progress towards completion and costs incurred in measuring revenue. Where these costs are reimbursed by clients, they are included in the total contract value recognized over time based on our assessment of progress towards completion.

As the nature of our business involves the management of projects, the majority of which have a duration of one to four years, the commencement or completion of projects in a fiscal year can have a material impact on revenues earned with the relevant clients in such years. In addition, as we typically work with some, but not all divisions of a client, fluctuations in the number and status of available projects within such divisions can also have a material impact on revenues earned from such clients from year to year.

Termination or delay in the performance of an individual contract may occur for various reasons, including, but not limited to, unexpected or undesired results, production problems resulting in shortages of the drug, adverse patient reactions to the drug, the client's decision to de-emphasize a particular trial or inadequate patient enrollment or investigator recruitment. In the event of termination the Company is usually entitled to all sums owed for work performed through the notice of termination and certain costs associated with the termination of the study. In addition, contracts generally contain provisions for renegotiation in the event of changes in the scope, nature, duration, or volume of services of the contract.

Our unsatisfied performance obligation comprises our assessment of contracted revenue yet to be earned from projects awarded by clients. At December 31, 2018 we had a backlog of approximately $5.3 billion. We believe that our backlog as of any date is not necessarily a meaningful predictor of future results, due to the potential for cancellation or delay of the projects included in the backlog, and no assurances can be given on the extent to which we will be able to realize the backlog.

Although we are domiciled in Ireland, we report our results in U.S. dollars. As a consequence the results of our non-U.S. based operations, when translated into U.S. dollars, could be materially affected by fluctuations in exchange rates between the U.S. dollar and the currencies of those operations.

In addition to translation exposures, we are also subject to transaction exposures because the currency in which contracts are priced can be different from the currencies in which costs relating to those contracts are incurred. Our operations in the United States are not materially exposed to such currency differences as the majority of our revenues and costs are in U.S. dollars. However, outside the United States the multinational nature of our activities means that contracts are usually priced in a single currency, most often U.S. dollars or euro, while costs arise in a number of currencies, depending, among other things, on which of our offices provide staff for the contract and the location of investigator sites. Although many such contracts benefit from some degree of natural hedging, due to the matching of contract revenues and costs in the same currency, where costs are incurred in currencies other than those in which contracts are priced, fluctuations in the relative value of those currencies could have a material effect on our results of operations. We regularly review our currency exposures.

As we conduct operations on a global basis, our effective tax rate has depended and will depend on the geographic distribution of our revenue and earnings among locations with varying tax rates. Our results therefore may be affected by changes in the tax rates of the various jurisdictions. In particular, as the geographic mix of our results of operations among various tax jurisdictions changes, our effective tax rate may vary significantly from period to period.

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Operating Results

The following table sets forth, for the periods indicated, certain financial data as a percentage of revenue and the percentage change in these items compared to the prior comparable period. The trends illustrated in the following table may not be indicative of future results.

	Year Ended December 31,			
	2018	2017	2018	2017
	Percentage of Revenue		Percentage Increase/(Decrease)	
Revenue/gross revenue	100.0%	100.0%	8.1%	1.6%
Costs and expenses:				
Direct costs	70.0%	42.8%	77.0%	6.9%
Selling, general and administrative	12.6%	13.5%	0.6%	(0.6)%
Depreciation	1.9%	1.8%	16.4%	3.1%
Amortization	0.6%	0.7%	(14.1)%	2.4%
Income from operations (excluding restructuring)	14.9%	14.4%	11.5%	8.2%
Restructuring	0.5%	0.3%	61.1%	(5.0)%
Income from operations (including restructuring)	14.4%	14.1%	10.4%	8.5%

The provisions of ASC 606 were applied in the preparation and presentation of the results for the twelve months ended December 31, 2018. As ICON adopted the standard using the cumulative effect transition method, there is no restatement of comparative amounts. The results for the year ended December 31, 2017 and previously therefore reflect the provisions of ASC 605 'Revenue Recognition'. The most significant impact of application of the new standard reflects the measurement of a clinical trial service as a single performance obligation recognized over time. We have concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical trial. The progress towards completion for clinical service contracts is measured based on total project costs (direct fees are therefore inclusive of third party costs). Gross revenue is therefore our primary measure of performance on adoption of ASC 606. In common with others in the sector, our results previously separately identified that revenue stream which related to services provided by third parties. Those services were previously separately identified as reimbursable expenses and presented separately in our Statement of Operations. Reimbursable expenses are included within direct costs on adoption of ASC 606. See note 26 for impact of new accounting policy. Consistent with the provisions of ASC 606, our commentary and analysis in respect of the results for the year-ended December 31, 2018 reflect our assessment of revenue as presented. Our commentary and analysis in respect of the results for the years ended December 31, 2017 and previously refer to net revenue unless otherwise stated (direct fee revenue excluding amounts reimbursable from third parties) as our primary measure of performance prior to the adoption of ASC 606.

Year ended December 31, 2018 compared to year ended December 31, 2017

Revenue for the year increased by $193.5 million, or 8.1%, from $2,402.3 million (revenue including reimbursable expenses) for the year ended December 31, 2017 to $2,595.8 million for the year ended December 31, 2018. Revenue increased by 6.9% in constant currency or 3.7% in constant dollar organic. The increase in revenues can be explained by both continued organic growth and the additional revenues from the acquisition of Mapi on July 27, 2017.

Revenues from our top five customers were $1,024.1 million in the year ended December 31, 2018 compared to $1,009.7 million in the year December 31, 2017 or 39.5% and 42% respectively. The largest of these customers related to a strategic partnership with a large global pharmaceutical company. Revenue (including revenue from reimbursables) from this customer contributed 21% of revenue for the year ended December 31, 2017, compared to 14% of revenue for the year ended December 31, 2018. The addition of new customer accounts, particularly large and

mid-tier pharma customers and biotech customers have resulted in a reduction in this concentration of revenues from our top five customers.

Revenue in Ireland increased by $122.1 million in year ended December 31, 2018, from $944.1 million (gross revenue) for the year ended December 31, 2017 to $1,066.2 million for the year ended December 31, 2018. Revenue in Ireland during the year ended December 31, 2018 increased by 12.9% compared to an overall increase in group revenue of 8.1%. Revenue in Ireland is principally a function of our global transfer pricing model. See note 19 Business Segment and Geographical Information for further details.

Revenue for Rest of Europe increased by $24.3 million or 6.8%, from $355.6 million for the year ended December 31, 2017 (gross revenue) to $379.9 million for the year ended December 31, 2018, principally reflecting the acquisition of Mapi in July 2017.

Revenue in the U.S. increased by $13.1 million or 1.5%, from $881.8 million for the year ended December 31, 2017 (gross revenue) to $895.0 million for the year ended December 31, 2018. Revenues in the U.S. were positively impacted by both continued organic growth and by the full year impact of the acquisition of Mapi in July 2017.

Revenue in our Rest of World ('Other') region increased by $33.9 million or 15.4%, from $220.8 million for the year ended December 31, 2017 (gross revenue) to $254.7 million for the year ended December 31, 2018. Revenues in non-U.S. dollar operations in this region were impacted by foreign currency translation and the movement in local rates to the U.S. dollar over the comparative year.

Direct costs for the year increased by $790.9 million, or 77.0%, from $1,027.3 million for the year ended December 31, 2017 to $1,818.2 million for the year ended December 31, 2018. Direct costs for the year ended December 31, 2018 include reimbursable expenses of $702.8 million. Other direct costs increased by $88.1 million from $1,027.3 million for the year ended December 31, 2017 to $1,115.4 million. Other direct costs primarily consist of compensation, associated fringe benefits and share based compensation expense for project-related employees and other direct project driven costs. The increase in other direct costs during the period arose due to an increase in headcount and a corresponding increase in personnel related expenditure of $81.3 million combined with an increase in other direct project related costs of $1.5 million, increases in laboratory costs of $4.3 million and an increase in travel related costs of $1.0 million.

Selling, general and administrative expenses for the year increased by $2.1 million, or 0.6%, from $323.7 million for the year ended December 31, 2017 to $325.8 million for the year ended December 31, 2018. Selling, general and administrative expenses comprise primarily of compensation, related fringe benefits and share based compensation expense for non-project-related employees, recruitment expenditure, professional service costs, advertising costs and all costs related to facilities and information systems. As a percentage of revenue, selling, general and administrative expenses decreased from 13.5% of revenue for the year ended December 31, 2017 to 12.6% of revenue for the year ended December 31, 2018. Personnel related costs increased by $2.7 million in the year, facilities related costs increased by $4.3 million and general overhead costs net of foreign exchange costs decreased by $5.0 million.

Share based compensation expense recognized during the years ended December 31, 2018 and December 31, 2017 was $31.6 million and $30.6 million respectively.

Depreciation expense for the year increased by $7.1 million or 16.4%, from $43.4 million for the year ended December 31, 2017 to $50.6 million for the year ended December 31, 2018. The depreciation charge reflects investments in facilities, information systems and equipment supporting the Company's continued growth. As a percentage of revenue, the depreciation expense increased from 1.8% for the year ended December 31, 2017 to 1.9% of revenues for the year ended December 31, 2018. Amortization expense for the year decreased by $2.5 million or 14.1%, from $17.9 million for the year ended December 31, 2017 to $15.4 million for the year ended December 31, 2018. The amortization expense represents the amortization of intangible assets acquired on business combinations. The amortization expense for the year incorporates a full year's amortization of intangibles acquired in the Mapi acquisition on July 27, 2017. These increases were offset by the completion of amortization on other assets. As a percentage of revenue, the amortization expense decreased from 0.7% of revenue for the year ended December 31, 2017 to 0.6% of revenues for the year ended December 31, 2018.

During the year ended December 31, 2018 the Company implemented a restructuring plan to improve operating efficiencies resulting in recognition of a restructuring charge of $12.5 million. The restructuring plan includes the cost

of resource rationalizations in certain areas of the business to improve utilization. During the year ended December 31, 2017 the Company implemented a restructuring plan to improve operating efficiencies resulting in recognition of a restructuring charge of $7.8 million. See note 14 to the Audited Consolidated Financial Statements.

As a result of the above, income from operations increased by $35.0 million, or 10.4%, from $338.3 million ($346.1 million, excluding restructuring and other charges) for the year ended December 31, 2017 to $373.4 million ($385.8 million excluding restructuring charges) for the year ended December 31, 2018 . As a percentage of revenue, income from operations increased from 14.1% of revenues for year ended December 31, 2017 to 14.4% of revenues for year ended December 31, 2018.

Income from operations in Ireland increased by 10.8% from $232.0 million for the year ended December 31, 2017, to $257.1 million for year ended December 31, 2018. Income from operations in Ireland and other geographic regions are reflective of the Company’s global transfer pricing model. Continued strategic investment in personnel and infrastructure together with on-going enhancement of operating processes and the successful leverage of support costs in 2018 has continued to result in a decrease of

the proportion of the Group's revenue used to support other Group entities and a corresponding increase in income from operations in Ireland during 2018.

In the Rest of Europe region, income from operations increased by $9.8 million, from $26.5 million for the year ended December 31, 2017 to $36.3 million for the year ended December 31, 2018. Excluding restructuring charges recorded income from operations in the Rest of Europe increased by $10.6 million, from $26.4 million for the year ended December 31, 2017 to $36.9 million for the year ended December 31, 2018. As a percentage of revenues income from operations in the Rest of Europe region increased from 7.5% for the year ended December 31, 2017 to 9.6% for the year ended December 31, 2018.

In the U.S. region, income from operations increased by $0.3 million or 0.5%, from $58.3 million for the year ended December 31, 2017 to $58.6 million for the year ended December 31, 2018. Excluding restructuring charges recorded income from operations in the U.S. increased by $0.2 million, from $58.2 million for the year ended December 31, 2017 to $58.3 million for the year ended December 31, 2018. As a percentage of revenues income from operations in the U.S. region decreased from 6.6% for the year ended December 31, 2017 to 6.5% for the year ended December 31, 2018.

In other regions, income from operations decreased by $0.1 million, from $21.5 million for the year ended December 31, 2017 to $21.4 million for the year ended December 31, 2018. Excluding restructuring charges recorded income from operations in other regions decreased by $0.1 million, from $21.5 million for the year ended December 31, 2017 to $21.4 million for the year ended December 31, 2018. As a percentage of revenues, income from operations in the other regions decreased from 9.7% for the year ended December 31, 2017 to 8.4% for the year ended December 31, 2018.

Interest expense increased from $12.6 million for the year ended December 31, 2017 to $13.5 million for the year ended December 31, 2018. No amounts were drawn down during the year ended December 31, 2017 or the year ended December 31, 2018. Interest income for the year ended December 31, 2018 increased from $2.3 million for the year ended December 31, 2017 to $4.8 million for the year ended December 31, 2018.

Provision for income taxes for the period decreased from $46.6 million for the year ended December 31, 2017 to $42.0 million for the year ended December 31, 2018. The Company's effective tax rate for the year ended December 31, 2018 was 11.5% compared with 14.2% (12.0% excluding the impact of restructuring charges and non-recurring items including US tax reform) for the year ended December 31, 2017. The Company's effective tax rate is principally a function of the distribution of pre-tax profits in the territories in which it operates.

Year ended December 31, 2017 compared to year ended December 31, 2016

Net revenue for the year increased by $91.9 million, or 5.5%, from $1,666.5 million for the year ended December 31, 2016 to $1,758.4 million for the year ended December 31, 2017. Revenue increased by 4.8% in constant currency. The increase in net revenues can be explained by both continued organic growth and the additional net revenues from the acquisition of Mapi on July 27, 2017 and the full year impact of the acquisition of ICON Government & Public Health Solutions ("GPHS") (formerly Clinical Research Management) acquired on September 15, 2016.

Net revenues from our top five customers were $709.1 million in 2017 compared to $744.2 million in 2016, or 40% and 45% respectively. The largest of these customers related to a strategic partnership with a large global pharmaceutical company. Net revenue from this customer contributed 26% of net revenue for the year ended December 31, 2016, compared to 18% of net revenue for the year ended December 31, 2017. The addition of new customer accounts, particularly large and mid-tier pharma customers and biotech customers have resulted in a

reduction in this concentration of revenues from our top five customers.

Net revenue in Ireland increased by $13.7 million in 2017, from $410.6 million for the year ended December 31, 2016 to $424.3 million for the year ended December 31, 2017. Net revenue in Ireland during the year ended December 31, 2017 increased by 3.3% compared to an overall increase in Group revenue of 5.5%. Net revenue in Ireland is principally a function of our global transfer pricing model.

Net revenue for Rest of Europe increased by $23.9 million or 7.6%, from $313.2 million for the year ended December 31, 2016 to $337.1 million for the year ended December 31, 2017, principally reflecting the acquisition of Mapi in July 2017. Net revenue in the U.S. increased by $27.7 million or 3.6%, from $763.8 million for the year ended December 31, 2016 to $791.5 million for the year ended December 31, 2017. Net revenues in the U.S. were positively impacted by both continued organic growth and by the acquisition of Mapi on July 27, 2017 and the full year impact of the acquisition of ICON Government & Public Health Solutions ("GPHS") on September 15, 2016. Net revenue in our Rest of World (‘Other’) region increased by $26.6 million or 14.9%, from $178.9 million for the year ended December 31, 2016 to $205.5 million for the year ended December 31, 2017. Net revenues in

non-U.S. dollar operations in this region were impacted by foreign currency translation and the movement in local rates to the U.S. dollar over the comparative year.

Direct costs for the year increased by $66.0 million, or 6.9%, from $961.3 million for the year ended December 31, 2016 to $1,027.3 million for the year ended December 31, 2017. Direct costs consist primarily of compensation, associated fringe benefits and share based compensation expense for project-related employees and other direct project driven costs. The increase in direct costs during the period arose due to an increase in headcount and a corresponding increase in personnel related expenditure of $56.6 million combined with an increase in other direct project related costs of $11.7 million. These were offset by decreases in laboratory costs of $0.7 million and travel related costs of $1.7 million. As a percentage of net revenue, direct costs increased from 57.7% of revenue for the year ended December 31, 2016 to 58.4% of net revenue for the year ended December 31, 2017.

Selling, general and administrative expenses for the year decreased by $2.0 million, or 0.6%, from $325.7 million for the year ended December 31, 2016 to $323.7 million for the year ended December 31, 2017. Selling, general and administrative expenses comprise primarily of compensation, related fringe benefits and share based compensation expense for non-project-related employees, recruitment expenditure, professional service costs, advertising costs and all costs related to facilities and information systems. As a percentage of net revenue, selling, general and administrative expenses decreased from 19.5% of net revenue for the year ended December 31, 2016 to 18.4% of net revenue for the year ended December 31, 2017. Personnel related costs increased by $0.7 million in the year, facilities related costs decreased by $0.5 million and general overhead costs net of foreign exchange costs decreased by $2.1 million. During the year ended December 31, 2017, a credit of $6.0 million was recorded being the reduction in the assessment of the fair value of contingent consideration liability relating to the acquisition of ("GPHS") (see note 4 of the Financial Statements at Item 19). Once-off professional costs of $3.5 million related to a proposed transaction were also recorded.

Share based compensation expense recognized during the years ended December 31, 2017 and December 31, 2016 was $30.6 million and $40.3 million respectively.

Depreciation expense for the year increased by $1.3 million, or 3.1%, from $42.1 million for the year ended December 31, 2016 to $43.4 million for the year ended December 31, 2017. The depreciation charge reflects investments in facilities, information systems and equipment supporting the Company’s continued growth. As a percentage of net revenue, the depreciation expense remained unchanged at 2.5% of net revenues for the year ended December 31, 2016 and the year ended December 31, 2017. Amortization expense for the year increased by $0.4 million, or 2.3%, from $17.5 million for the year ended December 31, 2016 to $17.9 million for the year ended December 31, 2017. The amortization expense represents the amortization of intangible assets acquired on business combinations. The amortization expense for the year includes amortization of intangibles acquired in the Mapi acquisition on July 27, 2017 and the impact of a full year’s amortization for GPHS acquired on September 15, 2016. These increases were offset by the cessation of amortization on other assets. As a percentage of net revenue, the amortization expense decreased from 1.1% of net revenue for the year ended December 31, 2016 to 1.0% of net revenues for the year ended December 31, 2017.

During the year ended December 31, 2017 the Company implemented a restructuring plan to improve operating efficiencies resulting in recognition of a restructuring charge of $7.8 million during 2017. The restructuring plan includes the cost of resource rationalizations in certain areas of the business to improve utilization. During the year ended December 31, 2016 the Company implemented a restructuring plan to improve operating efficiencies resulting in recognition of a restructuring charge of $8.2 million during 2016. The restructuring plan includes the cost of resource rationalizations in certain areas of the business to improve utilization (resulting in a charge of $6.2 million), and office consolidation (resulting in the recognition of an onerous lease obligation of $2.0 million). See note 14 to the Audited Consolidated Financial Statements.

As a result of the above, income from operations increased by $26.6 million, or 8.5%, from $311.7 million for the year ended December 31, 2016 to $338.3 million for the year ended December 31, 2017 ($26.2 million, or 8.2% excluding restructuring charges). As a percentage of net revenue, income from operations increased from 18.7% (19.2% excluding restructuring charges) of net revenues for year ended December 31, 2016 to 19.2% (19.7% excluding restructuring charges) of net revenues for year ended December 31, 2017.

Income from operations in Ireland increased by 7.4% from $216.1 million ($218.3 million excluding the impact of restructuring and other charges) for the year ended December 31, 2016, to $232.0 million ($240.1 million excluding the impact of restructuring and other charges) for year ended December 31, 2017. Income from operations in Ireland and other geographic regions are impacted by the Company’s global transfer pricing model. Continued strategic investment in personnel and infrastructure together with on-going enhancement of operating processes and the successful leverage of support costs in 2017 has continued to result in a decrease of the proportion of the Group’s net revenue used to support other Group entities and a corresponding increase in income from operations in Ireland during 2017.

In the Rest of Europe region, income from operations decreased by $7.7 million, from $34.2 million for the year ended December 31, 2016 to $26.5 million for the year ended December 31, 2017. Excluding restructuring charges recorded income from operations in the Rest of Europe decreased by $10.1 million, from $36.5 million for the year ended December 31, 2016 to $26.4 million for the year ended December 31, 2017. As a percentage of net revenues income from operations in the Rest of Europe region decreased from 10.9% (11.7% excluding restructuring charges) for the year ended December 31, 2016 to 7.9% (7.8% excluding restructuring charges) for the year ended December 31, 2017. Income from operations in Europe and in Ireland in the three month period and year ended December 31, 2016 reflected the impact of a one-off intergroup transaction. This transaction resulted in an increase in income from operations in Europe and a decrease in income from operations in Ireland in that period.

In the U.S. region, income from operations increased by $17.0 million or 41.2%, from $41.3 million for the year ended December 31, 2016 to $58.3 million for the year ended December 31, 2017. Excluding restructuring charges recorded income from operations in the U.S. increased by $13.6 million, from $44.6 million for the year ended December 31, 2016 to $58.2 million for the year ended December 31, 2017. As a percentage of net revenues income from operations in the U.S. region increased from 5.4% (5.8% excluding restructuring charges) for the year ended December 31, 2016 to 7.4% (7.3% excluding restructuring charges) for the year ended December 31, 2017, principally reflecting a credit of $6.0 million recorded on revaluation of the contingent consideration related to the acquisition of GPHS, the income contribution since acquisition of GPHS, and the impact of refinements to the consideration earned by US subsidiaries under the Group's global transfer pricing model. These increases were offset in part by increased amortization charges.

In other regions, income from operations increased by $1.5 million, from $20.0 million for the year ended December 31, 2016 to $21.5 million for the year ended December 31, 2017. Excluding restructuring charges recorded income from operations in other regions increased by $1.1 million, from $20.4 million for the year ended December 31, 2016 to $21.5 million for the year ended December 31, 2017. As a percentage of net revenues, income from operations in the other regions decreased from 11.2% (11.4% excluding restructuring charges) for the year ended December 31, 2016 to 10.4% (10.4% excluding restructuring charges) for the year ended December 31, 2017.

Interest expense decreased from $13.0 million for the year ended December 31, 2016 to $12.6 million for the year ended December 31, 2017. This decrease primarily reflects the drawdown of $53.0 million under the five year committed multi-currency Revolving Credit Facility in the year ended December 31, 2016. This facility bears interest at LIBOR plus a margin. No amounts were drawn down during the year ended December 31, 2017. Interest income for the year ended December 31, 2017 increased from $1.5 million for the year ended December 31, 2016 to $2.3 million for the year ended December 31, 2017.

Provision for income taxes for the period increased from $38.0 million ($39.0 million excluding the impact of restructuring charges) for the year ended December 31, 2016 to $46.6 million ($47.5 million excluding the impact of restructuring charges) for the year ended December 31, 2017. The Company's effective tax rate for the year ended December 31, 2017 was 14.2% (12.0% excluding the impact of restructuring charges and non-recurring items including US tax reform) compared with 12.7% (12.7% excluding the impact of restructuring charges) for the year ended December 31, 2016. The Company's effective tax rate is principally a function of the distribution of pre-tax profits in the territories in which it operates.

Liquidity and Capital Resources

The CRO industry is generally not capital intensive. The Group's principal operating cash needs are payment of salaries, office rents, travel expenditures and payments to investigators. Investing activities primarily reflect capital expenditures for facilities and information systems enhancements, the purchase and sale of short term investments and

acquisitions.

Our clinical research and development contracts are generally fixed price with some variable components and range in duration from a few weeks to several years. Revenue from contracts is generally recognized as income on the basis of the relationship between costs incurred and the total estimated contract costs. The cash flow from contracts typically consists of a small down payment at the time the contract is entered into, with the balance paid in installments over the contract duration, in some cases on the achievement of certain milestones. Therefore, cash receipts do not correspond to costs incurred and revenue recognized on contracts.

Cash and cash equivalents and net borrowings

$ in thousands	Balance December 31, 2017	Drawn down/ (repaid)	Net cash inflow/ (outflow)	Other non-cash adjustments	Effect of exchange rates	Balance December 31, 2018
Cash and cash equivalents	282,859	—	118,320	—	(5,328)	395,851
Available for sale investments	77,589		(18,909)	1,230		59,910
Private placement notes	(348,888)	—	—	(376)	—	(349,264)
	11,560	—	99,411	854	(5,328)	106,497

The Company’s cash and available for sale investments at December 31, 2018 amounted to $455.8 million compared with cash and available for sale investments of $360.4 million at December 31, 2017. The Company’s cash and short term investment balances at December 31, 2018 comprised cash and cash equivalents $395.9 million and short-term investments $59.9 million. The Company’s cash and short term investment balances at December 31, 2017 comprised cash and cash equivalents $282.9 million and short-term investments $77.6 million.

On March 12, 2018, the Company entered into a five year committed multi-currency Revolving Credit Facility for $150.0 million with Citibank, JP Morgan, Santander, HSBC Bank and Morgan Stanley International (“Revolving Credit Facility”). Each bank subject to the agreement has committed $30.0 million to the facility, with equal terms and conditions in place with all institutions. The facility is guaranteed by ICON plc. The facility replaces the $100.0 million facility which was entered into in June 2014 due to mature in June 2019. The facility bears interest at LIBOR plus a margin. No amounts were drawn at December 31, 2018, or at December 31, 2017, in respect of the Revolving Credit Facility. Amounts available to the Group under the facility at December 31, 2018 were $150.0 million and at December 31, 2017 were $100.0 million.

On July 27, 2017, a subsidiary of the Company, ICON Clinical Research Limited, acquired Mapi Development SAS ('Mapi'). Mapi is a leading patient-centered health outcomes research and commercialization company. Cash outflows on acquisition were $144.1 million.

On September 15, 2016, a subsidiary of the Company, ICON US Holdings Inc. acquired ICON Government & Public Health Solutions ("GPHS") (formerly Clinical Research Management (ClinicalRM)) which resulted in net cash outflows of $52.4 million (including certain payments made on behalf of GPHS totaling $9.2 million).

On December 15, 2015, ICON Investments Five Unlimited Company issued Senior Notes for aggregate gross proceeds of $350.0 million in a private placement. The Senior Notes will mature on December 15, 2020. Interest payable is fixed at 3.64%, and is payable semi-annually on the Senior Notes on each June 15 and December 15, which commenced on June 15, 2016. The Senior Notes are guaranteed by ICON plc. In October 2015, the Company entered into an interest rate hedge in respect of the planned issuance of the Senior Notes in December 2015. The interest rate hedge matured in November 2015 when the interest rate on the Senior Notes was fixed. The interest rate hedge was effective in accordance with Financial Accounting Standards Board (“FASB”) ASC 815, “Derivatives and Hedging”. The cash proceeds, representing the realized gain on the interest rate hedge, were received on maturity in November 2015.

On July 27, 2015 the Company entered into a 364 day bridge facility for $350.0 million with two financial institutions. The facility bore interest at LIBOR plus a margin and included certain guarantees and indemnities in

favor of the two financial institutions. The bridge facility was repaid in full in December 2015.

Net cash provided by operating activities was $268.6 million for the year ended December 31, 2018 compared with net cash provided by operating activities of $383.1 million for the year ended December 31, 2017.

The dollar value of these balances and the related number of days' revenue outstanding (i.e. revenue outstanding as a percentage of revenue for the period, multiplied by the number of days in the period) can vary over a study or trial duration. Contract fees are generally payable in installments based on the achievement of certain performance targets or "milestones" (e.g. target patient enrollment rates, clinical testing sites initiated or case report forms completed), such milestones being specific to the terms of each individual contract, while revenues on contracts are recognized as contractual obligations as performed. Billed and unbilled revenue also includes amounts recoverable from customers in respect of reimbursable costs. On adoption of ASC 606, we concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support a clinical trial. The progress towards completion for clinical service contracts is measured based on total project costs (including reimbursable costs). Reimbursable expenses are included within direct costs on adoption of ASC 606 and are recorded based on activity undertaken by the third party. Amounts owed to investigators and others in respect of reimbursable expenses at December 31, 2018 were $85.6 million (see note 7 Other liabilities). Contractual terms with our customers require ICON to receive and discharge payment to third parties prior to billing the customer for these items. Days' revenue outstanding will vary therefore due to, amongst others, the scheduling of contractual milestones over a study or trial duration, the achievement of a particular milestone during the period, the timing of receipt of invoices from third parties for reimbursable costs and or the timing of cash receipts from customers. A decrease in the number of days' revenue outstanding during a period will result in cash inflows to the Company while an increase in days revenue outstanding will lead to cash outflows. The number of days' revenue outstanding at December 31, 2018 was 67 days compared to 49 days at December 31, 2017 . This reflects both extended credit terms provided to a number of key accounts and timing of cash collections. The increase in days' revenue outstanding and a reduction in days payment outstanding resulted in a reduction in cash provided by operations.

Net cash used in investing activities was $37.3 million for the year ended December 31, 2018 compared to net cash used in investing activities of $177.8 million for the year ended December 31, 2017. Net cash used in the year ended December 31, 2018 arose principally on the investment in capital expenditure of $48.4 million, offset in part by the net income on the sale of short-term investments of $18.9 million. In December 2017, net cash used in investing activities of $177.8 million was driven by cash paid for acquisitions of $144.1 million (excluding cash acquired with subsidiary undertaking of $19.6 million - see note 4 Business Combinations for further details), capital expenditures of $44.7 million and the purchase of short-term investments of $41.7 million offset by the sale of short-term investments of $33.1 million.

Capital expenditure of $48.4 million for the year ended December 31, 2018 comprised mainly of expenditure on global infrastructure and information technology systems to support the Company's growth. During the year ended December 31, 2018 the Company incurred a net cash outflow of $18.8 million in respect of the purchase and sale of short-term investments. This compares to receipt of a net $8.6 million during the year ended December 31, 2017.

Net cash outflow from financing activities amounted to $113.0 million for the year ended December 31, 2018 compared with net cash outflow from financing activities of $119.3 million for the year ended December 31, 2017. Cash outflows in respect of financing activities includes consideration paid by the Company for share buybacks pursuant to the Company's share repurchase program totalling $129.0 million in the year-ended December 31, 2018 (see note 12 Share Capital for further information).
As a result of these cash flows, cash and cash equivalents increased by $113.0 million for the year ended December 31, 2018 compared to an increase of $90.3 million for the year ended December 31, 2017.

Contractual obligations table
The following table represents our contractual obligations and commercial commitments as of December 31, 2018:

	Payments due by period		
	Total	1 to 3	3 to 5

		Less than 1 year	years	years	More than 5 years
	(U.S.$ in millions)				
Operating lease obligations	126.6	32.6	48.2	26.6	19.2
Senior Notes	350.0	—	350.0	—	—
Interest on Senior Notes	25.5	12.7	12.8	—	—
Current and Non-current tax liabilities	18.2	1.4	3.9	9.6	3.3
Total (U.S.$ in millions)	$520.3	$46.7	$414.9	$36.2	$22.5

We expect to spend approximately $55 million in the next twelve months on further investments in information technology, the expansion of existing facilities and the addition of new offices. We believe that we will be able to fund our additional foreseeable cash needs for the next twelve months from cash flow from operations, existing cash balances and funds available under negotiated facilities. In the future, we may consider acquiring businesses to enhance our service offerings and global presence. Any such acquisitions could require additional external financing and we may from time to time seek to obtain funds from public or private issues of equity or debt securities. There can be no assurance that such financing will be available on terms acceptable to us.

Critical Accounting Policies

The preparation of consolidated financial statements in accordance with generally accepted accounting principles in the United States requires management to make estimates and judgments that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reported period.

We base our estimates and judgments on historical experience and on the other factors that we believe are reasonable under current circumstances. Actual results may differ from these estimates if these assumptions prove to be incorrect or if conditions develop other than as assumed for the purposes of such estimates. The following is a discussion of the accounting policies used by us, which we believe are critical in that they require estimates and judgments by management.

Revenue Recognition

Significant management judgments and estimates must be made and used in connection with the recognition of revenue in any accounting period. Material differences in the amount of revenue in any given period may result if these judgments or estimates prove to be incorrect or if management’s estimates change on the basis of development of the business or market conditions. To date there have been no material differences arising from these judgments and estimates.

We earn revenues by providing a number of different services to our clients. These services, which are integral elements of the clinical development process, include clinical trials management, contract staffing, consulting, and laboratory services. Contracts range in duration from a number of months to several years. The criteria for revenue recognition is based on five steps: (1) identify the contract(s) with a customer; (2) identify the performance obligation in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) the entity satisfies the performance obligation.

The Company adopted ASC 606 ‘Revenue from Contracts with Customers’, with a date of initial application of January 1, 2018. The revenue recognition accounting policy applied in preparation of the results for the twelve months ended December 31, 2018 therefore reflect application of ASC 606. ICON has elected to adopt the standard using the cumulative effect transition method. See note 26 for details of adoption.

The most significant impact of application of the standard relates to our assessment of performance and percentage of completion in respect of our clinical trial service revenue. Prior to application of ASC 606, the revenue attributable to performance was determined based on both input and output methods of measurement. We have concluded that under the new standard, a clinical trial service is a single performance obligation satisfied over time i.e. the full service obligation in respect of a clinical trial (including those services performed by investigators and other parties) is considered a single performance obligation. Promises offered to the customer are not distinct within the context of the contract. We have concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical research project. The transaction price is

determined by reference to the contract or change order value (total service revenue and pass-through/ reimbursable expenses) adjusted to reflect a realizable contract value. An assessment of the realizable contract value is judgmental in nature. The realizable value assessment is updated at each reporting period, having regard to (i) contract terms and (ii) customer experience.

Revenue is recognized on a percentage completion basis as the single performance obligation is satisfied. The progress towards completion for clinical service contracts is measured therefore based on an input measure being total project costs (inclusive of third party costs) at each reporting period. Measurement of the progress towards completion involves judgment and estimation. Assessment of completion requires an evaluation of labor and related time cost incurred at the reporting date and third party costs incurred at the reporting date. The assessment of third party costs incurred (principally investigator costs) requires a review of activity performed and recorded by the third party services providers. The timing of payments to third parties in respect of cost incurred reflect invoicing by third parties. The timing difference between the activity performed and receipt of invoices from third parties may result in significant accrued amounts at reporting periods.

The assessment of progress towards completion also requires an up to date evaluation of the forecast costs to complete in respect of these projects. Given the long-term nature of the clinical trials, and the complex nature of those trials, the forecast costs to complete (being internal direct costs and costs that will be incurred by third parties (principally investigators)) is judgmental. Forecast time (and related costs) is determined by reference to (i) contract terms and (ii) past experience. Forecast third party costs to complete are determined by project by project reference to (i) contract terms and (ii) past experience.

Our contracting services revenue is recognized on a right to invoice basis. Our consulting services revenue is recognized based on an assessment of progress towards completion at each reporting period. Laboratory services revenue is recognized when, or as, obligations under the terms of a contract are satisfied, which occurs when control of the products or services are transferred to the customer. Service revenue is recognized over time as the services are delivered to the customer based on an assessment of progress towards completion.

Impact of New Accounting Pronouncements

Impact of new accounting pronouncements adopted during fiscal year-ended December 31, 2018

The Company adopted ASC 606 ‘Revenue from Contracts with Customers’, with a date of initial application of January 1, 2018. The revenue recognition accounting policy applied in preparation of the results for the twelve months ended December 31, 2018 therefore reflect application of ASC 606. ICON has elected to adopt the standard using the cumulative effect transition method. See note 26 for details of adoption.

The new standard requires application of five steps: (1) identify the contract(s) with a customer; (2) identify the performance obligation in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) the entity satisfies the performance obligation.

The most significant impact of application of the standard relates to our assessment of performance and percentage of completion in respect of our clinical trial service revenue. Prior to application of ASC 606, the revenue attributable to performance was determined based on both input and output methods of measurement. We have concluded that under the new standard, a clinical trial service is a single performance obligation satisfied over time i.e. the full service obligation in respect of a clinical trial (including those services performed by investigators and other parties) is considered a single performance obligation. Promises offered to the customer are not distinct within the context of the contract. We have concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical research project.

Impact of new accounting pronouncements which will be adopted during fiscal year-ended December 31, 2019

In February 2016, the FASB issued ASU 2016-02, 'Leases', requiring lessees to recognize a right-of-use asset and a lease liability on the Consolidated Balance Sheet for all leases with the exception of short-term leases. For lessees, leases will continue to be classified as either operating or finance leases in the income statement. Lessor accounting is similar to the current model but updated to align with certain changes to the lessee model. Lessors will continue to classify leases as operating, direct financing or sales-type leases. The effective date of the new standard for public companies is for fiscal years beginning after December 15, 2018 and interim periods within those fiscal years. Early adoption is permitted. The new standard must be adopted using a modified retrospective transition and requires application of the new guidance at the beginning of the earliest comparative period presented. The updated standard is effective for us beginning in the first quarter of the year-ended December 31, 2019. We are currently evaluating the effect that the updated standard will have on our consolidated financial statements and related disclosures. See note 15 Commitments and Contingencies for details of operating leases held during year-ended December 31, 2018. A lease liability and right-of-use asset will be recorded on the Consolidated Balance Sheet at December 31, 2019. We estimate the impact of the adoption of ASC 842 will be the recognition of a right-of use asset and of lease liabilities in the

range of $100 million to $110 million. Under the new standard we expect an insignificant change in net result due to the replacement of operating lease expenses with amortization of the lease asset and the interest expense.

In July 2018, the FASB issued ASU 2018-11, which creates a new, optional transition method for implementing ASU 2016-02 and a lessor practical expedient for separating lease and non-lease components.
This ASU is effective:
•For entities that have not early adopted ASU 2016-02 with the effective date of ASU 2016-02.
•For entities that have early adopted ASU 2016-02 upon issuance. However, it can only be adopted by entities either at (1) the beginning of the company's first reporting period after issuance or (2) the entity's mandatory ASC 842 effective date. The Company has elected to adopt this transition method for implementing ASU 2016-02 and the related practical expedient.

In July 2018, the FASB issued ASU 2018-10 which clarifies and corrects errors in ASC 842. The effective date and transition requirements in ASU 2018-10 are the same as the effective date and transition requirements of ASU 2016-02.

In January 2018, the FASB issued ASU 2018-01, which clarifies that land easements are in the scope of ASU 2016-02, 'Leases', and provides transition relief. The effective date and transition requirements in ASU 2018-01 are the same as the effective date and transition requirements of ASU 2016-02. This clarification does impact on the impact assessment of the adoption of ASC 842.

In August 2017, the FASB issue ASU 2017-12 'Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities' which changes the recognition and presentation requirements of hedge accounting, including:

- Eliminating the requirement to separately measure and report hedge ineffectiveness; and
- Presenting all items that affect earnings in the same income statement line item as the hedged item.

The ASU also provides new alternatives for:

- Applying hedge accounting to additional hedging strategies;
- Measuring the hedged item in fair value hedges of interest rate risk;
- Reducing the cost and complexity of applying hedge accounting by easing the requirements for effectiveness testing, hedge documentation and application of the critical terms match method; and
- Reducing the risk of material error correction if a company applies the shortcut method inappropriately.

This ASU is effective for public business entities, for annual and interim periods in fiscal years beginning after December 15, 2018. Early adoption is permitted any time after the issuance of the ASU, including in an interim period. If adopted at other than the beginning of a fiscal year, cumulative effect adjustments are reflected as of the beginning of the fiscal year. The adoption of the ASU is not expected to have a significant impact on the financial statements.

In February 2017, the FASB issued ASU 2017-05 'Other Income-Gains and Losses from the Derecognition of Nonfinancial Assets (Subtopic 610-20): Clarifying the Scope of Asset Derecognition Guidance and Accounting for Partial Sales of Nonfinancial Assets'. In February 2017, the FASB issued ASU 2017-05 which clarifies the guidance in Subtopic 610-20 on accounting for derecognition of a nonfinancial asset. The ASU also defines in-substance nonfinancial assets and includes guidance on partial sales of non-financial assets. The adoption of ASU 2017-05 is not expected to have an impact on the financial statements.

In July 2017, the FASB issued ASU 2017-11 'Earnings Per Share (Topic 260); Distinguishing Liabilities from Equity (Topic 480); Derivatives and Hedging (Topic 815): (Part I) Accounting for Certain Financial Instruments with Down Round Features, (Part II) Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception' under which down round features will not cause certain equity-linked financial instruments to be accounted for as derivatives. A company that presents EPS information will reflect the effect of a down round feature of free-standing equity-linked financial instruments in EPS only if it is triggered. The ASU is effective for public business entities, for annual and interim periods in fiscal years beginning after December 15, 2018. The adoption of the ASU is not expected to have an impact on the financial statements.

In June 2016, the FASB issued ASU 2016-13 'Measurement of Credit Losses on Financial Instruments', which significantly changes the way entities recognize impairment of many financial assets by requiring immediate recognition of estimated credit losses expected to occur over their remaining life. The ASU is effective for public

business entities that are SEC filers for interim and annual periods in fiscal years beginning after December 15, 2019. The adoption of ASU 2016-13 is not expected to have a significant impact on the financial statements.

In July 2018, the FASB issued ASU 2018-09, which clarifies and corrects unintended application of guidance, and makes improvements to several Codification Topics. The changes are part of an ongoing FASB project to make non-substantive technical corrections, clarifications, and improvements that are not expected to have a significant effect on accounting practice or create a significant administrative cost to most entities. Most of the amendments are effective immediately.
Some of the amendments are effective for:
•Public business entities for annual and interim periods in fiscal years beginning after December 15, 2018.
•All other entities for annual periods in fiscal years beginning after December 15, 2019 and interim periods in fiscal years beginning after December 15, 2020. Other amendments, which affect recently issued ASUs that are not yet effective, are effective with the original ASU. The impact of adoption of ASU 2018-09 is not expected to be significant.

In June 2018, the FASB issued ASU 2018-08 which clarifies and improves current guidance about whether a transfer of assets (or the reduction, settlement, or cancellation of liabilities) is a contribution or an exchange transaction. For transactions in which an entity is either a public business entity or an NFP that has issued, or is a conduit bond obligor for securities that are traded, listed, or quoted on an exchange or an over-the-counter market and serves as a resource recipient, the entity should apply the amendments

in this ASU on contributions received to annual and interim periods in fiscal years beginning after June 15, 2018. All other entities should apply the amendments for transactions in which the entity serves as the resource recipient to annual periods in fiscal years beginning after December 15, 2018, and interim periods in fiscal years beginning after December 15, 2019. For transactions in which an entity is either a public business entity or an NFP that has issued, or is a conduit bond obligor for securities that are traded, listed, or quoted on an exchange or an over-the-counter market and serves as a resource provider, the entity should apply the amendments in this ASU on contributions made to annual and interim periods in fiscal years beginning after December 15, 2018. All other entities should apply the amendments for transactions in which the entity serves as the resource provider for annual periods in fiscal years beginning after December 15, 2019 and interim periods in fiscal years beginning after December 15, 2020. Early adoption of the amendments is permitted. The adoption of ASU 2018-08 is not expected to have a significant impact on the financial statements.

In February 2018, the FASB issued ASU 2018-02 which allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act. This ASU is effective for all entities for annual and interim periods in fiscal years beginning after December 15, 2018. Early adoption is permitted, including adoption in any interim period, (1) for public business entities for reporting periods for which financial statements have not yet been issued and (2) for all other entities for reporting periods for which financial statements have not yet been made available for issuance. The adoption of ASU 2018-02 is not expected to have a significant impact on the financial statements.

In December 2017, the FASB issued ASU 2017-15. The ASU eliminates Topic 995, which includes an exemption to the recognition of deferred taxes on certain statutory reserve deposits that were, but are no longer, tax deferred. This ASU is effective for all entities for annual and interim periods in fiscal years beginning after December 15, 2018. Early adoption is permitted for all entities, including adoption in an interim period. The adoption of ASU 2017-15 is not expected to have a significant impact on the financial statements.

Impact of other new accounting pronouncements

In January 2017, the FASB issued ASU 2017-04 'Intangibles - Goodwill and Other: Simplifying the test for goodwill impairment' which requires an entity to no longer perform a hypothetical purchase price allocation to measure goodwill impairment. Instead, impairment will be measured using the difference between the carrying amount and the fair value of the reporting unit. The ASU is effective for public businesses, that are SEC filers, for annual and interim periods in fiscal years beginning after December 15, 2019. The adoption of ASU 2017-04 is not expected to have a significant impact on the financial statements.

In August 2018, the FASB issued ASU 2018-15, which clarifies that implementation costs incurred by customers in cloud computing arrangements are deferred if they would be capitalized by customers in software licensing arrangements under the internal-use software guidance.
This ASU is effective for:
•Public business entities for annual and interim periods in fiscal years beginning after December 15, 2019.
•Early adoption is permitted. Our evaluation of the impact of adoption of ASU 2018-15 is on-going.

In August 2018, the FASB issued ASU 2018-14, which aims to improve the overall usefulness of disclosures to financial statement users and reduce unnecessary costs to companies when preparing defined benefit plan disclosures.
This ASU is effective for:
•Public business entities for financial statements issued for fiscal years ending after December 15, 2020.
Retrospective adoption is required and early adoption is permitted. Our evaluation of the disclosure impact of adoption of ASU 2018-14 is on-going.

In August 2018, the FASB issued ASU 2018-13 which aims to improve the overall usefulness of disclosures to financial statement users and reduce unnecessary costs to companies when preparing fair value measurement disclosures. This ASU is effective for all entities for annual and interim periods in fiscal years beginning after December 15, 2019. Retrospective adoption is required except for the following changes, which are required to be applied prospectively for only the most recent interim or annual period presented in the initial fiscal year of adoption:

•Changes in unrealized gains and losses included in other comprehensive income for Level 3 instruments;

•The range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements; and

•The narrative description of measurement uncertainty.

Early adoption is permitted. An entity may early adopt any eliminated or modified disclosure requirements and delay adoption of the additional disclosure requirements until their effective date. In such cases, users should refer to the Codification for disclosure requirements. Our evaluation of the disclosure impact of adoption of ASU 2018-13 is on-going.

In August 2018, the FASB issued ASU 2018-12 which changes how insurance entities recognize, measure, present and disclose long-duration contracts. This ASU is effective for:
•Public business entities for annual and interim periods in fiscal years beginning after December 15, 2020.
•Early adoption is permitted. The adoption of ASU 2018-12 is not expected to impact on the financial statements.

In June 2018, the FASB issued ASU 2018-07 which more closely aligns the accounting for employee and nonemployee share-based payments.
This ASU is effective for:
•Public business entities for annual and interim periods in fiscal years beginning after December 15, 2018.
•The adoption of ASU 2018-07 is not expected to have a significant impact on the financial statements.

Inflation

We believe that the effects of inflation generally do not have a material adverse impact on our operations or financial conditions.

Item 6. Directors, Senior Management and Employees.

Directors and Senior Management

The following table and accompanying biographies set forth certain information concerning each of ICON plc's Directors, officers and other key employees as of March 1, 2019.

Name	Age	Position
Ciaran Murray	56	Non Executive Chairman and Director
Dr. Steve Cutler (1) (5)	58	Chief Executive Officer and Director
Brendan Brennan (1)(5)	40	Chief Financial Officer
Ronan Murphy (2) (3)(5)	61	Lead Independent Director
Declan McKeon (3)(4)	67	Director
Dr. John Climax	66	Director
Professor Dermot Kelleher	63	Director
Professor William Hall (2)(4)	69	Director
Mary Pendergast (2)	68	Director
Professor Hugh Brady (3)	59	Director
Eugene McCague (3)	60	Director
Joan Garahy (2) (4)	56	Director
Diarmaid Cunningham	44	Chief Administrative Officer, General Counsel & Company Secretary

(1) Named Executive Officer of the Company.
(2) Member of Compensation and Organization Committee.
(3) Member of Audit Committee.
(4) Member of Nominating and Governance Committee.
(5) Member of Execution Committee.

Ciaran Murray was appointed as the Executive Chairman of ICON plc in March 2017, having previously served as Chief Executive Officer from October 2011. In February 2018, the Board approved the appointment of Mr. Murray as non-Executive Chairman of ICON plc with effect from May 12, 2018. Mr. Murray joined ICON as Chief Financial Officer in 2005 and he served in that capacity until his appointment as Chief Executive Officer. Mr. Murray is an

executive with 37 years experience forged from a career spent operating in global markets in high-growth entrepreneurial companies and blue-chip multi-nationals, including PwC Ireland, Kraft Foods, Novell Inc., Northern Foods and Codec Systems. Mr. Murray has also played a leadership role in advocating for safe, ethical high-quality research through his 2014 Chairmanship of the Association of Clinical Research Organisations (ACRO). ACRO represents the CRO industry globally to key stakeholders including pharmaceutical, biotech and medical device companies, regulators, legislators and patient groups. In 2014, Mr. Murray was named as a leader in CRO Innovation by PharmaVOICE100, a listing of the most influential people in the bio pharma industry. Mr. Murray graduated with a Bachelor of Commerce degree from University College Dublin and he is a Fellow of the Institute of Chartered Accountants in Ireland. He was

awarded an Honorary Degree of Doctor of Laws from University College Dublin in 2013 for his support of third level research and innovation in Ireland.

Dr. Steve Cutler was appointed Chief Executive Officer of ICON plc in March 2017, having previously served as Chief Operating Officer from January 2014. Dr. Cutler served as Group President Clinical Research Services since November 2011 until his appointment as Chief Operating Officer. Dr. Cutler was appointed to the Board of ICON plc in November 2015. Prior to joining the Company, Dr. Cutler held the position of Chief Executive Officer of Kendle, having previously served as Chief Operating Officer. Prior to Kendle, Dr. Cutler spent 14 years with Quintiles where he served as Senior Vice President, Global Project Management; Senior Vice President, Clinical, Medical and Regulatory; Senior Vice President, Project Management - Europe; and Vice President, Oncology - Europe, as well as regional leadership positions in South Africa and Australia. Prior to joining Quintiles, Dr. Cutler held positions with Sandoz (now Novartis) in Australia and Europe. Dr. Cutler holds a B.Sc. and a Ph.D from the University of Sydney and a Masters of Business Administration from the University of Birmingham (UK).

Brendan Brennan has served as Chief Financial Officer since February 2012. Mr. Brennan has developed his career over the last twenty years from experience in various industries. Mr. Brennan joined ICON in 2006 and he has served in a number of senior finance roles in the Company including the role of Senior Vice President of Corporate Finance. Prior to this he developed his broad financial experience in Cement Roadstone Holdings, a major Irish building materials organization. Mr. Brennan spent a number of years in public accounting with PwC prior to this. Mr. Brennan is a Fellow of the Institute of Chartered Accountants in Ireland and holds a bachelor’s degree in Accounting and Finance from Dublin City University.

Ronan Murphy has served as an outside Director of the Company since October 2016. He was appointed as Lead Independent Director in January 2019. Mr. Murphy is the former Senior Partner of PwC Ireland. Mr. Murphy was elected Senior Partner in 2007 and was re-elected for a further four year term in 2011. Following completion of the maximum two terms, Mr. Murphy retired from the firm in 2015. Mr. Murphy was also a member of the PwC EMEA Leadership Board for a five year period from 2010 to 2015. Mr. Murphy joined PwC in 1980 and was admitted to the Partnership in 1992. As an Assurance Partner, he served clients across a number of sectors. In 1995, Mr. Murphy joined the firm’s leadership team and held a number of operational leadership roles, prior to being appointed as Partner in Charge of the Firm’s Assurance Practice in 2003, a position he held for four years prior to his appointment as Senior Partner. Mr. Murphy is presently Chairman of Greencoat Renewables PLC and a non-executive director of Davy Stockbrokers and of Liberty Insurance's operations in Ireland. Mr. Murphy currently serves as a Board Member of the UCD Michael Smurfit Business School, as a council member of the ESRI and as Chair of Business in the Community Ireland. He is also a founding Board Member of the British Irish Chamber of Commerce. Mr. Murphy completed a Bachelor of Commerce and Masters in Business Studies at University College Dublin before qualifying as a chartered accountant in 1982.

Declan McKeon has served as an outside Director of the Company since April 2010 and served as acting Chairman from April 2016 until March 2017. He served as the Lead Independent Director from March 2017 to December 2018. Mr. McKeon was a partner in PwC Ireland from 1986 to 2007. His roles included leadership of the audit and business advisory team for PwC Ireland, membership of the PwC Europe audit and business advisory services executive and market sector leader for consumer and industrial products. Mr. McKeon holds a Bachelor of Commerce and Masters in Business Studies from University College Dublin and is a Fellow of The Institute of Chartered Accountants in Ireland.

Dr. John Climax, one of the Company’s co-founders, served as Chairman of the Board of the Company from November 2002 to December 2009 and as Chief Executive Officer from June 1990 to October 2002. From January 2010 he has held a position as an outside Director of the Company. Dr. Climax has over 25 years of experience in the clinical research industry. Dr. Climax is the Executive Chairman of DS Biopharma Limited. Dr. Climax received his primary degree in pharmacy in 1977 from the University of Singapore, his masters in applied pharmacology in 1979

from the University of Wales and his Ph.D. in pharmacology from the National University of Ireland in 1982. He has authored a significant number of papers and presentations, and holds adjunct professorship at the Royal College of Surgeons of Ireland and an honorary professorship at the National University of Singapore. He is currently Executive Chairman of DS Biopharma and CEO of Afimmune, both of which are private companies.

Professor Dermot Kelleher has served as an outside Director of the Company since May 2008. Professor Kelleher is currently Dean of the Faculty of Medicine and Vice President (Health) at the University of British Columbia in Vancouver. From 2012 to 2015 he was Vice President (Health) and Dean of the Faculty of Medicine at Imperial College London and concurrently Dean of the Lee Kong Chian School of Medicine in Singapore from 2012 to 2014. From 2004 to 2012 he was Head of the School of Medicine and Vice Provost for Medical Affairs at Trinity College, Dublin, Ireland where he led the development of the Institute of Molecular Medicine and Molecular Medicine Ireland. Professor Kelleher's research interests have focused on immunology of gastrointestinal infection, cancer and inflammatory diseases and over a distinguished thirty year career he has led significant research projects in this field. He is a Fellow of the Academy of Medical Sciences. Alongside his notable academic appointments,

Professor Kelleher has been President of the Federation of European Academies of Medicine, has served as a visiting research scientist with a major pharmaceutical company and has been a founder of a number of biotechnology companies.

Professor William Hall has served as an outside Director of the Company since February 2013. He is a renowned expert in infectious diseases and virology. He currently serves as Distinguished Professor in Hokkaido University in Japan and is Professor Emeritus of Medical Microbiology and the Centre for Research in Infectious Diseases at University College Dublin's (UCD) School of Medicine and Medical Science. He is also Executive Chairman of the UCD National Virus Reference Laboratory and is a Consultant Microbiologist at St. Vincent's University Hospital Dublin. Professor Hall also serves as a consultant to the Minister of Heath and Children in the Republic of Ireland, providing input on a range of topics including influenza pandemic preparedness and bioterrorism. Prior to his tenure at UCD, Professor Hall was Professor and Head of the Laboratory of Medical Virology, Senior Physician and Director of the Clinical Research Centre at the Rockefeller University in New York. He previously served as an Assistant and Associate Professor of Medicine at Cornell University. Professor Hall is a Board member of The Atlantic Philanthropies and is a co-founder of the Global Virus Network.

Mary Pendergast has served as an outside Director of the Company since February 2014. Ms. Pendergast is an expert in the regulatory aspects of drug development and is President of Pendergast Consulting, a consulting firm that advises biopharmaceutical companies, patient groups, professional and advocacy organizations, governments and academic and financial institutions. Prior to founding her own firm, Ms. Pendergast was Executive Vice President of Government Affairs at Elan Corporation plc from 1998 to 2003. Ms. Pendergast also spent more than 18 years at the US Food and Drug Administration (FDA), serving as Deputy Commissioner and Senior Advisor to the FDA Commissioner and Associate Chief Counsel for Enforcement.

Professor Hugh Brady has served as an outside Director of the Company since April 2014. In September 2015, Professor Brady took up the position of President and Vice-Chancellor of the University of Bristol - a member of the UK's Russell Group of elite research-intensive universities. Professor Brady is also President Emeritus of University College Dublin (UCD), where he served as President from 2004 until the end of 2013. During his tenure Professor Brady oversaw a major institution-wide transformation program that included significant expansion of UCD's science, engineering and biomedical research capacity through the development of the O'Brien Centre for Science, Conway Institute for Biomedical Research, UCD Clinical Research Centre, the Dublin Academic Medical Centre and the Ireland East Hospital Group. In addition, he led a major growth in UCD's international footprint. A nephrologist by training, Professor Brady was Professor of Medicine and Therapeutics at UCD before being appointed the university's President. Prior to that, he built a successful career as a physician and biomedical research scientist in the US - spending almost a decade at Harvard University where he was Associate Professor of Medicine, Director of the Renal Division of the Brockton/West Roxbury VA Medical Center and Consultant Physician at the Brigham and Women's Hospital, Boston. He has an international reputation in the pathogenesis of diabetic kidney disease and renal inflammation. Professor Brady has held many national and international leadership roles, including Chairman of the Irish Health Research Board and Chairman of the Universitas 21 Network of global research universities. He is also a non-executive Director of Kerry Group plc.

Eugene McCague was appointed as an outside Director of the Company in October 2017. Mr. McCague was a corporate partner of Arthur Cox, one of Ireland's premier law firms, from 1988 until June 2017. During his time with Arthur Cox, Mr. McCague served as both managing partner and chairman of Arthur Cox and also advised a wide range of public and private companies on mainstream corporate work, mergers and acquisitions, corporate restructurings and corporate governance. In addition to his distinguished legal career, Mr. McCague also has extensive board experience with commercial, government and educational organizations. Mr. McCague currently serves on the board of FLY Leasing Limited, an aircraft leasing company listed on the New York Stock Exchange, and on the board of the Irish branch of AON Insurance. He also serves as chairman of Ibec, Ireland's leading business representative

association. Mr. McCague's previous board roles include the Health Service Executive, the Irish state body which administers public health service in Ireland, chairman of the governing body of Dublin Institute of Technology, chairman of the Dublin Institute of Technology Foundation and chairman of the governing authority of University College Dublin. Mr. McCague was also president of the Dublin Chamber of Commerce in 2006. Mr. McCague holds a Bachelor of Civil Law degree and a diploma in European Law from University College Dublin.

Joan Garahy was appointed as an outside Director of the Company in November 2017. Ms. Garahy is the managing director of ClearView Investment & Pensions Limited, a financial advisory company. Ms. Garahy is also a non-executive director of both Kerry Group plc and Irish Residential Properties REIT plc. Ms. Garahy's previous executive roles include founder and managing director of HBCL Investment & Pensions Ltd, director of investments at HC Financial Services Group, head of research at the Irish National Pension Reserve Fund, head of research at Hibernian Investment Managers and her equity analyst roles with Goodbody Stockbrokers and NCB Group. Ms. Garahy was also previously a non-executive director of Galway University Foundation and she is currently a member of the board of The Irish Chamber Orchestra. Ms. Garahy holds a Bachelor of Science degree from University College Galway and a Master of Science from University College Dublin.

Diarmaid Cunningham is Chief Administrative Officer, General Counsel, Executive Vice President and Company Secretary. Mr. Cunningham joined the Company as General Counsel in November 2009. From 2009 until 2013, Mr. Cunningham was based in the Company's global headquarters in Dublin. In 2013, Mr. Cunningham was seconded to the Company's US headquarters in Pennsylvania and that secondment ended in 2018 when Mr. Cunningham returned to Dublin. In July 2016, Mr. Cunningham's role expanded to include Chief Administrative Officer in addition to General Counsel. This expansion of his role means Mr. Cunningham has responsibility to the Company's Quality Assurance, Client Contracts Services, Facilities and Procurement groups in addition to his responsibility for the Company's Legal group. Mr. Cunningham graduated with a Bachelor of Business and Legal Studies from University College Dublin in 1997, qualified as a lawyer in 2001 and completed the Stanford Executive Program at Stanford University in California in 2015. Mr. Cunningham served as Secretary to the Board of the Association of Clinical Research Organizations (ACRO) in 2013 and 2014. ACRO represents the CRO industry globally to key stakeholders including pharmaceutical, biotech and medical device companies, regulators, legislators and patient groups. Prior to joining the Company, Mr. Cunningham spent 10 years with A&L Goodbody, one of Ireland's premier corporate law firms.

Board Practices

Board of Directors

The business of the Company is managed by the Directors who may exercise all the powers of the Company which are not required by the Companies Act 2014 of Ireland or by the Constitution of the Company to be exercised by the Company in general meeting. A meeting of Directors at which a quorum is present may exercise all powers exercisable by the Directors. The Directors may delegate (with power to sub-delegate) to any Director holding any executive office and to any Committee consisting of one or more Directors, together with such other persons as may be appointed to such Committee by the Directors, provided that a majority of the members of each Committee appointed by the Directors shall at all times consist of Directors and that no resolution of any such Committee shall be effective unless two of the members of the Committee present at the meeting at which it was passed are Directors.

The Board comprises one executive and ten outside Directors at the date of this report. The outside Directors bring independent judgment to bear on issues of strategy, performance, resources, key appointments and standards. The Company considers all of its outside Directors to be of complementary skills, experience and knowledge and each outside Director has specific skills, experience and knowledge that are valuable to the Company. The Board members between them have very strong financial, pharmaceutical, CRO, scientific, medical and other skills and knowledge which are harnessed to address the challenges facing the Group. The Board meets regularly throughout the year and all Directors have full and timely access to the information necessary for them to discharge their duties. The Directors have access to the advice and services of the Company Secretary and may seek external independent professional advice where required. The Board considers its current size (11 Directors) to be adequate but continues to look for suitable qualified potential candidates to join the Board.

As set out below, certain other matters are delegated to Board Committees and all Board Committees report to the Board. The Company maintains what it considers an appropriate level of insurance cover in respect of legal action against its Directors. The Board, through the Nominating and Governance Committee, engages in succession planning for the Board and in so doing considers the strength and depth of the Board and the levels of knowledge, skills and experience of the Directors necessary for the Company to achieve its objectives. The Board meets at least four times each year. During the year ended December 31, 2018 the Board held seven board meetings. All Directors allocated sufficient time to the Company during the year ended December 31, 2018 to effectively discharge their responsibilities to the Company.

Directors' retirement and re-election

The Company's Constitution provides that, unless otherwise determined by the Company at a general meeting, the number of Directors shall not be more than 15 nor less than 3. At each annual general meeting, one third of the Directors who are subject to retirement by rotation, rounded down to the next whole number if it is a fractional number, shall retire from office. The Directors to retire shall be those who have been longest in office, but as between persons who became or were last re-appointed on the same day, those to retire shall be determined, unless otherwise agreed, by lot. Any additional Director appointed by the Company shall hold office until the next annual general meeting and will be subject to re-election at that meeting. Accordingly, at the annual general meeting of the Company to be held in 2019, it is anticipated that three Directors will retire in accordance with the Constitution and offer themselves for re-election. The Board of Directors adopted a Non-Executive Director Policy for Service on April 24, 2018 which provides that, subject to individual waiver by the Board, an outside director of ICON plc shall serve on the Board of the Directors for an initial term which expires at the fourth annual general meeting after their appointment. Each outside Director may serve for a further two terms of 3 years each subject to the Board's approval. After the final 3 year term the Board may request that the outside Director serve for a further 1 year term which may be renewed annually subject to the Board's approval. For an outside director who previously served as an executive of the Company, the initial 3 year term referred to in this policy is deemed

to commence on the date that he is determined to be independent as per the NASDAQ Rules. This policy does not apply to Dr. John Climax as he is a founder of the Company.

Lead Independent Director

The Board of Directors adopted a Lead Independent Director Charter on February 14, 2017 which provides that in circumstances where the Chairman of the Board is not independent, the independent members of the Board of Directors shall appoint, from among their number, a Lead Independent Director. The Lead Independent Director shall generally assist in optimizing the effectiveness and independence of the Board of Directors by performing such duties as described in the charter, on behalf of the Board of Directors, including coordinating the meetings of the other non-employee and independent directors, and such other duties as determined from time to time by the Board of Directors and/or its independent members. Mr. Declan McKeon, who served as Lead Independent Director since March 1, 2017 stepped down on January 1, 2019 and Mr. Ronan Murphy was appointed as Lead Independent Director with effect from that date.

Board committees

The Board has delegated some of its responsibilities to Board Committees. There are four permanent Committees. These are the Audit Committee, the Compensation and Organization Committee, the Nominating and Governance Committee and the Execution Committee. Each Committee has been charged with specific responsibilities and each has written terms of reference that are reviewed periodically. Minutes of Committee meetings are available to all members of the Board. The Company Secretary is available to act as secretary to each of the Board Committees if required. Appropriate key executives are regularly invited to attend meetings of the Board committees. The Audit Committee, Compensation and Organization Committee and Nominating and Governance Committee each completed a self-evaluation of the performance of the committee in respect to the year ended December 31, 2018 and each committee was satisfied with their performance.

Audit Committee

The Audit Committee meets a minimum of four times a year. It reviews the quarterly and annual financial statements, the effectiveness of the system of internal control and recommends the appointment and removal of the external auditors. It monitors the adequacy of internal accounting practices and addresses all issues raised and recommendations made by the external auditors. The Audit Committee pre-approves all audit and non-audit services provided to the Company by its external auditors on a quarterly basis. The Audit Committee, on a case by case basis, may approve additional services not covered by the quarterly pre-approval, as the need for such services arises. The Audit Committee reviews all services which are provided by the external auditor to review the independence and objectivity of the external auditor, taking into consideration relevant professional and regulatory requirements. The Chief Financial Officer, the Head of Internal Audit, the General Counsel and the external auditors normally attend all meetings of the Audit Committee and have direct access to the Committee Chairman at all times. The Audit Committee is currently comprised of four independent Directors: Ronan Murphy (Chairperson), Declan McKeon, Professor Hugh Brady and Eugene McCague. Professor Dermot Kelleher and Professor William Hall, who served as a members of the Committee during 2018, stepped down on May 1, 2018. Professor Hugh Brady and Eugene McCague joined the Committee on May 1, 2018. Declan McKeon stepped down as Chairperson and Ronan Murphy assumed the position of Chairperson of the Committee with effect from February 19, 2019.

Compensation and Organization Committee

The Compensation and Organization Committee is responsible for senior executive remuneration. The committee aims to ensure that remuneration packages are competitive so that individuals are appropriately rewarded relative to

their responsibility, experience and value to the Company. Annual bonuses for the executive Directors and senior executive management are determined by the committee based on the achievement of the Company's objectives. The Committee also oversees succession planning for the Company's senior management. The Compensation and Organization Committee is currently comprised of the following independent Directors: Joan Garahy (Chairperson), Professor William Hall, Mary Pendergast and Ronan Murphy. Declan McKeon, who served as a member of the Committee during 2018, stepped down as a member of the Committee on May 1, 2018. Joan Garahy joined the Committee on May 1, 2018. Ronan Murphy stepped down as Chairperson of the Committee and Joan Garahy assumed the position Chairperson with effect from February 19, 2019.

Nominating and Governance Committee

The Nominating and Governance Committee reviews the membership of the Board of the Company and Board committees on an ongoing basis. As part of this it regularly evaluates the balance of skills, knowledge and experience on the Board and then, based on this evaluation, identifies and, if appropriate, recommends individuals to join the Board of the Company. The Committee uses

an external search consultant as needed to assist it in identifying potential new outside Directors. Once potential suitable candidates are identified either by the external search consultants or by members of the Nominating and Governance Committee, the Committee then discusses and considers the skills, knowledge and experience of the potential candidate. The Committee will assess if the Board of the Company requires and would benefit from the potential candidate's skills, knowledge and experience and, if it decides the potential candidate is suitable, the Committee would recommend to the Board of the Company that the potential candidate be appointed. The Board of the Company then decides whether or not to appoint the candidate. The Committee considers diversity of the Board members when making recommendations to the Board of the Company. The Nominating and Governance Committee currently comprises the following independent Directors: Professor William Hall (Chairperson), Declan McKeon and Joan Garahy. Ronan Murphy, who served as a member of the Committee during 2018, stepped down as a member of the Committee on May 1, 2018. Joan Garahy joined the Committee on May 1, 2018.

Execution Committee

The primary function of the Execution Committee is to exercise the powers and authority of the Board in intervals between meetings of the Board within the limits set out in the Charter of the Execution Committee. The Execution Committee exercises business judgment to act in what the committee members reasonably believe to be in the best interest of the Company and its shareholders. All powers exercised by the Execution Committee are ratified at board meetings. This Committee convenes as often as it determines to be necessary or appropriate. The Execution Committee is currently comprised of the following Directors and Officer: Steve Cutler (Chairperson), Ronan Murphy, and Brendan Brennan. On January 1, 2019, Declan McKeon stepped down as a member of the Execution Committee and Ronan Murphy joined the Committee.

Attendance at Board and Committee meetings

Attendance at Board and committee meetings by the Directors who held office during 2018 are set out as follows:

Directors' Attendance Table

Director	Board	Audit	Compensation and Organization	Nominating and Governance
	Number of meetings attended / number of meetings eligible to attend as a Director			
Ciaran Murray	7/7	—	—	—
Dr. Steve Cutler	7/7	—	—	—
Declan McKeon (1) (2)	7/7	4/4	2/2	5/5
Dr. John Climax (1)	7/7	—	-	—
Dr. Ronan Lambe (1) (3)	5/5	—	—	—
Prof. Dermot Kelleher (1) (4)	7/7	2/2	—	—
Prof. William Hall (1) (4)	7/7	2/2	4/4	5/5
Mary Pendergast (1) (5)	6/7	—	3/4	—
Prof. Hugh Brady (1) (4)	7/7	2/2	—	—
Ronan Murphy (1) (5)	7/7	4/4	4/4	3/3
Eugene McCague (1) (4)	7/7	2/2	—	—
Joan Garahy (1) (2) (5)	7/7	—	2/2	2/2

(1) Independent Director as defined under NASDAQ Rule 5605(a)(2).

(2) Mr. Declan McKeon retired from the Compensation and Organization Committee with effect from May 1, 2018. Ms. Joan Garahy was appointed to the Compensation and Organization Committee with effect from May 1, 2018.
(3) Dr. Ronan Lambe retired as a Director of the Board on July 24, 2018.
(4) Prof. Dermot Kelleher and Prof. William Hall retired from the Audit Committee with effect from May 1, 2018 and Prof. Hugh Brady and Mr. Eugene McCague were appointed to the Audit Committee with effect from May 1, 2018.
(5) Mr. Ronan Murphy retired from the Nominating and Governance Committee with effect from May 1, 2018 and Ms. Joan Garahy was appointed to the Nominating and Governance Committee with effect from May 1, 2018.
(6) All decisions by the Execution Committee were made by written resolution and therefore no meetings were held.

Executive Officers and Directors Remuneration

Compensation Discussion & Analysis

Remuneration policy

The Compensation and Organization Committee seeks to achieve the following goals with the Company's executive compensation programs: to attract, motivate and retain key executives and to reward executives for value creation. The Committee seeks to foster a performance-oriented environment by ensuring that a significant portion of each executive's cash and equity compensation is based on the achievement of performance targets that are important to the Company and its shareholders.

The Company's executive compensation program has three main elements: base salary, a bonus plan and equity incentives in the form of share related awards granted under the Company's equity incentive plans. All elements of key executives' compensation are determined by the Compensation and Organization Committee based on the achievement of the Group's and individual performance objectives. Base salary, bonus awards and Directors' fees were determined by the Compensation and Organization Committee in U.S. dollars or euro.

Outside Directors' remuneration

Outside Directors are remunerated by way of Directors' fees and are also eligible for participation in the share option scheme. During 2018, each Outside Director (excluding the Board Chairman) was paid an annual retainer of $65,000 and additional fees for Board Committee service.

Mr. Murray's Executive Chairman term expired on May 12, 2018 and he transitioned to the Outside Director role of Non-Executive Chairman. The arrangements with the Non-Executive Chairman of the Board provide for payment of €300,000 (translated at average rate for the year: $355,380) annually. During 2018, Mr. Declan McKeon served as Lead Independent Director and received an additional fee of $25,000 for this role. Mr. Ronan Murphy was appointed as Lead Independent Director with effect from 1 January 2019 and he will receive an additional fee of $25,000 for this role.

Outside Directors are not eligible for performance related bonuses and no pension contributions are made on their behalf. The Compensation and Organization Committee sets non-Executive remuneration.

Executive Directors' and Key Executive Officers' remuneration

Total cash compensation is divided into a base salary portion and a bonus incentive portion. The Committee targets total cash compensation with regard to healthcare/ biopharmaceutical companies of similar market capitalization and peer CRO companies, adjusted upward or downward based on individual performance and experience and level of responsibility. The Compensation and Organization Committee believes that the higher the executive's level of responsibility within the Company, the greater the percentage of the executive's compensation that should be tied to the Company's performance. Target bonus incentive for executive officers range between 50% and 100% with actual pay outs ranging from 25% to 100% of salary based on group and individual performance.

A total bonus of $1.4 million was awarded to the following individuals; Dr. Steve Cutler Chief Executive Officer ($1.1 million) and Mr. Brendan Brennan Chief Financial Officer ($0.3 million) to reflect their contribution to the performance of the Company during 2018. These amounts were approved by the Compensation and Organization Committee and will be paid during the year-ended December 31, 2019.

The Company's executives are eligible to receive equity incentives, including stock options, restricted share units and performance share units, granted under the Company's equity incentive plans. If executives receive equity incentive grants, they are normally approved annually at the first scheduled meeting of the Committee in the fiscal year. The grant date is determined by the Committee, and grants are awarded at the closing price on the day of grant. Newly hired executives may receive sign-on grants. In addition, the Committee may, at its discretion, issue additional equity incentive awards to executives if the Committee determines such awards are necessary to ensure appropriate incentives are in place. The number of equity awards granted to each participant is determined primarily by the Committee at the start of each year based on peer groups and advice from independent compensation consultants.

All executive officers are eligible to participate in applicable pension plans. The Company's contributions are generally a fixed percentage of their annual compensation, supplementing contributions by the executive. The Company has the discretion to make additional contributions if deemed appropriate by the Committee. The Company's contributions are determined at the peer group

median of comparable Irish companies and peer CRO companies. Contributions to this plan are recorded as an expense in the Consolidated Statement of Operations.

Third party Agreements and Arrangements

ICON has not identified any arrangements or agreements relating to compensation or other payments provided by a third party to ICON's directors or director nominees in connection with their candidacy or board service as required to be disclosed pursuant to NASDAQ Rule 5250(b)(3).

Executive Compensation

Summary compensation table - Year ended December 31, 2018

Name & principal position	Year	Salary	Bonus	Pension contribution	All other compensation	Subtotal	Share-based compensation	Director's Fees	Total compensation
		$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Ciaran Murray Non-executive Chairman, former Chairman and former Chief Executive Officer	2018	135	—	17	5	157	2,677	232	3,066
Dr. Steve Cutler Chief Executive Officer and former Chief Operating Officer	2018	1,100	1,100	186	195	2,581	5,235	44	7,860
Brendan Brennan, Chief Financial Officer	2018	560	323	70	26	979	1,569	—	2,548
Total	2018	1,795	1,423	273	226	3,717	9,481	276	13,474

Summary compensation table - Year ended December 31, 2017

Name & principal position	Year	Salary	Bonus	Pension contribution	All other compensation	Subtotal	Share-based compensation	Director's Fees	Total compensation
		$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Ciaran Murray Executive Chairman and former Chief Executive Officer	2017	1,119	339	140	35	1,633	5,903	—	7,536
Dr. Steve Cutler Chief Executive Officer and former Chief Operating Officer	2017	1,045	1,210	110	235	2,600	4,453	37	7,090

Brendan Brennan, Chief Financial Officer	2017	525	393	66	26	1,010	1,503	—	2,513
Total	2017	2,689	1,942	316	296	5,243	11,859	37	17,139

Director Compensation

Summary compensation table - Year ended December 31, 2018

Name	Year	Salary	Company pension contribution	All other compensation	Subtotal	Share-based compensation	Director's fees	Total Compensation
		$'000	$'000	$'000	$'000	$'000	$'000	$'000
Ciaran Murray*	2018	135	17	5	157	2,677	232	3,066
Declan McKeon	2018	—	—	—	—	279	127	406
John Climax	2018	—	—	—	—	279	65	344
Ronan Lambe**	2018	—	—	—	—	1,416	36	1,452
Dermot Kelleher	2018	—	—	—	—	279	69	348
William Hall	2018	—	—	—	—	283	102	385
Mary Pendergast	2018	—	—	—	—	277	78	355
Hugh Brady	2018	—	—	—	—	277	73	350
Steve Cutler	2018	1,100	186	1,295	2,581	5,235	44	7,860
Ronan Murphy	2018	—	—	—	—	173	102	275
Eugene McCague	2018	—	—	—	—	133	73	206
Joan Garahy	2018	—	—	—	—	133	82	215
Total	2018	1,235	203	1,300	2,738	11,441	1,083	15,262

* Appointed as Executive Chairman on March 1, 2017 and non-Executive Chairman from May 12, 2018

** Retired from the Board at the AGM on July 24, 2018

Summary compensation table - Year ended December 31, 2017

Name	Year	Salary	Company pension contribution	All other compensation	Subtotal	Share-based compensation	Director's fees	Total Compensation
		$'000	$'000	$'000	$'000	$'000	$'000	$'000
Ciaran Murray *	2017	1,119	140	374	1,633	5,903	—	7,536
Declan McKeon**	2017	—	—	—	—	137	169	306
John Climax	2017	—	—	—	—	137	69	206
Ronan Lambe	2017	—	—	—	—	137	69	206
Dermot Kelleher	2017	—	—	—	—	137	83	220
William Hall	2017	—	—	—	—	148	113	261
Mary Pendergast	2017	—	—	—	—	131	81	212
Hugh Brady	2017	—	—	—	—	131	65	196
Steve Cutler	2017	1,045	110	1,445	2,600	4,453	37	7,090
Ronan Murphy	2017	—	—	—	—	27	110	137
Eugene McCague ***	2017	—	—	—	—	—	16	16
Joan Garahy ****	2017	—	—	—	—	—	8	8
Total		2,164	250	1,819	4,233	11,341	820	16,394

* Appointed as Executive Chairman on March 1, 2017.
** Appointed as Lead Independent Director on March 1, 2017. Acting Chairman until March 1, 2017.
*** Appointed to the Board on October 3, 2017.
**** Appointed to the Board on November 16, 2017.

Disclosure of Compensation Agreements

Employment Contracts, Termination of Employment and Change in Control Arrangements

The Company does not have any termination or change of control agreements with its named executive officers other than as set out below and in the agreements relating to their equity incentives which provide for accelerated vesting on change of control.

Directors' and Executive Officers' service agreements and letters of engagement

Dr. Steve Cutler

Dr. Steve Cutler has served as Chief Executive Officer since March 2017 having served as Chief Operating Officer of the Company from January 2014 until March 2017. Prior to his appointment as Chief Operating Officer he served as Group President Clinical Research Services since November 2011. He has served as an Executive Director of the Company since November 2015. The Chief Executive Officer service agreement with Dr. Cutler is terminable on 12 months' notice by either party. Under the terms of this agreement Dr. Cutler is entitled to receive an annual salary of $1,100,000 and a bonus to be agreed by the Compensation and Organization Committee. He is also entitled to receive a pension contribution, a car allowance of $12,000 and medical insurance coverage for himself and his dependents. He was previously granted and held at March 1, 2019 165,328 ordinary share options at exercise prices ranging from $47.03 to $115.11 per share, 27,867 Restricted Share Units which vest on various dates between March 2019 and March 2021 and 55,616 (up to a maximum of 111,232 based on certain performance conditions) Performance Share Units which vest between March 2019 and March 2021 subject to the fulfillment of certain performance conditions. His Chief Executive Officer service agreement requires him to devote his full time and attention to his duties for the Company excepting certain outside director positions authorized by the Company. The agreement with Dr. Cutler includes termination and change of control provisions and also includes certain post-termination clauses including non-disclosure, non-competition and non-solicitation provisions. Dr. Cutler has a separate agreement with the Company in respect to his role as a director of ICON plc. Under the terms of this agreement he is entitled to receive an annual fee of $44,000.

Mr. Brendan Brennan

Mr. Brendan Brennan has served as Chief Financial Officer since February 2012 having previously served as acting Chief Financial Officer since October 2011. Prior to this appointment, he served in a number of senior finance roles in the Company including the role of Senior Vice President of Corporate Finance. The service agreement with Mr. Brennan is terminable on 12 months' notice by either party. Under the terms of this agreement Mr. Brennan is entitled to receive an annual salary of $559,802 (€472,566) and a bonus to be agreed by the Compensation and Organization Committee. He is also entitled to receive a pension contribution, a car allowance of €20,000 and medical insurance coverage for himself and his dependents. He was previously granted and held at March 1, 2019 73,472 ordinary share options at exercise prices ranging from $32.37 to $115.11 per share, 7,376 Restricted Share Units, which vest on various dates between March 2019 and March 2021, and 17,526 (up to a maximum of 35,052 based on certain performance conditions) Performance Share Units which vest between March 2019 and March 2021 subject to the fulfillment of certain performance conditions. His service agreement requires him to devote his full time and attention to his duties for the Company excepting certain outside Director positions authorized by the Board. The agreement with Mr. Brennan includes termination and change of control provisions and also includes certain post-termination clauses including non-disclosure, non-competition and non-solicitation provisions.

Mr. Ciaran Murray

Mr. Ciaran Murray has served as Non-Executive Chairman of the Board of Directors since May 2018 having served as Executive Chairman of the Board of Directors from March 2017 until May 2018. Mr. Murray served as Chief Executive Officer of the Company from October 2011 until March 2017. Mr. Murray has served as an Director of the Company since October 2011. He previously served as Chief Financial Officer of the Company from October 2005 until October 2011. Mr. Murray entered into an agreement with the Company in respect of his role as Executive Chairman which was effective from March 2017. Under this agreement from October 18, 2017, Mr. Murray was entitled to receive an annual salary of $355,380 (€300,000) and a bonus to be agreed by the Compensation and Organization Committee. Mr. Murray's Executive Chairman term expired on May 12, 2018 and he transitioned to Non-Executive Chairman. The current arrangement with Mr. Murray provides for the payment to him of fees of $355,380 (€300,000) per annum in respect of his position as Non-Executive Chairman. His previous service agreement as Executive Chairman included termination provisions and also includes certain post-termination clauses including non-disclosure, non-competition and non-solicitation provisions which still apply. As Chief Financial Officer, Chief Executive and Executive Chairman, Mr. Murray was granted and held ordinary share options, Restricted Share Units and Performance Share Units. The vesting of the ordinary share options and Restricted Share Units which were unvested on Mr. Murray ceasing to be an ICON plc

employee on May 12, 2018 was accelerated and the outstanding Ordinary Share options and Restricted Share Units vested on that date. The unvested Performance Share Units with vesting dates between May 12, 2018 and March 2019 were forfeited on Mr. Murray ceasing to be an ICON plc employee on May 12, 2018. He was previously granted and held at March 1, 2019 133,259 ordinary share options at exercise prices ranging from $47.03 to $125.74 per share.

Mr. Ronan Murphy

Mr. Ronan Murphy has served as Lead Independent Director from January 2019 having served as an outside Director of the Company since October 2016. The arrangements with Mr. Murphy (including changes effective from February 2019) continue to provide for the payment to him of Directors fees of $122,500 per annum. He was previously granted and held at March 1, 2019 12,698 ordinary share options at an exercise prices ranging from $90.03 to $125.74.

Dr. John Climax

Dr. John Climax, one of the Company's co-founders, served as Chairman of the Board of the Company from November 2002 to December 2009. He also served as Chief Executive Officer of the Company from June 1990 to October 2002 and is currently an outside Director of the Company. The arrangements with Dr. Climax provide for the payment to him of Director fees of $65,000 per annum. He was previously granted and held at March 1, 2019 47,755 ordinary share options at exercise prices ranging from $22.30 to $125.74 per share.

Mr. Declan McKeon

Mr. Declan McKeon has served as an outside Director of the Company since April 2010. He served as Lead Independent Director from March 2017 until January 2019, having served as Acting Chairman of the Board from April 2016 until March 2017. The arrangements with Mr. McKeon effective from January 2019, provide for the payment to him of Directors fees of $90,000 per annum in respect of his position as Director. He was previously granted and held at March 1, 2019 23,495 ordinary share options at exercise prices ranging from $40.83 to $125.74.

Professor Dermot Kelleher

Professor Dermot Kelleher has served as an outside Director of the Company since May 2008. The arrangements with Professor Kelleher provide for the payment to him of Director fees of $65,000 per annum. He was previously granted and held at March 1, 2019 23,495 ordinary share options at an exercise price ranging from $40.83 to $125.74.

Professor William Hall

Professor William Hall has served as an outside Director of the Company since February 2013. The arrangements with Professor Hall provide for the payment to him of Directors fees of $97,500 per annum. He was previously granted and held at March 1, 2019 23,495 ordinary share options at exercise prices ranging from $40.83 to $125.74.

Ms. Mary Pendergast

Ms. Mary Pendergast has served as an outside Director of the Company since February 2014. The arrangements with Ms. Pendergast provide for the payment to her of Directors fees of $77,500 per annum. She was previously granted and held at March 1, 2019 43,255 ordinary share options at exercise prices ranging from $40.83 to $125.74.

Professor Hugh Brady

Professor Hugh Brady has served as an outside Director of the Company since April 2014. The arrangements with Professor Brady provide for the payment to him of Directors fees of $77,500 per annum. He was previously granted and held at March 1, 2019 43,255 ordinary share options at exercise prices ranging from $40.83 to $125.74.

Mr. Eugene McCague

Mr. Eugene McCague has served as an outside Director of the Company since October 2017. The arrangements with Mr. McCague provide for the payment to him of Directors fees of $77,500 per annum. He was previously granted and held at March 1, 2019 5,005 ordinary share options at an exercise price of $125.74.

Ms. Joan Garahy

Ms. Joan Garahy has served as an outside Director of the Company since November 2017. The arrangements with Ms. Garahy provide for the payment to her of Directors fees of $97,500 per annum effective from February 20, 2019. She was previously granted and held at March 1, 2019 5,005 ordinary share options at an exercise price of $125.74.

Employees

At December 31, 2018, December 31, 2017 and December 31, 2016 we employed approximately 13,670, 13,250 and 12,500 people respectively. Our employees are not unionized and we believe we have a satisfactory relationship with our employees.

Share Ownership

Shares

The following table sets forth certain information as of March 1, 2019 regarding beneficial ownership of our ordinary shares by all of our current Directors and executive officers. Unless otherwise indicated below, to our knowledge, all persons listed below have sole voting and investment power with respect to their ordinary shares, except to the extent authority is shared by spouses under applicable law.

Name of Owner or Identity of Group	No. of Shares (1)	% of total Shares	
Mr. Ciaran Murray	—	—	
Dr. Steve Cutler	40,424	0.08	%
Mr. Brendan Brennan	9,199	0.02	%
Dr. John Climax	685,011	1.27	%
Professor Dermot Kelleher	—	—	
Mr. Declan McKeon	—	—	
Professor William Hall	—	—	
Ms. Mary Pendergast	—	—	
Professor Hugh Brady	—	—	
Mr. Ronan Murphy	—	—	
Mr. Eugene McCague	—	—	
Ms. Joan Garahy	—	—	

(1) As used in these tables, each person has the sole or shared power to vote or direct the voting of a security, or the sole or shared investment power with respect to a security (i.e. the power to dispose, or direct the disposition, of a security). A person is deemed as of any date to have "beneficial ownership" of any security if that such person has the right to acquire such security within 60 days after such date.

Restricted Share Units and Performance Share Units

The following table sets forth certain information as of March 1, 2019 regarding beneficial ownership of restricted share units ("RSUs") and performance share units ("PSUs") which have been issued to our current Directors and executive officers.

Name of Owner or Identity of Group	No. of RSUs	Vesting Date	No. of PSUs [1]	Vesting Date
Dr. Steve Cutler	5,271	March 3, 2019	22,117	March 4, 2019
	4,299	March 3, 2019	18,449	March 3, 2020
	4,424	March 4, 2019	15,050	March 3, 2021
	5,272	March 3, 2020		
	4,299	March 3, 2020		
	4,302	March 3, 2021		
Mr. Brendan Brennan	1,190	March 3, 2019	9,827	March 4, 2019
	1,009	March 3, 2019	4,167	March 3, 2020
	1,966	March 4, 2019	3,532	March 3, 2021
	1,192	March 3, 2020		
	1,009	March 3, 2020		
	1,010	March 3, 2021		

(1) Of the issued PSUs, performance conditions will determine how many vest. If performance targets are exceeded, additional PSUs will be issued and will vest in accordance with the terms of the relevant PSU award. The PSUs vest based on service and specified EPS targets over the period 2015 - 2018, 2016 - 2019, 2017 - 2020 and 2018 - 2021. Depending on the actual amount of EPS from 2015 to 2021, up to an additional 73,142 PSUs may also be granted.

Share Options

The following table sets forth certain information as of March 1, 2019 regarding options to acquire ordinary shares of the Company by all of our current Directors and executive officers.

Name of Owner or Identity of Group	No. of Options [1]	Exercise price	Expiration Date
Mr. Ciaran Murray	12,540	$47.03	March 3, 2022
	26,916	$48.67	March 17, 2022
	35,157	$68.39	March 18, 2023
	45,948	$71.95	March 4, 2024
	7,693	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Dr. Steve Cutler	3,167	$47.03	March 3, 2022
	6,789	$48.67	March 17, 2022
	12,500	$68.39	March 18, 2023
	30,632	$71.95	March 4, 2024
	62,887	$83.47	March 3, 2025
	49,353	$115.11	March 3, 2026
Mr. Declan McKeon	2,000	$40.83	May 23, 2022
	4,000	$68.39	March 18, 2023

6,335	$65.60	May 20, 2024
6,155	$90.03	May 19, 2025
5,005	$125.74	May 18, 2026

Name of Owner or Identity of Group	No. of Options [1]	Exercise price	Expiration Date
Mr. Brendan Brennan	15,813	$32.37	May 1, 2021
	1,006	$47.03	March 3, 2022
	6,967	$48.67	March 17, 2022
	10,285	$68.39	March 18, 2023
	13,611	$71.95	March 4, 2024
	14,206	$83.47	March 3, 2025
	11,584	$115.11	March 3, 2026
Dr. John Climax	2,000	$22.30	April 27, 2020
	2,500	$32.37	May 1, 2021
	10,000	$40.83	May 23, 2022
	10,000	$68.39	March 18, 2023
	10,557	$65.60	May 20, 2024
	7,693	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Professor Dermot Kelleher	2,000	$40.83	May 23, 2022
	4,000	$68.39	March 18, 2023
	6,335	$65.60	May 20, 2024
	6,155	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Professor William Hall	2,000	$40.83	May 23, 2022
	4,000	$68.39	March 18, 2023
	6,335	$65.60	May 20, 2024
	6,155	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Ms. Mary Pendergast	10,000	$40.83	May 23, 2022
	10,000	$68.39	March 18, 2023
	10,557	$65.60	May 20, 2024
	7,693	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Professor Hugh Brady	10,000	$40.83	May 23, 2022
	10,000	$68.39	March 18, 2023
	10,557	$65.60	May 20, 2024
	7,693	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Mr. Ronan Murphy	7,693	$90.03	May 19, 2025
	5,005	$125.74	May 18, 2026
Mr. Eugene McCague	5,005	$125.74	May 18, 2026
Ms. Joan Garahy	5,005	$125.74	May 18, 2026

(1) The title of securities covered by all of the above options are non-qualified.

In February 2018, the Board approved the appointment of Mr. Murray as non-Executive Chairman of the Board of Directors with effect from May 12, 2018. Mr. Murray ceased to be an employee of the Company as of this date. Mr. Murray was granted and held ordinary share options, Restricted Share units and Performance Share units as Chief Financial Officer, Chief Executive Officer and Executive Chairman. The vesting of the Ordinary Share Options and Restricted Share Units which were unvested on Mr. Murray ceasing to be an ICON plc employee (May 12, 2018) were accelerated and the outstanding Ordinary Share Options and Restricted Share Units vested on that date. The unvested Performance Share Units with vesting dates between May 12, 2018 and March 2019 were forfeit on Mr. Murray ceasing to be an ICON plc employee on May 12, 2018.

Equity Incentive Plans

On April 23, 2013 the Company adopted the 2013 Employees Restricted Share Unit and Performance Share Unit Plan (the "2013 RSU Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may select any employee, or any Director holding a salaried office or employment with the Company, or a Subsidiary to receive an award under the plan. On May 11, 2015, the 2013 RSU Plan was amended and restated in order to increase the number of ordinary shares that can be issued under the RSU Plan by 2.5 million shares. Accordingly, an aggregate of 4.1 million ordinary shares have been reserved for issuance under the 2013 RSU Plan. The shares are awarded at par value and vest over a service period. Awards under the 2013 RSU Plan may be settled in cash or shares at the option of the Company.

On July 21, 2008 the Company adopted the 2008 Employees Restricted Share Unit Plan (the "2008 RSU Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may select any employee, or any Director holding a salaried office or employment with the Company or a Subsidiary to receive an award under the plan. An aggregate of 1.0 million ordinary shares have been reserved for issuance under the 2008 RSU Plan.

On July 21, 2008 the Company adopted the Employee Share Option Plan 2008 (the "2008 Employee Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may grant options to any employee, or any Director holding a salaried office or employment with the Company or a Subsidiary for the purchase of ordinary shares. On the same date, the Company also adopted the Consultants Share Option Plan 2008 (the "2008 Consultants Plan"), pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may grant options to any consultant, adviser or non-executive Director retained by the Company or any Subsidiary for the purchase of ordinary shares.

On February 14, 2017 both the 2008 Employee Plan and the 2008 Consultants Plan (together the "2008 Option Plans") were amended and restated in order to increase the number of options that can be issued under the 2008 Consultants Plan from 400,000 to 1 million and to extend the date for options to be granted under the 2008 Option Plans. An aggregate of 6.0 million ordinary shares have been reserved under the 2008 Employee Plan as reduced by any shares issued or to be issued pursuant to options granted under the 2008 Consultants Plan under which a limit of 1 million shares applies. Further, the maximum number of ordinary shares with respect to which options may be granted under the 2008 Employee Option Plan, during any calendar year to any employee shall be 400,000 ordinary shares. There is no individual limit under the 2008 Consultants Plan. No options may be granted under the 2008 Option Plans after February 14, 2027.

Each option granted under the 2008 Option Plans will be a nonqualified stock option, or NSO and not an incentive stock option as described in Section 422 of the Internal Revenue Code. Each grant of an option under the 2008 Options Plans will be evidenced by a Stock Option Agreement between the optionee and the Company. The exercise price will be specified in each Stock Option Agreement, however option prices will not be less than 100% of the fair

market value of an ordinary share on the date the option is granted.

On January 17, 2003 the Company adopted the Share Option Plan 2003 (the "2003 Share Option Plan") pursuant to which the Compensation and Organization Committee of the Board could grant options to officers and other employees of the Company or its subsidiaries for the purchase of ordinary shares. An aggregate of 6.0 million ordinary shares were reserved under the 2003 Share Option Plan; and, in no event could the number of ordinary shares issued pursuant to options awarded under this plan exceed 10% of the outstanding shares, as defined in the 2003 Share Option Plan, at the time of the grant, unless the Board expressly determined otherwise. Further, the maximum number of ordinary shares with respect to which options could be granted under the 2003 Share Option Plan during any calendar year to any employee was 400,000 ordinary shares. The 2003 Share Option Plan expired on January 17, 2013. No new options may be granted under this plan.

Share option awards are granted with an exercise price equal to the market price of the Company's shares at date of grant. Share options typically vest over a period of five years from date of grant and expire eight years from date of grant. The maximum contractual term of options outstanding at December 31, 2018 is eight years.

Item 7. Major Shareholders and Related Party Transactions.

The following table sets forth certain information regarding beneficial ownership of ICON's ordinary shares as of March 1, 2019 (i) by each person that beneficially owns more than 5% of the outstanding ordinary shares, based upon information known to us and publicly available information; and (ii) by all of our current Directors, officers and other key employees as a group. Unless otherwise indicated below, to our knowledge, all persons listed below have sole voting and investment power with respect to their ordinary shares, except to the extent authority is shared by spouses under applicable law.

Name of Owner or Identity of Group	No. of Shares (1)	Percent of Class	
WCM Investment Management (2)	5,272,086	9.8	%
Wellington Management Company, LLP (2)	3,728,130	6.9	%
All Directors, officers and other key employees as a group (3)	1,578,677	2.9	%

(1) As used in this table, each person has the sole or shared power to vote or direct the voting of a security, or the sole or shared investment power with respect to a security (i.e., the power to dispose, or direct the disposition, of a security). A person is deemed as of any date to have "beneficial ownership" of any security if that such person has the right to acquire such security within 60 days after such date.

(2) Neither the Company nor any of its officers, Directors or affiliates holds any voting power in this entity.

(3) Includes 633,915 ordinary shares issuable upon the exercise of stock options granted by the Company, 40,172 RSUs awarded by the Company to Directors, officers and other key employees and 169,956 PSUs awarded by the Company to Directors, officers and other key employees. Of the PSUs, performance conditions determine how many of them will vest and, if performance targets are exceeded, additional PSUs will be issued and vest in accordance with the terms of the relevant PSU award, the figure included is the maximum amount of PSUs that may be issued.

ICON plc, is not directly or indirectly, owned or controlled by another corporation or by any government.

Related Party Transactions

Subsidiaries of the Company earned revenue of $633,000 (2017: $743,000) from DS Biopharma Limited (formerly Dignity Sciences Limited) during the year. Dr. John Climax is Chief Executive Officer and both Dr. John Climax and Dr. Ronan Lambe are Directors and shareholders of DS Biopharma Limited. $338,000 was recorded as due from DS Biopharma Limited at December 31, 2018. The contract terms were agreed on an arm’s length basis.

During the year ended December 31, 2017, personal expenses totaling $178,000 were settled by the Company on behalf of Mr. Ciaran Murray. Payment was received in advance from Mr. Murray in respect of these expenses. The Company transferred ownership of an asset at fair value ($77,000) to Mr. Ciaran Murray effective November 1, 2017. Payment was received in full in January 2018.

On July 22, 2016, Mr. Thomas Lynch retired as a Director of the Company, having previously resigned as Chairman of the Company in March 2016. An expense of €231,750 was recorded during 2018 in respect of consultancy services provided by a company controlled by Mr. Lynch. $64,000 was recorded as due to Mr. Lynch under the terms of the agreement at December 31, 2018.

Item 8. Financial Information.

Financial Statements

See Item 18.

Significant Changes

There have been no significant changes to our business that we believe could reasonably be expected to have a material adverse effect on our business, results of operations and financial condition.

Legal Proceedings

ICON is not party to any litigation or other legal proceedings that we believe could reasonably be expected to have a material adverse effect on our business, results of operations and financial condition.

Dividends

We have not paid cash dividends on our ordinary shares and do not currently intend to pay cash dividends on our ordinary shares in the foreseeable future.

Item 9. The Offer and Listing.

ICON's ordinary shares are traded on the NASDAQ Global Select Market under the symbol "ICLR". ICON plc's ADR program was terminated on January 31, 2013 and ICON plc's ordinary shares began directly trading on NASDAQ on February 4, 2013. Prior to that date, ICON plc's ADSs were traded on NASDAQ and ICON plc's Depository for the ADSs was The Bank of New York Mellon.

Item 10. Additional Information.

Constitution

We hereby incorporate by reference our Constitution, as amended, located under the heading "Constitution of the Company" in Exhibit 3.1.

The following is a summary of certain provisions of the current Constitution of the Company. This summary does not purport to be complete and is qualified in its entirety by reference to the complete text of the Constitution of the Company, which are included as an exhibit to this annual report.

Objects
The Company is incorporated under the name ICON plc, and is registered in Ireland under registered number 145835. The Company's objects, which are detailed in the Constitution of the Company, are broad and include, but are not limited to, the carrying on the business of an investment holding company.

Directors
Subject to certain exceptions, Directors may not vote on matters in which they have a material interest. Any Director who holds any executive office, serves on any committee or otherwise performs services, which, in the opinion of the Directors, are outside the scope of the ordinary duties of a Director, may be paid such extra remuneration as the Directors may determine. The Directors may exercise all the powers of the Company to borrow money. These powers may be amended by special resolution of the shareholders. The Directors are not required to retire at any particular age. One-third of the Directors retire and offer themselves for re-election at each Annual General Meeting ("AGM") of the Company. The Directors to retire by rotation are those who have been longest in office since their last appointment or reappointment. As between persons who became or were appointed Directors on the same date, those to retire are determined by agreement between them or, otherwise, by lot. All of the shareholders entitled to attend and vote at the AGM may vote on the re-election of Directors. There is no requirement for Directors to hold shares set out in the Constitution.

Rights, Preferences and Dividends Attaching to Shares
The Company has only one class of shares, Ordinary Shares with a par value of €0.06 per share. All such Ordinary Shares rank equally with respect to voting, payment of dividends and on any winding-up of the Company. Any

dividend, interest or other sum payable to a shareholder that remains unclaimed for one year after having been declared may be invested by the Directors for the benefit of the Company until claimed. If the Directors so resolve, any dividend which has remained unclaimed for 12 years from the date of its declaration shall be forfeited and cease to remain owing by the Company. In the event of the Company being wound up, if the assets available for distribution among the Members shall be more than sufficient to repay the whole of the share capital paid up or credited as paid up at the commencement of the winding up, the excess shall be distributed among the Members in proportion to the capital at the commencement of the winding up paid up or credited as paid up on the said Ordinary Shares held by them respectively. An Ordinary Share shall be deemed to be a redeemable share in certain circumstances. The liability of shareholders to invest additional capital is limited to the amounts remaining unpaid on the shares held by them.

Action Necessary to Change the Rights of Shareholders
The rights attaching to shares in the Company may be varied by special resolutions passed at class meetings of that class of shareholders of the Company.

Annual and General Meetings
The AGM shall be held in such place and at such time as shall be determined by the board, but no more than 15 months shall pass between the dates of consecutive AGMs. Directors may call an Extraordinary General Meeting ("EGM") at any time. The members, in accordance with the Constitution of the Company and Irish Company law, may also requisition EGM's. Notice of the AGM or an EGM passing any special resolution must be given at least 21 clear days prior to the scheduled date and, in the case of any other general meeting, not less than 14 clear days' notice. All holders of Ordinary Shares are entitled to attend, speak at and vote at general meetings of the Company.

Limitations on the Right to Own Shares
There are no limitations on the right to own shares in the Constitution of the Company.

Disclosure of Share Ownership
Under Irish law, the Company can require parties to disclose their interests in shares. The Constitution of the Company entitle the Directors to require parties to provide details regarding their identity and the nature and extent of any interest which such parties hold in Ordinary Shares. Under Irish law, if a party acquires or disposes of Ordinary Shares so as to bring his interest above or below 3% of the total issued share capital of the Company, he must notify the Company of that. The Company would also need to be notified of the acquisition by an existing substantial (i.e. 3% plus) shareholder, of every movement of one whole percentage integer (e.g. 3.9% to 4.1% but not 4.1% to 4.9%) or more.

Other Provisions of the Constitution
There are no provisions in the Constitution of the Company:

(i) delaying or prohibiting a change in the control of the Company, but which operate only with respect to a merger, acquisition or corporate restructuring;

(ii) discriminating against any existing or prospective holder of shares as a result of such shareholder owning a substantial number of shares; or

(iii) governing changes in capital, in each case, where such provisions are more stringent than those required by law.

Material Contracts

Not applicable.

Exchange Controls and Other Limitations Affecting Security Holders

Irish exchange control regulations ceased to apply from and after December 31, 1992. Except as indicated below, there are no restrictions on non-residents of Ireland dealing in domestic securities, which includes shares or depository receipts of Irish companies. Except as indicated below, dividends and redemption proceeds also continue to be freely transferable to non-resident holders of such securities.

The Financial Transfers Act, 1992 gives power to the Minister for Finance of Ireland to make provision for the restriction of financial transfers between Ireland and other countries and persons. Financial transfers are broadly defined, and include all transfers which would be movements of capital or payments within the meaning of the treaties

governing the European Communities. The acquisition or disposal of shares issued by an Irish incorporated company and associated payments may fall within this definition. In addition, dividends or payments on redemption or purchase of shares and payments on a liquidation of an Irish incorporated company would fall within this definition.

The Financial Transfers Act, 1992 prohibits financial transfers involving a number of persons, entities and bodies, which is subject to amendment on an ongoing, regular basis and currently includes, but is not limited to: certain persons and activities in Sudan, the Republic of Guinea-Bissau, Côte d'Ivoire, Libya, Iraq, the Democratic People's Republic of Korea, Myanmar, Somalia, Tunisia, Liberia, Democratic of Congo, Lebanon, certain activities, persons and entities in Syria and Iran; certain persons and entities associated with the Taliban in Afghanistan; certain persons, entities and bodies in Ukraine; and certain known terrorists and terrorist groups and countries that harbor certain terrorist groups, without the prior permission of the Central Bank of Ireland.

There are no restrictions under the Company’s Constitution or under Irish Law that limit the right of non-residents or foreign owners to hold the Company’s ordinary shares or vote at general meetings of the Company.

Taxation

General

The following discussion is based on existing Irish tax law, Irish court decisions and the practice of the Revenue Commissioners of Ireland, and the convention between the United States and Ireland for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with respect to income and capital gains (the "Treaty"). This discussion does not purport to deal with the tax consequences of owning the ordinary shares for all categories of investors, some of which may be subject to special rules. Prospective purchasers of ordinary shares are advised to consult their own tax advisors concerning the overall tax consequences arising in their own particular situations under Irish law. Each prospective investor should understand that future legislative, administrative and judicial changes could modify the tax consequences described below, possibly with retroactive effect.

As used herein, the term "U.S. Holder" means a beneficial owner of ordinary shares that (i) owns the ordinary shares as capital assets; (ii) is a U.S. citizen or resident, a U.S. corporation, an estate the income of which is subject to U.S. federal income taxation regardless of its source or a trust that meets the following two tests: (A) a U.S. court is able to exercise primary supervision over the administration of the trust, and (B) one or more U.S. persons have the authority to control all substantial decisions of the trust; and for the purpose of the discussion under Irish Taxation of U.S. Holders (A) is not a resident of, or ordinarily resident in, Ireland for the purposes of Irish tax; and (B) is not engaged in trade or business in Ireland through a permanent establishment.

AS USED HEREIN, REFERENCES TO THE ORDINARY SHARES SHALL INCLUDE SHARES HELD IN THE ACCOUNTS OF PARTICIPANTS THROUGH THE DEPOSITARY TRUST COMPANY (“THE DTC”).

Irish Taxation

Irish corporation tax on income

ICON is a public limited company incorporated and resident for tax purposes in Ireland by virtue of its place of central management and control being in Ireland.

Companies which are resident in the Republic of Ireland are subject to Irish corporation tax on their total profits (wherever arising and, generally, whether or not remitted to the Republic of Ireland). The question of residence, by virtue of management and control, is essentially one of fact. It is the present intention of the Company's management to continue to manage and control the Company from the Republic of Ireland, so that the Company will continue to be resident in the Republic of Ireland.

The standard rate of Irish corporation tax on trading income (with certain exceptions) is currently 12.5%.

A research and development tax credit is available in Ireland where an Irish resident company incurs qualifying expenditure on research and development activities. Qualifying expenditure incurred in a particular account period results in a tax credit of 25% of that expenditure.

Corporation tax is charged at the rate of 25% on a company's non-trading income and certain types of trading income not eligible for the lower rate of 12.5% referred to above.

Capital gains arising to an Irish resident company are liable to tax at 33%. However, a capital gains tax exemption is available in Ireland for qualifying Irish resident companies in respect of disposals of certain qualifying shareholdings.

The exemption from capital gains tax on the disposal of shares by an Irish resident company will apply where certain conditions are met. These conditions principally are:

- The company claiming the exemption must hold (directly or indirectly) at least 5% of the ordinary share capital of the company in which the interest is being disposed of, throughout a continuous period of at least 12 months, within the two year period prior to disposal;

- The shares being disposed of must be in a company, which at the date of disposal, is resident in a Member State of the European Communities or in a country with which Ireland has signed or made specific arrangements to sign a double tax agreement (together a “Relevant Territory”);

- The shares must be in a company which is primarily a trading company or the company making the disposal together with its "5% plus subsidiaries" should be primarily a trading group; and

- The shares must not derive the greater part of their value from land or mineral rights in the State.

Irish withholding tax on dividends

Unless specifically exempted, all dividends paid by the Company, will be subject to Irish withholding tax at the standard rate of income tax in force at the time the dividend is paid, which is currently 20%.

An individual shareholder who is neither resident nor ordinarily resident for tax purposes in Ireland, but is resident in a country with which Ireland has a double tax treaty, or in a member state of the European Union, other than Ireland (together, a Relevant Territory), will be exempt from withholding tax provided he or she makes the requisite declaration.

Irish resident corporate shareholders will be exempt from withholding tax. Where the shareholding held by the recipient Company, in the company paying the dividend is not 51% or greater a declaration must be made in order to avail of the exemption.

Non-Irish resident corporate shareholders will be exempt from withholding tax on the production of the appropriate certificates and declarations where they:

- are resident in a Relevant Territory and are not controlled (directly or indirectly) by Irish residents;

- are ultimately controlled (directly or indirectly) by residents of a Relevant Territory; or

- have the principal class of their shares, or shares of a 75% parent, substantially and regularly traded on one or more recognized stock exchanges in a Relevant Territory (including Ireland) or Territories; or

- are wholly owned by two or more companies, each of whose principal class of shares is substantially and regularly traded on one or more recognized stock exchanges in a Relevant Territory (including Ireland) or Territories.

U.S. holders of ordinary shares should note, however, that detailed documentation requirements may need to be complied with. Special arrangements are available in the case of an interest in shares held in Irish companies through a depositary or in accounts of participants through the DTC. In certain cases the depositary or the DTC can receive and pass on a dividend from an Irish company without deducting withholding tax, provided the depositary or the DTC is a qualifying intermediary, and provided the person beneficially entitled to the distribution would meet the same conditions outlined above for the withholding tax exemption to apply and has provided the qualifying intermediary with the appropriate declarations. The depositary or the DTC shall be regarded as a qualifying intermediary provided the following conditions are met:

- the depositary or the DTC is resident in a Relevant Territory; and

- the depositary or the DTC have entered into a qualifying intermediary agreement with the Irish tax authorities; and

- the depositary or the DTC have been authorized by the Irish Revenue Commissioners as a qualifying intermediary and such authorization has not expired or been revoked.

Irish income tax on dividends

Irish resident or ordinarily resident shareholders will generally be liable to Irish income tax on dividend income at their marginal rate of income tax. This income may also be liable to Pay Related Social Insurance ("PRSI") of up to 4% and the Universal Social Charge ("USC") of up to 11% (up to 15% in total).

Under certain circumstances, non-Irish resident shareholders will be subject to Irish income tax on dividend income. This liability is limited to tax at the standard rate of 20% and therefore, where withholding tax has been deducted, this will satisfy the tax liability. No PRSI or USC should apply in these circumstances.

However, a non-Irish resident shareholder will not have an Irish income tax liability on dividends from the Company if the holder is neither resident nor ordinarily resident in the Republic of Ireland and the holder is:

- an individual resident in the U.S. or in a Relevant Territory;
- a corporation that is ultimately controlled by persons resident in the U.S. or in a Relevant Territory;
- a corporation whose principal class of shares (or its 75% or greater parent's principal class of shares) is substantially and regularly traded on a recognized stock exchange in an EU country or in a Relevant Territory;
- a corporation resident in another EU member state or in a Relevant Territory, which is not controlled directly or indirectly by Irish residents; or
- a corporation that is wholly owned by two or more corporations each of whose principal class of shares is substantially and regularly traded on a recognized stock exchange in an EU country or in a Relevant Territory.

U.S. Holders who do not qualify for the above income tax exemption may be able to obtain treaty benefits under the double tax treaty.

Irish domicile levy

Certain non-Irish resident individuals that are domiciled in Ireland will be subject to an annual levy of €200,000 if their Irish-located property exceeds €5,000,000, their worldwide annual income exceeds €1,000,000 and their liability to Irish Income Tax in that year is less than €200,000.

Irish capital gains tax on disposal of shares
Irish resident or ordinarily resident shareholders will be liable to capital gains tax at 33% on gains arising from the disposal or part disposal of their shareholding.
A person who is not resident or ordinarily resident in Ireland, who has not been an Irish resident within the past five years and who does not carry on a trade in Ireland through a branch or agency will not be subject to Irish capital gains tax on the disposal of ordinary shares or shares held in accounts of participants through the DTC, so long as the shares do not derive the greater part of their value from Irish land or mineral rights.

There are provisions to subject a person who disposes of an interest in a company while temporarily being non-Irish resident, to Irish capital gains tax. This treatment will apply to Irish domiciled individuals:

- who cease to be Irish resident;
- who beneficially own the relevant assets when they cease to be resident;
- if there are not more than 5 years of assessment between the last year of Irish tax residence prior to becoming temporarily non-resident and the tax year that he/she resumes Irish tax residency;
- who dispose of the relevant assets during this temporary non-residence; and
- the interest disposed of represents 5% or greater of the issued share capital of the company or is worth at least €500,000.

In these circumstances the person will be deemed, for Irish capital gains tax purposes, to have sold and immediately reacquired the interest in the company on the date of his or her departure and will be subject to tax at 33% of the taxable gain.

Irish capital acquisitions tax

Irish capital acquisitions tax (referred to as CAT) applies to gifts and inheritances. Subject to certain tax-free thresholds, gifts and inheritances are liable to tax at 33%.

Where a gift or inheritance is taken under a disposition made after December 1, 1999 it will be within the charge to CAT:

- to the extent that the property of which the gift or inheritance consists is situated in the Republic of Ireland at the date of the gift or inheritance;

- where the person making the gift or inheritance is or was resident or ordinarily resident in the Republic of Ireland at the date of the disposition under which the gift or inheritance is taken;

- in the case of a gift taken under a discretionary trust where the person from whom the gift is taken was resident or ordinarily resident in the Republic of Ireland at the date he made the settlement, or at the date of the gift or, if he is dead at the date of the gift, at the date of his death; or

- where the person receiving the gift or inheritance is resident or ordinarily resident in the Republic of Ireland at the date of the gift or inheritance.

For these purposes a non-Irish domiciled individual will not be regarded as resident or ordinarily resident in the Republic of Ireland on a particular date unless they are resident or ordinarily resident in the Republic of Ireland on that date and have been resident for the 5 consecutive tax years immediately preceding the year of assessment in which the date falls.

The person who receives the gift or inheritance ("the beneficiary") is primarily liable for CAT. In the case of an inheritance, where a beneficiary and personal representative of the deceased are both non-residents, a solicitor must be appointed to be responsible for paying inheritance tax. Taxable gifts or inheritances received by an individual since December 5, 1991 from donors in the same threshold class are aggregated and only the excess over a specified tax-free threshold is taxed. The tax-free threshold is dependent on the relationship between the donor and the donees and the aggregation since December 5, 1991 of all previous gifts and inheritances, within the same tax threshold.

The tax-free threshold amounts that apply are:
- €16,250 in the case of persons who are not related to one another;

- €32,500 in the case of gifts or inheritances received from inter alia a brother or sister or from a brother or sister of a parent or from a grandparent; and

- €320,000 in the case of gifts and inheritances received from a parent (or from a grandparent by a minor child of a deceased child) and specified inheritances received by a parent from a child for gifts or inheritances taken on or after October 10, 2018. This threshold was €310,000 prior to October 10, 2018.

Gifts and inheritances passing between spouses are exempt from CAT.

A gift or inheritance of ordinary shares or ADSs will be within the charge to Irish capital acquisitions tax, notwithstanding that the person from whom or by whom the gift or inheritance is received is domiciled or resident outside Ireland.

The Estate Tax Convention between Ireland and the United States generally provides for Irish capital acquisitions tax paid on inheritances in Ireland to be credited against U.S. Federal Estate tax payable in the United States and for tax paid in the United States to be credited against tax payable in Ireland, based on priority rules set forth in the Estate Tax Convention. The Estate Tax Convention does not apply to Irish capital acquisitions tax paid on gifts.

Irish stamp duty

Irish stamp duty, which is a tax on certain documents, is payable on all transfers of ordinary shares (other than between spouses) whenever a document of transfer is executed. Where the transfer is attributable to a sale, stamp duty will be charged at a rate of 1%, rounded to the nearest euro. The stamp duty is calculated on the amount or value of the consideration (i.e. purchase price) or, if the transfer is by way of a gift (subject to certain exceptions) or for

consideration less than the market value, on the market value of the shares. Where the consideration for the sale is expressed in a currency other than euro, the duty will be charged on the euro equivalent calculated at the rate of exchange prevailing on the date of the transfer.
Transfers through the DTC of book entry interests in shares are not subject to Irish stamp duty.

A transfer of ordinary shares by a shareholder to a depositary or custodian for deposit and a transfer of ordinary shares from the depositary or the custodian for the purposes of the withdrawal of the underlying ordinary shares in accordance with the terms of a deposit agreement will be stampable at the ad valorem rate if the transfer relates to a sale, a contemplated sale, a gift or any other change in the beneficial ownership of such ordinary shares. However transfers of ordinary shares into or out of the DTC are not subject to Irish stamp duty provided that no change in beneficial ownership of the shares has occurred and provided a contract for sale in respect of the transferring shares is not in place.

The person accountable for payment of stamp duty is normally the transferee or, in the case of a transfer by way of gift, or for a consideration less than the market value, all parties to the transfer.

Transfers of ordinary shares between associated companies (broadly, companies within a 90% group relationship and subject to the satisfaction of certain conditions) are exempt from stamp duty in the Republic of Ireland. In the case of transfers of ordinary shares where no beneficial interest passes (e.g. a transfer of shares from a beneficial owner to his nominee), no stamp duty arises.

No stamp duty shall arise on the transfer of ordinary shares where the consideration for the transfer does not exceed €1,000, provided the instrument contains a statement certifying that the transaction does not form part of a larger transaction or a series of larger transactions, in respect of which the amount of the total consideration attributable to the shares would exceed €1,000.

Documents on Display

We are subject to the informational requirements of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and file reports and other information with the SEC. The SEC maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC at http://www.sec.gov.

We "incorporate by reference" information that we file with the SEC, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this report and more recent information automatically updates and supersedes more dated information contained or incorporated by reference in this report. Our SEC file number for Exchange Act reports is 333-08704.

As a foreign private issuer, we are exempt from certain rules under the Exchange Act, including prescribing the furnishing and content of proxy statements to shareholders.

We will provide without charge to each person, including any beneficial owner, on the written or oral request of such person, a copy of any or all documents referred to above which have been or may be incorporated by reference in this report (not including exhibits to such incorporated information that are not specifically incorporated by reference into such information). Requests for such copies should be directed to us at the following address: ICON plc, South County Business Park, Leopardstown, Dublin 18, Ireland, Attention: Erina Fox telephone number: +353 1 2912000.

Exemptions From Corporate Governance Listing Requirements Under the NASDAQ Marketplace Rules

NASDAQ may provide exemptions from certain NASDAQ corporate governance standards to a foreign private issuer if, among other reasons those standards are contrary to a law, rule or regulation of a public authority exercising jurisdiction over such issuer or contrary to generally accepted business practices in the issuer's home country of domicile, provided, that, the foreign private issuer properly notifies NASDAQ and makes the required disclosure except to the extent that such exemptions would be contrary to United States federal securities laws.

The exemptions that the Company relies on, and the practices the Company adheres to, are as follows:

- The Company is exempt from provisions set forth in NASDAQ Rule 5620(c), which requires each issuer (other than limited partnerships) to provide for a quorum in its by-laws for any meeting of the holders of common stock, which shall in no case be less than 33.33% of the outstanding shares of the issuer's common voting stock. The Company's Constitution requires that only 3 members be present, in person or by proxy, at a shareholder meeting to constitute a quorum. This quorum requirement is in accordance with Irish law and generally accepted business practices in

Ireland.

- The Company is exempt from provisions set forth in NASDAQ Rule 5635(c) which requires (other than for certain specified exceptions) shareholder approval prior to the establishment or material amendment of a stock option or purchase plan or other equity compensation arrangement made or materially amended, pursuant to which stock may be acquired by officers, Directors, employees or consultants. Irish law does not require shareholder approval with respect to equity compensation arrangements. Accordingly, the 2013 Employees Restricted Share Unit Plan and the amendments to the Employee Share Option Plan 2008 and Consultants Share Option Plan 2008 were adopted by the Board of Directors without shareholder approval.

- The Company is exempt from provisions set forth in NASDAQ Rule 5605(b)(2), which requires independent Directors to hold regularly scheduled meetings at which only independent Directors are present. Irish law does not require independent Directors to hold regularly scheduled meetings at which only independent Directors are present. The Company holds regularly scheduled meetings which all of the Directors may attend and the Lead Independent Director may call meetings

of the independent directors and non-employee directors of the Board, as appropriate, in accordance with the Lead Independent Director Charter.

Item 11 . Quantitative and Qualitative Disclosures about Market Risk.

The principal market risks (i.e. risk of loss arising from adverse changes in market rates and prices) to which we are exposed include foreign currency risk and interest rate risk.

Foreign Currency Exchange Risk

We are subject to a number of foreign currency risks given the global nature of our operations. The principal foreign currency risks to which the business is subject to includes both foreign currency translation risk and foreign currency transaction risk.

Although domiciled in Ireland, we report our results in U.S. dollars. As a consequence the results of our non-U.S. based operations, when translated into U.S. dollars, could be affected by fluctuations in exchange rates between the U.S. dollar and the currencies of those operations.

We are also subject to foreign currency transaction exposures as the currency in which our contracts are priced can be different from the currencies in which costs relating to those contracts are incurred. Our operations in the United States are not materially exposed to such currency differences as the majority of revenues and costs are in U.S. dollars. However, outside the United States the multinational nature of our activities means that contracts may be priced in a single currency, most often U.S. dollars, or euro, while costs arise in a number of currencies, depending, among other things, on which of our offices provide staff for the contract and the location of investigator sites. Although many such contracts benefit from some degree of natural hedging due to the matching of contract revenues and costs in the same currency, where costs are incurred in currencies other than those in which contracts are priced, fluctuations in the relative value of those currencies could have a material effect on our results of operations. We regularly review our foreign currency exposures and enter into forward currency contracts to manage our exposure. We had no open foreign currency contracts at December 31, 2018.

The following significant exchange rates applied during the year:

	Average Rate		Closing Rate	
	2018	2017	2018	2017
Euro:USD	1.1846	1.1229	1.1467	1.2005
Pound Sterling:USD	1.3401	1.2883	1.2754	1.3513

Interest Rate Risk

We are exposed to interest rate risk in respect of our cash and cash equivalents and available for sale investments. Our treasury function actively manages our available cash resources and invests significant cash balances to try to ensure optimum returns for the Company. Financial instruments are classified either as cash and cash equivalents or available for sale investments depending upon the maturity of the related investment. Funds may be invested in the form of floating rate notes and medium term minimum “A-” rated corporate securities. We may be subject to interest rate risk in respect of interest rate changes on amounts invested. Interest rate risk is managed by monitoring the composition of the Company’s investment portfolio on an ongoing basis having regard to current market interest rates and future trends.

In December 2015 we issued $350 million in the private placement market, the rate on these senior notes is fixed at 3.64% for the five year term. The interest rate is further reduced by an interest rate cash flow hedge which was entered

into in advance of the rate fixing date. This cash flow hedge was deemed to be fully effective in accordance with Financial Accounting Standards Board (“FASB”) ASC 815 “Derivatives and Hedging”. The realized gain related to this derivative is recorded within other comprehensive income and is amortized over the life of the Senior Notes. The effective rate on our 5 year Senior Notes is fixed at 3.37%. ICON did not have any short term borrowings in 2018 and were not exposed to changes in market interest rates as a result.

The sensitivity analysis below represents the hypothetical change in the net interest payable of a 1% movement in market interest rates.

	Interest for the year ended December 31, 2018 (in thousands)	Interest Change 1% increase in market interest rate (in thousands)	Interest Change 1% decrease in market interest rate (in thousands)
Interest Income	$4,759	$8,155	$1,372
Interest Expense	($13,502)	($13,502*)	($13,502*)
	($8,743)	($5,347)	($12,130)

*No variable debt drawn down during year ended December 31, 2018.

Item 12 . Description of Securities Other than Equity Securities.

Not applicable.

Part II

Item 13. Defaults, Dividend Arrearages and Delinquencies.

None.

Item 14. Material Modifications to the Rights of Security Holders and Use of Proceeds.

None.

Item 15. Controls and Procedures.

(a) Disclosure controls and procedures

An evaluation was carried out under the supervision and with the participation of the Company's management, including the Chief Executive Officer (CEO) and the Chief Financial Officer (CFO), of the effectiveness of our disclosure controls and procedures as at December 31, 2018. Based on that evaluation, the CEO and CFO have concluded that the Company's disclosure controls and procedures are effective to ensure that information required to be disclosed by the Company in reports that it files or submits under the Securities Exchange Act of 1934 is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms.

(b) Management's Annual Report on Internal Accounting Control over Financial Reporting

Reference is made to page 76 of this Form 20-F.

(c) Attestation Report of Independent Registered Public Accounting Firm

Reference is made to page 77 of this Form 20-F.

(d) Changes in Internal Controls over Financial Reporting

Effective January 1, 2018, we adopted the new revenue standard, ASC Topic 606, Revenue from Contracts with Customers, and implemented a new clinical trial service revenue process and internal controls to assist in the application of the new revenue standard. There were no changes in our internal controls over financial reporting that occurred during the period covered by this Form 20-F that have materially affected or are reasonably likely to materially affect our internal controls over financial reporting.

Item 16. Reserved.

Item 16A. Audit Committee Financial Expert

Mr. Declan McKeon acts as the Audit Committee financial expert serving on our Audit Committee and Board of Directors. The Board has determined that Mr. McKeon is independent.

Item 16B. Code of Ethical Conduct

Our Global Code of Ethical Conduct applies to all ICON employees.
There are no waivers from the provisions of the Code of Ethical Conduct that are required to be disclosed.
This Code of Ethical Conduct is available on our website at the following address:
https://investor.iconplc.com/corporate-governance/governance-documents

Item 16C. Principal Accountant Fees and Services

Our principal accountants for the years ended December 31, 2018 and December 31, 2017 were KPMG.

The table below summarizes the fees for professional services rendered by KPMG for the audit of our annual financial statements for the years ended December 31, 2018 and December 31, 2017 and fees billed for other services rendered by KPMG.

	12 month period ended December 31, 2018 (in thousands)		12 month period ended December 31, 2017 (in thousands)	
Audit fees (1)	$1,661	71 %	$1,556	42 %
Audit related fees (2)	$40	2 %	$1,297	35 %
Tax fees (3)	$642	27 %	$850	23 %
Total	$2,343	100 %	$3,703	100 %

(1) Audit fees include annual audit fees for the Company and its subsidiaries.

(2) Audit related fees principally consist of fees for financial due diligence services, fees for audit of the financial statements, fees for the audit of employee benefit plans and fees for pension reviews. The lower level of audit related fees in 2018 compared to 2017 relates to additional financial due diligence services ($1.1 million) provided in 2017 in connection with a proposed significant one-time acquisition transaction.

(3) Tax fees are fees for tax compliance and tax consultation services.

The Audit Committee pre-approves all audit and non-audit services provided to the Company by its auditors.

Item 16D. Exemptions from the Listing Standards for Audit Committees

Not applicable.

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Item 16E. Purchases of Equity Securities by the Issuer and Affiliated Purchasers

	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of a Publicly Announced Plan	Total Price Paid for Shares Purchased as Part of a Publicly Announced Plan	Maximum Approximate Value of Shares that may yet be purchased under the Publicly Announced Plan
		(in thousands, except per share data)			
October 10/1/16– 10/31/16	474,118	$77.63	474,118	$36,804	$363,196
November 11/1/16 – 11/30/16	756,001	$76.77	756,001	$58,039	$305,157
December 12/1/16 – 12/31/16	199,068	$76.13	199,068	$15,157	$290,000
January 1/1 /17– 1/31/17	152,601	$77.96	152,601	$11,897	$278,103
February 2/1/17 – 2/28/17	—	—	—	—	$278,103
March 3/1/17 – 3/31/17	1,121,907	$79.08	1,121,907	$88,726	$189,377
April 4/1/17 – 4/30/17	93,628	$79.92	93,628	$7,483	$181,894
May 5/1/17 – 5/31/17	—	—	—	—	$181,894
June 6/1/17 – 6/30/17	—	—	—	—	$181,894
July 7/1/17 – 7/31/17	—	—	—	—	$181,894
August 8/1/17 – 8/31/17	—	—	—	—	$181,894
September 9/1/17 – 9/30/17	—	—	—	—	$181,894
October 10/1/17 – 10/31/17	—	—	—	—	$181,894
November 11/1/17 – 11/30/17	2,376	$114.49	2,376	$272	$181,622
December 12/1/17 – 12/31/17	218,715	$113.06	218,715	$24,728	$156,894
January 1/1 /18– 1/31/18	—	—	—	—	$156,894
February 2/1/18 – 2/28/18	196,591	$108.20	196,591	$21,271	$135,623
March 3/1/18 – 3/31/18	148,521	$114.04	148,521	$16,937	$118,686
April 4/1/18 – 4/30/18	—	—	—	—	$118,686
May 5/1/18 – 5/31/18	—	—	—	—	$118,686
June 6/1/18 – 6/30/18	118,943	$134.22	118,943	$15,964	$102,722
July 7/1/18 – 7/31/18	21,088	$132.20	21,088	$2,788	$99,934
August 8/1/18 – 8/31/18	—	—	—	—	$99,934
September 9/1/18 – 9/30/18	—	—	—	—	$99,934
October 10/1/18 – 10/31/18	357,303	$139.94	357,303	$50,000	$49,934
November 11/1/18 – 11/30/18	165,716	$132.76	165,716	$22,000	$27,934
December 12/1/1 – 12/31/18	—	—	—	—	$27,934
	4,026,576	$92.40	4,026,576	$372,066	$27,934

On October 3, 2016 the Company commenced a previously announced share buyback program of up to $400 million. During the year ended December 31, 2018, the Company redeemed a total of 1,008,162 ordinary shares under this program for total consideration of $129.0 million. At December 31, 2018 a total of 4,026,576 ordinary shares were redeemed by the Company under this buyback program for a total consideration of $372.1 million

On January 8, 2019 the Company announced a share buyback program of up to 1 million shares to be executed opportunistically during 2019 depending on cash commitments. All ordinary shares that are redeemed under the

buyback program will be canceled in accordance with the constitutional documents of the Company and the nominal value of these shares transferred to an undenominated capital fund as required under Irish Company law.

Under the repurchase programs, a broker purchased the Company's shares from time to time on the open market or in privately negotiated transactions in accordance with agreed terms and limitations. The programs are designed to allow share repurchases during periods when the Company would ordinarily not be permitted to do so because it may be in possession of material non-public or price-sensitive information, applicable insider trading laws or self-imposed trading blackout periods. The Company's instructions to the broker were irrevocable and the trading decisions in respect of the repurchase programs were made independently of and uninfluenced by the Company. The Company confirms that on entering the share repurchase plans it had no material non-public, price-sensitive or inside information regarding the Company or its securities. Furthermore, the Company will not enter into additional plans whilst in possession of such information. The timing and actual number of shares acquired by way of the redemption will be dependent on market conditions, legal and regulatory requirements and the other terms and limitations contained in the programs. In addition, acquisitions under the programs may be suspended or discontinued in certain circumstances in accordance with the agreed terms. Therefore, there can be no assurance as to the timing or number of shares that may be acquired under the programs.

Item 16F. Changes in Registrant's Certifying Accountant

Not applicable.

Item 16G. Corporate Governance

See Item 10 "Exemptions from Corporate Governance Listing Requirements under the NASDAQ Marketplace Rules".

Item 16H. Mine Safety Disclosure

Not applicable.

Part III

Item 17. Financial Statements.

See item 18.

Item 18. Financial Statements.

Reference is made to pages 76 to 135 of this Form 20-F.

Item 19. Exhibits.

Consolidated Financial Statements of ICON plc and subsidiaries

Exhibits

Management's Report on Internal Control over Financial Reporting

Reports of Independent Registered Public Accounting Firm

Consolidated Balance Sheets as at December 31, 2018 and December 31, 2017

Exhibits of ICON plc and subsidiaries

Exhibit Number	Title
3.1	Description of the Constitution of the Company (incorporated by reference to exhibit 99.2 to the Form 6K (File No. 333-08704) filed on July 25, 2016).
12.1*	Section 302 certifications.
12.2*	Section 906 certifications.
21.1	List of Subsidiaries (incorporated by reference to Item 4 of Form 20-F filed herewith).
23.1*	Consent of KPMG, Independent Registered Public Accounting Firm
101.1*	Interactive Data Files (XBRL – Related Documents)

* Filed herewith

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934.

The Company's internal control over financial reporting is a process designed by, or under the supervision of, the Company's executive and financial officers and effected by the Company's board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external reporting purposes in accordance with generally accepted accounting principles.

A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorization of management and Directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of the inherent limitation due to, for example, the potential for human error or circumvention of control, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2018. In making this assessment, we used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control – Integrated Framework 2013. Based upon the assessment performed, we determined that, as of December 31, 2018 the Company's internal control over financial reporting was effective. Effective January 1, 2018, we adopted the new revenue standard, ASC Topic 606, Revenue from Contracts with Customers, and implemented a new clinical trial service revenue process and internal controls to assist in the application of the new revenue standard. There have been no changes in the Company's internal control over financial reporting during 2018 that have materially affected, or are reasonably likely to affect materially, the Group's internal control over financial reporting.

KPMG, an independent registered public accounting firm, has audited the consolidated financial statements of ICON plc and subsidiaries as of and for the year ended December 31, 2018, included herein, and has issued an audit report on the effectiveness of our internal control over financial reporting, which is included on pages 77 and 78 of Form - 20F.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors

ICON plc:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of ICON plc and subsidiaries ("the Company") as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income, shareholders' equity and comprehensive income, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively, the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the Company’s internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 1, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, effective January 1, 2018, the Company has changed its method of accounting for revenue recognition, due to the adoption of ASC Topic 606, Revenue from Contracts with Customers.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

(signed) KPMG

We have served as the Company's auditor since 1990.

Dublin, Ireland
March 1, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors

ICON plc:

Opinion on Internal Control Over Financial Reporting

We have audited ICON plc and subsidiaries' (the "Company") internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework 2013 issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework 2013 issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income, shareholders' equity and comprehensive income, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes, (collectively, the "consolidated financial statements"), and our report dated March 1, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding

prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

(signed) KPMG

Dublin, Ireland
March 1, 2019

ICON plc
CONSOLIDATED BALANCE SHEETS

	December 31, 2018	December 31, 2017
ASSETS	(in thousands)	
Current Assets:		
Cash and cash equivalents	$395,851	$282,859
Available for sale investments (Note 3a)	59,910	77,589
Accounts receivable, net (Note 17)	414,791	379,501
Unbilled revenue (Note 17)	362,926	268,509
Other receivables	40,459	33,798
Prepayments and other current assets	36,801	34,377
Income taxes receivable (Note 13)	19,445	24,385
Total current assets	1,330,183	1,101,018
Other Assets:		
Property, plant and equipment, net (Note 6)	158,669	163,051
Goodwill (Note 4)	756,260	769,058
Other non-current assets	14,525	15,393
Non-current income taxes receivable (Note 13)	20,023	18,396
Non-current deferred tax asset (Note 13)	13,577	8,074
Investments in equity- long term (Note 3b)	6,963	—
Intangible assets (Note 5)	54,055	71,628
Total Assets	$2,354,255	$2,146,618
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities:		
Accounts payable	$13,288	$18,590
Payments on account (Note 17)	274,468	298,992
Other liabilities (Note 7)	317,143	233,503
Income taxes payable (Note 13)	5,724	14,973
Total current liabilities	610,623	566,058
Other Liabilities:		
Non-current bank credit lines and loan facilities (Note 22)	349,264	348,888
Non-current other liabilities (Note 8)	13,446	17,111
Non-current government grants (Note 11)	877	966
Non-current income taxes payable (Note 13)	17,551	14,879
Non-current deferred tax liability (Note 13)	8,213	7,716
Commitments and contingencies (Note 15)	—	—
Total Liabilities	999,974	955,618
Shareholders' Equity:		
Ordinary shares, par value 6 euro cents per share; 100,000,000 shares authorized, (Note 12) 53,971,706 shares issued and outstanding at December 31, 2018 and 54,081,601 shares issued and outstanding at December 31, 2017.	4,658	4,664
Additional paid-in capital	529,642	481,337
Other undenominated capital (Note 12 (a))	983	912
Accumulated other comprehensive income (Note 21)	(69,328)	(38,713)
Retained earnings	888,326	742,800
Total Shareholders' Equity	1,354,281	1,191,000
Total Liabilities and Shareholders' Equity	$2,354,255	$2,146,618

The accompanying notes are an integral part of these consolidated financial statements.

ICON plc
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31,		
	2018	2017	2016
	(in thousands, except share and per share data)		
Revenue:			
Gross revenue	$2,595,777	$2,402,321	$2,364,956
Reimbursable expenses	—	(643,882)	(698,469)
		1,758,439	1,666,487
Costs and expenses:			
Direct costs	1,818,220	1,027,310	961,333
Selling, general and administrative	325,794	323,741	325,726
Depreciation and amortization	65,916	61,297	59,575
Restructuring (Note 14)	12,490	7,753	8,159
Total costs and expenses	2,222,420	1,420,101	1,354,793
Income from operations	373,357	338,338	311,694
Interest income	4,759	2,346	1,484
Interest expense	(13,502)	(12,627)	(13,006)
Income before income taxes expense	364,614	328,057	300,172
Income tax expense (Note 13)	(41,958)	(46,569)	(37,993)
Net income	$322,656	$281,488	$262,179
Net income per ordinary share:			
Basic	$5.96	$5.20	$4.75
Diluted	$5.89	$5.13	$4.65
Weighted average number of ordinary shares outstanding:			
Basic (Note 2 (v))	54,118,764	54,129,439	55,248,900
Diluted (Note 2 (v))	54,790,663	54,849,046	56,407,136

The accompanying notes are an integral part of these consolidated financial statements.

ICON plc
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31,		
	2018	2017	2016
	(in thousands)		
Net income	$322,656	$281,488	$262,179
Other comprehensive income, net of tax			
Currency translation adjustment	(26,522)	33,966	(12,839)
Currency impact of long-term funding	(4,834)	13,730	(8,428)
Unrealized capital (loss)/gain– investments	(155)	(272)	11
Actuarial gain/(loss) on defined benefit pension plan	2,855	50	(2,485)
Amortization of interest rate hedge	(923)	(923)	(923)
Fair value of cash flow hedge	(1,036)	1,036	—
Total comprehensive income	$292,041	$329,075	$237,515

The accompanying notes are an integral part of these consolidated financial statements.

ICON plc
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY AND COMPREHENSIVE INCOME
(in thousands, except share and per share data)

	Shares	Amount	Additional Paid-in Capital	Other Undenominated Capital	Accumulated Other Comprehensive Income	Retained Earnings	Total
Balance at December 31, 2015	54,958,912	$4,719	$383,355	$ 715	$ (61,636)	$435,943	$763,096
Comprehensive Income:							
Net income	—	—	—	—	—	262,179	262,179
Currency translation adjustment	—	—	—	—	(12,839)	—	(12,839)
Currency impact of long-term funding	—	—	—	—	(8,428)	—	(8,428)
Unrealized capital loss - investments	—	—	—	—	11	—	11
Actuarial gain on defined benefit pension plan	—	—	—	—	(2,485)	—	(2,485)
Net gain on interest rate hedge	—	—	—	—	(923)	—	(923)
Total comprehensive income	—	—	—	—	—	—	237,515
Exercise of share options	393,240	26	10,113	—	—	—	10,139
Issue of restricted share units/ performance share units	607,878	41	—	—	—	—	41
Share based compensation expense	—	—	40,343	—	—	—	40,343
Share issue costs	—	—	(17)	—	—	—	(17)
Repurchase of ordinary shares	(1,429,187)	(94)	—	94	—	(110,000)	(110,000)
Share repurchase costs	—	—	—	—	—	(275)	(275)
Excess income tax benefit on exercise of equity compensation	—	—	4,332	—	—	—	4,332
Balance at December 31, 2016	54,530,843	$4,692	$438,126	$ 809	$ (86,300)	$587,847	$945,174
Comprehensive Income:							
Net income	—	—	—	—	—	281,488	281,488
Currency translation adjustment	—	—	—	—	33,966	—	33,966
Currency impact of long-term funding	—	—	—	—	13,730	—	13,730
Unrealized capital loss - investments	—	—	—	—	(272)	—	(272)
Actuarial loss on defined benefit pension plan	—	—	—	—	50	—	50
Amortization of interest rate hedge	—	—	—	—	(923)	—	(923)
Fair value of cash flow hedge	—	—	—	—	1,036	—	1,036
Total comprehensive income	—	—	—	—	—	—	329,075
Exercise of share options	458,243	31	13,875	—	—	—	13,906
Issue of restricted share units / performance share units	681,742	44	—	—	—	—	44
Share based compensation expense	—	—	29,351	—	—	—	29,351
Share issue costs	—	—	(15)	—	—	—	(15)
Repurchase of ordinary shares	(1,589,227)	(103)	—	103	—	(133,106)	(133,106)
Share repurchase costs	—	—	—	—	—	(106)	(106)
	—	—	—	—	—	6,677	6,677

Cumulative effect adjustment from adoption of ASU 2016-09							
Balance at December 31, 2017	54,081,601	$4,664	$481,337	$ 912	$ (38,713)	$742,800	$1,191,000

ICON plc
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY AND COMPREHENSIVE INCOME
(in thousands, except share and per share data)

	Shares	Amount	Additional Paid-in Capital	Other Undenominated Capital	Accumulated Other Comprehensive Income	Retained Earnings	Total
Balance at December 31, 2017	54,081,601	$4,664	$481,337	$ 912	$ (38,713)	$742,800	$1,191,000
Cumulative effect adjustment from adoption of ASC 606	—	—	—	—	—	(48,104)	(48,104)
Balance at January 1, 2018	54,081,601	4,664	481,337	912	(38,713)	694,696	1,142,896
Comprehensive income:							
Net income	—	—	—	—	—	322,656	322,656
Currency translation adjustment	—	—	—	—	(26,522)	—	(26,522)
Currency impact of long-term funding	—	—	—	—	(4,834)	—	(4,834)
Unrealized capital loss - investments	—	—	—	—	(155)	—	(155)
Actuarial gain on defined benefit pension plan	—	—	—	—	2,855	—	2,855
Amortization of interest rate hedge	—	—	—	—	(923)	—	(923)
Fair value of cash flow hedge	—	—	—	—	(1,036)	—	(1,036)
Total comprehensive income	—	—	—	—	—	—	292,041
Exercise of share options	408,699	29	16,777	—	—	—	16,806
Issue of restricted share units / performance share units	489,568	36	—	—	—	—	36
Share based compensation expense	—	—	31,544	—	—	—	31,544
Share issue costs	—	—	(16)	—	—	—	(16)
Repurchase of ordinary shares	(1,008,162)	(71)	—	71	—	(128,960)	(128,960)
Share repurchase costs	—	—	—	—	—	(66)	(66)
Balance at December 31, 2018	53,971,706	4,658	529,642	983	(69,328)	888,326	1,354,281

The accompanying notes are an integral part of these consolidated financial statements.

ICON plc
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31, 2018	Year Ended December 31, 2017	Year Ended December 31, 2016
	(in thousands)		
Cash flows from operating activities:			
Net income	$322,656	$281,488	$262,179
Adjustments to reconcile net income to net cash provided by operating activities:			
Loss on disposal of property, plant and equipment	70	228	151
Depreciation expense	50,565	43,436	42,125
Amortization of intangibles	15,351	17,861	17,450
Amortization of government grants	(47)	(44)	(44)
Interest on short term investments	(1,329)	(1,088)	(823)
Realized (gain)/loss on sale of short term investments	(56)	(112)	(50)
Gain on re-measurement of financial assets	(800)	—	—
Amortization of gain on interest rate hedge	(923)	(923)	(923)
Amortization of financing costs	812	556	566
Stock compensation expense	31,594	30,573	40,343
Deferred tax expense	1,652	10,729	1,545
Changes in assets and liabilities:			
(Increase)/decrease in accounts receivable	(37,557)	57,747	2,526
Increase in unbilled revenue	(98,510)	(62,491)	(16,753)
Decrease/(increase) in other receivables	3,107	1,771	(1,829)
(Increase)/decrease in prepayments and other current assets	(3,237)	4,359	1,872
Decrease/(increase) in other non-current assets	856	(1,524)	(2,157)
Decrease in payments on account	(6,253)	(7,174)	(45,754)
Increase/(decrease) in other current liabilities	2,009	6,679	(44,713)
(Decrease)/increase in other non-current liabilities	(1,034)	(3,710)	3,008
Decrease in income taxes payable	(5,220)	(2,293)	(690)
(Decrease)/increase in accounts payable	(5,067)	7,014	1,175
Net cash provided by operating activities	268,639	383,082	259,204
Cash flows from investing activities:			
Purchase of property, plant and equipment	(48,397)	(44,717)	(42,601)
Purchase of subsidiary undertakings	(1,645)	(144,131)	(54,209)
Cash acquired with subsidiary undertaking	—	19,649	3,168
Sale of available for sale investments	99,865	33,086	40,858
Purchase of available for sale investments	(80,956)	(41,701)	(22,030)
Purchase of investments in equity - long term	(6,163)	—	—
Net cash used in investing activities	(37,296)	(177,814)	(74,814)
Cash flows from financing activities:			
Financing costs	(823)	—	—
Drawdown of credit lines and facilities	—	—	73,000
Repayment of credit lines and facilities	—	—	(73,000)
Proceeds from the exercise of equity compensation	16,842	13,950	10,180
Share issue costs	(16)	(15)	(17)

Excess tax benefit on exercise of equity compensation	—	—	6,402
Repurchase of ordinary shares	(128,960)	(133,106)	(110,000)
Share repurchase costs	(66)	(106)	(275)
Net cash used in financing activities	(113,023)	(119,277)	(93,710)
Effect of exchange rate movements on cash	(5,328)	4,327	(2,050)
Net increase in cash and cash equivalents	112,992	90,318	88,630
Cash and cash equivalents at beginning of year	282,859	192,541	103,911
Cash and cash equivalents at end of year	$395,851	$282,859	$192,541

The accompanying notes are an integral part of these consolidated financial statement

ICON plc
NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

1. Description of business

ICON plc and its subsidiaries ("the Company" or "ICON") is a clinical research organization ("CRO"), providing outsourced development services on a global basis to the pharmaceutical, biotechnology and medical device industries. We specialize in the strategic development, management and analysis of programs that support all stages of the clinical development process from compound selection to Phase I-IV clinical studies. Our vision is to be the Global CRO partner of choice in drug development by delivering best in class information, solutions and performance in clinical and outcomes research.

We believe that we are one of a select group of CROs with the expertise and capability to conduct clinical trials in most major therapeutic areas on a global basis and have the operational flexibility to provide development services on a stand-alone basis or as part of an integrated "full service" solution. At December 31, 2018 we had approximately 13,670 employees, in 89 locations in 37 countries. During the year ended December 31, 2018, we derived approximately 34.5%, 55.7% and 9.8% of our net revenue in the United States, Europe and Rest of World, respectively.

We began operations in 1990 and have expanded our business predominately through internal growth, together with a number of strategic acquisitions to enhance our capabilities and expertise in certain areas of the clinical development process. We are incorporated in Ireland and our principal executive office is located at: South County Business Park, Leopardstown, Dublin 18, Republic of Ireland. The contact telephone number of this office is +353 1 2912000.

2. Significant Accounting Policies

The accounting policies noted below were applied in the preparation of the accompanying financial statements of the Company and are in conformity with accounting principles generally accepted in the United States.

(a) Basis of consolidation

The consolidated financial statements include the financial statements of the Company and all of its subsidiaries. All significant intercompany profits, transactions and account balances have been eliminated. The results of subsidiary undertakings acquired in the period are included in the Consolidated Statement of Operations from the date of acquisition.

(b) Use of estimates

The preparation of financial statements in conformity with generally accepted accounting principles in the United States requires management to make estimates and judgments that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates. The principal management estimates and judgments used in preparing the financial statements relate to revenue recognition and taxation.

(c) Revenue recognition

The Company primarily earns revenues by providing a number of different services to its customers. These services, which are integral elements of the clinical development process, include clinical trials management, consulting,

contract staffing, and laboratory services. Contracts range in duration from a number of months to several years.

ASC 606 - Revenue from Contracts with Customers (year-ended December 31, 2018)

ICON adopted ASC 606 ' 'Revenue from Contracts with Customers' standard using the cumulative effect transition method. Under this transition method, ICON has applied the new standard as at the date of initial application (i.e. January 1, 2018), without restatement of comparative amounts. The cumulative effect of initially applying the new standard (to revenue, costs and tax) is recorded as an adjustment to the opening balance of equity at the date of initial application. The comparative information has not been adjusted and therefore continues to be reported under ASC 605 ‘Revenue Recognition’ and therefore in accordance with previous accounting policies. See note 26 Impact of change in accounting policies for details of the impact of adoption of the new accounting policy.

The new standard requires application of five steps: (1) identify the contract(s) with a customer; (2) identify the performance obligation in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) the entity satisfies the performance obligation.

Clinical trial service revenue

The most significant impact of application of the standard relates to our assessment of performance and percentage of completion in respect of our clinical trial service revenue. Prior to application of ASC 606, the revenue attributable to performance was determined based on both input and output methods of measurement on a percentage of completion basis. We have concluded that under the new standard, a clinical trial service is a single performance obligation satisfied over time i.e. the full service obligation in respect of a clinical trial (including those services performed by investigators and other parties) is considered a single performance obligation. Promises offered to the customer are not distinct within the context of the contract. We have concluded that ICON is the contract principal in respect of both direct services and in the use of third parties (principally investigator services) that support the clinical research project. The transaction price is determined by reference to the contract or change order value (total service revenue and pass-through/ reimbursable expenses) adjusted to reflect a realizable contract value. Revenue is recognized as the single performance obligation is satisfied. The progress towards completion for clinical service contracts is measured based on an input measure being total project costs (inclusive of third party costs) at each reporting period.

Contracting services revenue

On evaluation of the principles at (1) - (5) set-out above in respect of ASC 606, the Company has availed of the practical expedient which results in recognition of revenue on a right to invoice basis. Application of the practical expedient reflects the right to consideration from the customer in an amount that corresponds directly with the value to the customer of the performance completion to date. This reflects hours performed by contract staff.

Consulting services revenue

On application of the ASC 606 'Revenue from Contracts with Customers' principles at (1) - (5) set-out above, we have concluded that our consulting services contracts represent a single performance obligation satisfied over time. The transaction price is determined by reference to contract or change order value. Revenue is recognized as the performance obligation is satisfied. The progress towards completion for consulting contracts is measured based on total project inputs (time) at each reporting period.

Laboratory services revenue

Revenue is recognized when, or as, obligations under the terms of a contract are satisfied, which occurs when control of the products or services are transferred to the customer. Revenue for laboratory services is measured as the amount of consideration we expect to receive in exchange for transferring products or services. Where contracts with customers contain multiple performance obligations, the transaction price is allocated to each performance obligation based on the estimated relative selling price of the promised good or service. Service revenue is recognized over time as the services are delivered to the customer based on the extent of progress towards completion of the performance obligation. The determination of the methodology to measure progress requires judgment and is based on the nature of services provided. This requires an assessment of the transfer of value to the customer. The right to invoice measure of progress is generally related to rate per unit contracts, as the extent of progress towards completion is measured based on discrete service or time-based increments, such as samples tested or labor hours incurred. Revenue is recorded in

the amount invoiced since that amounts corresponds to the value of the Company's performance and the transfer of value to the customer.

ASC 605 - Revenue recognition (years ended December 31, 2017 and December 31, 2016)
Revenue for services, as rendered, is recognized only after persuasive evidence of an arrangement exists, the sales price is fixed or determinable and collectability is reasonably assured.

Clinical trials management revenue is recognized on a proportional performance method. Depending on the contractual terms revenue is either recognized on the percentage of completion method based on the relationship between hours incurred and the total estimated hours of the trial or on the unit of delivery method. Contract costs equate to the product of labor hours incurred and compensation rates. For the percentage of completion method, the input (effort expended) method has been used to measure progress towards completion as there is a direct relationship between input and productivity. Contract revenue is the product of the aggregated labor hours required to complete the specified contract tasks at the agreed contract rates. The Company regularly reviews the estimate of total contract time to ensure such estimates remain appropriate taking into account actual contract stage of completion, remaining time to complete and any identified changes to the contract scope. Remaining time to complete depends on the specific contract tasks, the complexity of the contract and can include geographical site selection and initiation, patient enrollment, patient testing and level of results analysis required. While the Company may routinely adjust time estimates, the Company's estimates and assumptions historically have been accurate in all material respects in the aggregate. Where revenue is recognized on the unit of delivery method, the basis applied is the number of units completed as a percentage of the total number of contractual units.

Consulting revenue is recognized on a fee-for-service basis as each hour of the related service is performed.

Contract staffing revenue is recognized on a fee-for-service basis, over the time the related service is performed, or in the case of permanent placement, once the candidate has been placed with the client.

Laboratory service revenue is recognized on a fee-for-service basis. The Company accounts for laboratory service contracts as multiple element arrangements, with contractual elements comprising laboratory kits and laboratory testing, each of which can be sold separately. Sales prices for contractual elements are determined by reference to objective and reliable evidence of their sales price. Revenues for contractual elements are recognized on the basis of the number of deliverable units completed in the period.

Informatics revenue is recognized on a fee-for-service basis. Informatics contracts are treated as multiple element arrangements, with contractual elements comprising license fee revenue, support fee revenue and revenue from software services, each of which can be sold separately. Sales prices for contractual elements are determined by reference to objective and reliable evidence of their sales price.

License and support fee revenues are recognized rateably over the period of the related agreement. Revenue from software services is recognized using the percentage of completion method based on the relationship between hours incurred and the total estimated hours required to perform the service.

Contracts generally contain provisions for renegotiation in the event of changes in the scope, nature, duration, or volume of services of the contract. Renegotiated amounts are recognized as revenue by revision to the total contract value arising as a result of an authorized customer change order.

(d) Third party costs (Reimbursable expenses)

Reimbursable expenses comprise investigator payments and certain other costs which are reimbursed by clients under terms specific to each contract to the investigators. Third party costs (Reimbursable expenses) and the related revenue were separately presented on the face of the Consolidated Statement of Operations for periods up to and including the year-ended December 31, 2017. See sections (c) and (e) for accounting policy in respect of the treatment of activity relating to reimbursable expenses on revenue (c) and costs (e) on adoption of ASC 606 'Revenue from Contracts with Customers'.

(e) Direct costs

Direct costs consist of compensation, associated employee benefits and share-based payments for project-related employees and other direct project-related costs.

On adoption of ASC 606 'Revenue from Contracts with Customers', reimbursable expenses are presented within direct costs. This presentation is to align the presentation of costs with our assessment that our clinical trial service is a single performance obligation satisfied over time i.e. the full service obligation is in respect of a clinical trial (including those services performed by investigators and other parties) is considered a single performance obligation. Reimbursable expenses are recorded once the activity which forms the basis for the cost has occurred. Direct costs for the year-ended December 31, 2018 are therefore inclusive of third party costs of $702.8 million.

Investigator payment costs are recorded and reported reflecting investigator activity over the life of the contract. Investigator payments are made based on predetermined contractual arrangements. Payments may differ from the recording and reporting of the expense which is based on activity.

(f) Advertising costs

All costs associated with advertising and promotion are expensed as incurred. The advertising and promotion costs were $6,516,637, $6,744,333 and $7,167,050 for the years ended December 31, 2018, December 31, 2017 and December 31, 2016 respectively.

(g) Foreign currencies and translation of subsidiaries

The Company's financial statements are prepared in United States dollars. Transactions in currencies other than United States dollars are recorded at the rate ruling at the date of the transaction. Monetary assets and liabilities denominated in currencies other than United States dollars are translated into United States dollars at exchange rates prevailing at the Balance Sheet date. Adjustments resulting from these translations are charged or credited to income. Amounts charged or credited to the Consolidated Statement of Operations for the years ended December 31, 2018, December 31, 2017 and December 31, 2016 were as follows:

	Year ended December 31, (in thousands)		
	2018	2017	2016
Amounts (credited)/ charged	$(3,876)	$7,760	$2,094

The financial statements of subsidiaries with other functional currencies are translated at period end rates for the Consolidated Balance Sheet and average rates for the Consolidated Statement of Operations. Translation gains and losses arising are reported as a movement on accumulated other comprehensive income. Foreign currency transaction gains and losses are reported in other comprehensive income rather than through income where the foreign currency transaction is 'long-term investment' in nature i.e. settlement is not planned or anticipated in the foreseeable future.

(h) Disclosure of fair value of financial instruments

Cash, cash equivalents, unbilled revenue, other receivables, available for sale investments, prepayments and other current assets, accounts receivable, accounts payable, investigator payments, payments on account, accrued liabilities, accrued bonuses and income taxes payable have carrying amounts that approximate fair value due to the short term maturities of these instruments. Other liabilities' carrying amounts approximate fair value based on net present value of estimated future cash flows. Debt is measured at historical cost.

Financial instruments are measured in the Consolidated Balance Sheet at fair value using a fair value hierarchy of valuation inputs. The hierarchy prioritizes the inputs into three levels based on the extent to which inputs used in measuring fair value are observable in the market. Each fair value measurement is reported in one of three levels, which is determined by the lowest level input that is significant to the fair value measurement in its entirety. These levels are:

Level 1: Inputs are based upon unadjusted quoted prices for identical instruments traded in active markets.

Level 2:	Inputs are based upon quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active and model-based valuation techniques for which all significant assumptions are observable in the market or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
Level 3:	Inputs are generally unobservable and typically reflect management's estimates of assumptions that market participants would use in pricing the asset or liability.

The Group's Senior notes (private placement debt) is carried at $350.0 million (prior to related financing costs). The carrying value at December 31, 2018, closely approximates fair value.

The Company classifies its investments in short term debt or equity investments as available for sale, as it does not actively trade such securities nor does it intend to hold them to maturity. The fair value of short term investments are represented by level 1 fair value measurements – quoted prices in active markets for identical assets. The unrealized movements in fair value are recognized in equity until disposal or sale, at which time, those unrealized movements from prior periods are recognized in Consolidated Statement of Operations. Losses other than temporary, which reduce the carrying amount below cost are recognized in Consolidated Statement of Operations.

(i) Business combinations

The cost of a business combination is measured as the aggregate of the fair values at the date of exchange of assets given, liabilities incurred or assumed and equity instruments issued in exchange for control. Where a business combination agreement provides for an adjustment to the cost of the acquisition which is contingent upon future events, the amount of the estimated adjustment is recognized at the acquisition date at the fair value of the contingent consideration. Any changes to this estimate outside the measurement period will depend on the classification of the contingent consideration. If the contingent consideration is classified as equity it shall not be re-measured and the settlement shall be accounted for within equity. If the contingent consideration is classified as a liability any adjustments will be accounted for through the Consolidated Statement of Operations or Other Comprehensive Income depending on whether the liability is considered a financial instrument.

The assets, liabilities and contingent liabilities of businesses acquired are measured at their fair values at the date of acquisition. In the case of a business combination which is completed in stages, the fair values of the identifiable assets, liabilities and contingent liabilities are determined at the date of each exchange transaction. When the initial accounting for a business combination is determined provisionally, any subsequent adjustments to the provisional values allocated to the identifiable assets, liabilities and contingent liabilities are made within twelve months of the acquisition date and presented as adjustments to goodwill in the reporting period in which the adjustments are determined.

(j) Goodwill and Impairment

Goodwill represents the excess of the cost of acquired entities over the net amounts assigned to assets acquired and liabilities assumed. Goodwill primarily comprises acquired workforce in place which does not qualify for recognition as an asset apart from goodwill. Goodwill is stated net of any provision for impairment. The Company tests goodwill annually for any impairments or whenever events occur which may indicate impairment. The Company applied the provisions of ASU 2017-04 with effect from January 1, 2018. Under the amendment, the Company was required to perform its annual goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount. An impairment charge would be recognized for any amount by which the carrying amount exceeds the reporting unit's fair value up to the amount of existing goodwill. The amendment allows an entity to perform a qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. No impairment was recognized as a result of the impairment testing carried out for the years ended December 31, 2018, December 31, 2017 and December 31, 2016.

(k) Intangible assets

Intangible assets are amortized on a straight line basis over their estimated useful life.

(l) Cash and cash equivalents

Cash and cash equivalents include cash and highly liquid investments with initial maturities of three months or less and are stated at cost, which approximates market value.

(m) Investments in debt, equity and other

Available for sale investments

The Company classifies short-term investments as available for sale in accordance with the terms of FASB ASC 320, Investments – Debt and Equity Securities. Realized gains and losses are determined using specific identification. The investments are reported at fair value, with unrealized gains or losses reported in a separate component of shareholders' equity. Any differences between the cost and fair value of the investments are represented by accrued interest and unrealized gains/losses.

Long term investments

The Company classifies its interests in funds having considered the nature of its investment, the extent of influence over operating and financial decisions and the availability of readily determinable fair values. The Company determined that the interests in funds at December 31, 2018 meet the definition of equity securities without readily determinable fair values. Effective from 1 January 2018, the Company concluded that the interests held at December 31, 2018 qualify for the NAV practical expedient in ASC 820 'Fair value measurements and disclosures'. Any increases or decreases in fair value are recognized in net income in the period. These are therefore measured at Level 3 of the fair value hierarchy.

(n) Accounts receivable, net

Accounts receivable are recorded at fair value less an allowance for doubtful accounts. The allowance is an estimate based on historical collection experience, current economic and market conditions, and a review of the current status of each customer's trade accounts receivable. Account balances are written-off against the allowance when the Group determines that it is probable that the receivable will not be recovered.

(o) Inventory

Inventory is valued at the lower of cost and net realizable value and after provisions for obsolescence. The cost of inventories comprises the purchase price and attributable costs, less trade discounts. At December 31, 2018 the carrying value of inventory, included within prepayments and other current assets on the Consolidated Balance Sheet, was $2.3 million (2017: $2.2 million).

(p) Property, plant and equipment

Property, plant and equipment is stated at cost less accumulated depreciation. Depreciation of property, plant and equipment is computed using the straight line method based on the estimated useful lives of the assets as listed below:

	Years
Building	40
Computer equipment and software	2-8
Office furniture and fixtures	8
Laboratory equipment	5
Motor vehicles	5

Leasehold improvements are amortized using the straight line method over the estimated useful life of the asset or the lease term, whichever is shorter.

(q) Leased assets

Costs in respect of operating leases are charged to the Consolidated Statement of Operations on a straight line basis over the lease term.

Assets acquired under capital finance leases are included in the Consolidated Balance Sheet at the present value of the future minimum lease payments and are depreciated over the shorter of the lease term and their remaining useful lives. The corresponding liabilities are recorded in the Consolidated Balance Sheet and the interest element of the capital lease rental is charged to interest expense.

(r) Income taxes

The Company applies the asset and liability method of accounting for income taxes. Under the asset and liability method, deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carry-forwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which these temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. Deferred tax assets are reduced by a valuation allowance to the amount more likely than not to be realized. The Company recognizes the effect of income tax positions only if those positions will more likely than not be sustained. Recognized income tax positions are measured at the largest amount of tax

benefit that is greater than 50 percent likely of being realized upon settlement. Interest and penalties related to income taxes are included in income tax expense and classified with the related liability on the Consolidated Balance Sheet. The Company accounts for the impact of GILTI ("global intangible low-taxed income") as a period item in the period it arises and has therefore not provided for deferred taxes in respect of this item.

(s) Government grants

Government grants received relating to capital expenditures are shown as deferred income and credited to income on a basis consistent with the depreciation policy of the relevant assets. Grants relating to categories of operating expenditures are credited to income in the period in which the expenditure to which they relate is charged.

Under the grant agreements amounts received may become repayable in full should certain circumstances specified within the grant agreements occur, including downsizing by the Company, disposing of the related assets, ceasing to carry on its business or the appointment of a receiver over any of its assets. The Company has not recognized any loss contingency having assessed as remote the likelihood of these events arising.

(t) Research and development credits

Research and development credits are available to the Company under the tax laws in certain jurisdictions, based on qualifying research and development spend as defined under those tax laws. Research and development credits are generally recognized as a reduction of income tax expense. However, certain tax jurisdictions provide refundable credits that are not wholly dependent on the Company's ongoing income tax status or income tax position. In these circumstances the benefit of these credits is not recorded as a reduction to income tax expense, but rather as a reduction of operating expenditure.

(u) Pension costs

The Company contributes to defined contribution plans covering all eligible employees. The Company contributes to these plans based upon various fixed percentages of employee compensation and such contributions are expensed as incurred.

The Company operates, through two subsidiaries, a defined benefit plan for certain of its United Kingdom and Swiss employees. The Company accounts for the costs of these plans in accordance with ASC 715-30. These plans are presented in accordance with the requirements of FASB ASC 715-60 Defined Benefit Plans – Other Post retirement.

(v) Net income per ordinary share

Basic net income per ordinary share has been computed by dividing net income available to ordinary shareholders by the weighted average number of ordinary shares outstanding during the period. Diluted net income per ordinary share is computed by adjusting the weighted average number of ordinary shares outstanding during the period for all potentially dilutive ordinary shares outstanding during the period and adjusting net income for any changes in income or loss that would result from the conversion of such potential ordinary shares.

There is no difference in net income used for basic and diluted net income per ordinary share. The reconciliation of the number of shares used in the computation of basic and diluted net income per ordinary share is as follows:

	Year Ended December 31,		
	2018	2017	2016
	54,118,764	54,129,439	55,248,900

Weighted average number of ordinary shares outstanding for basic net income per ordinary share			
Effect of dilutive share options outstanding	671,899	719,607	1,158,236
Weighted average number of ordinary shares outstanding for diluted net income per ordinary share	54,790,663	54,849,046	56,407,136

(w) Share-based compensation

The Company accounts for its share options, restricted share units ("RSUs") and performance share units ("PSUs") in accordance with the provisions of FASB ASC 718, Compensation – Stock Compensation. Share-based compensation expense for equity-

settled awards made to employees and Directors is measured and recognized based on estimated grant date fair values. These equity-settled awards include employee share options, RSUs and PSUs.

Share-based compensation expense for share options awarded to employees and Directors is estimated at the grant date based on each option's fair value as calculated using the Black-Scholes option-pricing model. Share-based compensation for RSUs and PSUs awarded to employees and Directors is calculated based on the market value of the Company's shares on the date of award of the RSUs and PSUs. The value of awards expected to vest is recognized as an expense over the requisite service periods. Forfeitures are estimated on the date of grant and revised if actual or expected forfeiture activity differs materially from original estimates.

Estimating the grant date fair value of share options as of the grant date using an option-pricing model, such as the Black-Scholes model, is affected by the Company's share price as well as assumptions regarding a number of complex variables. These variables include, but are not limited to, the expected share price volatility over the term of the awards, risk-free interest rates and the expected term of the awards.

Liability classified awards are measured at the fair value of the award on the grant date and remeasured at each reporting period at fair value until the award is settled.

(x) Impairment of long-lived assets

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured at the amount by which the carrying amount of the asset exceeds the fair value of the asset. Assets to be disposed of are reported at the lower of the carrying amount of the asset or fair value less selling costs.

(y) Derivative financial instruments

We enter into transactions in the normal course of business using various financial instruments in order to hedge against exposure to fluctuating exchange and interest rates. We use derivative financial instruments to reduce exposure to fluctuations in interest rates. A derivative is a financial instrument or other contract whose value changes in response to some underlying variable, which has an initial net investment smaller than would be required for other instruments that have a similar response to the variable and that will be settled at a future date. We do not enter into derivative financial instruments for trading or speculative purposes. We did not hold any interest rate swap contracts or forward currency contracts at December 31, 2018 or December 31, 2017.

We use derivative financial instruments to reduce exposure to fluctuations in foreign exchange rates. During the years-ended December 31, 2017 and December 31, 2018 we entered into forward currency contracts in respect of identified exposure arising from euro payments. All contracts expired during the year ended December 31, 2018.

Our accounting policies for derivative financial instruments are based on whether they meet the criteria for designation as cash flow or fair value hedges. A designated hedge of the exposure to variability in the future cash flows of an asset or a liability, or of a forecasted transaction, is referred to as a cash flow hedge. A designated hedge of the exposure to changes in fair value of an asset or a liability is referred to as a fair value hedge. The criterion for designating a derivative as a hedge includes the assessment of the instrument's effectiveness in risk reduction, matching of the derivative instrument to its underlying transaction and the probability that the underlying transaction will occur. For derivatives with cash flow hedge accounting designation, we report the gain or loss from the effective portion of the hedge as a component of Other Comprehensive Income and reclassify it into earnings in the same

period or periods in which the hedged transaction affects earnings and within the same Statement of Operations line item as the impact of the hedged transaction. For derivatives with fair value hedge accounting designation, we recognize gains or losses from the change in fair value of these derivatives, as well as the offsetting change in the fair value of the underlying hedged item, in earnings. Fair value gains and losses arising on derivative financial instruments not qualifying for hedge accounting are reported in our Consolidated Statement of Operations.

(z) Financing costs and gain on interest rate hedge

The interest rate in respect of the Senior Notes is fixed at 3.64% for the five year term of the agreement. The associated interest cost is recognized in interest expense in the period since drawdown in December 2015.

Cash proceeds ($4.6 million) received in November 2015 in respect of the realized hedge gain are amortized to the Consolidated Statement of Operations, net against interest payable, over the period of the Senior Notes.

Deferred financing costs (including issue costs relating to the Senior Notes) are reported at cost less accumulated amortization and the related amortization expense is included in interest expense, in our Consolidated Statement of Operations.

(aa) Reclassifications

Certain amounts in the consolidated financial statements have been reclassified where necessary to conform to the current year presentation.

3. Investments

(a) Available for sale investments

	December 31, 2018	December 31, 2017
	(in thousands)	
At start of year	$77,589	$68,046
Purchases	80,956	41,701
Sales and maturities	(99,865)	(33,086)
Interest on short term investments	1,329	1,088
Realized gain on sale of short term investments	56	112
Unrealized capital loss – investments	(155)	(272)
At end of year	$59,910	$77,589

The Company classifies its investment in short term investments as available for sale. Short term investments comprise highly liquid investments with maturities of greater than three months and minimum "A-" rated fixed and floating rate securities. Short term investments at December 31, 2018 have an average maturity of 1.22 years compared to 1.58 years at December 31, 2017. The investments are reported at fair value with unrealized gains or losses reported in a separate component of shareholders' equity. Any differences between the cost and fair value of investments are represented by accrued interest and unrealized gains/losses. The fair value of short term investments are represented by level 1 fair value measurements – quoted prices in active markets for identical assets.

The following table represents our available for sale short term investments by major security type as of December 31, 2018:

	Cost Total	Unrealized gains / (losses)	Fair Value Total	Maturity by period Less than 1 year	1 to 5 years
	(U.S.$ in millions)				
US government debt securities	14.91	(0.07)	14.84	5.96	8.88
Corporate securities	44.92	(1.19)	43.73	11.48	32.25
Term deposits	1.34	—	1.34	0.70	0.64
Total (U.S.$ in millions)	$61.17	($1.26)	$59.91	$18.14	$41.77

The contractual maturity of certain investments in the portfolio is greater than 12 months; however, classification as short-term investments reflects the Company practice and intention in respect of these investments. The company recognizes the unrealized losses in fair value in equity as these unrealized losses on short term investments have been

considered as temporary.

(b) Investments in equity - long term

The Company entered into subscription agreements with a number of funds. Capital totaling $6.2 million had been advanced under the terms of the subscription agreements at December 31, 2018. The Company determined that the interests in the funds meet the definition of equity securities without readily determinable fair values. Effective from 1 January 2018, the Company concluded that the interests held at December 31, 2018 qualify for the NAV practical expedient in ASC 820 'Fair value measurements and disclosures'. An increase in fair value of $0.8 million was recognized in net income during the period bringing the carrying value

of the subscriptions to $6.963 million at December 31, 2018. The Company had committed to future investments of $21.3 million in respect of these funds.

4. Goodwill

	December 31, 2018	December 31, 2017
	(in thousands)	
Opening goodwill	$769,058	$ 616,088
Current year acquisitions	—	129,222
Prior period acquisition (note 4 (a))	1,048	1,393
Foreign exchange movement	(13,846)	22,355
Closing goodwill	$756,260	$ 769,058

The Company has made a number of strategic acquisitions since inception to enhance its capabilities and experience in certain areas of the clinical development process. Goodwill arising on acquisition represents the excess of the cost of acquired entities over the net amounts assigned to assets acquired and liabilities assumed. Goodwill primarily comprises of the acquired workforce in place which does not qualify for recognition as an asset apart from goodwill.

The Company acquired Mapi Développement SAS ('Mapi') during the year-ended December 31, 2017 resulting in the recognition of goodwill of $130.3 million (note 4 (a)).

The Company tests goodwill annually for impairment or whenever events occur which may indicate impairment. The results of the Company's goodwill impairment testing assessed at September 30, 2018 during the year ended December 31, 2018 provided no evidence of impairment and indicated the existence of sufficient headroom such that a reasonably possible change to the key assumptions used would be unlikely to result in an impairment of the related goodwill.

(a) Acquisitions - Mapi Group

On July 27, 2017, a subsidiary of the Company, ICON Clinical Research Limited, acquired Mapi Group. Mapi Group is a leading patient-centered health outcomes research and commercialization company. Cash outflows on acquisition were $145.8 million. The acquisition agreement provided for working capital targets to be achieved. On March 26, 2018, the Company paid $1.6 million in respect of these targets on completion of the working capital review.

The acquisition of Mapi has been accounted for as a business combination in accordance with FASB ASC 805 Business Combinations. The table following summarizes the Company’s assessment of the fair values of the assets acquired and liabilities assumed:

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	July 27, 2017 (in thousands)
Cash	19,649
Property, plant and equipment	4,872
Goodwill*	130,270
Order book	13,012
Customer list	18,392
Accounts receivable	15,874
Unbilled revenue	6,984
Prepayments and other current assets	2,587
Other receivables	1,430
Income taxes receivable	4,262
Accounts payable	(2,994)
Payments on account	(31,445)
Other liabilities	(24,952)
Non-current other liabilities	(1,061)
Non-current deferred tax liability	(11,104)
Net assets acquired	$145,776
Cash outflows	$144,131
Working capital adjustment	1,645
Total consideration	$145,776

*Goodwill represents the acquisition of an established workforce with experience in late phase commercialization, analytics, real world evidence generation and strategic regulatory services in clinical trial services for biologics, drugs and devices. Goodwill related to the business acquired is not tax deductible. In finalizing the goodwill on acquisition of Mapi in the twelve month period from acquisition, fair value adjustments were made which resulted in increases in other liabilities ($3.9 million), plant and equipment ($1.7 million) and accounts receivable ($1.7 million) and income taxes receivable ($1.5 million) and decreases in unbilled revenue ($4.8 million), prepayments and other current assets ($1.9 million) and other receivables ($1.0 million) and in payment on account ($2.6 million) and non-current deferred tax liability ($9.1 million). Customer list and order backlog assets were also finalized.

The proforma effect of the Mapi acquisition if completed on January 1, 2016 would have resulted in net revenue, net income and earnings per share for the fiscal years ending December 31, 2017 and December 31, 2016 as follows:

	Year Ended	
	2017	2016
	(in thousands)	
Net revenue	$1,811,018	$1,750,643
Net income	$284,903	$263,101
Basic earnings per	$5.26	$4.76

share	
Diluted earnings per share	$5.19 $4.66

(b) Acquisition of ICON Government & Public Health Solutions (formerly Clinical Research Management (ClinicalRM))

On September 15, 2016, a subsidiary of the Company, ICON US Holdings Inc. acquired ICON Government & Public Health Solutions ("GPHS") (formerly Clinical Research Management (ClinicalRM)) which resulted in net cash outflows of $52.4 million (including certain payments made on behalf of GPHS totaling $9.2 million). GPHS is a full-service CRO specializing in preclinical through Phase IV support of clinical research and clinical trial services for biologics, drugs and devices. The organization helps

customers progress their products to market faster with a wide array of research, regulatory and sponsor services within the U.S. and around the globe. GPHS provide full service and functional research solutions to a broad range of US government agencies. Their extensive expertise extends across basic and applied research, infectious diseases, vaccines development, testing and the response to bio-threats. They have worked in collaboration with government and commercial customers to respond to the threat of global viral epidemics. Further consideration of up to $12.0 million was payable if certain performance milestones are achieved in respect of periods up to December 31, 2017. The fair value of the contingent consideration on acquisition and at March 31, 2017, was estimated at $6.0 million. The evaluation of the performance and forecast performance of GPHS against performance milestones was updated as required at June 30, 2017. Arising from that evaluation, the fair value of the contingent consideration liability was determined as $Nil, resulting in a net credit of $6.0 million being recorded within selling, general & administrative expenses in the Consolidated Statement of Operations during the year ended December 31, 2017.

The acquisition of GPHS has been accounted for as a business combination in accordance with FASB ASC 805 Business Combinations. The table following summarizes the fair values of the assets acquired and liabilities assumed:

	September 15, 2016 (in thousands)
Cash	$3,168
Property, plant and equipment	939
Goodwill*	35,969
Customer lists	4,012
Order backlog	1,668
Brand	1,409
Accounts receivable	11,431
Unbilled revenue	3,868
Prepayments and other current assets	1,673
Accounts payable	(165)
Other liabilities	(5,569)
Non-current other liabilities	(7)
Net assets acquired	$58,396
Total consideration	$58,396

*Goodwill represents the acquisition of an established workforce with experience in preclinical through Phase IV support of clinical research and clinical trial services for biologics, drugs and devices. Goodwill related to the US portion of the business acquired is tax deductible. In finalizing the goodwill on acquisition of GPHS in the twelve month period from acquisition, fair value adjustments were made which resulted in an increase to unbilled revenue ($1.1 million) and other liabilities ($1.1 million) and in a decrease to accounts receivable ($0.3 million) and accounts payable ($0.5 million). Customer list, order backlog and brand intangible asset values were also finalized.

The proforma effect of the GPHS acquisition if completed on January 1, 2015 would have resulted in net revenue, net income and earnings per share for the fiscal years ended December 31, 2016 and December 31, 2015 as follows:

	Year Ended December 31,	
	2016	2015

	(in thousands)	
Net revenue	$1,713,245	$1,639,085
Net income	$266,148	$244,167
Basic earnings per share	$4.82	$4.16
Diluted earnings per share	$4.72	$4.05

(c) Acquisition of PMG

On December 4, 2015, a subsidiary of the Company, ICON Clinical Research LLC. acquired PMG for cash consideration of $65.4 million, including certain payments on behalf of PMG totaling $10.1 million. PMG is an integrated network of 52 clinical research sites in North Carolina, South Carolina, Tennessee, Illinois and Iowa. The site network includes wholly owned facilities and dedicated clinical research sites. PMG conducts clinical trials in all major therapeutic areas and has particular expertise in vaccine, gastroenterology, cardiovascular, neurology and endocrinology studies. It has a proprietary database of clinical trial participants. It also has access to in excess of 2 million active patients via electronic medical records through its partnerships with health care institutions and community physical practices.

5. Intangible Assets

	December 31, 2018	December 31, 2017
Cost	(in thousands)	
Customer relationships acquired	$109,622	$ 91,230
Technology asset acquired	11,169	11,169
Order backlog	31,220	18,208
Trade names/ brands acquired	2,766	2,766
Volunteer list acquired	1,325	1,325
Non-compete arrangements	489	489
Mapi intangible asset	—	32,305
Foreign exchange movement	(5,085)	(2,389)
Total cost	151,506	155,103
Accumulated amortization	(100,249)	(84,898)
Foreign exchange movement	2,798	1,423
Net book value	$54,055	$ 71,628

On July 27, 2017, a subsidiary of the Company, ICON Clinical Research Limited acquired Mapi Group. Mapi is a leading patient-centered health outcomes research and commercialization company. The acquisition of Mapi strengthens ICON’s existing commercialization and outcomes research business adding significant commercialization presence, analytics, real world evidence generation and strategic regulatory services. The value of certain customer relationships and order backlog identified of $18.4 million and $13.0 million respectively were recognized on acquisition and are being amortized over approximately over 8 years and 8.5 years, the estimated period of benefit. In total, $5.8 million has been amortized in the period since the date of acquisition.

On September 15, 2016, a subsidiary of the Company, ICON US Holdings Inc., acquired ICON Government & Public Health Solutions ("GPHS"), a full-service CRO specializing in preclinical through Phase IV support of clinical research and clinical trial services for biologics, drugs and devices. The organization helps customers progress their products to market faster with a wide array of research, regulatory and sponsor services within the U.S. and around the globe. GPHS provide full service and functional research solutions to a broad range of US government agencies. The value of certain customer relationship, order backlog and brand assets identified of $4.0 million, $1.7 million and $1.4 million respectively are being amortized over approximately 7 years, 2 years and 5 years respectively, the estimated period of benefit. In total, $4.4 million has been amortized in the period since the date of acquisition.

On December 4, 2015, a subsidiary of the Company, ICON Clinical Research LLC, acquired PMG, an integrated network of 52 clinical research sites in North Carolina, South Carolina, Tennessee, Illinois and Iowa. The site network includes wholly owned facilities and dedicated clinical research sites. PMG conducts clinical trials in all major therapeutic areas and has particular expertise in vaccine, gastroenterology, cardiovascular, neurology and endocrinology studies. The value of certain customer relationship and order backlog assets identified of $6.9 million and $3.0 million respectively are being amortized over approximately 7 years and 2 years respectively, the estimated period of benefit. In total, $6.0 million has been amortized in the period since the date of acquisition. The order backlog is fully amortized at December 31, 2018.

On February 27, 2015, a subsidiary of the Company, ICON Holdings Unlimited Company (formerly ICON Holdings), acquired MediMedia Pharma Solutions. Headquartered in Yardley, Pennsylvania, MediMedia Pharma Solutions includes MediMedia

Managed Markets and Complete Healthcare Communications. MediMedia Managed Markets is a leading provider of strategic payer-validated market access solutions. Complete Healthcare Communications is one of the leading medical and scientific communication agencies working with medical affairs, commercial and brand development teams within life science companies. The value of certain customer relationships and order backlog identified of $22.8 million and $2.5 million respectively are being amortized over approximately 7 years and 1 year, the estimated period of benefit. $15.0 million has been amortized in the period since the date of acquisition. The order backlog is fully amortized at December 31, 2018.

On May 7, 2014, a subsidiary of the Company, ICON US Holdings Inc., acquired Aptiv Solutions, Inc. ("Aptiv"), a global biopharmaceutical and medical device development services company and leader in adaptive clinical trials. Aptiv offers full-service clinical trial consulting and regulatory support for drugs, medical devices and diagnostics with a specific focus on strategy to increase product development efficiency and productivity. The value of certain customer relationships and order backlog identified of $21.4 million and $7.9 million respectively are being amortized over approximately 7 years and 3 years, the estimated period of benefit. In total, $22.2 million has been amortized in the period since the date of acquisition. The order backlog is fully amortized at December 31, 2018.

On February 15, 2013, subsidiaries of the Company, ICON Clinical Research LLC (formerly ICON Clinical Research, Inc.) and ICON Clinical Research (U.K.) Limited, acquired the Clinical Trial Services division of Cross Country Healthcare, Inc. Cross Country Healthcare's Clinical Trial Services division includes US resourcing providers, ClinForce and Assent Consulting, whose services include contract staffing, permanent placement and functional service provision ("FSP"). The value of certain customer relationships and order backlog identified of $3.3 million and $0.6 million respectively are being amortized over approximately 3 years and 1 year, the estimated period of benefit. The full $3.9 million has been amortized in the period since the date of acquisition.

On February 28, 2012, a subsidiary of the Company, ICON Clinical Research LLC (formerly ICON Clinical Research, Inc.), acquired PriceSpective, a strategy consulting company. The value of certain customer relationships identified of $10.2 million is being amortized over approximately 10 years, the estimated period of benefit. The value of order backlog and certain non-compete arrangements identified of $0.4 million and $0.4 million respectively are being amortized over approximately 0.8 years and 3 years, the estimated period of benefit. In total, $7.8 million has been amortized in the period since the date of acquisition.

On February 15, 2012, a subsidiary of the Company, ICON Clinical Research Limited, acquired BeijingWits Medical, a Chinese CRO. The value of certain customer relationships and order backlog identified of $1.8 million and $0.4 million respectively are being amortized over approximately 10 years and 4 years, the estimated period of benefit. The value of certain non-compete arrangements identified of $0.01 million are being amortized over approximately 5 years, the estimated period of benefit. In total, $1.7 million has been amortized in the period since the date of acquisition.

On July 14, 2011, a subsidiary of the Company, ICON Clinical Research Limited, acquired Firecrest Clinical Limited, a provider of technology solutions that boost investigator site performance and study management. The value of certain technology assets and customer relationships identified of $11.2 million and $5.2 million respectively are being amortized over approximately 7.5 years, the estimated period of benefit. The value of the Firecrest trade name and order backlog identified of $1.4 million and $1.2 million respectively are being amortized over approximately 4.5 years and 1.2 years, the estimated period of benefit. In total, $16.4 million has been amortized in the period since the date of acquisition.

On January 14, 2011, a subsidiary of the Company, ICON Clinical Research (U.K.) Limited, acquired Oxford Outcomes Limited, an international health outcomes consultancy business. The value of certain customer relationships and order backlog identified of $6.6 million and $0.6 million respectively were amortized over approximately 6.5

years and 2 years, the estimated period of benefit. The intangible assets identified have been fully amortized at December 31, 2018.

On November 14, 2008, subsidiaries of the Company, ICON Holdings Clinical Research International Limited and ICON Clinical Research LLC (formerly ICON Clinical Research, Inc.), acquired Prevalere Life Sciences, a US provider of bioanalytical and immunoassay laboratory services. The value of certain customer relationships identified of $7.4 million is being amortized over periods ranging from approximately 7 to 11 years, the estimated period of the benefit. In total, $7.2 million has been amortized in the period since the date of acquisition.

On February 11, 2008, a subsidiary of the Company, ICON Clinical Research LLC (formerly ICON Clinical Research, Inc.), acquired Healthcare Discoveries, a US provider of Phase I clinical trial services. The value of certain client relationships identified of $1.6 million was amortized over periods ranging from approximately 2 to 9 years, the estimated periods of benefit. The value of certain volunteer lists identified of $1.3 million was amortized over approximately 6 years, the estimated period of benefit. The intangible assets identified have been fully amortized at December 31, 2018.

Future intangible asset amortization expense for the years ended December 31, 2019 to December 31, 2023 is as follows:

Year Ended December 31,(in thousands)	
2019	$ 13,183
2020	12,895
2021	10,857
2022	6,069
2023	4,221
	$ 47,225

6. Property, Plant and Equipment, net

	December 31, 2018	December 31, 2017
	(in thousands)	
Cost		
Land	$3,476	$ 3,464
Building	86,621	88,411
Computer equipment and software	399,192	358,874
Office furniture and fixtures	83,215	78,372
Laboratory equipment	36,092	34,918
Leasehold improvements	25,827	24,097
Motor vehicles	144	42
	634,567	588,178
Less accumulated depreciation and asset write offs	(475,898)	(425,127)
Property, plant and equipment (net)	$158,669	$ 163,051

7. Other Liabilities

	December 31, 2018	December 31, 2017
	(in thousands)	
Personnel related liabilities	$171,866	$ 168,964
Facility related liabilities	14,012	13,061
General trade and overhead liabilities*	118,845	41,789
Other liabilities	4,289	4,628
Short term government grants (note 11)	42	35
Restructuring (note 14)	8,089	5,026
	$317,143	$ 233,503

*includes amounts due to third parties in respect of reimbursable expenses of $85.6 million at December 31, 2018.

8. Non-Current Other Liabilities

	December 31, 2018	December 31, 2017
	(in thousands)	
Defined benefit pension obligations, net (note 9)	$3,320	$ 6,061
Other non-current liabilities	10,126	11,050
	$13,446	$ 17,111

9. Employee Benefits

Certain Company employees are eligible to participate in a defined contribution plan (the "Plan"). Participants in the Plan may elect to defer a portion of their pre-tax earnings into a pension plan, which is run by an independent party. The Company matches participant's contributions typically at 8% of the participant's annual compensation. Contributions to the plan are recorded as an expense in the selling, general and administrative line in the Consolidated Statement of Operations. Contributions for the years ended December 31, 2018, December 31, 2017 and December 31, 2016 were $25,241,000, $20,355,000 and $20,952,000 respectively.

The Company's United States operations maintain a retirement plan (the "U.S. Plan") that qualifies as a deferred salary arrangement under Section 401(k) of the Internal Revenue Code. Participants in the U.S. Plan may elect to defer a portion of their pre-tax earnings, up to the Internal Revenue Service annual contribution limit. The Company matches participant's contributions up to 3% and matches 50% of participant's contributions thereafter to a maximum Company contribution of 4.5% of the participant's annual compensation. Contributions to this U.S. Plan are recorded, in the year contributed, as an expense in the Consolidated Statement of Operations. Contributions for the years ended December 31, 2018, December 31, 2017 and December 31, 2016 were $15,532,000, $14,946,000 and $15,223,000 respectively.

ICON Development Solutions Limited pension plan

One of the Company's subsidiaries, ICON Development Solutions Limited, operates a defined benefit pension plan in the United Kingdom for its employees. The plan is managed externally and the related pension costs and liabilities are assessed in accordance with the advice of a professionally qualified actuary. Plan assets at December 31, 2018, December 31, 2017 and December 31, 2016, consist of units held in independently administered funds. The pension costs of this plan are presented in the following tables in accordance with the requirements of ASC 715-60, Defined Benefit Plans – Other Postretirement. The plan has been closed to new entrants with effect from July 1, 2003.

Funded status	December 31, 2018	December 31, 2017
	(in thousands)	
Projected benefit obligation	$(30,045)	$ (37,759)
Fair value of plan assets	27,297	32,423
Funded status	$(2,748)	$ (5,336)
Non-current other liabilities (note 8)	$(2,748)	$ (5,336)

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Change in benefit obligation	December 31, 2018	December 31, 2017
	(in thousands)	
Benefit obligation at beginning of year	$37,759	$ 32,906
Service cost	124	112
Interest cost	895	929
Plan participants' contributions	24	22
Expenses	—	(8)
Benefits paid	(3,049)	(68)
Actuarial (gain)/loss	(3,844)	658
Foreign currency exchange rate changes	(1,864)	3,208
Benefit obligation at end of year	$30,045	$ 37,759

Change in plan assets	December 31, 2018	December 31, 2017
	(in thousands)	
Fair value of plan assets at beginning of year	$32,423	$ 24,876
Actual return on plan assets	(584)	979
Employer contributions	153	4,008
Plan participants' contributions	24	22
Benefits paid	(3,049)	(68)
Foreign currency exchange rate changes	(1,670)	2,606
Fair value of plan assets at end of year	$27,297	$ 32,423

The fair values of the assets above do not include any of the Company's own financial instruments, property occupied by, or other assets used by, the Company.

The following amounts were recorded in the Consolidated Statement of Operations as components of the net periodic benefit cost:

	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Service cost	$124	$ 112	$ 75
Interest cost	895	929	1,017
Expected return on plan assets	(624)	(586)	(646)
Amortization of net loss	248	250	—
Expenses	—	(8)	8
Net periodic benefit cost	$643	$ 697	$ 454

The following assumptions were used at the commencement of the year in determining the net periodic pension benefit cost for the years ended December 31, 2018, December 31, 2017 and December 31, 2016:

	December 31, 2018	December 31, 2017	December 31, 2016
Discount rate	2.5%	2.7%	4.0%
Rate of compensation increase	3.7%	3.9%	3.7%

Expected rate of return on plan assets	2.0	%	2.1	%	3.0	%

Other comprehensive income	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Actuarial (gain)/loss - benefit obligation	$(3,844)	$ 658	$ 10,057
Actuarial loss/(gain) – plan assets	1,208	(393)	(5,215)
Actuarial gain recognized in net periodic benefit cost	(248)	(250)	—
Total	$(2,884)	$ 15	$ 4,842

The estimated net loss and prior service cost for the defined benefit pension plan that will be amortized from accumulated other comprehensive income into net periodic benefit cost over the next year are $0.1 million and $Nil respectively.

Amounts recognized in accumulated other comprehensive income that have not yet been recognized as components of net periodic benefit cost are as follows:

	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Net actuarial loss	$4,254	$ 7,138	$ 7,123
Total	$4,254	$ 7,138	$ 7,123

Benefit Obligation

The following assumptions were used in determining the benefit obligation at December 31, 2018 and December 31, 2017:

	December 31, 2018	December 31, 2017
Discount rate	2.9 %	2.5 %
Rate of compensation increase	3.7 %	3.7 %

The discount rate is determined by reference to UK long dated government and corporate bond yields at the Balance Sheet date. This is represented by the iboxx corporate bond over 15 year index plus 10 basis points.

Plan Assets

The assets of the scheme are invested with Legal and General and are held in a combination of: the Active Corporate Bond over 10 Year fund, Gilt and Index Linked Gilt funds. The overall investment strategy is that approximately 75% of investments are in government bonds (both fixed interest and index linked), approximately 25% of investments are held in corporate bonds. There is no self-investment in employer related assets. The expected long-term rate of return on assets at December 31, 2018 of 2.1% was calculated as the value of the fund after application of a market value reduction factor. The expected long term rates of return on different asset classes are as follows:

Asset Category	Expected long-term return per annum
Corporate Bonds	2.9 %
Gilts	1.8 %
Cash	2.9 %

The long-term expected return on corporate bonds and gilts (fixed interest and index linked) is determined by reference to bond yields and gilt yields at the Balance Sheet date.

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The underlying asset split of the fund is shown below.

Asset Category	December 31, 2018	December 31, 2017
Corporate Bonds	25 %	22 %
Gilts	71 %	65 %
Cash	4 %	13 %
	100 %	100 %

Applying the above expected long term rates of return to the asset distribution at December 31, 2018, gives rise to an expected overall rate of return of scheme assets of approximately 2.1% per annum.

Plan Asset Fair Value Measurements

	Quoted Prices in Active Markets for Identical Assets Level 1 (in thousands)	
	December 31, 2018	December 31, 2017
Cash	$1,029	$ 4,086
Fixed Income Securities		
Legal and General Active Corporate Bond – Over 10 Year	6,688	7,188
Legal and General Gilt Funds	7,136	7,611
Legal and General Index Linked Gilt Funds	12,444	13,538
	$27,297	$ 32,423

Cash Flows

The Company expects to contribute $0.2 million to the pension fund in the year ending December 31, 2019.

The following annual benefit payments, which reflect expected future service as appropriate, are expected to be paid.

	(in thousands)
2019	295
2020	311
2021	383
2022	412
2023	403
Years 2024 - 2028	$ 3,451

The expected cash flows are estimated figures based on the members expected to retire over the next 10 years assuming no early retirements plus an additional amount based on recent average withdrawal experience. At the present time it is not clear whether annuities will be purchased when members reach retirement or whether pensions will be paid each month out of scheme assets. The cash flows above have been estimated on the assumption that pensions will be paid monthly out of scheme assets. If annuities are purchased, then the expected benefit payments will be significantly different from those shown above.

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Aptiv Solutions pension plan

On May 7, 2014 the Company acquired 100% of the common stock of Aptiv Solutions ("Aptiv"). The acquisition of Aptiv was accounted for as a business combination in accordance with FASB ASC 805 Business Combinations. The Company has a defined benefit plan covering its employees in Switzerland as mandated by the Swiss government. Benefits are based on the employee's years of service and compensation. Benefits are paid directly by the Company when they become due, in conformity with the funding requirements of applicable government regulations. The plan is managed externally and the related pension costs and liabilities are assessed in accordance with the advice of a professionally qualified actuary. Plan assets at December 31, 2018 and December 31, 2017 consist of units held in independently administered funds. The pension costs of this plan are presented in the following tables in accordance with the requirements of ASC 715-60, Defined Benefit Plans – Other Postretirement.

Funded status	December 31, 2018	December 31, 2017
	(in thousands)	
Projected benefit obligation	$(5,279)	$ (5,927)
Fair value of plan assets	4,707	5,202
Funded status	$(572)	$ (725)
Non-current other liabilities (note 8)	$(572)	$ (725)

Change in benefit obligation	December 31, 2018	December 31, 2017
	(in thousands)	
Benefit obligation at beginning of year	$5,927	$ 6,928
Service cost	138	243
Interest cost	47	54
Plan participants' contributions	83	120
Settlement	(409)	(1,019)
Prior service cost	(8)	—
Transferred (benefits paid)/balances	(77)	(76)
Actuarial gain	(372)	(626)
Foreign currency exchange rate changes	(50)	303
Benefit obligation at end of year	$5,279	$ 5,927

Change in plan assets	December 31, 2018	December 31, 2017
	(in thousands)	
Fair value of plan assets at beginning of year	$5,202	$ 6,006
Expected return on plan assets	41	47
Actual return on plan assets	(240)	(296)
Scheme contributions	109	157
Plan participants' contributions	83	120
Transferred (benefits paid)/balances	(77)	(76)
Settlement	(409)	(1,019)
Foreign currency exchange rate changes	(2)	263
Fair value of plan assets at end of year	$4,707	$ 5,202

The fair values of the assets above do not include any of the Company's own financial instruments, property occupied by, or other assets used by, the Company.

	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Service cost	$138	$ 243	$ 352
Interest cost	47	54	82
Expected return on plan assets	(41)	(47)	(48)
Amortization of net (gain)/loss	(69)	(43)	22
Amortization of prior service credit	(8)	(8)	(8)
Settlement	(93)	(214)	(136)
Curtailment	—	—	—
Net periodic benefit credit	$(26)	$ (15)	$ 264

The following assumptions were used at the commencement of the year in determining the net periodic pension benefit cost for the years ended December 31, 2018, December 31, 2017 and December 31, 2016:

	December 31, 2018	December 31, 2017	December 31, 2016
Discount rate	0.80%	0.75%	0.95%
Rate of compensation increase	2.00%	2.00%	2.00%
Expected rate of return on plan assets	0.80%	0.75%	0.95%

Other comprehensive income	December 31, 2018	December 31, 2017	December 31, 2016
Actuarial gain - benefit obligation	$ (372)	$ (626)	$ (1,157)
Actuarial loss/(gain) – plan assets	240	296	(1,233)
Prior service credit recognized in net periodic benefit cost	93	215	136
Actuarial gain/(loss) recognized in net periodic benefit cost	69	43	(22)
Amortization of net prior service credit	8	8	8
Net prior service cost occurring during the year	(9)	(1)	(89)
Total	$ 29	$ (65)	$ (2,357)

The estimated net gain and prior service credit for the defined benefit pension plan that will be amortized from accumulated other comprehensive income into net periodic benefit cost over the next year are $95,000 and $9,000 respectively.

Amounts recognized in accumulated other comprehensive income that have not yet been recognized as components of net periodic benefit cost are as follows:

	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Net actuarial gain	$(1,254)	$ (1,283)	$ (1,218)
Total	$(1,254)	$ (1,283)	$ (1,218)

Benefit Obligation

The following assumptions were used in determining the benefit obligation at December 31, 2018 and December 31, 2017:

	December 31, 2018		December 31, 2017	
Discount rate	0.80	%	0.80	%
Rate of compensation increase	2.00	%	2.00	%

The discount rate is determined by reference to Swiss corporate bond yields at the Balance Sheet date.

Plan Assets

The pension plan is an insured arrangement with Swiss Life. The assets are an insurance contract whose value depends on the amount saved by employees and the interest granted by Swiss Life. The value of assets does not depend on the performance of any underlying assets. There is no self-investment in employer related assets.

Cash Flows

The Company expects to contribute $0.1 million to its pension fund in the year ending December 31, 2019.

The following annual benefit payments, which reflect expected future service as appropriate, are expected to be paid.

	(in thousands)
2019	678
2020	212
2021	209
2022	204
2023	199
Years 2023 - 2028	$ 908

The expected cash flows are estimated figures based on the members expected to retire over the next 10 years assuming no early retirements plus an additional amount based on recent average withdrawal experience. At the present time it is not clear whether annuities will be purchased when members reach retirement or whether pensions will be paid each month out of scheme assets. The cash flows above have been estimated on the assumption that pensions will be paid monthly out of scheme assets. If annuities are purchased, then the expected benefit payments will be significantly different from those shown above.

10. Equity Incentive Schemes and Stock Compensation Charges
Share Options

On July 21, 2008 the Company adopted the Employee Share Option Plan 2008 (the "2008 Employee Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may grant options to any employee, or any Director holding a salaried office or employment with the Company or a Subsidiary for the purchase of ordinary shares. On the same date, the Company also adopted the Consultants Share Option Plan 2008 (the "2008 Consultants Plan"), pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may grant options to any consultant, adviser or non-executive Director retained by the Company or

any Subsidiary for the purchase of ordinary shares.
On February 14, 2017 both the 2008 Employee Plan and the 2008 Consultants Plan (together the "2008 Option Plans") were amended and restated in order to increase the number of options that can be issued under the 2008 Consultants Plan from 400,000 to 1 million and to extend the date for options to be granted under the 2008 Option Plans.

An aggregate of 6.0 million ordinary shares have been reserved under the 2008 Employee Plan, as reduced by any shares issued or to be issued pursuant to options granted under the 2008 Consultants Plan, under which a limit of 1 million shares applies.

Further, the maximum number of ordinary shares with respect to which options may be granted under the 2008 Employee Option Plan, during any calendar year to any employee shall be 400,000 ordinary shares. There is no individual limit under the 2008 Consultants Plan. No options may be granted under the 2008 Option Plans after February 14, 2027.

Each option granted under the 2008 Option Plans will be an employee stock option, or NSO, as described in Section 422 or 423 of the Internal Revenue Code. Each grant of an option under the 2008 Options Plans will be evidenced by a Stock Option Agreement between the optionee and the Company. The exercise price will be specified in each Stock Option Agreement, however option prices will not be less than 100% of the fair market value of an ordinary share on the date the option is granted.

On January 17, 2003 the Company adopted the Share Option Plan 2003 (the "2003 Share Option Plan") pursuant to which the Compensation and Organization Committee of the Board could grant options to officers and other employees of the Company or its subsidiaries for the purchase of ordinary shares. An aggregate of 6.0 million ordinary shares were reserved under the 2003 Share Option Plan; and in no event could the number of ordinary shares issued pursuant to options awarded under this plan exceed 10% of the outstanding shares, as defined in the 2003 Share Option Plan, at the time of the grant, unless the Board expressly determined otherwise. Further, the maximum number of ordinary shares with respect to which options could be granted under the 2003 Share Option Plan during any calendar year to any employee was 400,000 ordinary shares. The 2003 Share Option Plan expired on January 17, 2013. No new options may be granted under this plan.

Share option awards are granted with an exercise price equal to the market price of the Company's shares at date of grant. Prior to 2018, share options typically vest over a period of five years from date of grant and expire eight years from date of grant. Share options granted to non-executive directors during 2018 vest over 12 months and expire eight years from the date of grant. The maximum contractual term of options outstanding at December 31, 2018 is eight years.

The following table summarizes the transactions for the Company's share option plans for the years ended December 31, 2018, December 31, 2017 and December 31, 2016:

	Options Granted Under Plans	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
Outstanding at December 31, 2015	1,626,582	$ 34.87	$ 11.94
Granted	256,191	$ 69.61	$ 20.10
Exercised	(393,240)	$ 25.79	$ 9.84
Cancelled	(23,089)	$ 29.74	$ 11.19
Outstanding at December 31, 2016	1,466,444	$ 43.45	$ 13.94
Granted	219,113	$ 85.98	$ 25.06
Exercised	(458,243)	$ 30.35	$ 10.72
Cancelled	(55,921)	$ 54.35	$ 16.76
Outstanding at December 31, 2017	1,171,393	$ 56.02	$ 17.15
Granted	167,557	$ 118.90	$ 36.84
Exercised	(408,699)	$ 41.12	$ 13.55
Cancelled	(9,505)	$ 32.35	$ 11.39
Outstanding at December 31, 2018	920,746	$ 74.32	$ 22.39
Vested and exercisable at December 31, 2018	397,923	$ 56.10	$ 17.11

The weighted average remaining contractual life of options outstanding and options exercisable at December 31, 2018, was 5.01 years and 3.83 years respectively (2017: 4.86 years and 3.44 years respectively). 241,149 options are expected to vest during the year ended December 31, 2019 (255,198 options were expected to vest during the year ended December 31, 2018).

The intrinsic value of options exercised during the year ended December 31, 2018 amounted to $38.2 million. The intrinsic value of options outstanding and options exercisable at December 31, 2018 amounted to $48.6 million and $28.3 million respectively. Intrinsic value is calculated based on the market value versus strike price of the Company's shares at the date of exercise.

Non-vested shares outstanding as at December 31, 2018 are as follows:

	Options Outstanding Number of Shares	Weighted Average Exercise Price	Weighted Average Fair Value
Non-vested outstanding at December 31, 2017	694,727	$ 68.06	$ 20.03
Granted	167,557	118.90	36.84
Vested	(336,756)	62.21	18.51
Forfeited	(2,705)	56.58	16.84
Non-vested outstanding at December 31, 2018	522,823	$ 88.18	$ 26.41

Outstanding and exercisable share options:

The following table summarizes information concerning outstanding and exercisable share options as of December 31, 2018:

Options Outstanding				Options Exercisable	
Range Exercise Price	Number of Shares	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price	Number of Shares	Weighted Average Exercise Price
$20.28	18,190	0.16		18,190	
$22.30	52,811	1.32		52,811	
$23.66	1,161	1.57		1,161	
$26.71	450	1.69		450	
$32.37	20,848	2.33		20,848	
$36.22	2,141	2.46		2,141	
$37.90	920	2.93		920	
$40.83	40,502	3.39		25,360	
$47.03	22,685	3.17		14,020	
$48.67	50,896	3.21		34,906	
$51.35	2,030	3.60		1,224	
$65.60	66,752	5.38		24,543	
$66.47	4,267	4.39		1,572	
$66.97	1,249	4.45		—	
$68.39	135,400	4.18		79,069	
$71.95	127,905	5.17		74,473	
$83.47	127,136	6.17		22,461	
$90.03	77,846	6.38		23,774	
$115.11	107,794	7.17		—	
$125.74	59,763	7.38		—	
$20.28 - $125.74	920,746	5.01	$ 74.32	397,923	$ 56.10

Options outstanding include both vested and unvested options as at December 31, 2018. Options exercisable represent options which have vested at December 31, 2018. From the date of grant, substantially all options vest over a five year period at 20% per annum.

Fair value of Stock Options Assumptions

The weighted average fair value of options granted during the years ended December 31, 2018, December 31, 2017 and December 31, 2016 was calculated using the Black-Scholes option pricing model. The weighted average fair values and assumptions were as follows:

	Year Ended December 31, 2018	December 31, 2017	December 31, 2016
Weighted average fair value	$36.84	$ 25.06	$ 20.10
Assumptions:			
Expected volatility	30 %	29 %	30 %
Dividend yield	— %	— %	— %
Risk-free interest rate	2.76 %	1.93 %	1.39 %
Expected life	5.0 years	5.0 years	5.0 years

Expected volatility is based on the historical volatility of our common stock over a period equal to the expected term of the options; the expected life represents the weighted average period of time that options granted are expected to be outstanding given consideration to vesting schedules and our historical experience of past vesting and termination patterns. The risk-free rate is based on the U.S. government zero-coupon bonds yield curve in effect at time of the grant for periods corresponding with the expected life of the option.

Restricted Share Units and Performance Share Units

On July 21, 2008 the Company adopted the 2008 Employees Restricted Share Unit Plan (the "2008 RSU Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may select any employee, or any Director holding a salaried office or employment with the Company, or a Subsidiary to receive an award under the plan. An aggregate of 1.0 million ordinary shares have been reserved for issuance under the 2008 RSU Plan.

On April 23, 2013 the Company adopted the 2013 Employees Restricted Share Unit and Performance Share Unit Plan (the "2013 RSU Plan") pursuant to which the Compensation and Organization Committee of the Company's Board of Directors may select any employee, or any Director holding a salaried office or employment with the Company, or a Subsidiary to receive an award under the plan. On May 11, 2015 the 2013 RSU Plan was amended and restated in order to increase the number of shares that can be issued under the RSU Plan by 2.5 million shares. Accordingly, an aggregate of 4.1 million ordinary shares have been reserved for issuance under the 2013 RSU Plan. The shares are awarded at par value and vest over a service period. Awards under the 2013 RSU Plan may be settled in cash or shares at the option of the Company.

The Company has awarded RSUs and PSUs to certain key individuals of the Group. The following table summarizes RSU and PSU activity for the year ended December 31, 2018:

	PSU Outstanding Number of Shares	PSU Weighted Average Fair Value	PSU Weighted Average Remaining Contractual Life	RSU Outstanding Number of Shares	RSU Weighted Average Fair Value	RSU Weighted Average Remaining Contractual Life
Outstanding at December 31, 2017	511,026	$ 72.07	0.93	715,970	$ 72.65	1.28
Granted	71,906	$ 116.02		160,113	$ 123.42	

Shares vested	(215,826	) $ 68.28		(276,495	) $ 67.99	
Forfeited	(116,053	) $ 70.89		(64,911	) $ 78.92	
Outstanding at December 31, 2018	251,053	$ 85.95	0.96	534,677	$ 89.50	1.22

The fair value of RSUs vested for the year ended December 31, 2018 totaled $18.8 million (2017: $16.6 million).

The fair value of PSUs vested for the year ended December 31, 2018 totaled $14.7 million (2017: $15.0 million).

The PSUs vest based on service and specified EPS targets over the period 2015 – 2018, 2016 – 2019, 2017 – 2020 and 2018 – 2021. Since 2013, 147,630 PSUs (net of forfeitures) have been granted. Depending on the actual amount of EPS from 2015 to 2021, up to an additional 103,423 PSUs may also be granted.

Non-cash stock compensation expense

Income from operations for the year ended December 31, 2018 is stated after charging $31.6 million in respect of non-cash stock compensation expense. Non-cash stock compensation expense has been allocated as follows:

	Year ended December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Direct costs	$17,408	$ 18,020	$ 21,903
Selling, general and administrative	$14,186	$ 12,553	$ 18,440
Total compensation costs	$31,594	$ 30,573	$ 40,343

Total non-cash stock compensation expense not yet recognized at December 31, 2018 amounted to $43.1 million. The weighted average period over which this is expected to be recognized is 2.19 years.

The amendments required by Accounting Standards Update (‘ASU’) 2016-09 ‘Improvements to Employee Share-Based Payment Accounting’ require the Company to record all tax effects related to share-based payments through the income statement rather than additional paid in capital. The Company has applied the updated standard prospectively in the twelve months of the year ended December 31, 2017.

The income tax expense for the year ended December 31, 2018 reflects a net income tax benefit of $12.7 million in connection with stock compensation (including excess tax benefits) and the total tax benefit in connection with stock options exercised during 2018 was $3.6 million. The income tax expense for the year ended December 31, 2017 reflects a net income tax benefit of $9.3 million in connection with stock compensation (including excess tax benefits) and the total tax benefit in connection with stock options exercised during 2017 was $3.2 million. The income tax expense for the year ended December 31, 2016 reflects a net income tax benefit of $3.5 million in connection with stock compensation (excluding excess tax benefits) and the cash tax benefit realized in connection with stock options exercised during 2016 was $3.4 million.

11. Government Grants

	December 31, 2018	December 31, 2017
	(in thousands)	
Received	$3,539	$ 3,539
Less accumulated amortization	(2,792)	(2,745)
Foreign exchange translation adjustment	172	207
Total government grants	919	1,001
Less current portion	(42)	(35)
Non-current government grants	$877	$ 966

Capital grants received may be refundable in full if certain events occur. Such events, as set out in the related grant agreements, include sale of the related asset, liquidation of the Company or failure to comply with other conditions of the grant agreements. No loss contingency has been recognized as the likelihood of such events arising has been assessed as remote. Government grants amortized to the profit and loss account amounted to $47,000 for the year ended December 31, 2018. A net charge of $44,000 was recorded in respect of government grants during the year ended December 31, 2017. As at December 31, 2018 the Company had $3.2 million in restricted retained earnings, pursuant to the terms of grant agreements.

12. Share Capital

Holders of ordinary shares will be entitled to receive such dividends as may be recommended by the Board of Directors of the Company and approved by the shareholders and/or such interim dividends as the Board of Directors of the Company may decide. On liquidation or a winding up of the Company, the par value of the ordinary shares will be repaid out of the assets available for distribution among the holders of the ordinary shares of the Company. Holders of ordinary shares have no conversion or redemption rights. On a show of hands, every holder of an ordinary share present in person or proxy at a general meeting of shareholders shall have one vote, for each ordinary share held with no individual having more than one vote.

During the year ended December 31, 2018, 408,699 options were exercised by employees at an average exercise price of $41.12 per share for total proceeds of $16.8 million. During the year ended December 31, 2018, 276,495 ordinary shares were issued in respect of certain RSUs and 215,826 ordinary shares were issued in respect of PSUs previously awarded by the Company.

During the year ended December 31, 2017, 458,243 options were exercised by employees at an average exercise price of $30.35 per share for total proceeds of $13.9 million. During the year ended December 31, 2017, 361,102 ordinary shares were issued in respect of certain RSUs and 320,640 ordinary shares were issued in respect of PSUs previously awarded by the Company.

During the year ended December 31, 2016, 393,240 options were exercised by employees at an average exercise price of $25.79 per share for total proceeds of $10.1 million. During the year ended December 31, 2016, 296,386 ordinary shares were issued in respect of certain RSUs and 311,492 ordinary shares were issued in respect of PSUs previously awarded by the Company.

(a) Share Repurchase Program

On October 3, 2016 the Company commenced a previously announced share buyback program of up to $400 million. During the year ended December 31, 2018, the Company redeemed a total of 1,008,162 ordinary shares under this program for total consideration of $129.0 million. At December 31, 2018 a total of 4,026,576 ordinary shares were redeemed by the Company under this buyback program for a total consideration of $372.1 million. All ordinary shares that were redeemed under the buyback program were canceled in accordance with the Constitution of the Company and the nominal value of these shares transferred to a other undenominated capital fund as required under Irish Company Law.

On July 31, 2015 the Company commenced a buyback program of up to $400 million under which the Company could acquire its outstanding ordinary shares (by way of redemption), in accordance with Irish law, the United States securities laws and the Company's constitutional documents through open market share acquisitions. A total of 5,316,062 ordinary shares were redeemed by the Company under this buyback program for a total consideration of $400 million. All ordinary shares that were redeemed under the buyback program were canceled in accordance with the Constitution of the Company and the nominal value of these shares transferred to a other undenominated capital reserve as required under Irish Company Law. The share buyback program was completed in December 31, 2015, with a total of 6,198,481 ordinary shares redeemed during the year ended December 31, 2015 for total consideration of $457.9 million (including the programe for $400 million).

Under the repurchase program, a broker purchased the Company's shares from time to time on the open market or in privately negotiated transactions in accordance with agreed terms and limitations. The program was designed to allow share repurchases during periods when the Company would ordinarily not be permitted to do so because it may be in

possession of material non-public or price-sensitive information or due to applicable insider trading laws or self-imposed trading blackout periods. The Company's instructions to the broker were irrevocable and the trading decisions in respect of the repurchase program were made independently of and uninfluenced by the Company. The Company confirms that on entering the share repurchase plans it had no material non-public, price-sensitive or inside information regarding the Company or its securities. Furthermore, the Company will not enter into additional plans whilst in possession of such information. The timing and actual number of shares acquired by way of the redemption will be dependent on market conditions, legal and regulatory requirements and the other terms and limitations contained in the program. In addition, acquisitions under the program may be suspended or discontinued in certain circumstances in accordance with the agreed terms. Therefore, there can be no assurance as to the timing or number of shares that may be acquired under the program.

13. Income Taxes

The Company's United States and Irish based subsidiaries file tax returns in the United States and Ireland respectively. Other foreign subsidiaries are taxed separately under the laws of their respective countries.

The components of income before income tax expense are as follows:

	Year ended December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Ireland	$243,988	$ 218,306	$ 201,221
United States	27,499	28,426	11,466
Other	93,127	81,325	87,485
Income before provision for income taxes	$364,614	$ 328,057	$ 300,172

The components of provision for income taxes are as follows:

	Year ended December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Provision for income taxes:			
Current tax expense:			
Ireland	$28,042	$ 20,084	$ 22,931
United States	2,885	5,792	7,768
Other	9,379	9,964	5,749
Total current tax expense	40,306	35,840	36,448
Deferred tax expense/(benefit):			
Ireland	1,054	261	1,284
United States	875	8,980	613
Other	(277)	1,488	(352)
Total deferred tax expense	1,652	10,729	1,545
Provision for income taxes	41,958	46,569	37,993
Impact on shareholders equity and other comprehensive income of the tax consequence of :			
Excess tax benefit on stock compensation	—	—	(4,332)
Currency impact on long term funding	119	973	(396)
Fair value of cash flow hedge	(148)	148	—
Total	$41,929	$ 47,690	$ 33,265

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Ireland's statutory income tax rate is 12.5%. The Company's consolidated reported provision for income taxes differed from the amount that would result from applying the Irish statutory rate as set forth below:

	Year ended December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Taxes at Irish statutory rate of 12.5% (2017:12.5%; 2016:12.5%)	$45,577	$ 41,007	$ 37,522
Foreign and other income taxed at higher rates	7,649	6,324	4,642
Research & development tax incentives	(1,243)	(830)	(907)
Movement in valuation allowance	5,667	1,329	1,208
Effects of change in tax rates	(147)	925	576
Increase/(decrease) in unrecognized tax benefits	(5,423)	933	(1,521)
Impact of stock compensation	(8,301)	(9,917)	(4,121)
Impact of deemed repatriation under US Tax Reform	—	7,694	—
Other	(1,821)	(896)	594
Provision for income taxes	$41,958	$ 46,569	$ 37,993

In 2017, the provision for income taxes included non-recurring items related to US Tax Reform (H.R.1). The income tax expense recognized in respect of deemed repatriation of historic earnings of non-U.S. subsidiaries owned by our U.S. subsidiaries
was $7.7 million. The income tax expense recognized in respect of the change in the US federal income tax rate from 35% to 21% was $0.5 million (included in “Effects of change in tax rates” above).

The tax effects of temporary differences that give rise to significant portions of deferred tax assets and deferred tax liabilities are presented below:

	December 31, 2018	December 31, 2017
	(in thousands)	
Deferred tax liabilities:		
Property, plant and equipment	$981	$ 1,139
Goodwill	25,149	22,655
Other intangible assets	9,397	11,801
Other	5,703	4,139
Total deferred tax liabilities recognized	41,230	39,734
Deferred tax assets:		
Operating loss and tax credits carry-forwards	29,995	24,962
Property, plant and equipment	4,893	4,062
Accrued expenses and payments on account	24,599	24,433
Stock compensation	6,490	5,786
Deferred compensation	2,197	2,548
Deferred revenue	5,681	—
Other	2	740
Total deferred tax assets	73,857	62,531

Valuation allowance for deferred tax assets	(27,263)	(22,439)
Deferred tax assets recognized	46,594	40,092
Overall net deferred tax asset	$5,364	$ 358

At December 31, 2018 Ireland subsidiaries had tax credit carry-forwards for income tax purposes that may be carried forward indefinitely, available for offset against future tax liabilities, if any, of $4.0 million (2017: $4.5 million).

At December 31, 2018 U.S. subsidiaries had U.S. federal and state net operating loss ("NOL") carry-forwards of approximately $15.1 million and $32.6 million, respectively. These NOLs are available for offset against future taxable income and expire between 2022 and 2037. Of the $15.1 million U.S. federal NOLs, approximately $2.2 million is available for offset against future U.S. federal taxable income. The subsidiary's ability to use the remaining U.S. federal and state NOL carry-forwards is limited on an annual basis due to changes of ownership in 2000, 2010, 2014 and 2017, as defined by Section 382 of the Internal Revenue Code of 1986, as amended. Of the U.S. federal NOLs, $12.9 million are limited by Section 382. Of the $12.9 million of losses, the amounts are available as follows: $4.9 million for the years 2019 – 2020, $7.5 million in 2021-2025, $0.5 million for the years 2026 – 2035. As at December 31, 2018 , U.S subsidiaries also had excess disallowed interest carry-forwards of $21.9 million. These carry-forwards are available for offset against future taxable income in the event that the U.S subsidiaries have excess capacity for interest deductions in future years.

At December 31, 2018 other than those in the U.S. and Ireland, we had operating loss carry-forwards for income tax purposes that may be carried forward indefinitely, available to offset against future taxable income, if any, of approximately $72.9 million (2017: $77.2 million). In addition at December 31, 2018 those subsidiaries had tax credit carry-forwards for income tax purposes that may be carried forward indefinitely, available to offset against future tax liabilities, if any, of $4.9 million (2017: $4.8 million). At December 31, 2018 those subsidiaries also had additional operating loss carry forwards of $4.7 million which are due to expire between 2019 and 2025 (2017: $4.7 million) and operating carry-forwards of $3.2 million which are due to expire between 2026 and 2035 (2017: $0 million).

The expected expiry dates of these losses are as follows:

	Federal NOL's	State NOL's
	(in thousands)	
2021-2034	14,323	12,158
2035-2037	766	20,464
	$15,089	$32,622

In addition, US subsidiaries have alternative minimum tax credit carry-forwards of approximately $0.4 million that are available to reduce future U.S. federal regular income taxes through 2020. Any remaining alternative minimum tax credits will be fully refundable in 2021. We also have minimum tax credit carry-forwards of approximately $0.3 million that are available to offset future U.S. federal income taxes. These credits will be fully used or refunded before 2022.

The valuation allowance at December 31, 2018 was approximately $27.3 million. The valuation allowance for deferred tax assets as of December 31, 2017 and December 31, 2016 was $22.4 million and $20.3 million respectively. The net change in the total valuation allowance was an increase of $4.8 million during 2018 and an increase of $2.1 million during 2017. Of the total increase of $4.8 million in 2018, $5.6 million resulted in current year income tax expense and $0.8 million was recognized in Other Comprehensive Income. Of the total increase of $2.1 million in 2017, $0.5 million resulted in a current year income tax expense, and $1.6 million was recognized in Other Comprehensive Income.

The valuation allowances at December 31, 2018 and December 31, 2017 were primarily related to operating losses and tax credits carried forward that, in the judgment of management, are not more likely than not to be realized. In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Management considers the scheduled reversal of deferred tax liabilities and projected future taxable income in making this assessment. In respect of deferred tax assets not subject to a valuation allowance, management considers that it is more likely than not that these deferred tax assets will be realized on the basis that there will be sufficient reversals of deferred tax liabilities and taxable income in future periods. During 2017, there were no movements in the valuation allowance that had a material impact on the effective tax rate. During 2018, the Company recognized a valuation allowance of $6.2 million in respect of disallowed interest carry-forwards generated during the year as management does not consider it more likely than not that the Company will have sufficient capacity with which to utilize these losses.

The Company has recognized a deferred tax liability of $4.9 million (2017: $3.1 million) for investments in foreign subsidiaries where the Company does not consider the earnings to be indefinitely reinvested. For the deferred tax liability not recognized in respect of temporary differences related to investments in foreign subsidiaries which are consider to be indefinitely reinvested, it is not practicable to calculate the exact unrecognized deferred tax liability, however it is not expected to be material as Ireland allows a tax credit in respect of distributions from foreign subsidiaries at the statutory tax rate in the jurisdiction of the subsidiary so that no material tax liability would be expected to arise in the event these earnings were ever remitted. In addition, withholding taxes applicable to remittances from foreign subsidiaries would not be expected to be material given Ireland's tax treaty network and the EU parent subsidiary directive.

A reconciliation of the beginning and ending amount of total unrecognized tax benefits is as follows:

	December 31, 2018	December 31, 2017	December 31, 2016
	(in thousands)		
Unrecognized tax benefits at start of year	$23,720	$ 26,620	$ 28,166
Increase related to prior year tax positions	2,084	—	1,151
Decrease related to prior year tax positions	(2,915)	(3,050)	(2,483)
Increase related to current year tax positions	3,065	4,765	1,104
Settlements	(182)	(2,523)	(837)
Lapse of statute of limitations	(4,339)	(2,092)	(481)
Unrecognized tax benefits at end of year	$21,433	$ 23,720	$ 26,620

The relevant statute of limitations for unrecognized tax benefits totaling $1.3 million could potentially expire during 2019.

Included in the balance of total unrecognized tax benefits at December 31, 2018 were potential benefits of $21.4 million, which if recognized, would affect the effective rate on income tax from continuing operations. The balance of total unrecognized tax benefits at December 31, 2017 and December 31, 2016 included potential benefits which, if recognized, would affect the effective rate of income tax from continuing operations of $23.7 million and $26.6 million respectively.

Interest and penalties recognized as a net benefit during the year ended December 31, 2018 amounted to $1.3 million (2017: net expense of $0.9 million, 2016: net expense of $0.1 million) and are included within the provision for income taxes. Total accrued interest and penalties as of December 31, 2018 and December 31, 2017 were $1.1 million and $2.4 million respectively and are included in closing income taxes payable at those dates.

Our major tax jurisdictions are the United States and Ireland. We may potentially be subjected to tax audits in both our major jurisdictions. In the United States tax periods open to audit include the years ended December 31, 2015, December 31, 2016, December 31, 2017 and December 31, 2018. In Ireland, tax periods open to audit include the years ended December 31, 2014, December 31, 2015, December 31, 2016, December 31, 2017 and December 31, 2018. During such audits, local tax authorities may challenge the positions taken by us in our tax returns.

14. Restructuring charges

Restructuring and other items recognized during the year ended December 31, 2018 comprise:

	Year Ended December 31, 2017

	December 31, 2018	December 31, 2016
	(in thousands)	
Restructuring charges	$12,490	$ 7,753
Net charge	$12,490	$ 7,753

Restructuring Charges

A restructuring charge of $12.5 million was recognized during the year ended December 31, 2018, under a restructuring plan adopted following a review of operations. The restructuring plan reflected resource rationalization across the business to improve resource utilizations, resulting in a charge of $9.7 million and office consolidation resulting in the recognition of an onerous lease obligation of $2.8 million.

	Workforce reductions	Onerous Lease	Total
	(in thousands)		
Total provision recognized	$9,684	$2,806	$12,490
Utilized	(5,399)	(672)	$(6,071)
Foreign exchange	—	—	—
Provision at December 31, 2018	$4,285	$2,134	$6,419

Prior Period Restructuring Charges

A restructuring charge of $7.8 million was recognized during the year ended December 31, 2017, under a restructuring plan adopted following a review of operations. The restructuring plan reflected resource rationalization across the business to improve resource utilization. No additional charge was recorded during the twelve months ended December 31, 2018.

	Workforce reductions (in thousands)
Restructuring charges	$ 7,753
Utilized	(4,656)
Provision at December 31, 2017	$ 3,097
Utilized	(1,015)
Provision at December 31, 2018	$ 2,082

A restructuring charge of $8.2 million was recognized during the year ended December 31, 2016, under a restructuring plan adopted following a review by the Company of its operations. The restructuring plan includes resource rationalizations in certain areas of the business to improve resource utilization, resulting in charge of $6.2 million and office consolidation resulting in the recognition of an onerous lease of $2.0 million during the twelve months ended December 31, 2016. No additional charge was recorded during the twelve months ended December 31, 2017 and December 31, 2018.

	Workforce Reductions	Onerous Lease	Total
	(in thousands)		
Total provision recognized	$6,190	$1,969	$8,159
Utilized	(5,734)	(571)	(6,305)
Foreign excha			