BRIEFING NOTE FOR FIRST MINISTER

MEETING WITH APPLE

Monday 3rd April 2017

Key Messages	• Scotland set to become "global centre of excellence" in precision medicine, tackling diseases such as cancer and multiple sclerosis thanks to a **£4 million** Government investment into a 'Precision Medicine Ecosystem' that will co-ordinate precision medicine resources and opportunities across Scotland, bring together findings from individual research projects and improve information sharing in the fight against diseases. (Feb 16) **[REDACTED]**
What/Who	• Meeting with Apple CEO Tim Cook and Digital Health leadership team
Why	**[REDACTED]**
Where	Apple HQ, 1 Infinite Loop, Cupertino, California
When	14:00 – 15:00
Supporting Officials	Lena Wilson, CEO, Scottish Enterprise Raymond McGovern, Americas Director, SDI **[REDACTED]** Sheila Rowan Liz Lloyd
Attached documents	Annex A – Summary Page Annex B – Biographies Annex C – Company profile Annex D – Scottish public-academic-private collaboration initiatives Annex E – SG Digital health brief

SUMMARY PAGE

**Purpose of meeting:**
[REDACTED]

Key Facts:
- The Scottish digital health and care cluster is made up of around **150** companies from innovative homegrown operators such as **AxSys Technology, Aridhia** and **Sitekit** to large multinationals such as Thermo Fisher Scientific, Lockheed Martin, Selex, and Toshiba Medical Visualisation Systems
- Scotland is participating in initiatives such as the **Global Alliance for Genomics and Health** - an international coalition, formed to enable the sharing of genomic and clinical data in order to catalyze projects that will help unlock the great potential of genomic data. Scottish company **Aridhia** has been part of the initiative since 2014.
- In addition to almost **200,000** health staff and a similar number of social care staff, Scotland has:
  - Over **84,000** people currently working in digital technology.
  - More than **7,000** people working within the digital health and care technology companies.
  - An industry supplemented annually by **70,000** graduates and a pipeline of **17,000** graduates with digital health expertise.
  - The University of Edinburgh is home to a dedicated **Digital Health Doctoral Training Centre.**
- **Edinburgh has one of the biggest digital economy clusters** in the UK – **33%** growth in the number of digital companies 2010 to 2013 - **17,100** digital jobs.
- University Of Edinburgh's **School Of Informatics** produces more world-leading and internationally excellent research than any other university in the UK. Also home to "ARCHER", the UK's primary academic research super computer.

Lines to take:
- Scotland is perceived within the EU to be a leader in Digital Health Care innovation, development and adoption. **[REDACTED]**
- Digital health innovation is happening in Scotland: The Digital Health Institute supports projects from the first steps of R&D through to testing, scaling, and getting solutions closer to market. The Farr Institute of Health Informatics Research is leading the UK in health data linkage research.
- To capitalise on our strengths in this area, Scotland has created a number of other government-funded initiatives and organisations which are supporting the development of our digital health and care eco-system (detailed in Annex D)

BIOGRAPHIES

TIM COOK, CEO, APPLE INC
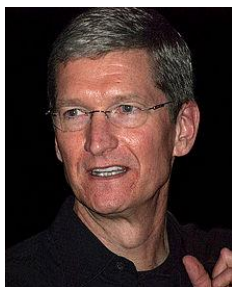
Timothy Donald "Tim" Cook (born November 1, 1960) is an American business executive, industrial engineer and developer. Cook is the current and seventh Chief Executive Officer of Apple Inc., previously serving as the company's Chief Operating Officer, under its founder Steve Jobs.

Cook joined Apple in March 1998 as senior vice president of worldwide operations and then served as Executive Vice President of worldwide sales and operations. He was made Chief Executive on August 24, 2011.

Cook also serves on the boards of directors of Nike, Inc. and the National Football Foundation.

After graduating from Auburn University, Cook spent 12 years in IBM's personal computer business, ultimately serving as the director of North American fulfillment. Later, he served as Chief Operating Officer of the computer reseller division of Intelligent Electronics and was vice president for corporate materials at Compaq for six months.

In 2014, Cook became the first Chief Executive of a Fortune 500 company to publicly identify as gay.

In early 2012, he was awarded compensation of one million shares, vesting in 2016 and 2021, by Apple's board of directors, and in March 2015, he said he planned to donate his entire stock fortune to charity.

COMPANY PROFILE (APPLE HEALTH)

- In recent months, Apple has been sending out strong signals suggesting a major thrust into healthcare. With a current health team of about 100, including medical device and medical sensor experts, the company appears poised to move beyond fitness apps to fully regulated medical technologies and clinical support systems.
- Apple recently bolstered its health team with four high-profile hires and forged partnerships with large healthcare systems. These include a clinical trial partnership with Beth Israel Deaconess Hospital and a precision medicine initiative with Scripps Translational Science Institute and WebMD launching a new smartphone-based Apple ResearchKit study on pregnant women to improve research as well as resources for expectant mothers.
- Apple has also partnered with IBM, Johnson & Johnson and Medtronic on cognitive computing platform called Watson Health Cloud. The platform offers tailored data analytics services to clinicians.
- In August 2016, [Apple confirmed its first digital health acquisition](#), personal health record startup Gliimpse. The Redwood, CA-based firm, which has raised about $1 million in seed funding, hopes to advance interoperability by aggregating health data into a single digital patient record.

Open source health frameworks:
- HealthKit designed to house healthcare and fitness apps, allow them to work together and collate their data under the Health app. For example, a heart monitoring app and blood pressure tracking app could send information to each other and with a person's doctor
- CareKit is a framework for medical care apps, that lets users monitor existing conditions and medication intake, as well as interact with doctors.
- ResearchKit is designed to collect and collate data via apps which are then used in wider research. Confidentiality is maintained.

SCOTTISH PUBLIC-ACADEMIC-PRIVATE COLLABORATION INITIATIVES

Stratified Medicine Scotland Innovation Centre (SMS-IC) brings together expertise and funding from across the Scottish public sector and industry partners Aridhia and Thermo Fisher Scientific. The centre, based at Glasgow's Queen Elizabeth University Hospital, spearheads the precision medicine activity in Glasgow and across Scotland.

- The University leads the largest of the 6 UK MRC/EPSRC Molecular Pathology Nodes, a collaboration between the University, NHS and industry partners at the QEUH, aimed at increasing the capacity and capability of the UK to drive novel diagnostics to market through provision of integrated support and postgraduate-level training.
- The University's academic leadership in precision medicine was further evidenced by the award of the UK's only Regius Chair of Precision Medicine in 2016 to Prof. Dame Anna Dominiczak, Vice Principal and Head of College of Medical, Veterinary and Life Sciences.
- The Imaging Centre of Excellence (ICE), opening on 29th March 2017, incorporates a 7 Tesla MRI scanner, an ultra-high resolution scanner, which will be the first of its kind fully integrated within a clinical site in the UK.
- ICE provides specialist infrastructure to drive healthcare innovation at QEUH, including space dedicated for biomedical companies. The ICE has already attracted international small and medium-size enterprises (SMEs) from around the world, including Clinnovate Health a Singapore and UK-based clinical research and service organisation that offers histological and genomics services for applications in fibrosis and cancer clinical research studies. In addition, SDI has assisted Californian company BioSpyder, to set up in the zone. (see company examples)

Scottish Precision Medicine Ecosystem is a strategic initiative from the SMS-IC that brings together healthcare, life sciences and academic organisations that want to align their activities through partnership to deliver precision medicine programmes more efficiently and effectively.

- £4m SG funding into the ecosystem will support two flagship national programmes:
  - o 'Precision Panc' will use state of the art techniques to better characterise pancreatic cancer, allowing patients to be recruited to clinical trials efficiently and quickly. On 24th March, Cancer Research announced it would increase its investment into the trials by £8m (with total investment now standing at £10m).
  - o 'Future MS' will study multiple sclerosis at the genetic level to help answer why the condition progresses differently in individual patients.
- The ecosystem offers unrivalled and direct access to a world-class network of precision medicine resources, expertise and richly phenotyped patient cohorts. Members get access to a host of high-quality data assets, reliable services and world-class NHS, academic and industry organisations.

- Professor Andrew Biankin is leading a major precision medicine programme (Precision-PANC), part funded by SG. Prof Biankin was the first to identify four discrete sub-types of pancreatic cancer).
- Recognition of the strengths of the Ecosystem model provided through a major collaboration with Astra Zeneca (announced Oct 2016) on precision medicine programmes in four therapeutic areas.
- SE has launched a £3m Genomic Medicine Industrial Catalyst Fund to help SMEs access genomic sequencing technology in collaboration with SMS-IC and the Scottish Genomes Partnership.

The Digital Health and Care Institute (DHI) aims to create innovative partnerships between industry, professionals and academics which can help address the major challenges facing the world's healthcare sector. Building Scotland's reputation for expertise in informatics, life sciences and medicine, the Institute operates across three key areas:

- The Digital Health Exploratory – engages with national and international organisations to identify priorities for action and stimulate the development of ideas.
- Experience Laboratories allow medical professionals, businesses and researchers to collaborate and prototype new products and services
- The Digital Health Factory offers a facilitation and resource platform, including access to expertise and test environments, business mentoring support and guidance on access to funding. Its objective is to work with industry, health and care partners, third sector organisations and universities to develop solutions which can be rapidly commercialised.

The Farr Institute of Health Informatics Research is leading the UK in health data linkage research. Brings the universities of Aberdeen, Dundee, Edinburgh, Glasgow and St Andrews together as part of new **£20 million health informatics research collaboration**.

- Medical, population and computer scientists will combine their expertise to interpret complex health datasets in research environments that safeguard patient confidentiality.
- Researchers will develop methods for safely sharing, combining and analysing diverse datasets across boundaries, enabling new discoveries and validating research findings with a speed and scale not previously possible.

Scottish Centre for Telehealth and Telecare (SCTT) – part of NHS24, established to support the development of new technology enabled health and care services, including home and mobile monitoring digital services and apps.

- Driven by collaboration between industry, academia and local health and area practitioners. SCTT provide overall leadership of the United4Health project. Involving **14** European regions, this is one **of the largest home and mobile health monitoring projects in Europe.**

- Supports people living with diabetes, COPD and heart failure as an alternative to hospital care.

Internationally, Scotland is participating in initiatives such as the **Global Alliance for Genomics and Health** - an international coalition, formed to enable the sharing of genomic and clinical data in order to catalyze projects that will help unlock the great potential of genomic data.

SG DIGITAL HEALTH BRIEFING

Digital Health & Care

- Scotland's overall digital strategy sets out our plans for ensuring that we put digital at the heart of everything we do – it confirms a 'digital first' approach to public service delivery and design, with the user at the heart;
- The Strategy seeks to stimulate innovation, welcomes investment, promotes its digital technologies industries and commits to meeting a shared objective to employ 150,000 people in digital technology roles over the next 5 years;
- Within Health & Social Care, our Health & Social Care Delivery Plan recognises that digital will underpin all transformational activity, with a key focus on self-management, prevention and digital access to services;

Current focus

- With the exponential rise in the consumer use of mobile devices (smartphones, tablets etc.), the move within our NHS is now to start harnessing the power of our citizens own devices and wearable technologies. Key activities now being worked on include:

- Moving from a hardware model – whereby patients are given a device to monitor their long term condition (such as diabetes) – to a software one whereby they are given access to a secure, accredited app that is able to transmit data securely from their own device back into the NHS 'system'

- We are already running large-scale trials involving simple SMS communication, however, we do not yet have a mechanism for accrediting apps;

- Looking to harness citizen-generated data and linking it into core NHS systems for risk prediction, prevention etc. How do we make the most of the rise in consumer wearable devices, such as fitness trackers, and the explosion in freely available health & wellbeing apps without overwhelming our health system with so much data? How do we use such information to prevent our citizens from becoming patients in the first place?

Enabling mechanisms:

- We are currently working on the development of a new Digital Health & Care Strategy for Scotland (due for publication late 2017) which will bring all of this together, but in the meantime there are a number of organisations helping to position Scotland as an excellent test bed for developing a new approach to using digital technology to both benefit our citizens health, and our NHS:

- The Digital Health and Care Institute (DHI) is one of our Innovation Centres which has brought together academics, the NHS and businesses to promote and commercialise innovation in digital health and social care. **[REDACTED]**The DHI acts as the route into

market for new innovations, backed by the offer of being able to say a product has been tried, tested and evaluated in the NHS. Sir Andy Murray is their global ambassador.

Opportunities

- Scotland has recognised that digital is key to transforming our public services. In our healthcare system, there is a growing reliance on digital technology to deliver key services, albeit there is a need for a step-change in the scale and speed with which we adopt digital technology. **[REDACTED]**