FORM 52-109F1
CERTIFICATION OF ANNUAL FILINGS
FULL CERTIFICATE

I, John Hargrove, Chief Executive Officer of Titan Medical Inc., certify the following:

1. ***Review:*** I have reviewed the AIF, if any, annual financial statements and annual MD&A, including, for greater certainty, all documents and information that are incorporated by reference in the AIF (together, the "annual filings") of Titan Medical Inc. (the "issuer") for the financial year ended December 31, 2014.

2. ***No misrepresentations:*** Based on my knowledge, having exercised reasonable diligence, the annual filings do not contain any untrue statement of a material fact or omit to state a material fact required to be stated or that is necessary to make a statement not misleading in light of the circumstances under which it was made, for the period covered by the annual filings.

3. ***Fair presentation:*** Based on my knowledge, having exercised reasonable diligence, the annual financial statements together with the other financial information included in the annual filings fairly present in all material respects the financial condition, financial performance and cash flows of the issuer, as of the date of and for the periods presented in the annual filings.

4. ***Responsibility:*** The issuer's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (DC&P) and internal control over financial reporting (ICFR), as those terms are defined in National Instrument 52-109 *Certification of Disclosure in Issuers' Annual and Interim Filings*, for the issuer.

5. ***Design:*** Subject to the limitations, if any, described in paragraphs 5.2 and 5.3, the issuer's other certifying officer and I have, as at the financial year end:

   (a) designed DC&P, or caused it to be designed under our supervision, to provide reasonable assurance that:

      (i) material information relating to the issuer is made known to us by others, particularly during the period in which the annual filings are being prepared; and

      (ii) information required to be disclosed by the issuer in its annual filings, interim filings or other reports filed or submitted by it under securities legislation is recorded, processed, summarized and reported within the time periods specified in securities legislation; and

   (b) designed ICFR, or caused it to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with the issuer's GAAP.

5.1 ***Control framework:*** The control framework the issuer's other certifying officer and I used to design the issuer's ICFR is the *Internal Control – Integrated Framework* (COSO 2013 Framework) published by The Committee of Sponsoring Organizations of the Treadway Commission.

5.2 ***ICFR – material weakness relating to design:*** N/A.

5.3 ***Limitation on scope of design:*** N/A.

6. ***Evaluation:*** The issuer's other certifying officer and I have:

(a) evaluated, or caused to be evaluated under our supervision, the effectiveness of the issuer's DC&P at the financial year end and the issuer has disclosed in its annual MD&A our conclusions about the effectiveness of DC&P at the financial year end based on that evaluation; and

(b) evaluated, or caused to be evaluated under our supervision, the effectiveness of the issuer's ICFR at the financial year end and the issuer has disclosed in its annual MD&A

(i) our conclusions about the effectiveness of ICFR at the financial year end based on that evaluation; and

(ii) N/A.

7. ***Reporting changes in ICFR:*** The issuer has disclosed in its annual MD&A any change in the issuer's ICFR that occurred during the period beginning on January 1, 2014 and ended on December 31, 2014 that has materially affected, or is reasonably likely to materially affect, the issuer's ICFR.

8. ***Reporting to the issuer's auditors and board of directors or audit committee:*** The issuer's other certifying officer and I have disclosed, based on our most recent evaluation of ICFR, to the issuer's auditors, and the board of directors or the audit committee of the board of directors any fraud that involves management or other employees who have a significant role in the issuer's ICFR.

Date: March 31, 2015

"John Hargrove" (signed)

John Hargrove
Chief Executive Officer
Titan Medical Inc.