



## RESEARCH EVALUATION FOR DEVELOPMENT 2019 EXPERT PANEL REPORT

### Institute of Odontology

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## Introductory Remarks

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The observations made in the following are based on the background information provided to the panel by the RED19 project group as available on the RED19 website. In addition to this, information has also been obtained from the Institute of Odontology (IO) website, including <https://odontology.gu.se/forskning/Forskare>. Based on this material, each panel member has independently filled a panel report template. The questions emerging from studying the background material were used to determine the contents of the site visit to the Institute of Odontology, which took place on 2<sup>nd</sup>-3<sup>rd</sup> April 2019. Here, the panel met with the IO management (*Prefekt, proprefekt*, as well as the former *prefekt*); the heads of sections; several discipline heads; representatives of the research and researcher education committee, the dental hygienist education, and the dental technician education; persons in charge of the PDS student clinics, and the PDS research coordinating officers. The panel also had a tour of the facilities for clinical research.

The present account represents the joint and unified observations of the panel. We have noted that departments have been *'encouraged to be open, and to address both their strengths and weaknesses'*, and that the panel should *'reflect on the department's capacity for critical self-reflection, including the ability to bring deficiencies to the surface'*. Moreover, the panel was asked to *'assess the department's readiness to deal with perceived weaknesses'*. In this context, it should be noted that two of the three panel members also participated in the RED10 evaluation of the Department of Odontology.

## Report: Observations and Analysis

### Section A – Background and Research Standing

#### A1. Background

The Institute of Odontology (IO) considers the existing 13 disciplines/clinical specialties to be the main 'building blocks' of the institute. The total staffing comprises 32.6 senior level FTEs plus 4.8 researcher/postdoc FTEs, 15 PhD FTEs, 8.4 lecturer FTEs (employed for undergraduate and special education) and 1.8 externally funded FTEs.

A discipline is typically led by a professor or a senior lecturer, and is additionally staffed by a senior lecturer and a part-time secretary. In two disciplines the total research FTE (including doctoral students) approaches 9 FTEs, whereas many other disciplines are down to just one or two FTEs.

A considerable number of PhD students (44 in total) are registered as doctoral students with IO, but have their employment elsewhere (typically with the Public Dental Service), and are doing their PhD part-time, extending study time from the stipulated four years full-time to eight years part-time.

The number of staff members has been constant in 2013-2017, but there is a considerable shortage of postdoc positions despite a considerable number of doctoral students per year. Thus, the availability of these positions is not in balance. The ratio of professors to other academic staff follows the current trend in the Nordic countries.

The existing 13 disciplines represent the traditional curriculum-based compartmentalisation of educational needs into clinical/technical subspecialties, such as Cariology, Periodontology, Endodontics, Oral and Maxillofacial Surgery, Prosthodontics and Dental Materials Sciences, Orthodontics, Paediatric Dentistry, Orofacial Pain, Oral Medicine & Pathology, Oral and Maxillofacial Radiology, Behavioural and Community Dentistry), just as a few basic science disciplines (Oral Microbiology & Immunology, Oral Biochemistry) have been retained.

The institute considers research and education as integrated activities and sees this integration as a prerequisite for high-quality research. Although the institute is relatively large in a Scandinavian perspective, the research conducted within the specialty equivalents (disciplines) may narrow the understanding and development of multidisciplinary research, just as competitiveness may be compromised. Moreover, while 13 disciplines may be adequate for educational purposes, research groups comprising 1-4 researchers are too small in size for the international level of research, where considerations regarding ‘critical mass’ and opportunities for cross-fertilisation would be more important. Discipline boundaries are only infrequently overstepped and only 20% of IO publications in the period 2013-2017 had co-authors from different disciplines within the institute. Also, internationally co-authored publications seemed not to be highly favoured.

The institute seems aware of some of these issues, as it is stated that *“It is possible that reorientation and strengthening of the sections would provide conditions for better control of the IO’s research activities”*. However, the institute does not seem to really believe in the possibility of such changes: *“Over the years, attempts have been made to form stronger research groups, by joining closely related disciplines, so as to increase the critical mass of each research area. However, the IO feels that all disciplines, where the majority represent clinical areas within the field of odontology, are important from both the research and education perspectives”*. This might indicate that smaller, less effective units fear being engulfed by the larger and more successful groups, and/or that the successful groups do not make themselves sufficiently attractive to others.

The institute is trying to foster more collaborative science across disciplines by concentrating the research infrastructure. This would indeed seem a feasible approach, particularly if it could be accompanied by a physical reorganisation of the staff and equipment within the IO premises. The ‘*Odontologen*’ building is very large and researchers are dispersed within the building to the extent that they rarely have a chance to meet. The majority of the academic staff met during the site visit stressed the need to be physically brought together to increase the possibilities for informal meetings between colleagues. Joint core research facilities, joint lunch rooms and coffee machines could thus be instrumental in bringing researchers together in an informal and therefore non-threatening way to promote research cross-fertilisation and collaboration.

The expected change in research staff due to retirements of senior researchers may present a natural opportunity to reorganise and strengthen research environments by these informal means.

Currently, the institute hosts no faculty or university research centres or infrastructures, and existing IO research facilities are rather scattered across disciplines; facilities hosted by one discipline are not clearly accessible to researchers outside this discipline. This absence of sharing research infrastructures (core facilities/joint research facility platforms) will most likely cause problems for the

long-term development of specific methodologies and expertise of research areas, which currently have chiefly dental objectives. On the other hand, research areas closer to medicine and biomedicine may benefit from being not too strongly linked only to IO research laboratories. Even so, interdisciplinary research with medical, biological and technical research groups and institutions is not prominent.

From an outside perspective, it appears self-evident that a strengthening and concentration of research environments is necessary, and that the creation of a common platform for research facilities could be instrumental for the definition of overriding and clinically and biologically interesting/relevant areas/topics of research that could lead to more effective research strategies, improve the overall research quality and give an even stronger basis for external grant applications to major funders, such as the Swedish Research Council (VR), EU or the US National Institutes of Health (NIH). A common platform for research facilities would also enhance and promote research cross-fertilisation and collaboration of researchers at different career levels. Such a reorganisation would require a significant change in the strategic efforts of IO leadership. Major and less active players in IO research must see the need for this change and the opportunities it provides. All parties involved may have to accept a short-term reduction in productivity, especially the established grant acquirers. The latter could, however, see their role as future coordinators/leaders in a larger and more renowned research centre.

The 13 constituting disciplines are organised in three sections, each comprising 3-6 disciplines. Each section is led by a section-head, whose mandate towards the constituting disciplines is chiefly administrative/managerial. This is at variance with the impression held by the panel until the site visit that section heads would also exert some form of research leadership. The actual grouping of disciplines into sections has chiefly been dictated by their in-house physical location, as the disciplines constituting a section are located in vicinity of each other, making possible the sharing of administrative resources such as secretaries. Section heads are appointed by the IO *prefekt* (Head of Institute/Department), together with the IO *proprefekt* (Assistant Head). The *prefekt*, *proprefekt*, and the three section heads form the Institutional Management Team, making an IO management group of only five persons.

The *prefekt* and *proprefekt* are appointed as a team on the basis of support from the academic staff, and their role is chiefly one of taking care of administrative and managerial issues, rather than exerting research leadership. The directors are supported by an external Advisory Board acting as a support for decision-making and by a Committee for Research and Research Education, whose roles seem chiefly advisory. There is currently no joint IO vision and strategy for research carried out in the institute, and it is entirely up to disciplines/research groups to follow their individual research interests, and 'make it on their own'. Some research support facilities exist at the faculty level (Sahlgrenska Academy), but these might be strengthened through professional fundraising/grant-writing support.

The institute collaborates with the Public Dental Service (PDS) through the TUA agreement (*tandläkarutbildningsavtal*), which governs both undergraduate dental education and support for clinical research. A joint PDS/IO board exists – the Odont-Sam – which handles cooperation issues relating to this agreement. TUA has existed since 1989 and applies to the odontological institutions in Gothenburg and Umeå, but not in Stockholm or Malmö, and this may preclude collaborations with the latter institutions. The TUA agreement has led to a reduction of staff in each IO discipline from typically more than 20 to fewer than five persons, as the undergraduate clinical education is handled by the PDS.

The TUA agreement dictates that IO researchers holding combined positions (which applies to most academic IO staff) must spend 25% of their time working with PDS patients. This clearly reduces the

time to run high-level research for the academic staff. It is difficult to see the rationale for the agreement of 25% patient work inside an agreement of education and research funding. It seems that the IO/university obtains TUA funds for research at the expense of giving off 25% of their researchers' time. In the self-evaluation, the institute suggests that this time would be better spent carrying out developmental or clinical research projects or health technology assessments. The panel would agree with this proposition and finds that the TUA rule of 25% clinical work by researchers represents an untoward use of the special expertise held by IO researchers.

The IO self-evaluation expresses the view that it is difficult to engage the PDS in clinical research activities, owing to a lack of competence on the part of the PDS and economic governance being stringently applied by the PDS. However, it is the panel's impression that such constraints do not apply; instead, there seems to be a limit to the number of clinical research projects that can be run simultaneously within the PDS. The view was also expressed that IO researchers planning a clinical research project would benefit from planning in collaboration with the PDS, just as some 'marketing' of the project towards the PDS clinics involved might be beneficial.

The teaching load of IO academic staff is quite considerable owing to the twice-yearly intake of dental students. It would seem a matter chiefly of reorganisation to make an annual intake fit with the premises for teaching within the institute, and thus somewhat reduce the teaching load.

The institutional management (*prefekt, proprefekt* and section heads) have considerable administrative duties, whereas the administrative chores are less pronounced among the academic rank and file, and the administration of the institute would seem pleasantly slim. Overall, it is stipulated that the average IO researcher would spend about 30% of their time doing research, which, however, is no guarantee for a competitive level of research.

## A2. Research standing

The overall IO view is that the institute is the sum of its constituent parts (disciplines). This points to a relatively weak institute management *vis-à-vis* the constituting disciplines, and it is therefore not surprising that research strategies and plans for the future at the institute level are few and sketchy. It is quite clear that initiatives for new interdisciplinary collaborations chiefly come from the research groups/disciplines, and are not part of an overriding strategy at the level of the institute. While this 'budding' strategy ensures a large degree of freedom in the choice of research topics and methods within each discipline, it also underpins the continued fragmentation of research, a problem that was also pointed out in RED10.

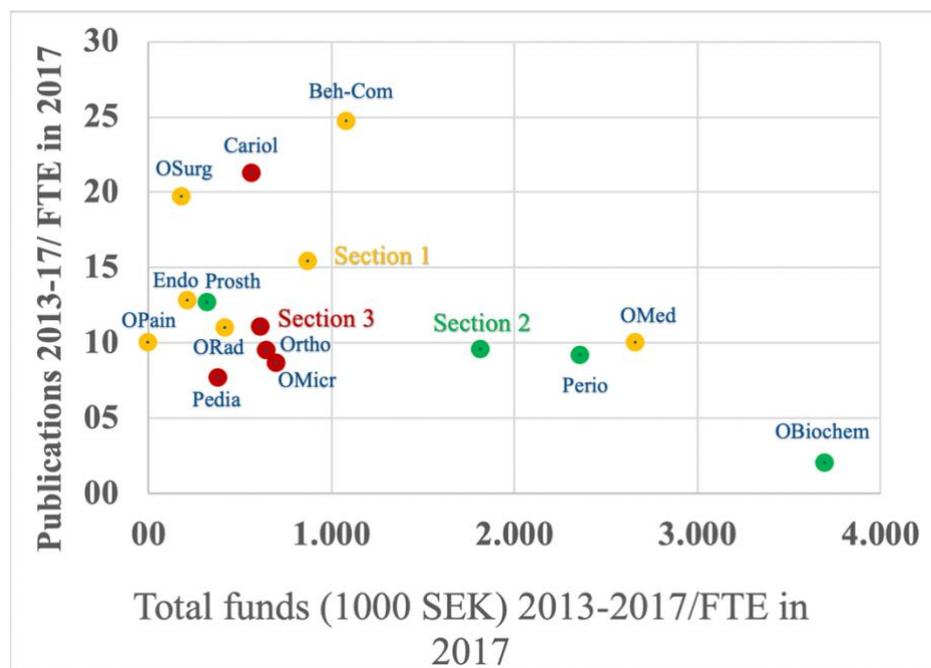
One institute-level initiative mentioned is the creation of a new research environment in information technology. This initiative has been made possible owing to a grant from industry, and carries certain provisions regarding the mutual benefits to academy and to the healthcare sector and industry. The creation of a novel research field in IT is a positive development, although the impact of such may take years to materialise. The adaptation of this new initiative should be carefully considered in the framework of attempts to create larger research groups and environments. It would thus be unfortunate if this new research area (IT) would form yet another small discipline paralleling the existing 13 disciplines. The IO self-evaluation also mentions "*new initiatives from the research groups are new interdisciplinary collaborations, analysis of registry-based data, and investigations of the link between oral and general health/diseases*". These seem additional good examples of how overriding research strategies could help define and support research that could fall into the categories of most, if not all disciplines.

Overall, the research standing of the institute would appear quite strong relative to that of comparable institutions. The institute ranks very high on the Shanghai ranking list, being no. 1 in a Scandinavian perspective, and no. 21 in a global perspective in the year 2018, which indicates a high degree of international visibility. This could be seen a strong point, and it may be appropriate to be somewhat humble in proposing major changes to an institution that has been so successful in its research activities. However, it is also noteworthy that the high degree of international visibility has not translated into more international collaboration and – not least – international researcher exchanges and recruitments.

Over the period 2013-2017, the annual research income of the institute has amounted to an average of SEK 56 million, with an average of SEK 33m retrieved in the form of block grants, and an average of SEK 13.6m in the form of external grants. This external contribution is split almost equally between funds granted on the basis of external competition or through commissioned projects (annual average of SEK 5.8m), and grants won in internal competition through the TUA funds available only to IO employees (annual average of SEK 6m). Overhead percentage of 35 % is acceptable to attract starting externally-funded projects.

Statistics relating to the ability to attract external research funds, the ability to acquire internal funds, and publication rates may be used to characterise the research productivity of the disciplines. It is clear from the data provided in the self-evaluation that ‘success breeds success’ and the ability to attract external research funds goes hand in hand with the acquisition of internal TUA grants. The figure below shows, for each discipline, the relationship between the number of publications (2013-2017) per FTE (2017) and the research funding attracted (2013-2017) per FTE (2017).

In terms of the ability to attract research funds, three disciplines stand out, and among these, Oral Biochemistry seems in its own league, followed by Oral Medicine and Pathology, and Periodontology.



In three disciplines, the publication rates (number of publications 2013-17/FTE (2017)) appear particularly high considering the amount of funds available (Behavioural and Community Dentistry, Cariology, Oral and Maxillofacial Surgery).

While the success of individuals/disciplines is an example of how personal engagement is decisive for research advances, the impact/influence of overriding research strategies is not apparent from the self-evaluation. The self-evaluation leaves the impression that monetary success is a primary indicator. This entails the danger that funding to individual researchers is credited to their discipline, which may be good for the short term, but not necessarily in the longer perspective. This risk is particularly relevant for manufacturer-supported research, where money may be readily available for research that may have little lasting interest.

## Section B – Leadership

### B1. Leadership

#### *B1.1 Department leadership*

##### **Strengths**

- The chiefly ‘managerial’ role of the department leadership means that research groups have a very high degree of freedom in their choice of research topics and methods

##### **Weaknesses**

- Department leadership appears weak in relation to the research disciplines and is somewhat estranged from the research groups, leading disciplines to act rather independently.
- Role of the Advisory Board, Directors of the Institute and Professors in the leadership is unclear.
- Teaching and clinical duty workload limits the time available for research. IO staff members are distributed to different wings and floors of the building, which makes leading the institute challenging.

##### **Recommendations**

- Clarification of the roles of leadership for 1) general administration, 2) education and 3) research and infrastructure.
- The leadership function, which is to ‘create possibilities in relation to personnel and facilities’, should focus on the creation of common research platforms and physical concentration of academic staff within ‘*Odontologen*’. CAVEAT: Faculty should assist in clarifying ASAP the physical premises allocated to IO during and after the new SA buildings that are planned.
- Department leadership should work to relieve researchers of their 25% clinical work duty as per the TUA agreement.

## *B1.2 Faculty/University level leadership*

### **Strengths**

- Discussions to promote research collaboration with medicine are supported by the faculty.

### **Weaknesses**

- The faculty presence is not felt. Many policies/traditions are local (IO), and not emerging from the faculty/university (e.g., internal promotion 'rules', lack of international recruitment).
- Little attempt to extend research collaboration for a mutual benefit across the borders from dental sciences to medical, natural and technical sciences.
- Interactions with the faculty seem to be at the 'discussion' level and mainly centre around the use of common core facilities. Other institutes working in areas closely related to the field of odontological sciences, e.g., biomaterial sciences, have only limited collaboration with the institute.
- Self-evaluation focus is on purely administrative issues.

### **Recommendations**

- Create an overriding policy for the definition of strategic areas for research focus.
- Better utilisation of Swedish dental and general health records. These are probably among the world's best sources of cohort data, and some have already been used for epidemiological and demographic studies.
- More efforts to open the expertise of dentistry to other science fields.
- Ensure reciprocal commitments among different faculties.
- Define dental science contributions to medicine and technical sciences.
- Create an 'infrastructure' in which relevant researchers from other departments at Sahlgrenska/Chalmers present 'state-of-the-art' research in their field. Mandatory participation for (IO) PhD students.

## *B2. Recruitment*

### **Strengths**

- Good reputation and attractive working environment of the institute has made good recruitments possible.
- Starting grants for new research employees.

### **Weaknesses**

- The institute maintains that it is important to find staff with a strong background in all aspects (research, teaching, and clinical work) – this limits the research scope of the institute, as well as the possibilities for bridging to related fields in Sahlgrenska and other institutions.
- There is very limited international recruitment. It limits international recruitment that academic teaching can apparently only be given in the Swedish language.

- Trying to combine clinical and research competence of recruited persons is not necessarily resulting in an optimal end-result, clinically or scientifically.
- Postdoctoral training abroad is seldom the case with present staff members.
- Internationally-recruited staff members are too few.

### **Recommendations**

- Consider recruiting researchers who can bridge the gaps between the institute and Sahlgrenska/Medical/Biological/Biotechnical research groups in general.
- Increase the number of internationally-recruited research staff members to the tailored positions of “Guest Professors” or “Collegium Scientists”.
- Well-paid guest professorships of 1-3 years’ duration might be a way to attract international competence and ensure international input.
- Staff members should be encouraged to go for international postdoc periods.

## **B3. Career structure**

### **Strengths**

- The institute has a lot of PhD students (15 FTEs with a studentship and 44 students without).
- Attempts to improve researchers’ careers is made in all undergraduate programmes.
- Job security.

### **Weaknesses**

- Recruitment into research positions seems the most imminent problem. Most PhDs seem to ‘vanish’ into the Public Dental Service.
- Most recruitment is internal, and promotion often ‘automatic’, which entails the risk of scientific inbreeding.
- International PhDs are not recruited.
- Postdoctoral positions do not exist or are very few in number.
- No overall IO strategy for the retention of PhDs.
- Very little researcher mobility – both in terms of other Swedish institutions and in terms of international research stays with other groups/labs.
- Combined (clinical/research) positions: The few most gifted in such positions may generate and conduct good research, the majority may at best be collaborators. But it is a vent for those either not willing or competent to pursue an academic career.

### **Recommendations**

- Make sure postdoc positions are available at institute level for retention purposes.
- Programme for researcher mobility.
- Stipends covering travel and accommodation for up to (e.g.) a three-month stay with research groups abroad.
- Make research stays abroad a mandatory component of the PhD programme – certainly for those financed by the institute.

## B4. Funding

### Strengths

- Some disciplines hold considerable external grants, and are sufficiently externally competitive to be able to win new grants.
- The TUA funds may ensure some stability in funds for research for all IO research staff through internal competition.
- Basic university funding seems to have been stable during the period reviewed.

### Weaknesses

- Annual external funding (average: SEK 5.8 million) (+ TUA funding: SEK 6m) could be considerably higher.
- No funding from the EC or ERC has been received.
- Limited tradition of IO management in devising strategic research initiatives to promote funding.
- TUA agreement promotes internal competition – not necessarily conducive to cooperation.

### Recommendations

- More efforts and motivation to apply for international-level research funding.

## B5. Feedback and evaluation

### Strengths

- Disciplines enjoy almost total freedom in terms of their strategies for research development. This is undoubtedly a key motivation for staff.

### Weaknesses

- Apart from annual follow-up on individual researcher performance (publications, funding) performed by section heads, there is no real IO-level hand on the development of research environments – the institute is the sum of its constituent disciplines.
- Performance in competing for external funding has not been systematically evaluated.

### Recommendations

- Motivation and support for evaluating research outcomes should be actively started.
- The annual salary review process would seem like a potentially potent stimulator for research and recruitment.

## Section C – Complete Academic Environment

## C1. Collaboration

### *C1.1 Collaboration and networks within the University of Gothenburg, with other Swedish universities, and internationally*

#### **Strengths**

- Some disciplines are very strong in international cooperation, and in cooperation with other national and local institutions.
- There is an ongoing collaboration with Chalmers University of Technology.

#### **Weaknesses**

- TUA research funds can only be used within the Västra Götaland region (VGR), and this limits the possibilities for collaboration outside VGR.
- Collaboration with other Swedish universities, especially within dentistry, is lacking.
- Global academic collaboration is limited.
- Most of the institute's prestige relies on research in implant-related problems.

#### **Recommendations**

- The institute is encouraged to actively search for research collaboration with other Swedish universities.
- It could be of interest to single out another area of research, which could piggy-back the resources and experiences of the implant success story. This might be industry-related (Bennett), public health (Skapa) or similar.

### *C1.2 Collaboration with external stakeholders*

#### **Strengths**

- The TUA agreement provides substantial research funds for internal use and enables clinical research.
- The adjunct positions for non-academic stakeholders.
- Strong collaboration with dental products industry – implants in particular.
- Strong history of and ongoing research collaboration with implant companies.

#### **Weaknesses**

- Underutilisation of the PDS cooperation as a research resource for clinical projects.
- Industry-commissioned research a possible threat to scientific integrity.
- External stakeholders as collaborative partners for the institute represent limited fields of industry.
- The financial and organisational integration of the PDS and university may have its advantages, but it is largely perceived as a disadvantage.

#### **Recommendations**

- Broaden adjunct position programme to encompass international academic and non-academic stakeholders.
- The institute is recommended to search industrial collaborative partners outside of dental industry, and more internationally within the dental industry.

## C2. Relevance and impact on society

### *C2.1 Management and support*

#### **Strengths**

- The university and institute have followed societal signals by enabling the evolution of the practical profession of dental hygienists into an academic discipline. A similar process can be seen in dental laboratory technician education.

#### **Weaknesses**

- There seems to be little institute-level effort to promote interaction with society, in order to increase utilisation and application of research results –this interaction is taking place at the discipline/individual researcher level.
- No current rewarding system for activities within the “third task” of the university.

#### **Recommendations**

- Management should consider methods of supporting staff members in becoming more active in the utilisation and dissemination of research results for society.
- The institute is recommended to support the development of dental hygienist education towards an oral health-promoting discipline, e.g., by doctoral training.
- Special attention should be paid to the global change and development of dental technology, which could have a similar impact to the evolution of the dental technician profession, as is seen with the dental hygienist profession.

### *C2.2 Research relevance and impact on society*

#### **Strengths**

- Attempts are made to disseminate research findings to a broader audience through dental peers, and with significant impact on public dental services.
- The institute has generated some intellectual property rights (IPR), which have been transferred to the dental industry.

#### **Weaknesses**

- Attempts to impact society have focused on the dental profession.
- Activities to impact other fields of science and society have occurred only to limited extent. More attention should be paid to supporting the transferral of scientific results to inventions.

## Recommendations

- The institute should pay more attention to actions by academic staff members, in order to be more active in disseminating the expertise of dental researchers to the wider research community, industry and society.

### C3. Research-teaching linkages

#### *C3.1 Undergraduate and master's education*

##### Strengths

- Students are taught by researchers.
- Having teachers working both in research and in clinics promotes transfer of recent scientific information to the teaching activities.
- Monthly APT meetings ensuring transfer of research results into standard operating procedures.
- Some scientific training of undergraduates through their master's thesis.
- The amanuensis programme, enabling students to work in research within the disciplines during their studies.

##### Weaknesses

- By agreement, IO researchers spend 25% of their time doing clinical work that is neither teaching nor research related. This may seem a waste of their special competences.

##### Recommendations

- Renegotiate agreement to ensure that more of the researchers' time is devoted to tasks related to clinical teaching or research.

#### *C3.2 Doctoral education*

##### Strengths

- IO-employed PhD students are integrated into research environments.
- Non-IO employed PhD students offer the possibility of introducing research into the clinic.
- The retention and involvement of emeritus professors.
- Access through NorDoc to doctoral training courses given in other Nordic universities.

##### Weaknesses

- Part-time PhD students who are not employed by the institute miss out on the academic environment, and there is a sense that the quality of their theses is lower than that of IO-employed PhD students.
- Long PhD study duration.
- Lack of socialisation of PhD students.

- Although doctoral studies are key activities of the institute, little attention has been paid to organise a “dental/oral health postgraduate school/doctoral programme”.
- No collaboration exists with doctoral programmes in other institutes and universities.
- The institute has not organised a systematic doctoral training programme for oral sciences. There is no such programme on the national level either.
- Doctoral students are selected to start doctoral studies by acceptance of the discipline head, without a transparent selection process where research and study plans are evaluated.

### **Recommendations**

- Reduce part-time PhD studies – part-timers do not become academically integrated, and they seem mainly to fill a role as ‘research assistants’ to supervisors.
- Make a 3-6 months’ research stay abroad a compulsory part of PhD training to strengthen outlook and international collaboration.
- The institute should rapidly organise doctoral training in an “oral health doctoral programme” which coordinates and supports doctoral studies, and provides regular courses and seminars for the students. By this, part-time students may also become more involved in systematic doctoral training.
- Doctoral programme for oral sciences on the institute, or preferably the national level, needs to be organised.

## Section D – Academic Culture

### D1. Academic culture

#### **Strengths**

- Monthly research seminars organised by the institute, open to all staff.
- Attention has been paid to knowledge transfer, and the expertise of senior researchers and emeriti to younger academic staff members.

#### **Weaknesses**

- It seems that most academic activities take place only at the discipline level.

#### **Recommendations**

- Strengthen the academic culture by creating informal meeting places for IO researchers and doctoral students. Joint lunch rooms, coffee machines, lunch seminars, joint research facility platforms.

### D2. Publication

### *D2.1 Publication strategy*

#### **Strengths**

- Publication in dental journals – results may reach target audience.

#### **Weaknesses**

- Publication mainly in dental journals – overall little ‘outside’ impact.
- There is no strategy for encouraging publication in journals of other fields. The present actions to promote publishing benefits dental society, but the visibility of dentistry and impact of dental research in a wider perspective is limited.

#### **Recommendations**

- The institute should pay more attention to promoting publishing not only in good quality dental journals but also in journals of fields which may benefit research by dental scientists and increase the visibility of dental science.

### *D2.2 Analysis of bibliometric data*

#### **Strengths**

- Publication activity high for many disciplines – overall impact above average.
- Publications in open access forums have increased over the period.

#### **Weaknesses**

- Publications lists indicate underreporting to the GUP system.
- Similarly, the number of doctoral theses is underreported.
- Although the total number of refereed publications annually is quite high (85-130), one could expect to see an even higher number of publications based on the number of academic staff members.
- Internationally co-authored publications are few in number.

#### **Recommendations**

- Increase the number of internationally co-authored publications.

### *D3. Facilities and research infrastructure*

#### **Strengths**

- To a large extent disciplines have their own facilities, including a 0.5 FTE lab technician provided by the institute.
- Sahlgrenska Academy can provide good infrastructure for biomedical research, which does not require specific dental research infrastructure and expertise from the assisting personnel.

## Weaknesses

- Poor sharing of resources. It is not clear how/to what extent Sahlgrenska Core Facilities are used – having core facility platforms within the institute could promote internal collaboration.
- This is according to the international trend of building large core-facility laboratories, and one field of research which has suffered from this trend is dental research.

## Recommendations

- Promote the creation of joint facilities and platforms.
- The importance of specific dental research laboratories, including disciplines covering e.g., biomechanics of dental tissues and materials, digitalised processes and imaging systems, needs to be highlighted to the faculty/university, and initiatives for creating such laboratories need to be taken.

## D4. Transverse perspectives

### *D4.1 Equal opportunities and gender equality*

#### Strengths

- There is focus on this aspect.
- Attempts to promote more women professors.
- IO attention to women obtaining the necessary qualifications (supervision etc).

#### Weaknesses

- Not clear how a gender balance is defined, e.g., 50/50? proportion to gender distribution in student mass?

#### Recommendations

- Formally define meaning of ‘gender balance’.

### *D4.2 Internationalisation*

#### Strengths

- Availability of funds allowing visiting researchers/professors.
- The institute is an attractive place for visiting scientists in certain fields of dentistry.
- Good collaboration with dental industry creates international research visibility.

#### Weaknesses

- Internationalisation is mainly in the form of international collaborations among researchers.

- There is no organised system for inviting visiting distinguished professors (“guest professor” or “collegium researcher”) to the institute to conduct research for periods of 1-2 years.
- No attempts to promote stays for doctoral students with collaborating international labs/research groups

### **Recommendations**

- Recruit staff internationally.
- Make stay in research lab/group outside Sweden a mandatory part of the PhD programme.
- Institute should consider starting a distinguished visiting professor programme to enhance the multidisciplinary understanding of scientific problems and solutions in dentistry.

## Section E – Support

### E1. Internal research support

#### **Strengths**

- The availability of TUA funds for internal research grants.
- Support and positive attitude by the PDS to carry out clinical research.

#### **Weaknesses**

- Little internal research support.
- Grants office exists at Sahlgrenska but no IO dedication.
- Little administrative research support.

#### **Recommendations**

- Employ a dedicated ‘fundraising/grant-writing’ assistant.
- Explore strategic avenues for the acquisition of larger, European or international grants.

### E2. Faculty and University-wide support

#### **Strengths**

- Availability of certain core facilities (animal house, library, legal advice, grants office).

#### **Weaknesses**

- Expensive facilities.
- Methodological help in study design and analysis could be closer to the institute.

## Recommendations

- Make sure that all new PhD projects are qualified, statistically and design-wise, before commencement.

## Section F – Other Matters

### F1. RED10 evaluation

The institute has attempted to address the ‘fragmentation of research’ by initiating more core facilities to promote collaboration between its disciplines. On the one hand, it is reported that this initiative is successful, on the other hand comments are also made on how difficult it is to make disciplines cross-fertilise each other, and the institute finds it difficult to initiate such interdisciplinary collaborations. Even so, it would seem that the institute could play a stronger role in fostering and supporting this development, for example by condensation of research staff, creation of joint research facility platforms, and by recruiting internationally or at least outside UGOT. The OMI (oral microbiology and immunology) professorship, which by necessity was taken by a non-dental researcher specialising in inflammation, shows a way to address the issue. It is clear that the internal competition for TUA funds and perhaps historical scars may counter collaboration and cross-fertilisation between IO disciplines. Therefore, more resources could be put into aiding disciplines in acquiring external research funds. Moreover, the tight correspondence between the educational need for specific disciplines and the matching research lines/groups might be rethought; this tight link seems to be a limiting factor given the ‘below-critical-mass’ number of staff in some disciplines; and it is probably more important that students are taught by a researcher with a good basic researcher training than by a researcher whose research is devoted precisely to the particular educational/clinical topic. It is clear that the staffing situation does not allow this principle to be upheld. The same could be said about the requirement for a clinical (dental?) specialisation for academic work. It would seem that the institute is actually putting considerable resources into the PDS by training PhDs who have no intention of working in academia, but remain in the PDS. One might suggest that these should not lead to full PhDs but perhaps to licentiates.

Many of the issues pointed out by the panel in RED19 were also identified in RED10. This calls for an internal discussion at UGOT on how to implement recommendations. Management attention to this is required.

### F2. Other matters

It is clear that if the meaning of ‘complete academic environments’ is that research at the institute is carried out by a dentist who has completed a PhD as well as a clinical specialisation, research candidates may wonder why so much education should be so relatively poorly remunerated. However, the incentives to engage in research are typically not financial, and some form of ‘mentoring’ particularly interested and engaged students at the pre-graduate level would seem a more feasible way of making prospective undergraduates interested in pursuing a research career.

International recruitment is another path to follow. Given the strong international reputation of the institute, it would seem that the barriers are internal (though not given by law), and could therefore be broken down, pending a change in philosophy and mindset.

The remarks about an increasing ‘split’ between the PDS and institute in terms of clinical education are worrying, in that clinical education may be approaching a lower common denominator, set by ever-changing clinical staff at the PDS. It remains to be seen whether the planned University Dental Care initiative can be used to counter this development.

## **Concluding Recommendations**

Overall, the issues identified in the preceding sections remain essentially the same as identified in the RED10 report, and the recommendations of RED10 remain valid and relevant. A crucial question, therefore, is how to equip the departmental and faculty leaderships so that the issues identified are truly addressed.